Ameren Missouri RebateSavers Impact and Process Evaluation: Program Year 2013

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Ameren Missouri
1901 Chouteau Avenue
St. Louis, MO 63103

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Prepared by:
Hope Lobkowicz
Jane Colby
Doug Bruchs
M. Sami Khawaja, Ph.D.
Cadmus: Energy Services Division

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EXECUTIVE SUMMARY

Ameren Missouri engaged the Cadmus team to perform annual process and impact evaluations of the RebateSavers program for a three-year period, from 2013 through 2015. This annual report covers the impact and process evaluation findings for Program Year 2013 (PY13), the period from January 1, 2013, through December 31, 2013.

Program Description

In PY13, the RebateSavers program provided downstream rebates for these measures:

- ENERGY STAR®-certified room air conditioners (RACs)
- ENERGY STAR-certified heat pump water heaters
- Electric storage water heaters with an Energy Factor (EF) of 0.93 or higher
- Programmable thermostats

In addition to providing mail-in and online rebates, RebateSavers offers a free home energy kit to customers who have electric hot water heaters and request the kit. The kit contains 12 compact fluorescent lamps (CFLs), a smart power strip, pipe wrap, up to three faucet aerators, and up to two efficient showerheads. Smart power strips are also available for purchase at a discounted price through Ameren's online store.

Key Impact Evaluation Findings

These are Cadmus' key findings for the PY13 evaluation period.

Gross Impacts

As shown in Table 1, the Cadmus team estimated per-unit gross realization rates for all RebateSavers' measures as the ratio of Ameren's *ex ante* savings from its Technical Resource Manual (TRM) and our team's evaluated (*ex post*) savings. We found the highest realization rates for electric water heaters (157%), water heater pipe wrap (142%), and heat pump water heaters (126%). We attribute these higher realization rates to higher efficiency levels than previously assumed for purchased water heaters, and longer lengths of pipe wrap installed compared to that assumed in the TRM. We found the lowest realization rates for programmable thermostats (19%), advanced power strips (29%-35%), and RACs (43%) due to lower estimates of how these products are used than assumed in the TRM.

We also determined installation rates through participant surveys. For mail-in rebate measures, we found all four measures were at or near 100%. The installation rates for kit measures installed in single-family homes were lower, ranging from 23% to 78%.

Table 1 summarizes PY13 participation, *ex post* gross per-unit savings, realization and installation rates, and *ex post* total gross savings.

Table 1. PY13 Summary: *Ex Post* Program Gross Savings Accounting for Installation Rates

Measure	PY13 Participation	Per-Unit *Ex Post* Savings (kWh/yr)	Realization Rate	Installed and Operating	Total *Ex Post* Gross Savings (kWh/yr)
Mail-In Rebates					
Electric Water Heaters	83	246	157%	100%	20,395
Heat Pump Water Heaters	268	2,275	126%	100%	609,581
Room Air Conditioners	871	50	43%	100%	43,204
Programmable Thermostats	2,182	105	19%	99%	227,726
Kit Measures – Single-Family (8,473 total kits)					
CFLs	101,676	49	64%	63%	3,165,759
Advanced Power Strips, Load Sensing	8,473	54	14%	48%	219,132
Faucet Aerators	24,224	37	15%	23%	204,144
Low-Flow Showerheads	15,759	210	27%	46%	1,523,467
Water Heater Pipe Wrap	8,473	364	50%	35%	1,078,937
Kit Measures – Multifamily (344 total kits)					
CFLs	4,128	49	154%	98%	199,933
Advanced Power Strips, Load Sensing	344	54	14%	48%	8,897
Faucet Aerators	718	35	94%	100%	25,026
Low-Flow Showerheads	374	231	97%	86%	74,332
Water Heater Pipe Wrap	344	91	324%	100%	31,203
Upstream Discounts – Online Store					
Advanced Power Strips, Load Sensing	16,442	59	32%	100%	972,708
Advanced Power Strips, Motion Sensing	78	64	35%	100%	5,030
Total	**184,437**	**n/a**	**40%**	**78%**	**8,409,475**

*Kit measure installation rates varied depending on if whether the kit was mailed or the measures installed directly. Final ex post savings are weighted according to the proportion of kits delivered through each method.

The reason for the program's low realization rate, based on actual savings, primarily results from two factors:

- The per-unit evaluated savings were lower than those specified in Ameren's TRM for some measures; and
- The installation rates for kit measures were low

Net Savings

As shown in Table 2, net savings values for the RebateSavers program experienced an overall savings-weighted net-to-gross ratio (NTG) of 92.7%. The program NTG is weighted by overall program savings, and thus is influenced by high-impact measures with low free ridership rates, such as heat pump water heaters and home energy kit measures.

Table 2. PY13 Net Impact Results Summary

Measure Group	*Ex Post* Gross Savings (kWh/yr)	Free Ridership	Participant Spillover	Non-Participant Spillover	NTG	Precision at 90% Confidence	Net Savings (kWh/yr)
Mail-in Rebates	900,907	28.2%	2.0%	1.7%	75.5%	11%	679,844
Home Energy Kits	6,530,831	15.1%	7.1%	1.7%	93.7%	4%	6,118,574
Discounted Advanced Power Strips	977,738	N/A	N/A	1.7%	101.9%	N/A	996,315
Total	**8,409,476**				**92.7%**		**7,794,732**

As shown in Table 3, due to higher-than-expected participation, the program achieved 104% of its proposed net energy savings target for PY13 (7,513 MWh) in Ameren's residential tariff.

Table 3. RebateSavers Savings Comparisons

Metric	MPSC-Approved Target[1]	*Ex Ante* Gross Savings Utility Reported[2]	*Ex Post* Gross Savings Determined by EM&V[3]	*Ex Post* Net Savings Determined by EM&V[4]	Percent of Goal Achieved[5]
Energy (MWh)	7,513	21,473	8,409	7,795	104%
Demand (kW)	1,273	2,026	779	723	57%

[1] https://www.ameren.com/sites/AUE/Rates/Documents/UECSheet191EEResidential.pdf
[2] Calculated by applying tracked program activity to TRM savings values.
[3] Calculated by applying tracked program activity to Cadmus' evaluated savings values.
[4] Calculated by multiplying Cadmus' evaluated gross savings and NTG ratio, which accounts for free ridership, participant spillover, nonparticipant spillover, and market effects.
[5] Compares MPSC Approved Target and *Ex Post* Net Savings Determined by EM&V.

Key Process Evaluation Findings

Program stakeholders reported encountering several challenges in ramping up the program in PY13. Specifically, stakeholders reported low savings the first part of the year, which they attributed to three factors: low participation for RACs and electric hot water heaters, late home energy kit mailings, and fewer measure offerings. However, despite these obstacles, the program met the PY13 interim energy

savings goal of 7,512,796 kWh/year specified in the Ameren Missouri tariff. (The interim goals are based on participation levels; so they differ from *ex ante* savings projections, of which Ameren achieved 37%.)

Marketing and Outreach

The RebateSavers program markets each component (mail-in rebates, home energy kits, and discounted advanced power strips) differently.

- **Mail-in Rebate Measures.** The program relies on a retailer's willingness to display program materials in the store and to coordinate with the program implementer, Applied Proactive Technologies (APT), on in-store activities. APT works closely with retailers to educate floor staff and customers. (Note that the mail-in rebate outreach consumes the largest portion of program resources.)
- **Home Energy Kits.** In PY13, energy-efficiency kits were marketed through a series of postcards targeting electric hot water customers. This offering relied on marketing efforts that were more targeted than the strategies used for mail-in rebate measures, given the need to reach electric hot water heater customers exclusively.
- **Advanced Power Strips.** Ameren Missouri offered discounted advanced power strips at a promotional price of $4.95 per strip through the online store, and marketed this promotion in Fall 2013 using bill stuffers and a banner advertisement on its website.

Customer Awareness and Decision-making

Mail-in rebate participants most commonly learned about RebateSavers through store signage or through rebate forms placed near the product, service counter, or check-out aisle. The Cadmus team found differences between online rebate applicants and paper rebate applicants. For example, 24% of online survey respondents said they first learned about the program from Ameren's website, as compared to only 4% of the respondents to the phone survey.

We asked the mail-in rebate participants a variety of questions about factors that impacted their decision making, and their responses revealed the following:

- Reasons for purchasing equipment varied by measure. For example,
  - Respondents who installed an electric water heater were more likely to be replacing broken or aging equipment than were respondents who installed other measure types;
  - Participants purchasing a RAC most often sought to improve their comfort; and
  - Participants buying a heat pump water heater or programmable thermostat most often sought to save money on energy costs.
- Respondents most frequently cited price and long-term energy savings as the most important factors in deciding exactly which model or brand to purchase.
- In terms of *when* participants decided on the model and brand they wanted to buy, nearly one-half of respondents made the decision while in a store, while 45% of respondents knew

what they wanted before going to a store or calling a contractor. This trend was fairly consistent across products.

Customer Satisfaction

Overall, program participants experienced high satisfaction levels with both the mail-in rebate portion of the program and the home energy kit. Specifically:

- 96% of mail-in rebate participants were either *very satisfied* or *somewhat satisfied* with the rebate amount,
- 99% were either *very satisfied* or *somewhat satisfied* with the products they had purchased, and
- 80% of respondents reported they received their rebate check in the mail in less than six weeks.

In general, kit respondents were also very satisfied with their experience, although a small number of respondents reported dissatisfaction with some item in the kit. One respondent was unsatisfied with the CFLs, one was unsatisfied with the faucet aerators, one was unsatisfied with the advanced power strip, and two were unsatisfied with the energy-efficient showerhead.

Key Conclusions and Recommendations

Although RebateSavers experienced a slow start in PY13, the program still met its interim annual target and had a strong overall NTG of 92.7%. The program's free home energy kit was particularly successful, as customers reports indicated a high response rate, and a large portion of the program's energy savings were attributed to the installation of the kit's measures.

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

Conclusion 1. Room air conditioners and programmable thermostats experienced low per-unit realization rates and high free ridership rates Further, other metrics support the possibility of market saturation for these measures in Ameren's territory, including a Home Inventory Study conducted for the LightSavers program, which found that 66% of customers already had a programmable thermostat, and the ENERGY STAR website, which indicates that nation-wide ENERGY STAR RACs have a 35% saturation.

> **Recommendation 1a. As part of the planning for future years, explore whether RACs and programmable thermostats will still meet cost-effectiveness requirements**, given the current levels of free ridership and the relatively low per-unit savings.
>
> **Recommendation 1b. Consider shifting the target segment for programmable thermostats from single-family to multifamily properties and** use a direct-install strategy to reduce the occurrence of replacing existing programmable thermostats. Direct installs may increase per-unit savings because these thermostats will be programmed correctly for tenants and only installed where manual thermostats currently are used.

Conclusion 2. In-store marketing effectively generates customer awareness about the Ameren rebate program, but does not necessarily influence customers to purchase energy-efficient options. A large portion of participants reported they had already decided on the brand and model they were planning to purchase before going to the store. This implies customers do more upfront research on the products, which possibly impacts free ridership. Also, a significant portion of those applying for the online rebate found out about the rebates through Ameren's website, indicating that online marketing reaches a different niche of customers.

> **Recommendation 2. Use online advertising tactics such as paid search and/or banner advertisements on home improvement websites,** such as Homedepot.com or Lowes.com. These tactics offer opportunities to influence customers who are conducting early research on products.

Conclusion 3. Ameren's installation rate for CFLs was 33% at the time of the survey and, with future installations, we estimate an installation rate of 63%.[1] Including future installations, CFL installations still remain lower than other direct-mail kit programs, which range from 69% to 96%. This is likely due to the large number of bulbs (12) provided in the kit, as other research has supported the finding that CFL installation rates decrease with additional bulbs.

> **Recommendation 3a. Reduce the number of CFLs in the kit to six bulbs to improve installation rates and cost-effectiveness.** In determining the optimal number of bulbs to include in the kit, consider the balance between likely installation rates and the overhead cost savings achieved from providing a larger number bulbs in each kit.
>
> **Recommendation 3b. Provide educational material about the energy and costs savings associated with replacing incandescent bulbs with CFLs** right away rather than waiting for the incandescent bulbs to burn out.
>
> **Recommendation 3c. Diversify the type and wattage level of bulbs included in the kit to provide participants with more options and consider adding LEDs.**

Conclusion 4. While satisfaction ratings for all measures in the kits were high, showerheads and faucet aerators received slightly lower satisfaction ratings, and faucet aerators had a particularly low installation rate of 23%.

> **Recommendation 4. Consider changing the kit's measure mix to one aerator and one showerhead per household** and provide a follow-up mechanism so participants can request additional devices if they are satisfied with the ones they received. Ameren could structure this

[1] To account for Ameren customers installing some currently uninstalled bulbs at a later date, the Cadmus team calculated the installation rate based on the protocol recommended in Residential Lighting chapter of The Uniform Methods Project: methods for Determining Energy Efficiency Savings for Specific Measures (UMP). With these data, we determined the probable rate of future installation applicable to Ameren results.

as a "limited time offer" so participants have 30 days to request another device upon receiving the kit. This type of design would: (1) convey a sense of urgency about installing and testing the measures, reducing the time lag between receiving the kit and installing the devices; (2) improve installation rates by reducing the risk that customers will remove multiple devices if they are not the right fit or if the customers are unhappy with the water pressure; and (3) save resources and potentially improve cost-effectiveness by reducing the number of unused items in the kit, depending on additional costs required to process and deliver a second round of items. Using a "limited time offer" to request more devices could also apply to other measures in the kit, such as CFLs, if Ameren decides to reduce the quantity of bulbs in the first mailing.

Program implementers should also consider researching other showerhead options to improve satisfaction with the measure.

Conclusion 5. The number of eligible electric hot water heating customers may be smaller in future years. Although Ameren and APT distributed home energy kits to a large number of customers this year, the number of eligible customers is likely to decline, so program staff must find new ways to identify them.

Recommendation 5a. Research new ways for identifying hot water customers or consider mailing CFL kits to all electric customers. For example, customers receiving the CFLs could self-certify that they have an electric water heater and then opt-in to receive more hot water heating measures.

Recommendation 5b. Research effective ways to market the program to multifamily property managers, which may broaden the participation as well as improve installation rates.

Conclusion 6. Program staff deemed the launch of the new online rebate submission tool successful, offering a streamlined process for customers and the implementer processing rebates on the back end. However, staff would like to increase online submissions.

Recommendation 6. Engage heavy online users through increased online program marketing and through promoting the online submission functionality at retail. Currently, the mail-in rebates include the online submission details (and the website URL). The program should consider promoting the online portal at point-of-purchase through signage and potentially through a direct URL to access the online form. This may entice online-oriented customers to participate in the program vs. completing and sending in a mail-in form. Furthermore, the program can reach these customers through online tactics, such as e-mail blasts and targeted online banners on partner (e.g., home improvement, retailer) websites. This would educate potential buyers about the program and prompt online rebate submissions.

Conclusion *7.* Advanced power strips had a low installation rate of 48%, and free home energy kit recipients expressed some confusion on how to use them. Participants also suggested including more information on how to use the strips when asked about ways to improve the program.

Recommendation 7. Although Ameren already includes some instructional material in the kit from the power strip manufacturer, TrickleStar, Ameren and APT should consider developing their own simplified collateral and instructions to educate customers on the best way to use the power strip. Cadmus found the materials included in the kit to be long and technical, often emphasizing the specifications of the power strip as opposed to how to use it. The TrickleStar material contained unfamiliar language and terminology, such as "peripherals" and "switched outlets." More clear and concise instructions with simplified terms and diagrams may help improve installation rates and ensure savings are achieved.

INTRODUCTION

Ameren engaged Cadmus to perform a process and impact evaluation of the RebateSavers program for a three-year period. This annual report covers the impact and process evaluation findings for Program Year 2013 (PY13), the period from January 1, 2013, through December 31, 2013.

Program Description

The RebateSavers program began in Cycle 1 (2009–2012) as the energy-efficient product rebate component of the combined PY09 Lighting and Appliance program. To implement the program, Ameren partners with two third-party contractors:

- Applied Proactive Technologies (APT), which implements the program, and manages a network of retail partners that sell qualifying equipment.
- Energy Federation Incorporated (EFI), which processes the rebates on Ameren's behalf.

Beginning in PY12, Ameren dropped the appliance portion of the combined Lighting and Appliance program and focused exclusively on lighting products. Ameren and APT reintroduced RebateSavers in PY13 as a new stand-alone appliance program, which was designed to promote a variety of energy-efficient products in the marketplace. The program provides incentives that encourage customers to purchase technologies that can save money, improve comfort, and save energy. The program also seeks to educate customers about energy-efficient product options and energy-savings tips.

In PY13, the program provided downstream rebates for:

- ENERGY STAR®-certified room air conditioners (RAC)
- ENERGY STAR-certified heat pump water heaters
- Electric storage water heaters with an Energy Factor (EF) of 0.93 or higher
- Programmable thermostats

In addition to mail-in and online rebates, RebateSavers also offers a free home energy kit to customers with electric hot water heaters. The kit contains 12 CFLs, a smart power strip, pipe wrap, up to three faucet aerators, and up to two efficient showerheads. Smart power strips are also available for purchase at a discounted price through Ameren's online store.

Program Activity

In PY13, a total of 28,741 products were delivered to Ameren participants in the RebateSavers program, as shown in Table 4.

Table 4. RebateSavers PY13 Program Activity

Measure	PY13 Participants
Mail-in Rebates	
Electric Water Heaters	83
Heat Pump Water Heaters	268
Room Air Conditioners	871
Programmable Thermostats	2,182
Subtotal	**3,404**
Home Energy Kits	
Home Energy Kits – Single Family	8,437
Home Energy Kits – Direct Install in Multifamily	344
Subtotal	**8,817**
Upstream Discounts – Online Store Purchases	
Advanced Power Strips	16,442
Advanced Power Strips – Motion Sensor	78
Subtotal	**16,520**
Total	**28,741**

EVALUATION METHODOLOGY

In evaluating Ameren's RebateSavers program, the Cadmus team identified these objectives for PY13:

- Verify equipment installations;
- Assess free ridership and spillover through participant and nonparticipant surveys;
- Assess the program design, marketing activities, and processes;
- Assess the program's achievements against goals;
- Estimate the program's gross energy savings and demand reductions;
- Calculate the cost-effectiveness of the program;
- Examine participant experience, satisfaction, and decision-making motivations; and
- Identify main market barriers and offer recommendations for effectively overcoming those barriers through program design and delivery improvements.

Table 5 lists our evaluation activities and a brief explanation of the purpose of each activity. Following the table are overviews of each activity.

Table 5. PY13 Process and Impact Evaluation Activities and Rationale

Evaluation Activity	Process	Impact	Rationale
Review the Technical Resource Manual (TRM)		•	Review TRM values and assumptions and then conduct an engineering analysis to provide updated information for future program years
Review the Tracking Data	•	•	Provide ongoing support to ensure all necessary program data are tracked accurately; identify gaps for evaluation, measurement, and verification (EM&V) purposes
Interview Stakeholders	•		Obtain an in-depth understanding of the program and identify its successes and challenges
Review Marketing Materials	•		Identify gaps and opportunities in the program's marketing and outreach strategies and activities
Survey Participants (phone and online)	•	•	Verify measure installation; collect data to inform the net-to-gross ratio (NTG); collect process-related data
Interview Retailers	•		Obtain an in-depth understanding of how eligible products are promoted by retailers; assess the program's influence on the marketplace
Create a Program Flow Diagram	•		Clarify the program's processes, roles, and responsibilities; identify gaps or bottlenecks
Conduct a Metering Study of Programmable Thermostats		•	Obtain metered data for use in calculating gross kWh savings for programmable thermostats

Evaluation Activity	Process	Impact	Rationale
Conduct an Engineering Analysis		•	Determine gross kWh savings for each measure
Conduct a Cost-Effectiveness Analysis		•	Measure the cost-effectiveness of the program through five standard perspectives: total resource cost, utility cost, societal cost test, participant cost test, and ratepayer impact test.

TRM Review

At the outset of the PY13 evaluation, the Cadmus team reviewed both the algorithms used by Ameren for RebateSavers measures and the algorithms in other TRMs for similar measures. After we benchmarked each measure's algorithm, assumptions, and savings against other TRMs, we attempted to identify—early in the program year—any potential differences between the values Ameren assumed in the TRM and the values that may result from the formal evaluation process. Our goals were these: (1) to enhance our understanding of the specific measures that Ameren's implementers were delivering; and (2) to provide early feedback that could potentially allow Ameren's implementers to make mid-year course corrections for improving program delivery.

Data Tracking Review

In conjunction with the TRM review, the Cadmus team reviewed the program tracking database, SalesForce, used by program implementer APT. Specifically, we assessed whether APT was gathering the data necessary for evaluation. Our review included an assessment of data quality and completeness. Because of the timing of our review, we were able to notify Ameren and its implementers early on in the evaluation process of observed issues and data gaps.

Stakeholder Interviews

In June and July 2013, the Cadmus team interviewed RebateSavers stakeholders. We designed these interviews to: (1) gather information on how the program is operating so far; (2) identify any challenges that program staff and implementers have encountered; and (3) determine appropriate solutions.

Cadmus spoke with five program stakeholders across Ameren and APT, as shown in Table 6. (The stakeholder interview guide is contained in Appendix B.)

Table 6. Completed Stakeholder Interviews

Stakeholder Group	Interviews Conducted
Ameren Program Staff	2
APT Program Management	2
APT Field Staff	1
Total	**5**

Throughout the program year, we regularly spoke with Ameren program staff and APT to discuss program operations and coordinate evaluation activities.

Marketing Review

In mid-2013, the Cadmus team requested copies of RebateSavers' marketing materials. We reviewed these materials to assess the program's ability to reach the identified customer segments and to drive participation. In our assessment, we considered the variety of marketing methods employed, each method's dedicated funding level, and the timing of deployment.

This report includes information from our findings memo (submitted to Ameren in November 2013) and our recommendations for the program's overall marketing approach.

Participant Surveys

The Cadmus team conducted three telephone surveys and one online survey of RebateSavers participants. Our surveys covered topics for both the impact evaluation and the process evaluation, including measure verification, free ridership, spillover, participant awareness and decision making, and satisfaction. In total, we completed 455 surveys for the RebateSavers PY13 evaluation, as shown in Table 7. (Survey instruments are contained in Appendix C.)

Table 7. RebateSavers Participant Survey Summary

Target Audience	Survey Method	Field dates	Completed Surveys
Kit Participants	Phone	Oct. 2013	91
Mail-in Rebate Participants	Phone – Wave 1	Aug. 2013	110
Mail-in Rebate Participants	Phone – Wave 2	Nov. 2013	103
Mail-in Rebate Participants – online applicants	Online	Aug. – Dec 2013	151
Total			**455**

For home energy kit participants, we administered phone surveys in October to customers who received kits in July, August, or September. This timing gave the participants at least one month to install the measures they received. To reduce the amount of lapsed time between product purchases and our survey (thus, improving recall rates), we conducted the mail-in rebate surveys in two waves.

For the three phone surveys, we generated a simple random sample stratified by measure, according to the measure population. We designed the phone survey samples to achieve results at 90% confidence with 10% precision at the program level. In contrast, the online survey was offered to everyone who completed an online rebate application.

Table 8. Completed Surveys by Measure

Stakeholder Group	Population	Targeted Surveys	Achieved Surveys
Phone Survey—Home Energy Kit Participants			
Kits Recipients—All measures	8,817	70	91
Phone Survey—Mail-in Rebate Participants			
Electric Water Heater	83	15	15
Heat Pump Water Heater	268	35	38
Room Air Conditioner	871	60	68
Programmable Thermostat	2,182	90	92
Sub-total	**3,404**	**200**	**213**
Online Survey—Mail-in Rebate Participants			
Electric Water Heater	28	n/a	8
Heat Pump Water Heater	92	n/a	48
Room Air Conditioner	49	n/a	11
Programmable Thermostat	299	n/a	84
Sub-total	**468***	**n/a**	**151**
Total (All Methods)	**12,221**	**270**	**455**

*The online survey population is a subset of the general population of program participants. Only online rebate applicants received the opportunity to participate in the online survey, but the phone survey sample included all applicants, both online and mail-in.

Retailer Interviews

The Cadmus team completed interviews with store staff from 10 participating retail locations in Ameren's territory. From the list of 179 participating stores, we generated a simple random sample of 30 stores to contact, with the goal of completing 10 interviews.

APT, the program implementer, provided us with contact names and phone numbers for each of the program's retail partners. We interviewed either the store manager or department manager at a variety of retailers (both large chains and independently owned stores). Table 9 contains the complete list of stores participating in the interviews. (Our retailer interview guide is contained in Appendix D.)

Table 9. Completed Interview Locations

	Store Name	City
1	Ace Hardware	Osage beach
2	Do It Best	Boonville
3	Home Depot	Brentwood
4	Home Depot	Wentzville
5	Lowe's	O'Fallon
6	Orscheln Farm & Home	Moberly
7	Potosi Lumber Co.	Potosi
8	Sears Hometown	Brookfield
9	Snapp Hardware, Inc.	Boonville
10	Walmart	Bowling Green

Program Flow Diagram

After discussing the program's internal operations and processes during our interviews with program stakeholders and retailers, we developed a flow diagram to illustrate the main program steps and the stakeholder roles and responsibilities (see Figure 1 and Figure 2 in the Program Delivery section). Designed for use by stakeholders and evaluators, these flow diagrams of key program activities provided an opportunity to identify rebate process bottlenecks or challenges.

Metering Study: Programmable Thermostats

In concert with the LightSavers home inventory visits to randomly selected Ameren customers, the Cadmus team installed temperature loggers on thermostats in 172 homes. We also installed runtime loggers on seven RACs. We will gather the loggers in early summer 2014 and use the data they collected to enhance our understanding of thermostat-setting behaviors for users of manual and programmable thermostats and associated patterns of heating and cooling system usage. We will use these data in our PY14 evaluation.[2]

Engineering Analysis

To estimate per-unit gross savings for each RebateSavers measure, Cadmus utilized the engineering algorithms and assumptions and all of the Ameren-specific inputs that were available. These algorithms yielded estimates of the difference between the energy usage of the rebated product and usage of a similar product that meets the minimum federal standard for efficiency. Each algorithm and input assumption is presented in the Gross Impact Evaluation Results section of this report.

[2] The Cadmus team also installed energy loggers on all room air conditioners identified during the LightSavers home inventory visits. Unfortunately, we did not identify and meter a sufficient number of room air conditioners (seven units in five homes) to provide a reliable estimate of Ameren-specific annual energy consumption.

Cost-Effectiveness Analysis

Using final PY13 RebateSavers participation and implementation data as well as the *ex post* gross and net savings estimates presented in this report, Morgan Marketing Partners determined the program's cost-effectiveness using DSMore. (DSMore is a financial analysis tool designed to evaluate the costs, benefits, and risks of demand-side management [DSM] programs and services.) We also calculated measure-specific cost-effectiveness. As shown in the Cost-Effectiveness Results section, we assessed cost-effectiveness using all five of the standard perspectives produced by DSMore:

- Total Resource Cost
- Utility Cost
- Societal Cost Test
- Participant Cost Test
- Ratepayer Impact Test

PROCESS EVALUATION FINDINGS

This section contains the Cadmus team's process evaluation findings for Ameren's RebateSavers program. We have organized our findings into four sections: Program Design, Program Delivery, Marketing and Outreach, and Program Satisfaction.

Program Design

The RebateSavers program was created to: (1) promote energy-efficiency awareness, and (2) encourage the purchase and use of energy-efficient products. The program is designed to achieve these objectives through three components:

- Downstream rebates for customers purchasing high-efficiency, home energy products from participating retailers;
- Free home energy kits for customers who have electric water heaters; and
- Upstream discounts for advanced power strips, which are sold through the Ameren online store.

Downstream Rebates

The downstream rebate component primarily relies on partnerships with participating retailers to communicate available incentives and create customer awareness about energy-efficient products. Eligible products and associated rebate amounts are listed in Table 10.

Table 10. Rebated Measures

Qualifying Products	Rebate Amount
ENERGY STAR Certified Room Air Conditioner	$20
ENERGY STAR Certified Heat Pump Water Heater	$300
Electric Storage Water Heaters with an EF of 0.93 or higher	$25
Programmable Thermostats	$25

In PY13, there were 179 retail locations that participated in the RebateSavers program. Of these, 52 sold only RebateSavers products, while 127 stores sold discounted ENERGY STAR light bulbs through the LightSavers program in addition to selling equipment eligible for an Ameren rebate through the RebateSavers program.

No signed memorandum of understanding or contractual agreement was needed to participate in the program. Instead, participating retailers worked with APT to display rebate forms and other marketing collateral. Also, the retailers allowed APT to host occasional on-site promotions or table displays.

According to information provided by APT, some participating retailers offered only some of the program-eligible equipment. While the majority of participating stores sold programmable thermostats, fewer stores sold electric water heaters, and a smaller fraction of stores sold heat pump water heaters and RACs (Table 11).

Table 11. Measures Sold by Participating Stores

Measure	Retailers that Sell Measure (N=312)
Programmable Thermostats	228
Electric Water Heaters	36
Heat Pump Water Heaters	58
Room Air Conditioners	152

*Source: APT

Free Home Energy Kits

In July 2013, Ameren began distributing free home energy kits to its electric water heating customers; the kits contained energy-saving measures and instructions for installing them. Table 12 lists the number of measures in each kit.

Table 12. Home Energy Kit Measures

Measure	Quantity in kit
Compact fluorescent lamps (CFLs)	12
Faucet aerators	2-3*
Energy-efficient showerheads	1-2*
Advanced power strip – load sensing	1
Pipe wrap	1

*Customers who opted in and reported having one bathroom on the postcard received two aerators and one showerhead. Customers who reported having two or more bathrooms on the postcard received three aerators and two showerheads.

APT delivered these kits through two channels: direct mail and direct install. The majority of kits were mailed directly to single-family households that had requested a kit, while a small number of kit measures were installed directly in multifamily building units by building maintenance staff.

- ***Direct mail, single-family.*** Electric hot water heating customers were identified by their past participation in the lighting and appliance program and through billing segmentation analysis conducted to identify likely electric hot water customers. These customers were sent postcards advertising the availability of the kit and, either returning the postcard or by calling Ameren, they opted-in to receive a kit. A total of 18% of those receiving the postcard requested a kit.
- ***Direct install, multifamily***. The program implementer worked with one multifamily property management company to install measures in two buildings, and the installations were completed by building maintenance staff.

Upstream Discounts

Ameren sells three types of advanced power strips at a discount through an online store managed by EFI.[3] To be eligible for the discount, customers must verify upon check-out that they live in Ameren's service territory. The price of these power strips ranges from $4.95 to $18.95 (Table 13). In September, Ameren and the program implementer began offering the TrickleStar 7 strips at the promotional price of $4.95 to boost participation.

Table 13. Available Advanced Power Strips

Manufacturer and Model	Type	Image
TrickleStar 12 Outlet Advanced Power Strip	Load-sensing	
TrickleStar Motion Sensor Advanced Power Strip	Occupancy-sensing and Load-sensing	
TrickleStar 7-Outlet Advanced Power Strip	Load-sensing	

Program Delivery

This section describes the various program management and delivery aspects assessed by the Cadmus team and provides feedback from program stakeholder and retailer interviews regarding the program's delivery in PY13.

[3] https://www.energyfederation.org/012609/default.php

Progress Towards Goals

Ameren's portfolio-wide energy savings targets were established for PY15. Although meeting interim targets on an annual basis and at the program level are not required, examining programmatic achievements against stated goals is important for planning purposes. Ameren's integrated resource plan (IRP) informs the program's three-year energy-savings goals, which are contained in Ameren's tariff. Program staff reported that annual goal-setting is a bottom-up process: APT provides participation goals for each measure, and these goals are then multiplied by each measure's estimated savings (as specified in the TRM) to calculate an aggregate kWh/year target.

In early PY13, stakeholders expressed concerns about meeting the program's goals, and they reported several reasons (described later in the section Program Implementation Challenges and Solutions) for the program's slow launch. One person perceived RebateSavers as one of Ameren's most challenging programs in terms of meeting goals. However, throughout the year, program activity accelerated sufficiently to meet the annual interim target. Overall, PY13 processes operated smoothly and effectively for a successful program year.

Program Processes

Program stakeholders reported that Ameren staff and implementers work together on a daily basis to manage RebateSavers, ensuring the program runs smoothly. Figure 1 shows the process flow for the mail-in rebate component.

Figure 1. Process Flow Diagram: Mail-in Rebates

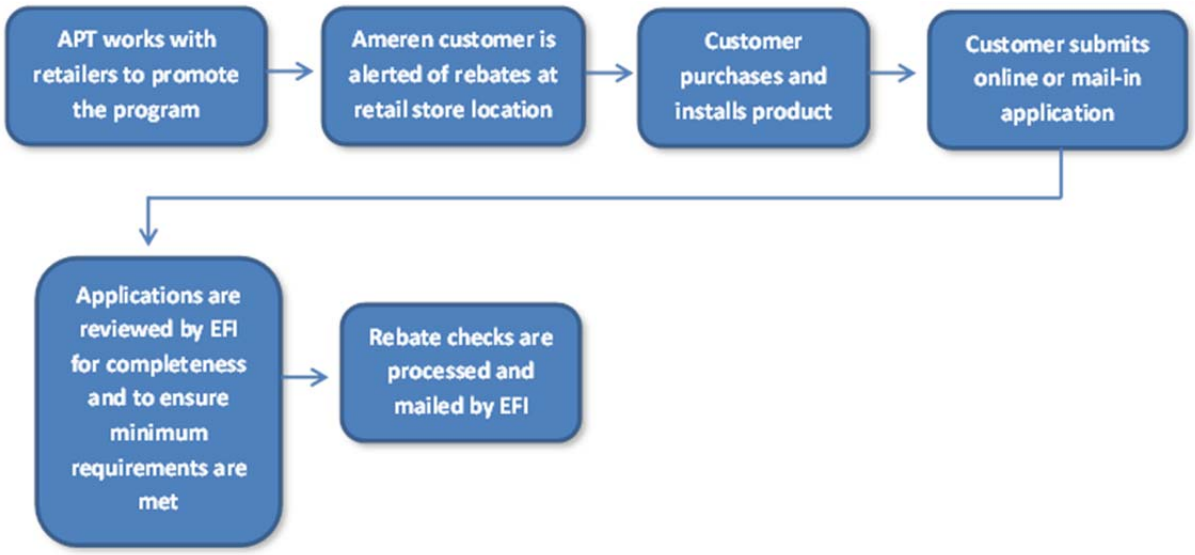
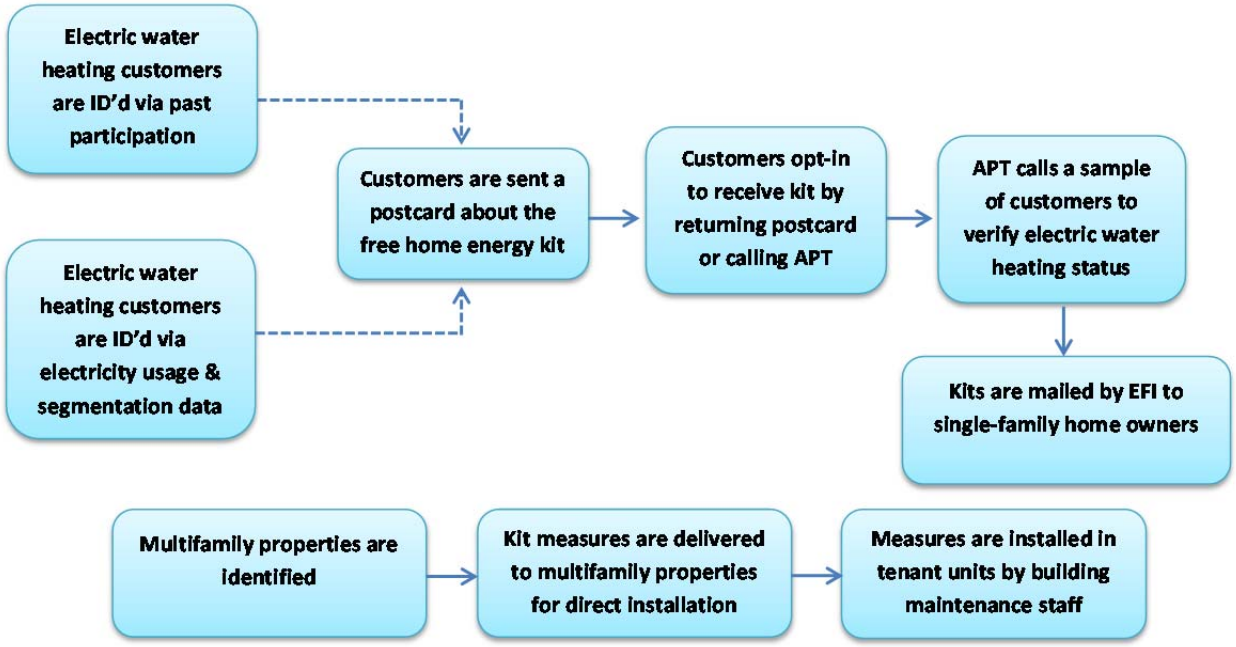


Figure 2 shows the process flow for the home energy kit component.

Figure 2. Process Flow Diagram: Home Energy Kits



Program Implementation Challenges and Solutions

In interviews with the Cadmus team, stakeholders identified several challenges in PY13 that negatively affected program participation and savings:

- ***Low uptake of RACs and electric hot water heaters.*** Several factors were cited regarding the low uptake of these two measures, and one staff person said that the incentive level may be too low for both.
  - For electric hot water heaters, the rebate is $25. As this represents a small fraction of the total equipment cost, the incentive may not be large enough to overcome general economic barriers and first-cost constraints. Also, having too low an incentive is likely to result in a higher proportion of free ridership, which was 56.6% for electric hot water heaters.
  - For RACs, the rebate was lowered from $50 in PY10 and PY11, to $20 this year. Staff members reported they were not seeing as many ENERGY STAR RACs stocked in stores, which could be a result of the lower rebate level. In addition, the cooler-than-normal weather patterns that occurred early in the summer likely had a negative effect on RAC purchases.
  - Although the program successfully launched as scheduled on January 1, 2013, staff members said that communicating with retailers before that date was challenging because the retailers were not yet officially participating in the program. Therefore, the program was unable to

influence retailer buying and stocking practices earlier in 2012. Stakeholders anticipated that in future program years, they will be able to work with retail partners in advance and, thus, influence purchases more effectively.

- ***Late mailings of the home energy kit***. Both implementers and Ameren staff acknowledged internal challenges with the home energy kits. Initially, staff members expected to launch kits in March or April 2013; however, they did not send postcards to eligible customers until June. Various factors contributed to the late start:
  - Only customers with electric hot water heaters are eligible to receive a kit, but identifying these customers was a challenge. The solution for the first round of postcards was to target previous Ameren program participants who had indicated on their rebate form that they had an electric hot water heater.
  - Working within the constraints of the program budget caused challenges because the original program budget for RebateSavers did not include the kit screening or customer recruitment activities.
- ***Fewer measures than anticipated.*** Program staff had planned to include rebates for energy-efficient air purifiers, water coolers, and pool pumps in PY13, which would have boosted annual energy savings. At the time of stakeholder interviews, staff was still hoping to add air purifiers and water coolers before the end of the year, but the program did not expand its measure offerings. Although one staff person said that savings opportunities were likely missed because efficient pool pumps were not added in time for the summer season, the implementers noted that a market potential analysis had revealed that savings from pool pump measures would likely be limited.

Delivery Successes and Program Achievements

When the Cadmus team asked about aspects of the program that were working particularly well, stakeholders reported the following information:

- Both program implementers and Ameren staff were very satisfied with the rebate processing to date and with the customer service provided by EFI. The goal has been to process rebates within six weeks, and APT said the program was processing rebates within approximately four weeks.
- Stakeholders said the May 2013 launch of a new online rebate portal was successful. The purpose of this online option was to simplify the rebate process for customers and to eliminate the potential for errors that can occur with manual keying. Although stakeholders did not set a goal for the percentage of online applications rather than paper applications they wanted to generate, they were satisfied with the rate of 15% of online to total applications, particularly because of how new the option was.
- Two Ameren staff members said the program marketing was going particularly well this year. Specifically, APT is working with Appliance Recycling Centers of America—the ApplianceSavers program implementer—to cross-promote the program, and the staff members were pleased about this collaboration.

Marketing and Outreach

This section contains the Cadmus team's findings on RebateSavers marketing strategies and outcomes.

Primary Marketing Channels: Mail-in Rebates

The primary marketing channel for the RebateSavers Program is working with retailers to place program materials in stores and to coordinate on in-store activities. Stakeholders reported that the overriding goal of the marketing effort is to create consumer awareness and to increase brand recognition of Ameren, the program sponsor. Indirectly, the marketing drives program participation and generates energy savings.

The program implementer and field staff emphasized the importance of managing retailer relationships and educating store staff so they will become champions for the program. An important aspect of working with retailers is ensuring that programs materials remain on display in stores. APT has a national coordinator who works with large retailers to set standards across all retail locations for in-store marketing efforts. This results in consistency across chain stores and ensures that the materials fit within corporate guidelines.

APT reported conducting the following in-store activities in support of the RebateSavers program:

- **In-store promotions:** APT conducts about two promotions per year in each participating big box store.
- **In-store meetings:** APT periodically hosts meetings to: (1) discuss the details of the RebateSavers program with all store employees; and (2) provide stores with a manual that includes a certified product list and rebate information.
- **Weekly visits:** Field staff conducts weekly visits to big box stores to check stock levels, prices, and program signage and to answer questions from store representatives and customers.

Retailer Interaction with Program Implementers

During interviews, the Cadmus team asked retailers about their interactions with APT and what activities APT conducted with them. Most respondents reported that APT visited once a month (three of 10) or every few months (four of 10). One retailer said an Ameren representative visited the store as frequently as once a week, while a respondent who described himself as the main contact for the RebateSavers program said a representative only visited about once a year. (This person worked at a small, independently owned store.) According to APT, small stores do not receive visits as frequently as the larger big-box stores.

The majority of retailers reported that APT refilled rebate brochures and forms during the store visit (seven of 10). Three retailers reported that the representative asked them if there were any questions about the program and verified the stock on the shelves. Two retailers reported that the representative inquired about program performance. Retailers also mentioned that APT did the following:

- Verified pricing
- Conducted in-store demonstrations
- Took pictures
- Explained program requirements to staff
- Informed store staff of program changes, such as added or updated rebates

When we asked 10 retailers if they had met with APT to discuss program details and eligible products, seven said "yes":

- Five reported the meeting was with two or three staff members in their store.
- One retailer estimated the APT representative had spoken with at least five staff members.
- A large retailer said APT had spoken with 10 to 15 sales associates and managers.

Overall, the respondents who met with implementers reported that—on a four-point scale—the meetings were either *very useful* or *somewhat useful*. One person who described the meeting as *very useful* said:

> *"The Ameren representative did all the groundwork in finding out what products we carry are eligible for rebates—which saved us from having to physically do that ourselves. [They] told us how the program works and helped us see the advantages of it."*

Primary Marketing Channels: Home Energy Kits and Advanced Power Strips

In addition to providing mail-in rebate measures, the program promotes the availability of free home energy kits and discounted advanced power strips through Ameren's online store. These offerings are marketed as follows:

- **Home Energy Kits:** In PY13, energy-efficiency kits were marketed through a series of postcards targeting electric hot water customers. The marketing efforts for this offering were more targeted than the strategies for mail-in rebate measures, given the need to reach electric hot water heater customers exclusively.
  - The first batch of postcards (which achieved a 29% response rate) were sent to customers who previously applied online for a rebate and had reported that they owned electric water heaters. In total, Ameren contacted 49,000 customers via postcards or calls, and it mailed or installed 8,817 kits, achieving an overall response rate of 18%.
- **Advanced Power Strips:** Ameren offered discounted advanced power strips at a promotional price of $4.95 per strip through the online store.
  - In Fall 2013, Ameren marketed the offer using bill stuffers and website banner advertisement.
  - Program staff attributed the high level of upstream participation to these marketing efforts and the special promotion.

Marketing Materials

Both APT and the surveyed retailers reported that the primary method of promoting the program entailed placing rebate application forms at the check-out counter and other in-store locations.

Rebate Forms

The Cadmus team received copies of the four program rebate forms along with several photos of the rebate and special pricing stickers and signage placed in stores. We reviewed each rebate form for the mail-in rebate measures (Figure 3) and determined that the design clearly delivers brand and program recognition to the audience.

Figure 3. PY13 Rebate Forms

The forms prominently feature these elements: the program offering, the Ameren logo, the website URL for ActOnEnergy.com, the ENERGY STAR logo (as appropriate), and the Rebate Savers program marketing logo. The forms include program benefits and savings figures, and they refer to the three other rebates available through the program. Furthermore, the rebate forms include an image of a customer, which provides a more personal and relatable feel to the program. In a shift from previous years, the forms also highlight information about how customers can submit forms online.

In-Store Signage and Displays

APT works with store staff to place in-store signage that provides customers with brand awareness and to associate the product and brand with discounts. The types of program signage include the following:

- Shelf stickers strategically placed so the customer sees the discounted price clearly and associates that recognition with the Ameren brand;
- Product clings on qualifying products;
- Pallet displays; and
- End-cap displays.

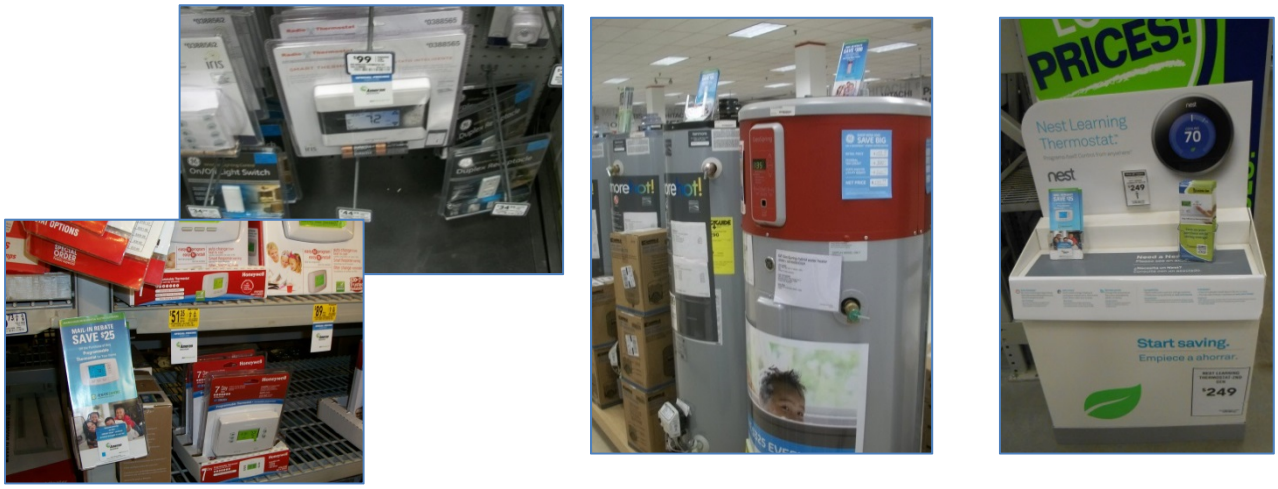
Cadmus asked 10 retailers about their use of various marketing tactics and their process for using Ameren's in-store marketing. Responses included the following:

- Four said Ameren provided them with materials, and they displayed them on their own schedule.
- Four described in-store marketing as something APT set up and managed.
- One respondent's process was a combination of both APT's and retailer's efforts, and
- One said the store did not display any advertising other than the rebate forms.

Four respondents reported that they either *rarely* or *never* use end cap or pallet displays for RebateSavers measures, while others reported they used this tactic often. Two respondents said they *always* used displays for air conditioners in the summer. Otherwise, respondents reported that store policy dictated how they used the displays.

From our review of several photos of in-store signage, we concluded that the promotional material appeared consistent with the Act On Energy® brand guidelines and had a streamlined look and feel in relation to the rebate forms. While the signage included the Ameren logo, it generally did not advertise RebateSavers specifically (Figure 4).

Figure 4. Photographs of RebateSavers In-Store Advertising and Signage



Cross-Program Promotion

Given that the same implementer markets and executes the RebateSavers Program and the LightSavers Program—which formerly were one program—a natural cross-program promotional aspect occurs. This is demonstrated in synergies occurring with in-store materials, relationships with store staff, and coordination of in-store promotions and events. The cross-promotion's philosophy assumes implementers not only represent the program, but present Ameren as a holistic, energy-efficiency solution provider.

Outside of these two programs, Ameren has identified opportunities for implementers to collaborate in cross-promoting one another's programs. For example, APT works with retailers to include

ApplianceSavers collateral in addition to the RebateSavers forms and collateral. Of 179 participating retail locations, 72 opted to cross-promote ApplianceSavers.

Act On Energy Campaign and Research

In addition to the efforts of APT, the corporate marketing and residential energy-efficiency management teams of Ameren supported the promotion of the RebateSavers program in PY13. Although retailers serve as the primary means for generating awareness about RebateSavers, Ameren conducts portfolio-wide marketing activities through the Act On Energy campaign. These activities include: using social media (Facebook and Twitter); sending annual "Personal Energy Reports" to customers (the reports contain customized energy information and specific information on saving energy); sending targeted e-mail blasts to customers using Internet billing; and utilizing some paid media campaigns. For this marketing effort, Ameren has conducted studies regarding segmentation, potential, and usability to inform program design and outreach efforts. (The results from the segmentation study are contained in Appendix E.)

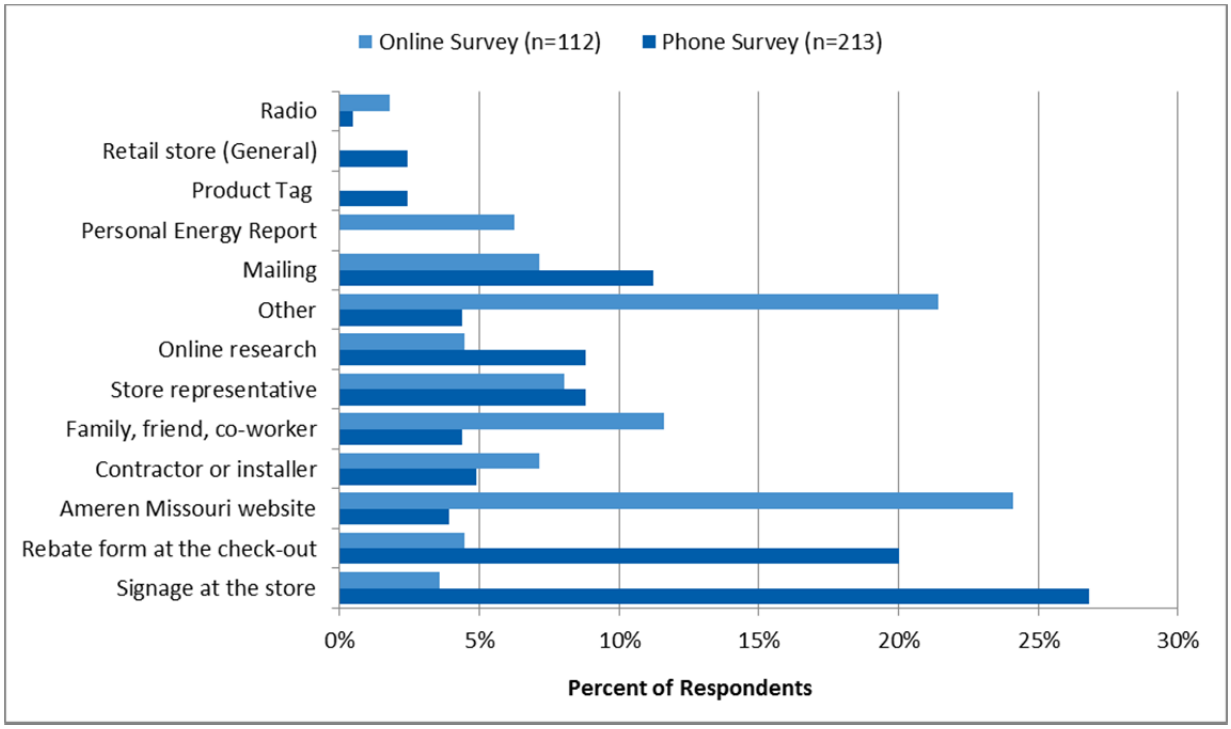
Customer Awareness and Decision-Making

The Cadmus surveys revealed that mail-in rebate participants typically learned about RebateSavers through store signage (19%, n=317) or from rebate forms at the check-out (15%). Participants also learned about the program through the Ameren website (11%) or a mailing from Ameren (10%).

Among the differences we identified between participants who completed the online survey and those responding to the phone survey; the most significant was that 24% of online survey respondents said they first learned of the program from Ameren's website, compared to only 4% of phone survey respondents. This finding indicates that customers who learn about the program online are more likely to apply for the rebate online. Among participants responding to the telephone survey, the source most commonly cited (27%) for learning of the program was store signage. However, only 4% of online survey respondents gave that response.

Figure 5 shows the sources online and telephone survey respondents reported informed them of RebateSavers.

Figure 5. Sources of Program Awareness Among Mail-in Rebate Program Participants



Participants receiving free home energy kits most commonly heard about the program through a postcard in the mail (an expected response, considering this was the main outreach channel).

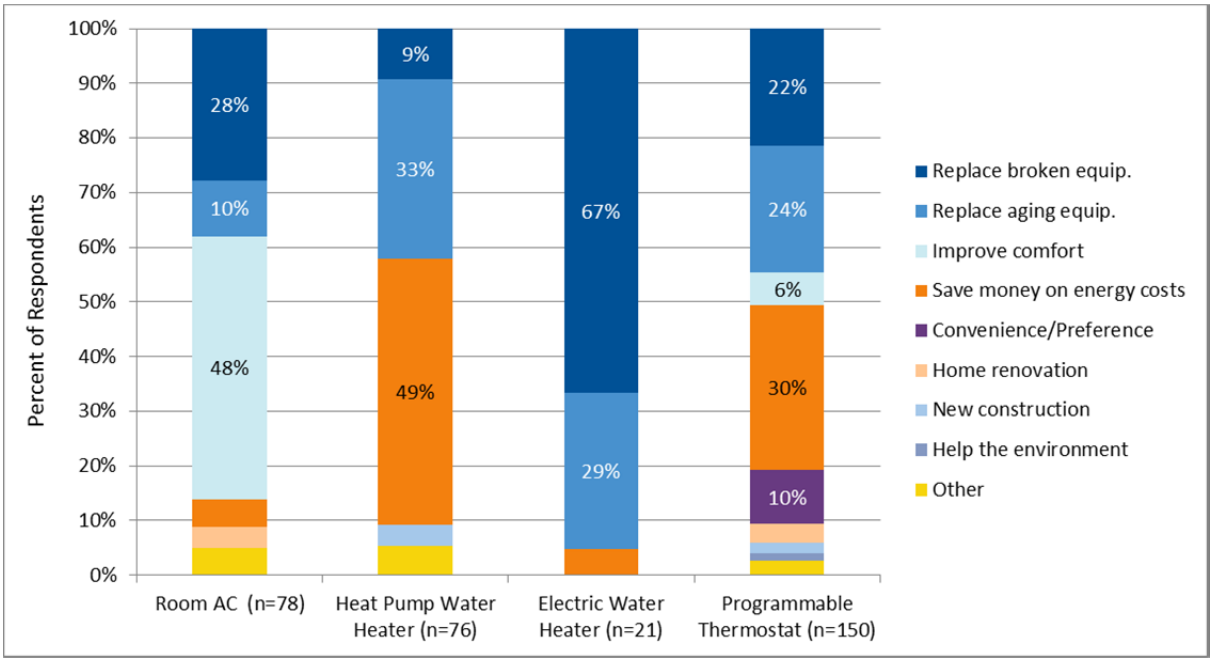
Reason for Purchase

Respondents most commonly said they purchased the measure to save money on energy costs (27%, n=324). Other top reasons for purchasing the products were: to replace broken equipment (23%), to replace aging equipment (23%), or to improve home comfort (15%).

Reasons for purchasing equipment varied by measure:

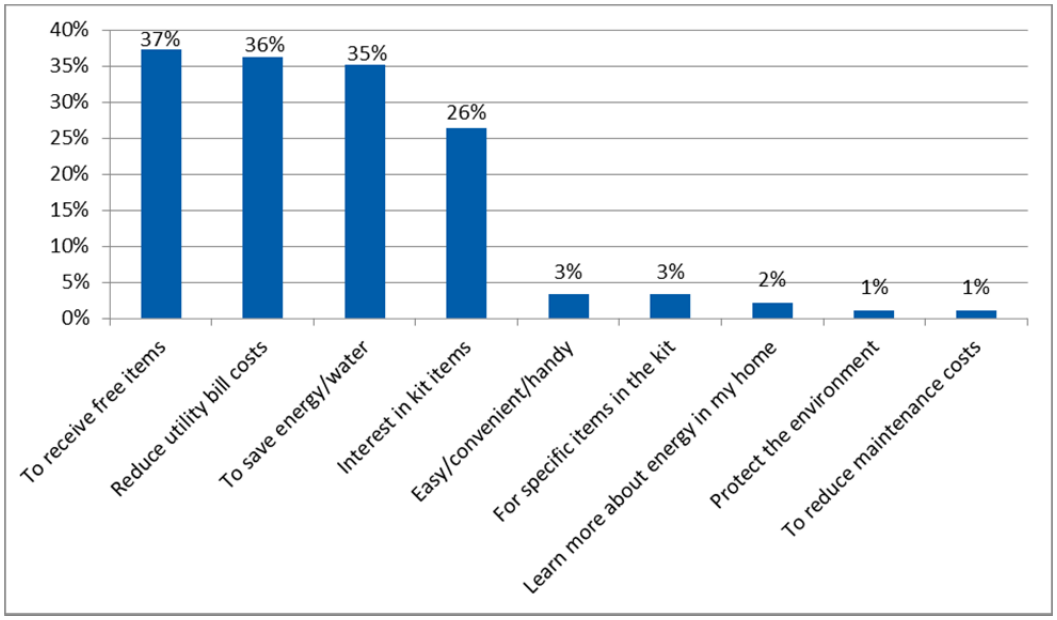
- Respondents who installed an electric water heater were more likely to report that they were replacing broken or aging equipment than did respondents installing other measure types.
- Respondents who purchased a RAC typically did so to improve their comfort.
- Respondents who bought a heat pump water heater or a programmable thermostat usually specified a desire to save money on energy costs (Figure 6).

Figure 6. Primary Reasons for Participants' Measure Purchases



For participants who received home energy kit, the most common reasons they reported for requesting the kit were: to receive free items, to reduce utility bill costs, or to save energy or water. Interestingly, 26% of respondents also reported they were interested in the specific kit items, and they expressed curiosity about the technologies (Figure 7).

Figure 7. Participant Reasons for Requesting the Home Energy Kit (n=91)



Note: Multiple responses allowed.

Why Mail-in Rebate Participants Chose a Specific Model and Brand

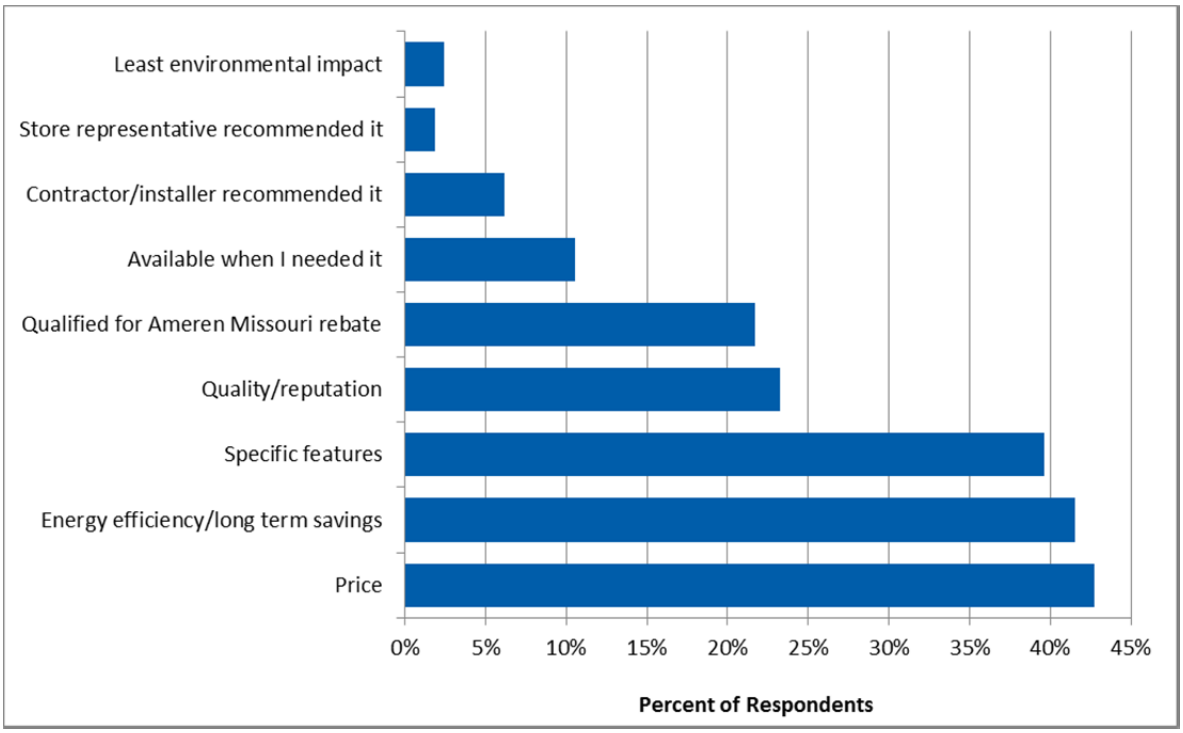
When respondents were asked why they purchased a specific model and brand, they cited:

- Price (43%, n=323);
- Energy efficiency and long-term savings (41%); and
- Specific model features (40%).[4]

When a respondent gave multiple answers regarding issues they considered important in making their decisions, we asked this follow-up question: "And if you had to choose just one, which factor would you say was the most important in your decision to purchase the specific model and brand you selected?"

Although respondents most frequently cited price as *an* important factor, upon asking participants their *most* important factor, respondents most often chose energy efficiency and long-term savings (35%) over price (19%). Figure 8 shows responses to the first question, which asked respondents to consider all important factors.

Figure 8. Factors Influencing Decision Making Among Mail-in Rebate Participants (n=323)

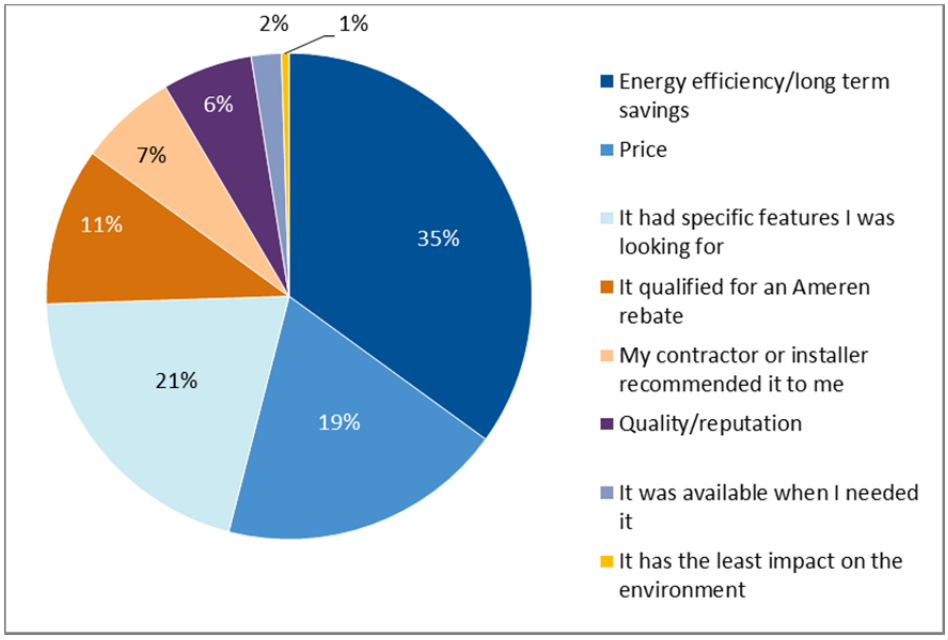


Note: Multiple responses allowed.

Figure 9 shows responses to the follow-up question about the most important factors.

[4] As multiple responses were allowed, percentages may total more than 100%.

Figure 9. "Most Important Factor" in Decision Making (n=200)

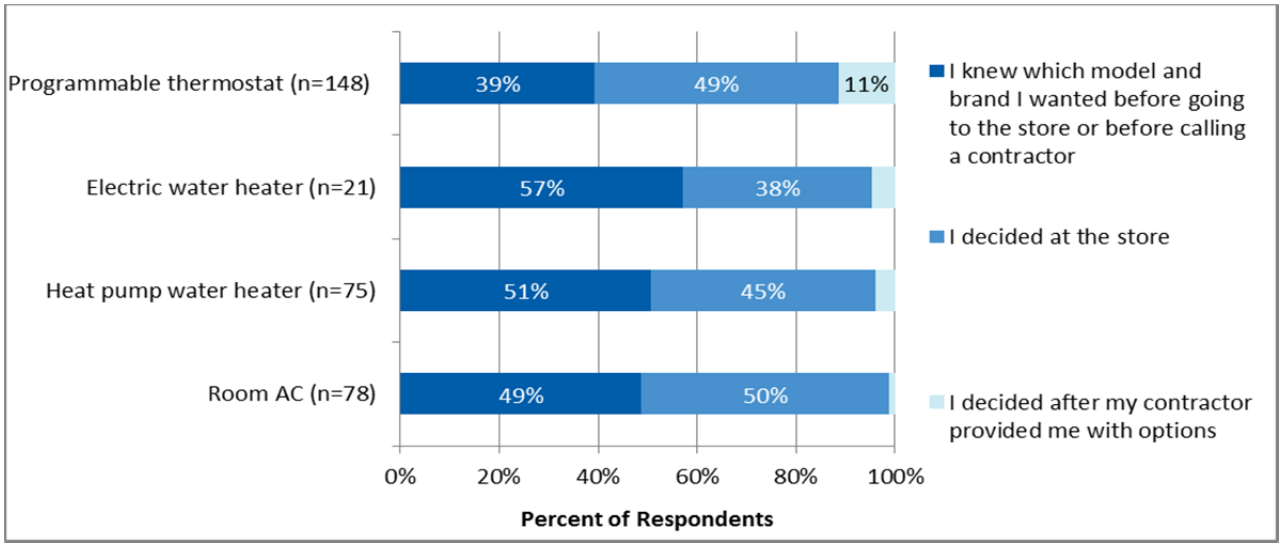


Participant Decision Timing

In terms of *when* participants decided on an exact model and brand they wanted to buy, slightly less than one-half of the respondents made that decision while in a store (48%, n=322). Another 45% knew what they wanted before going to a store or calling a contractor, and 7% made their decisions after their contractors provided them with options.

While these trends were fairly consistent across products, customers tended to do more research on expensive water heating measures than on other measures. Most of these respondents knew what they wanted before they went to the store or called a contractor: 57% of electric water heater users and 51% of heat pump water heater users reported knowing what they wanted beforehand. Customers buying thermostats, however, relied more on input from their contractors (Figure 10).

Figure 10. Decision Timing by Measure



Retailer and Contractor Promotion

The great majority of participants (88%, n=325) reported purchasing their products at retail locations. Although this held true for all measures, some differences occurred between products. As shown in Table 14, for example, 12% of participants purchased a programmable thermostat from a contractor. This could result from new HVAC equipment installations by contractors.

Table 14. Store vs. Contractor Purchases

Measure	Purchase Location		
	Store	Contractor	Other*
Room air conditioner (n=78)	96%	1%	3%
Heat pump water heater (n=76)	93%	4%	3%
Electric water heater (n=21)	95%	5%	0%
Programmable thermostat (n=150)	80%	12%	7%
Totals	**88%**	**7%**	**5%**

*Responses included purchases at the online store or another online source.

The surveys asked those who purchased a product at a store whether store associates mentioned that the measure qualified for an Ameren rebate.[5] As shown in Figure 5 (above), participants frequently learned of the program through a retailer (store signage or rebate forms upon check-out). When asked, however, if a store representative informed them of the rebate, 68% said "*no*" and 32% said "*yes*" (n=258).

[5] If respondents learned about the program from retail store staff, the survey omitted this follow-up question.

The surveys also asked respondents who reported purchasing their product from a contractor about the contractor's promotions. Responses were very similar: 66% said the contractor did not inform them about the program; 41% said the contractor did (n=53).

The Cadmus team's findings from interviews with retailers conflicted slightly with customer reports, in that 32% said a store representative told them about the rebate. Six of the 10 retailers we spoke with said they talked with customers about the available rebates, either by mentioning the rebates proactively or by informing customers who asked about energy-efficient appliances.

Program Satisfaction

The surveys asked program participants to rate their satisfaction with the following elements:

- Overall experience with the program;
- The time required to receive their rebate in the mail;
- Rebate amounts; and
- The measures.

In our phone surveys, we also asked questions about the respondents' satisfaction with Ameren in general. Overall, participants expressed satisfaction with all program aspects and with Ameren. Almost one-half of respondents said they had a more favorable opinion of Ameren following their program participation.

We did not ask these satisfaction questions of online survey respondents as the survey was conducted during the rebate application, and insufficiency time had passed to gauge program, rebate, and measure satisfaction.

Overall Program Satisfaction

Most participants described themselves as *very satisfied* with the program overall (92%, n=207), while most remaining participants (7%) were *somewhat satisfied*.

In terms of the different measure types, participants who purchased electric water heaters and heat pump water heaters gave the highest satisfaction ratings (100% were *very satisfied*). Among participants who purchased RACs, 93% were *very satisfied* and 7% were *somewhat satisfied*). Among participants who purchased programmable thermostats, 87% were *very satisfied*.

Rebate Satisfaction

Although the majority of respondents (92%) expressed high overall satisfaction levels with the program, some reported being less than satisfied with the time it took to receive the rebate or with the rebate amount.

Rebate Amount

About three-quarters (74%, n=201) of participants were *very satisfied* with the Ameren rebate amount, 22% were *somewhat satisfied,* 2% were *not too satisfied*, and 1% were *not at all satisfied*:

- Those purchasing heat pump water heaters and electric water heaters provided the most *very satisfied* ratings for the rebate amount (79% and 78%, respectively).
- Room air conditioner participants most often reported being either *not too satisfied* or *not satisfied at all* with the rebate amount (8%).

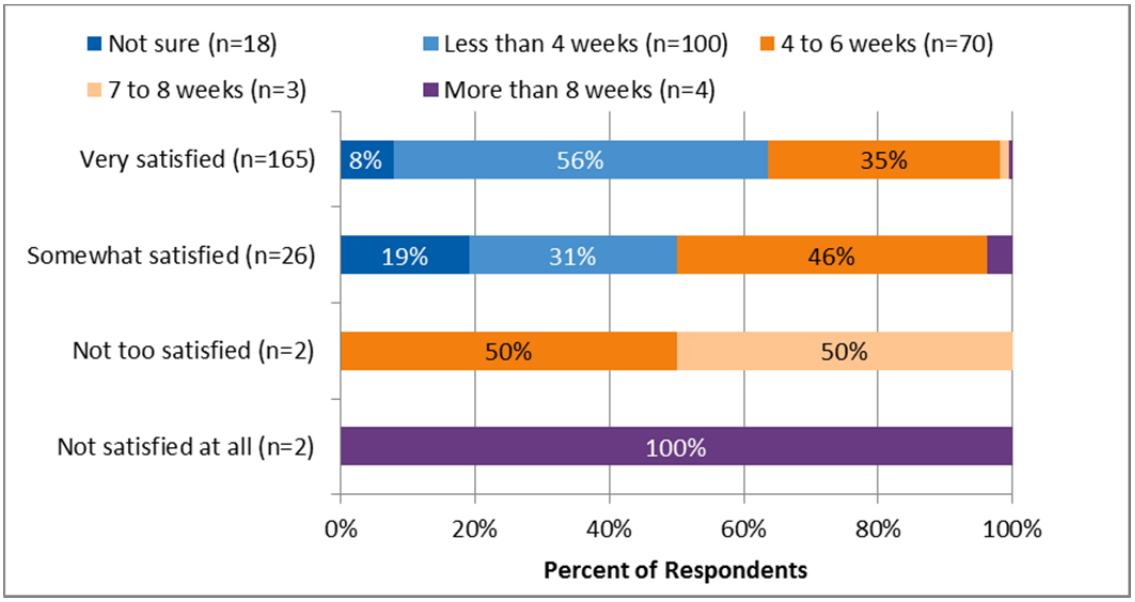
Time Required to Receive Rebate or Kit

When asked how long it took to receive their rebates in the mail, most respondents said it took either less than four weeks (47%, n=213) or between four and six weeks (33%). These respondents were either *very satisfied* or *somewhat satisfied* with the time required to receive their rebate checks. Another 13% did not know how long it took to receive their rebates.

Three respondents said it took between seven and eight weeks, and four respondents said it took more than eight weeks to receive their checks. This finding differed slightly from APT's understanding that rebate checks were being mailed within a four-week timeframe. Most kit participants (92%) were *very satisfied* with the process to request the kit, while the remaining participants (8%) were *somewhat satisfied*. The majority of respondents (74%) said their kit arrived in under four weeks.

Figure 11 compares rebate arrival times with the satisfaction of respondents regarding the receipt of their rebates. Although satisfaction generally correlated with fast check arrival times (for example, most respondents reporting being *very* or *somewhat satisfied* received checks in less than six weeks), not all responses could be predicted. One respondent receiving a check in four to six weeks still was *not too satisfied* with this timeframe. In contrast, two respondents saying the check took more than eight weeks to arrive still reported being s*omewhat* or *very satisfied* with the rebate arrival time.

Figure 11. Satisfaction with Rebate Arrival Time by Time it Took to Receive Rebate



Measure Satisfaction

Mail-in rebate participants generally expressed satisfaction with the measures they purchased through the program, with 88% *very satisfied* and 11% *somewhat satisfied* (n=208). Only one respondent reported being *not too satisfied* with the measure the purchased (a programmable thermostat); however, the respondent did not provide a reason for this dissatisfaction.

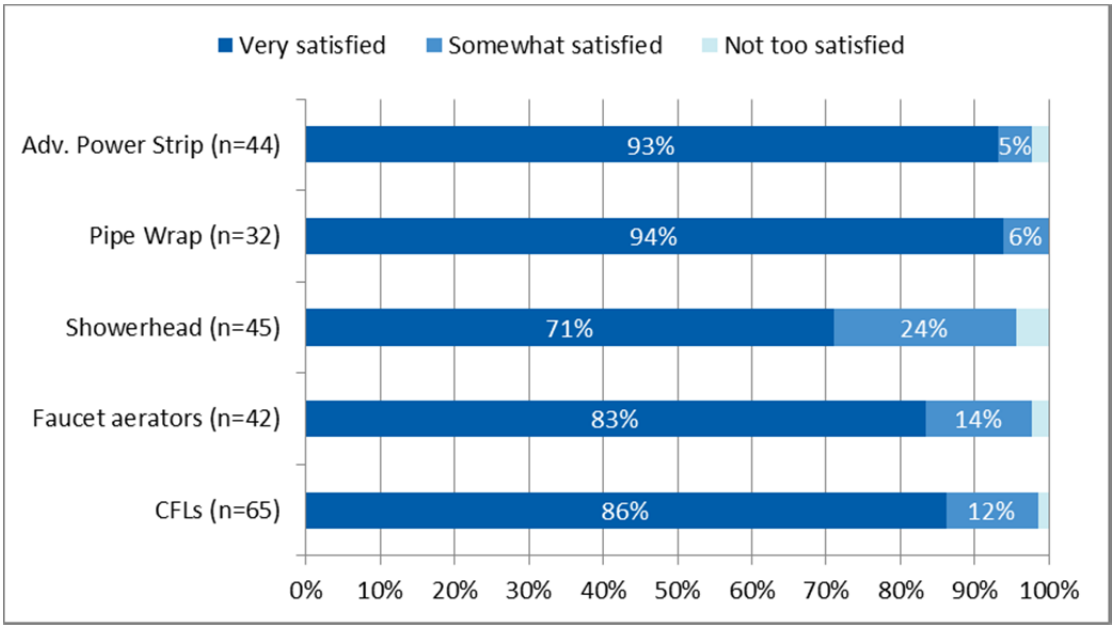
We also asked home energy kit participants were about their experiences with the various devices in the kits. Two measures—water heater pipe wrap and advanced power strips—received the highest satisfaction levels among participants, with 94% (n=32) and 93% (n=44)[6] of respondents, respectively, reporting they were *very satisfied* with these measures.

However, respondents were not as enthusiastic about the energy-efficient showerheads, with only 71% (n=45) giving a response of *very satisfied.*

Figure 12 shows participant satisfaction across all five measures.

[6] Sample sizes differed because questions regarding satisfaction about measures were only asked of participants who installed measures.

Figure 12. Satisfaction with Kit Measures



Five respondents reported dissatisfaction with at least one item in the kit: one respondent was not satisfied with the CFLs; one was not satisfied with the faucet aerators; one was not satisfied with the advanced power strip; and two were not satisfied with the showerhead. Table 15 lists these respondents' comments.

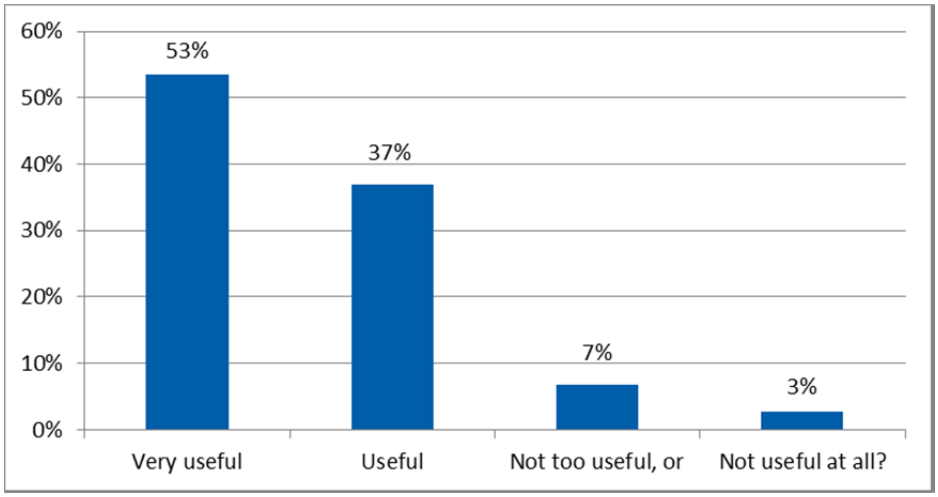
Table 15. Reasons for Dissatisfaction with Kit Measures

Measure	Number of Dissatisfied Respondents	Measure-Related Comments
CFLs	1	Bulbs not bright enough
Faucet aerators	1	Poor quality; low water pressure
Advanced power strips	1	Some of the outlets do not work
Showerheads	2	Too heavy; low water pressure

Kit Instructional Materials

Most respondents (81%) recalled receiving instructions on how to install the items in the kit. Of those who recalled receiving instructions (n=73), the majority thought the instructions were either *very useful* or *somewhat useful* (Figure 13).

Figure 13. Feedback on Usefulness of Kit Instructions (n=73)



A small number of respondents (7 of 73) perceived the instructions as unhelpful. The respondents' top suggestion was for the program to provide more instructions, specifically on the advanced power strip. The second most common suggestion was to include CFLs with higher wattages.

Satisfaction with Ameren Missouri

The majority of respondents said they were *very satisfied* with Ameren as an electric provider overall (68% of kit participants and 70% of mail-in rebate participants). While approximately one-quarter of respondents across both aspects of the program said they were *somewhat satisfied* (27%), only 3% reported being *not too satisfied* or *not satisfied at all*.

Furthermore, approximately one-half of respondents said their opinions of the company improved based on their experience with the rebate program (52% of kit participants and 46% of mail-in rebate participants).

Suggestions to Improve the Program

When the Cadmus team asked participants what Ameren could do to improve the program, respondents only offered a few suggestions:

- Increase the rebate for electric hot water heaters;
- Restructure the rebate for RACs to provide higher rebates for higher-efficiency products, rather than having one standard rebate amount for ENERGY STAR-certified air conditioners;
- Provide free programmable thermostats for customers that purchase new heat pumps; and
- Provide more instructions for advanced power strips in home energy kits.

Among retailers, five retailers requested additional outside advertising. One respondent said he would have been *very satisfied* if more customers came into the store already knowing about the Ameren program (assuming more customers are driven to purchase the products when they have prior knowledge about the rebate). Three retailers recommended having an Ameren representative on-site

more often to conduct more demonstrations. Five retailers also recommended newspaper or radio advertising to promote products eligible for rebates.

Upon asking retailers if they wanted rebates offered for products outside of the current program, two retailers cited appliances such as refrigerators, freezers, and dishwashers. One respondent suggested tankless water heaters, and another wanted to sell discounted light bulbs and participate in the LightSavers program.

CSR Summary

According to the Missouri Code of State Regulations (CSR),[7] demand-side programs that are part of a utility's preferred resource plan are subject to ongoing process evaluations that address, at a minimum, the five questions listed in Table 16. While the process evaluation findings above touch on each of these topics, Table 16 contains a summary response for each specified CSR requirements.

Table 16. 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?	Lack of energy efficiency awareness and the higher upfront cost of energy-efficient products
2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The target market of all residential customers is appropriate for the mail-in rebate programs; Efficiency Kits are limited to those with electric water heating. This is appropriate for this program.
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?	Between the mail-in rebates and free kit measures, the program rebates provide at no cost a total of nine energy-efficient home technologies. This is a highly diverse program. Depending on the potential for energy savings, the program may be expanded to cover air purifiers, water coolers, and pool pumps.
4	Are the communication channels and delivery mechanisms appropriate for the target market segment?	The delivery channels are appropriate but can be improved to overcome market barriers. For example, survey results show that many customers already know the type of product they want to purchase before entering the retail store. The online survey showed that listing rebates on the website allowed the program to reach more customers than otherwise would have occurred only through store advertising.
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?	Provide more marketing to alert customers about available rebates before they get to the store; provide more education on certain measures such as smart strips (See Conclusions and Recommendations).

[7] http://sos.mo.gov/adrules/csr/current/4csr/4c240-22.pdf

GROSS IMPACT EVALUATION RESULTS

The section report details the Cadmus team's determination of each measure's installation rate and calculations of per-unit savings for Ameren's RebateSavers' Program.

Measure Installation Verification

Through participant phone surveys, we confirmed that measures were installed and operating. The installation rate—the percentage of measures found to be installed and operating—is a key factor in estimating each measure's overall savings contribution to the program.

For the home energy kits, Ameren had two delivery channels: direct mail and direct installation by multifamily building facility staff. As shown in Table 19, we found different installation rates for each delivery channels. Precision varies, based on the total number of each measure included in the sample. Further, precision is not estimated for measures without variance (that is, we did not estimate precision for measures that had a 100% installation rate).

Table 17. Measure Installation

Measure	Percentage Installed & Operating	Precision at 90% Confidence
Mail-in Rebates		
Electric Water Heaters	100%	0.0%
Heat Pump Water Heaters	100%	0.0%
Room Air Conditioners	100%	0.0%
Programmable Thermostats	99%	1.4%
Kit Measures—Single-Family		
CFLs	63%	6.5
Advanced Power Strips	48%	6.8%
Faucet Aerators	23%	5.7%
Low-Flow Showerheads	46%	6.7%
Water Heater Pipe Wrap	35%	6.5%
Kit Measures—Multifamily		
CFLs	98%	1.6%
Advanced Power Strips	48%	5.6%
Faucet Aerators	100%	0.0%
Showerheads	86%	3.9%
Water Heater Pipe Wrap	100%	0.0%
Upstream Discounts—Online Store		
Advanced Power Strips, Load Sensing	100%	n/a
Advanced Power Strips, Motion Sensing	100%	n/a

Measure-Specific Gross Savings

Using the engineering algorithms outlined in the RebateSavers evaluation plan, the Cadmus team's engineers estimated savings for each program measure. The gross energy savings determined for each measure are summarized here, along with algorithms and inputs used.

Electric Water Heaters

We estimated per-unit electric savings for water heaters using the following algorithm:

$$\boldsymbol{Energy\ Savings\ (kWh/Year)} = \left(\frac{\mathbf{1}}{\boldsymbol{EFbase}} - \frac{\mathbf{1}}{\boldsymbol{EFeff}}\right) \times (\boldsymbol{HWT - CWT}) \times \boldsymbol{Den} \times \boldsymbol{GPD} \times \mathbf{365} \times \boldsymbol{C_p} \times \frac{\mathbf{1}}{\mathbf{3413}}$$

Table 18. Electric Water Heaters PY13 Savings Assumptions

Term	PY13 Value	PY13 Source
EFbase	0.90	Federal minimum standard
EFeff	0.95	PY5 RebateSavers Database - Average EF
HWT	135	Ameren Missouri TRM
CWT	61.3	Ameren Missouri TRM
GPD	64	Secondary Source [1]
C_P	1	Specific Heat of Water (Btu/lb-oF)
Den	8.33	Density of water (lb/gallon)
Days	365	Conversion Factor (day/yr)
3413	3413	Conversion Factor (Btu/kWh)

[1] DOE Federal Energy Management Program Energy Cost Calculator http://www1.eere.energy.gov/femp/technologies/eep_waterheaters_calc.html

Using this engineering algorithm, we determined an *ex post* energy savings value of 246 kWh/year for each installed and retained electric water heater. This value is approximately 157% of the program's *ex ante* value (157 kWh/year), which was based on Morgan Measure Library data (Table 19). The difference between *ex ante* and *ex post* savings estimates is due to the average energy-efficiency rating (EF) of the rebated measures (0.95), whereas the *ex ante* value assumed a value of 0.93.

Table 19. *Ex Ante* and *Ex Post* Comparison for Electric Water Heaters

Ex Ante Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
157 kWh/yr	246 kWh/yr	157%

Heat Pump Water Heaters

We estimated per-unit savings for heat pump water heaters using the following algorithm:

$$\boldsymbol{Energy\ Savings\ (kWh/Year)} = \left(\frac{\mathbf{1}}{\boldsymbol{EFbase}} - \frac{\mathbf{1}}{\boldsymbol{EFeff}}\right) \times (\boldsymbol{HWT - CWT}) \times \boldsymbol{Den} \times \boldsymbol{GPD} \times \mathbf{365} \times \boldsymbol{C_p} \times \frac{\mathbf{1}}{\mathbf{3413}} - \boldsymbol{kWheat} + \boldsymbol{kWhcool}$$

Where:

EFbase = energy factor of baseline water heater

EFeff = energy factor of program-qualified water heaters

HWT = hot water temperature (^{o}F)

CWT = cold water temperature (^{o}F)

GPD = gallons of hot water used per day

C_p = specific heat of water

Den = the water density (lb/gal)

kWhheat = heating interaction due to heat removed from room to heat water

kWhcool = cooling interaction due to heat removed from room to heat water

Table 20. Heat Pump Water Heaters PY13 Savings Assumptions

Term	PY13 Value	PY13 Source
EFbase	0.90	Federal minimum standard
EFeff	2	PY5 RebateSavers Database, Average EF
HWT	135	Ameren Missouri TRM
CWT	61.3	Ameren Missouri TRM
GPD	64	Secondary Source [1]
kWhheat	Electric Resistance = 1,577 Heat Pump = 779	Ohio Statewide TRM [2]
kWhcool	180	Ohio Statewide TRM [2]
C_P	1	Specific Heat of Water (Btu/lb-oF)
Den	8.33	Density of water (lb/gallon)
Days	365	Conversion Factor (day/yr)
3413	3,413	Conversion Factor (Btu/kWh)

[1] DOE Federal Energy Management Program Energy Cost Calculator.

[2] Interactive effects were adjusted to account for the saturation of electric resistance heat, heat pumps, and central air conditioners in Ameren's territory, as found by the 2013 RebateSavers survey (15%, 26%, and 81% respectively).

Using this engineering algorithm, we determined an *ex post* energy savings value of 2,275 kWh/year for each installed and retained heat pump hot water heater. This value is approximately 126% of the program's *ex ante* value (1,802 kWh/year), which was based on Morgan Measure Library data (Table 21). The difference between estimates resulted from the addition of heating and cooling interactive effects and higher-than-expected efficiency levels of actual purchases.

The savings were higher because the reduced heat loss (as compared to traditional water heaters) resulted in a reduced need for energy to cool the room, even after accounting for any increased heating needs in the winter.

Table 21. *Ex Ante* and *Ex Post* Comparison for Heat Pump Water Heaters

Ex Ante Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
1,802 kWh/yr	2,275 kWh/yr	126%

Room Air Conditioners

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

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

Where:

Btu/hr = the RAC's cooling capacity (Btu/hour)

EER_{BASE} = the baseline energy-efficiency ratio (Btu/W-hour)

EER_{EFF} = the energy-efficiency ratio (Btu/W-hour)

$EFLH_{COOL}$ = the cooling equivalent full-load hours (hour)

1,000 = the conversion factor between Wh and kWh (Wh/kWh)

Table 22. Room Air Conditioner PY13 Savings Assumptions

Term	PY13 Value	PY13 Source
Btu/hr	9,558	PY13 RebateSavers Program Database, Average Btu/hr
EER_{BASE}	9.8	Federal minimum efficiency standard
EER_{EFF}	10.7	PY13 RebateSavers Program Database, Average EER
$EFLH_{COOL}$ – primary unit[1]	860	PY13 CoolSavers Program Data
$EFLH_{COOL}$ – secondary unit[1]	556	Secondary Source[1]
1,000	1,000	Conversion Factor (Wh/kWh)

[1] A weighted average for $EFLH_{COOL}$ for primary and secondary sources was used based on PY13 survey responses; 84% of respondents reported using their RAC as a secondary cooling source.

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

Using this engineering algorithm, we determined an *ex post* energy savings value of 50 kWh/year for each installed and retained RAC. This value is approximately 43% of the program's *ex ante* value (115 kWh/year), which was based on PY10 evaluated savings (Table 23).

Table 23. *Ex Ante* and *Ex Post* Comparison for Room Air Conditioners

Ex Ante Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
115 kWh/yr	50 kWh/yr	43%

The difference between the estimates primarily resulted from the difference in effective full-load hours (EFLH)—a higher assumed value in *ex ante* calculations, which relied on the ENERGY STAR calculator. The ENERGY STAR calculator assumes: (1) a RAC is used as the primary cooling source in the home; and (2) it would be used similarly to a central air conditioner.

The results of our RebateSavers participant survey determined that 84% of respondents used their RACs as secondary cooling sources. As such, in PY13, we used the EFLH value from a RAC metering study

conducted for the California Public Utilities Commission (CPUC) and adjusted the results to account for Ameren's climate zone.

In the PY13 evaluation plans, we stated we would determine Ameren-specific RAC EFLH by metering all RACs identified in the 172 homes where we conducted a lighting inventory (as part of our PY13 LightSavers program evaluation). However, our field engineers found only seven RACs operating in five homes (2.9%).[8] Thus, while we installed metering equipment and will gather data on all seven RACs during summer 2014, we will use these data anecdotally, as the sample size is insufficient to provide a reliable estimate of average RAC usage.

Our engineering team also reviewed 12 potential secondary sources, including metering studies and various statewide TRM methodologies, for RAC EFLH. After assessing the viability of each study in detail, we determined that the 2009 CPUC study, in which we metered 102 RACs, was most appropriate for evaluating Ameren's programs.[9] We selected this study for two reasons: (1) it had the largest sample size; and (2) the weather adjustment necessary to align it with Ameren's local weather was relatively small compared to other studies.[10]

To adjust the 2009 CPUC study appropriately for Ameren's territory, we compared the cooling degree days (CDD) derived from the National Oceanic and Atmospheric Association's typical meteorological year data for California with the CDD provided by Ameren for 30-year normal weather at the St. Louis Lambert Airport. Table 24 lists the CPUC study EFLH, the weather adjustment factor for conversion to an Ameren-specific value, and the resulting Ameren-specific EFLH value.

Table 24. Weather-Adjusted EFLH Value for Ameren Missouri

Source Study	Metered Sites	CA Climate Zone 9 CDD	Ameren CDD	Adjustment Factor	CA Climate Zone 9 EFLH	Adjusted EFLH for Ameren
2009 CPUC	102 RACs	1,456	1,550	106%	522	556

Programmable Thermostats

We estimated programmable thermostat savings by using the RebateSavers participant survey data with the Ameren TRM savings algorithm and assumptions. At issue was whether homeowners changed their behavior to save energy after installing a programmable thermostat.

[8] This low saturation of RACs observed by Cadmus during the LightSavers inventories is consistent with the self-reported RAC saturation (3%) determined through Ameren's most recent potential study.

[9] The Cadmus Group, Inc. *Residential Retrofit High Impact Measure Evaluation Report: Evaluation of PGE2000, SDGE3024, & SCE2501 Room Air Conditioners (2006-2008).* 2010. Available online at: http://www2.epa.gov/sites/production/files/documents/CA_PUC_Assessment.pdf.

[10] The 2008 RLW study was the second most comprehensive RAC study to date, but took place across northeastern coastal locations.

To calculate programmable thermostat savings, we weighted the savings values from the Morgan Measure Libraries (MML) database to the reported program building stock, and then applied an adjustment factor to account for changes in participant behavior. We used the following resources and inputs:

- MML database to obtain home type, HVAC system type, home vintage, and building type.
- Participant survey data to obtain heating and cooling system saturations.
- Participant survey data to obtain behavioral data:
  - Use of previous thermostat (whether manual or programmable)
  - Use of Ameren-rebated replacement thermostat

Using weighted MML savings values—modified with a thermostat use factor derived from participant behavioral data—we determined the per-unit thermostat savings using the following algorithm:

$$Energy\ Savings\ \left(\frac{kWh}{Year}\right) = MML\ kWh\ X\ Thermostat\ use\ factor$$

Where:

- MML kWh = MML kWh savings weighted by program-specific housing characteristics
- Thermostat use factor = Program-specific behavioral adjustment (%)

For our calculation of the thermostat use factor, we asked survey respondents how they used their new programmable thermostat. Then, to determine if their behavior changed after the new thermostat was installed, we asked about their use of their previous thermostat. Our survey results showed that 93% of respondents *currently* use their thermostat in a manner that would save energy, while 72% of respondents used their previous thermostat in a way that would save energy. We determined the thermostat use factor by subtracting the percentage of those who used their previous thermostat efficiently (72%) from the percentage currently using their thermostat to save energy (93%), resulting in a net value of 21%. Table 25 contains the MML kWh, the thermostat use factor, and the *ex post* per-unit kWh for programmable thermostats.

Table 25. Programmable Thermostat Savings

Program	MML kWh	Thermostat Use Factor	*Ex Post* kWh
RebateSavers	502.0	21%	105.4

We determined an *ex post* energy savings value of 105 kWh/year for each installed and retained programmable thermostat. As shown in Table 28, this value is approximately 19% of the program's *ex ante* value (543 kWh/year). The main differences between the *ex ante* and *ex post* savings result from the program-specific adjustments made for heating and cooling equipment saturations and the thermostat use factor of 21%.

Table 26. *Ex Ante* and *Ex Post* Comparison for Programmable Thermostats

Ex Ante Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
543 kWh/yr	105.4 kWh/yr	19%

CFLs

We estimated per-unit savings for CFLs using the following algorithm:

$$\textbf{\textit{Energy Savings}}\ (\textbf{\textit{kWh/Year}}) = \frac{(\textbf{\textit{WattBASE}} - \textbf{\textit{WattEE}}) \times \textbf{\textit{HoursRES}} \times \textbf{\textit{Days}}}{\mathbf{1,000}} \times \textbf{\textit{WHF}}$$

Where:

WattBASE = wattage of the original incandescent bulb replaced by a Home Energy Kit CFL

WattEE = wattage of new bulb installed

HoursRES = the average hours of use per day

Days = days used per year

1,000 = the conversion factor between Wh and kWh (Wh/kWh)

WHF = Waste heat factor to account for interactive effects

Table 27. CFL PY13 Savings Assumptions

Term	PY13 Value	PY13 Source
WattBASE	60	Assumed existing wattage (lumen-equivalent)
WattEE	13	Program Data – kits contain 13 watt CFLs (60 watt replacements)
Hours	2.91	PY2 Lighting Metering Study
Days	365	Conversion Factor (day/yr)
1,000	1,000	Conversion Factor (Wh/kWh)
WHF	0.98	PY5 Engineering Simulation Modeling adjusted for heating and cooling saturations

Using this engineering algorithm, we determined an *ex post* energy savings value of 49 kWh/year for each installed and retained CFL. This value was approximately 102% of the program's *ex ante* value (48.4 kWh/year), which was based on the MML. The difference between the estimates primarily resulted from higher hours of use found during the PY2010 Lighting and Appliance Evaluation than those assumed by MML.

Table 28. *Ex Ante* and *Ex Post* Comparison for Kit CFLs

Ex Ante Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
48.4 kWh/yr	49 kWh/yr	102%

Advanced Power Strips

We used a deemed per-unit savings estimate for advanced power strips because it was difficult to gather reliable primary data on peripheral devices from phone surveys.[11] In our review of more than 20 studies on advanced power strips, we examined the assumptions for different equipment types (home office and home entertainment). The notable differences between the studies were the average number of controlled devices assumed in each equation and the type of smart-strip technology used.

After this detailed review, we determined that a 2011 study conducted by NYSERDA combined the most in-depth research with the most reasonable assumptions to calculate the energy savings for load-sensing smart strips. (NYSERDA's study used consumer electronics market characterization data to determine the peripheral devices to be included in the advanced power strip analysis.)[12] Table 29 shows the per-unit savings found by NYSERDA for home office and home entertainment applications.

Table 29. NYSERDA Savings Values

Smart Strip Location	Savings/Unit
Home Office	31 kWh/yr
Home Entertainment	75 kWh/yr

Ameren provides load-sensing advanced power strips in its home energy kits and sells them at a discounted price to customers via its online store. Ameren also sells one type of motion-sensing advanced power strip on its online store, a technology designed primarily to work in office settings, where computers may remain on for long periods without being used. However, almost no research exists on the improvement in savings from a motion-sensing advanced power strip over a load-sensing advanced power strip. One study concluded that motion-sensing strips— when used with entertainment centers—result in increased savings of 9%, as compared with load-sensing strips.[13]

Using this estimate, the Cadmus team calculated the *ex ante* and *ex post* per-unit savings for the different types of advanced power strips sold through the program in various home locations (Table 30).

Table 30. *Ex Ante* and *Ex Post* Comparison for Advanced Power Strips

APS Location and Type	*Ex Ante* Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
Home Office—Load sensing	147 kWh/yr	31 kWh/yr	21%
Home Entertainment—Load sensing	222 kWh/yr	75 kWh/yr	34%
Home Office—Motion sensing	N/A	34 kWh/yr	N/A
Home Entertainment—Motion sensing	N/A	82 kWh/yr	N/A

[11] Cadmus found that survey responses about the number and type of equipment plugged into "controlled" outlets were often unreliable.

[12] Lockheed Martin and Energy Solutions. 2011. *Advanced Power Strip Research Report.* Prepared for the New York State Energy Research and Development Authority (NYSERDA). Available at www.nyserda.ny.gov.

[13] Ecos. 2009. "Smart Plug Strips: Draft Report." Available at: http://www.efficientproducts.org/reports/smartplugstrip/Ecos-Smart-Plug-Strips-DRAFT-Jul2009-v2x.pdf

To determine final per-unit savings values for load-sensing and motion-sensing strips provided through the kit and the online store, we adjusted *ex post* savings based on the saturation levels of peripheral device use, as determined through participant surveys. Responses to our surveys revealed that saturation levels differed by delivery channel (Table 31).

Table 31. Adjusted *Ex Post* Values Considering Peripheral Device Saturation

Delivery Channel and APS Type	Home Office Saturation	Entertainment Center Saturation	Adjusted *Ex Post* Savings/unit
Home Energy Kit: Load sensing[1]	48%	52%	54 kWh/yr
Online Store: Load sensing[2]	36%	64%	59 kWh/yr
Online Store: Motion sensing[2]	36%	64%	64 kWh/yr

[1] Source: Kit participant survey.
[2] Source: PerformanceSavers participant survey.

A detailed overview of the NYSERDA algorithms used and the differences in assumptions between the NYSERDA report and the Ameren TRM are contained in Appendix F.

Faucet Aerators

We estimated per-unit savings for faucet aerators using the following algorithm:

$$\boldsymbol{Energy\ Savings\ (kWh/Year)} = \frac{\boldsymbol{People \times Faucet\ Time \times Days \times \Delta GPM \times (T_{FAUCET} - T_{IN}) \times C_P \times Den}}{\boldsymbol{3413 \times RE \times Number\ of\ Faucets}}$$

Where:

People = the number of people using faucet aerators (people/household)

Faucet Time = the average length of faucet use per day (min/day)

Days = the number of days per year (day/yr)

ΔGPM = the difference in rated gallons per minute between the base unit and the new unit (gal/min)

T_{FAUCET} = the average water temperature out of the faucet (^{o}F)

T_{IN} = the average inlet water temperature (^{o}F)

C_P = the specific water heat (Btu/lb-^{o}F)

Den = the water density (lb/gal)

ΔTemp = the temperature at the tap minus the temperature at the water main

RE = the water heater's recovery efficiency

Number of Faucets = the number of used faucets per home

Although the engineering algorithm was the same for the faucet aerators delivered to single-family homes and those installed in multifamily properties, several assumptions differed.

Table 32. Faucet Aerator PY5 Savings Assumptions

Term	PY13 Value: Single-Family	PY13 Source: Single-Family	PY13 Value: Multifamily	PY13 Source: Multifamily
People	2.53	PY13 Energy Kit Participant Survey	1.9	PY13 CommunitySavers Program Data
Faucet Time	3.7	PY11 MFIQ Metering Study/Person	3.7	PY11 MFIQ Metering Study/Person
Days	365	Conversion Factor (day/yr)	365	Conversion Factor (day/yr)
ΔGPM	0.7	PY13 Program Data	0.7	PY13 Program Data
T_{FAUCET}	80	Ameren TRM	80	Ameren TRM
T_{IN}	61.3	Ameren TRM	61.3	Ameren TRM
RE	0.98	Secondary Source[1]	0.98	Secondary Source[1]
CP	1	Specific Heat of Water (Btu/lb-oF)	1	Specific Heat of Water (Btu/lb-oF)
Den	8.33	Density (lb/gal)	8.33	Density (lb/gal)
3413	3413	Conversion Factor (Btu/kWh)	3413	Conversion Factor (Btu/kWh)
Number of faucets	3.04	Secondary Source[2]	2.4	PY13 Program Data[3]

[1] RE for electric hot water heater. 2010 Ohio Technical Reference Manual. Available at: http://amppartners.org/pdf/TRM_Appendix_E_2011.pdf

[2] Assumes one kitchen faucet per household plus an average of 2.04 bathrooms per home, as determined by the Ameren 2012 potential study.

[3] Assumes one kitchen faucet per household plus an average of 1.4 bathrooms per unit, according to Pear Tree Properties installation sheets.

Using this engineering algorithm, we determined the following *ex post* energy savings values:

- 37 kWh/year for each installed and retained aerator delivered to single-family homes (approximately 64% of the program's *ex ante* values).
- 35 kWh/year for multifamily homes (approximately 94% of the program's *ex ante* values).

The difference between the *ex post* and *ex ante* estimates for single-family homes primarily resulted from two factors:

- The TRM assumed average faucet time to be five minutes per day, based on a 1997 report by American Water Works Association Research Foundation. For the evaluated savings assumption, we used metering data from the PY11 Multifamily Income Qualified (MFIQ) program, which found an average faucet use time of 3.7 minutes per day.
- The TRM assumed 1.9 faucets per home, based on the PY10 MFIQ program site visits. Because this measure was installed in single-family homes, we used the 2012 Ameren potential study, which found an average of 2.04 bathrooms and assumed one kitchen faucet (for a total of 3.04 faucets per home).

Table 33 shows the *ex ante* and *ex post* savings.

Table 33. *Ex Ante* and *Ex Post* Comparison for Kit Low-Flow Aerators

Home Type	*Ex Ante* Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
Single-Family	57 kWh/yr	37 kWh/yr	64%
Multifamily	37 kWh/yr	35 kWh/yr	94%

Showerheads

We estimated energy-efficient showerhead savings using the following algorithm:

$$\boldsymbol{Energy\ Savings}\ (\boldsymbol{kWh/Year}) = \frac{\boldsymbol{People} \times \boldsymbol{Shower\ Time} \times \boldsymbol{Days} \times \%\boldsymbol{Days} \times \Delta\boldsymbol{GPM} \times (\boldsymbol{T_{SHOWER}} - \boldsymbol{T_{IN}}) \times \boldsymbol{C_P} \times \boldsymbol{Den}}{\boldsymbol{3,413} \times \boldsymbol{RE} \times \boldsymbol{Showerheads}}$$

Where:

People = the number of people taking showers (ppl/household)

Shower Time = the average shower length (min/shower)

Days = the number of days per year (day/yr)

%Days = the number of showers per day, per person (shower/day-ppl)

ΔGPM = the difference in rated gallons per minute for the base showerhead and the new showerhead (gal/min)

T_{SHOWER} = the average water temperature at the showerhead (^{o}F)

T_{IN} = the average inlet water temperature (^{o}F)

C_P = the specific heat of water (Btu/lb-^{o}F)

Den = the water density (lb/gal)

3,413 = the conversion rate between Btu and kWh (Btu/kWh)

RE = the water heater's recovery efficiency

Showerheads = the number of showerheads used per home

Although the engineering algorithm was the same for the showerheads delivered to single-family homes and those installed in multifamily properties, several assumptions differed. Table 34 contains the assumptions for both home types.

Table 34. Showerhead PY13 Savings Assumptions

Term	PY13 Value: Single-Family	PY13 Source: Single-Family	PY13 Value: Multifamily	PY13 Source: Multifamily
People	2.53	PY13 Energy Kit Participant Survey	1.9	PY13 CommunitySavers Program Data
ShowerTime	8.66	Secondary Source[1]	8.66	Secondary Source[1]
Days	365	Conversion Factor (day/yr)	365	Conversion Factor (day/yr)
%Days	0.66	Secondary Source[2]	0.66	Secondary Source[2]
ΔGPM	0.75	PY13 Program Data	0.75	PY13 Program Data
T_{SHOWER}	105	Secondary Source[3]	105	Secondary Source[3]
T_{IN}	61.3	Ameren TRM	61.3	Ameren TRM
RE	0.98	Secondary Source[4]	0.98	Secondary Source[4]
C_P	1	Specific Heat of Water (Btu/lb-°F)	1	Specific Heat of Water (Btu/lb-°F)
Den	8.33	Density (lb/gal)	8.33	Density (lb/gal)
3,413	3,413	Conversion Factor (Btu/kWh)	3,413	Conversion Factor (Btu/kWh)
Showerheads	2.05	PY13 Energy Kit Participant Survey	1.4	PY13 Program Data[5]

[1] DeOreo, William, P. Mayer, L. Martien, M. Hayden, A. Funk, M. Kramer-Duffield, and R. Davis (2011). "California Single-Family Water Use Efficiency Study." *Sponsored by*: California Department of Water Resources. pp. 90-91. http://www.aquacraft.com/sites/default/files/pub/DeOreo-%282011%29-California-Single-Family-Water-Use-Efficiency-Study.pdf.

[2] DeOreo, Op cit. %Days are calculated by the number of showers per day per household (1.96, pp. 90 of the DeOreo study) divided by the average number of people per household (2.95, pp. 182 of the DeOreo study).

[3] The Bonneville Power Administration measured average shower temperatures as 104–106.

[4] RE for electric hot water heater. 2010 Ohio Technical Reference Manual. Available at: http://amppartners.org/pdf/TRM_Appendix_E_2011.pdf

[5] Average number of showers according to Pear Tree Properties installation sheets.

Using this engineering algorithm, we determined the following *ex post* energy savings values for each installed and retained showerhead:

- 210 kWh/year for in single-family homes (approximately 58% of the program's *ex ante* values).
- 231 kWh/year for multifamily homes (approximately 113% of the program's *ex ante* values).

Table 37 shows the *ex ante* and *ex post* savings. The difference between the estimates for single-family homes primarily resulted from the following two factors:

- The TRM assumed the number of showers per person per day (%Days in the algorithm) was one. However, the study we used found the number of showers per person per day was 0.66.[14]
- The TRM assumed one showerhead per home. However, primary data collected from our participant survey found homes receiving the kits had an average of 2.05 showerheads per home.

Table 35. *Ex Ante* and *Ex Post* Comparison for Kit Low-Flow Showerheads

Home Type	*Ex Ante* Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
Single Family	361 kWh/yr	210 kWh/yr	58%
Multifamily	204 kWh/yr	231 kWh/yr	113%

Water Heater Pipe Wrap

We estimated per-unit savings from pipe wrap using the following algorithm:

$$\boldsymbol{Energy\ Savings\ (kWh/Year)} = \frac{\left(\left(\frac{\mathbf{1}}{\boldsymbol{R_{EXIST}}} - \frac{\mathbf{1}}{\boldsymbol{R_{NEW}}}\right) \times \boldsymbol{L} \times \boldsymbol{C} \times \boldsymbol{\Delta T} \times \mathbf{8,760}\right)}{\boldsymbol{RE} \times \mathbf{3413}}$$

Where:

R_{EXIST} = pipe heat loss coefficient of uninsulated pipe (existing) (Btu/hr-°F-ft) = 1.0

R_{NEW} = pipe heat loss coefficient of insulated pipe (new) (Btu/hr-°F-ft)

L = length of pipe from a water heating source covered by pipe wrap (ft)

C = circumference of pipe (ft); (Diameter (in) * π * 0.083)

ΔT = average temperature difference between supplied water (hot water) and ambient air temperatures (°F)

8,760 = the number of hours during which heat loss occurs throughout the year (hr/yr)

RE= recovery efficiency of the electric hot water heater

3,413 = the conversion rate between Btu and kWh (Btu/kWh)

Although the engineering algorithm was the same for pipe wrap delivered to single-family homes and wrap installed in multifamily properties, the length of pipe wrap was shorter for multifamily homes, which resulted in a lower *ex post* savings value.

Table 36 shows this difference in the two assumptions.

[14] DeOreo, William, P. Mayer, L. Martien, M. Hayden, A. Funk, M. Kramer-Duffield, and R. Davis (2011). "California Single-Family Water Use Efficiency Study." *Sponsored by*: California Department of Water Resources. pp. 90-91. http://www.aquacraft.com/sites/default/files/pub/DeOreo-%282011%29-California-Single-Family-Water-Use-Efficiency-Study.pdf.

Table 36. Pipe Wrap PY13 Savings Assumptions

Term	PY13 Value	PY13 Source
R_{EXIST}	1	Secondary Source[1]
R_{NEW}	4	PY13 Program Data
L (in feet)	14 ft – single family 4 ft - multifamily	PY13 Program Data
C	0.196	Calculated (assumed ¾" D)[2]
ΔT	67.5 – single family 58.9 – Multifamily	Secondary Source; Ameren TRM[3] Secondary Source; PY11MFIQ site-visits[4]
8,760	8,760	Constant (Hours per year)
RE	0.98	Secondary Source[5]
3,413	3,413	Conversion Factor (Btu/kWh)

[1] Navigant Consulting Inc. "Measures and Assumptions for Demand Side Management Planning; Appendix C Substantiation Sheets." April 2009. Pg. 77.
[2] 3/4" is standard pipe diameter.
[3] Ambient air temperature is 67.5 degrees based on: Department of Energy: Test Procedure for Water Heaters. May 11, 1998. http://www.gpo.gov/fdsys/pkg/FR-1998-05-11/pdf/98-12296.pdf. Hot water temperature is 135 degrees according to Ameren TRM. Cadmus will measure hot water temperature in Ameren homes during 2014 meter removals.
[4] Ambient air temperature is 67.5 degrees based on DoE Test procedure. Hot water temperature is 126.4 based on site visits.
[5] RE for electric hot water heater. 2010 Ohio Technical Reference Manual. Available at: http://amppartners.org/pdf/TRM_Appendix_E_2011.pdf

Using this engineering algorithm, we determined the following *ex post* energy savings values for installed pipe wrap:

- 364 kWh/year in single-family homes (approximately 142% of the program's *ex ante* value).
- 91 kWh/year in multifamily homes (approximately 35% of the program's *ex ante* value).

Table 37 shows *ex ante* and *ex post* savings. The difference between *ex ante* and *ex post* savings estimates for multifamily homes primarily resulted from the shorter average pipe length wrap installed (four feet).

Table 37. *Ex Ante* and *Ex Post* Comparison for Pipe Wrap

Home Type	*Ex Ante* Savings/Unit	*Ex Post* Savings/Unit	Realization Rate
Single Family	257 kWh/yr	364 kWh/yr	142%
Multifamily	28 kWh/yr	91 kWh/yr	324%

Summary

Table 38 lists the per-unit *ex ante* and *ex post* gross savings by measure.

Table 38. PY13 Summary: Comparison of *Ex Ante and Ex Post* Per-Unit Gross Savings

Measure	*Ex Ante* (kWh/yr)	*Ex Post* (kWh/yr)	Realization Rate
Mail-in Rebates			
Electric Water Heaters	157	246	157%
Heat Pump Water Heaters	1,802	2,275	126%
Room Air Conditioners	115	50	43%
Programmable Thermostats	543	105	19%
Kit Measures—Single-Family			
CFLs	48.4	49	102%
Advanced Power Strips—Load Sensing	184.5*	54	29%
Faucet Aerators	57	37	64%
Showerheads	361	210	58%
Water Heater Pipe Wrap	257	364	142%
Kit Measures—Multifamily			
CFLs	48.4	49	102%
Advanced Power Strips—Load Sensing	184.5*	54	29%
Faucet Aerators	37	35	94%
Showerheads	204	231	113%
Water Heater Pipe Wrap	28	91	324%
Upstream Discounts—Online Store			
Advanced Power Strips—Load Sensing	184.5*	59	32%
Advanced Power Strips—Motion Sensing	184.5*	64	35%

**Ex ante* value represents the average between home office and home entertainment estimates contained in the TRM

To estimate the program's total gross energy savings, we applied the per-unit values shown in Table 39 to the RebateSavers' PY13 participation rates.

Table 39. PY13 Summary: *Ex Post* Program Gross Savings Accounting for Installation Rates

Measure	PY13 Participation	Per-Unit *Ex Post* Savings (kWh/hr)	Percent Installed and Operating	Total *Ex Post* Savings (kWh/yr)
Mail-In Rebates				
Electric Water Heaters	83	246	100%	20,395
Heat Pump Water Heaters	268	2,275	100%	609,581
Room Air Conditioners	871	50	100%	43,204
Programmable Thermostats	2,182	105	99%	227,726
Kit Measures—Single-Family				
CFLs	101,676	49	63%	3,365,693
Advanced Power Strips—Load Sensing	8,473	54	48%	219,132
Faucet Aerators	24,224	37	23%	204,144
Low-Flow Showerheads	15,759	210	46%	1,523,467
Water Heater Pipe Wrap	8,473	364	35%	1,078,937
Kit Measures—Multifamily				
CFLs	4,128	49	98%	199,933
Advanced Power Strips—Load Sensing	344	54	48%	8,897
Faucet Aerators	718	35	100%	25,026
Low-Flow Showerheads	374	231	86%	74,332
Water Heater Pipe Wrap	344	91	100%	31,203
Upstream Discounts—Online Store				
Advanced Power Strips—Load Sensing	16,442	59	100%	972,708
Advanced Power Strips—Motion Sensing	78	64	100%	5,030
Total	**184,437**	**n/a**	**78%**	**8,409,476**

*Kit measure installation rates varied, depending on if they were mailed or installed directly. Final *ex post* savings are weighted according to the proportion of kits delivered through each method.

Table 40 shows a comparison of the program's *ex ante* and *ex post* gross savings. *Ex post* demand savings, determined through DSMore using these *ex post* energy savings, are provided in Appendix A.

Table 40. PY13 Summary: Comparison of *Ex Ante and Ex Post* Program Gross Savings

Measure	*Ex Ante* (kWh/yr)	*Ex Post* (kWh/yr)	Realization Rate	Precision at 90% Confidence
Mail-In Rebates				
Electric Water Heaters	13,031	20,395	157%	0.0%
Heat Pump Water Heaters	482,936	609,581	126%	0.0%
Room Air Conditioners	100,165	43,204	43%	0.0%
Programmable Thermostats	1,185,594	227,726	19%	1.4%
Kit Measures—Single Family				
CFLs	4,921,119	3,165,759	64 %	10.4%
Advanced Power Strips—Load Sensing	1,563,269	219,132	14%	14.1%
Faucet Aerators	1,380,768	204,144	15%	24.8%
Low-Flow Showerheads	5,688,999	1,523,467	27%	14.7%
Water Heater Pipe Wrap	2,177,561	1,078,937	50%	18.4%
Kit Measures—Multifamily				
CFLs	130,181	199,933	154%	1.6%
Advanced Power Strips—Load Sensing	63,468	8,897	14%	11.6%
Faucet Aerators	26,710	25,026	94%	0.0%
Low-Flow Showerheads	76,296	74,332	97%	4.5%
Water Heater Pipe Wrap	9,623	31,203	324%	0.0%
Upstream Discounts—Online Store				
Advanced Power Strips, Load Sensing	3,033,549	972,708	32%	n/a
Advanced Power Strips, Motion Sensing	14,391	5,030	35%	n/a
Total	**20,867,660**	**8,409,475**	**40%**	**2.8%**

NET IMPACT EVALUATION RESULTS

"Free ridership" is the percentage of savings that would have occurred in the absence of the program due to participants purchasing the same measures without the influence of the program. Thus "free riders" are customers who would have purchased the measure independent of the program, and because they account for some of the costs but none of the benefits of the program, they decrease a program's net savings. The Cadmus team estimated free ridership based on RebateSavers survey responses to a battery of questions regarding customer purchasing decisions.

To calculate the RebateSavers Program's NTG, the Cadmus team used the following formula:

$$NTG = 1 - Freeridership + Participant\ Spillover + Nonparticipant\ Spillover + Market\ Effects$$

"Spillover" is the savings that occur when customers undertake the installation of additional energy-efficiency measures or perform energy-efficient activities without receiving financial assistance as a result of their experience participating in a given program. Unlike free ridership, there are no program costs are associated with spillover savings, but there are energy-saving benefits that increase net savings.

Similar to free ridership, we estimated spillover using a battery of survey questions that determined whether the respondents' energy efficient actions were: (1) influenced by participation in the RebateSavers program, and (2) not incentivized through another Ameren Missouri program. (Due to time and resource constraints, we did not estimate market effects for the RebateSavers program.)

This section describes the Cadmus team's methodology for calculating net savings by measure.

Table 41 summarizes the program's net impacts.

Table 41. PY13 Net Impact Results Summary

Measure	*Ex Post* Gross Savings (kWh/yr)	Free ridership	Part-icipant Spillover	Non-participant Spillover	NTG	Precision at 90% Confidence	Net Savings (kWh/yr)
Mail-in Rebates							
Electric Water Heaters	20,395	56.60%	2.0%	1.7%	47.1%	2%	9,606
Heat Pump Water Heaters	609,581	14.70%			89.0%	5%	542,527
Room Air Conditioners	43,204	59.00%			44.7%	22%	19,312
Programmable Thermostats	227,726	56.10%			47.6%	9%	108,398
Subtotal[1]	**900,907**	**28.21%**	**2.0%**	**1.7%**	**75.5%**	**11%**	**679,844**
Kit Measures							
CFLs	3,365,693	22.2%	7.1%	1.7%	86.6%	4%	2,914,690
Advanced Power Strips	228,029	13.1%			95.7%		218,224

Measure	*Ex Post* Gross Savings (kWh/yr)	Free ridership	Part-icipant Spillover	Non-participant Spillover	NTG	Precision at 90% Confidence	Net Savings (kWh/yr)
Faucet Aerators	229,170	7.1%			101.7%		233,066
Low-Flow Showerheads	1,597,799	6.7%			102.1%		1,631,353
Water Heater Pipe Wrap	1,110,140	7.80%			101.0%		1,121,241
Subtotal[1]	**6,530,831**	**15.1%**	**7.1%**	**1.7%**	**93.7%**	4%	**6,118,574**
Upstream Discounts—Online Store[2]							
Advanced Power Strips—Load Sensing	972,708	N/A	N/A	1.7%	101.9%	N/A	991,189
Advanced Power Strips—Motion Sensing	5,030	N/A	N/A		101.9%	N/A	5,126
Program Total[1]	**8,409,476**			1.7%	**92.7%**		**7,794,732**

[1] Values weighted by total program measure-level savings.

[2] Free ridership and participant spillover were not assessed for these measures.

Free Ridership Methodology

Mail-in Rebate Measures

We determined mail-in rebate free ridership via a participant self-report approach, based on a standard battery of questions that define whether the participant did or would do the following:

- Already purchased the product before learning about the incentive
- Was planning to purchase the same product before learning about the incentive
- Would have purchased a product that was just as energy efficient without the incentive
- Would have purchased the product at the same time as they did when they went through the RebateSavers program.

We then applied a free ridership score—ranging from 0% to 100%—to individual participants based on their survey responses. (Appendix G contains a flowchart showing our methodology.)

Our process for determining a free ridership score for mail-in rebates is as follows.

- We categorized customers as 0% free riders in these instances: (1) they had no plans to install the measure in the absence of the program's incentives and would not have installed the measure within one year in absence of the program; (2) they had considered installing the measure before learning about the program but would not have done so without program incentives; or (3) in the absence of the program incentives, they would have purchased or installed less-efficient equipment.

- We categorized customers as 100% free riders if they had installed the measure before learning about the program, or if they would have installed the same measure at the same time without the program.
- We assigned a partial free ridership score to customers if, before the program, they had decided to install the measure and their decision about either the product to purchase or the likely purchase date was influenced by the program. For customers who were highly likely to install an energy-efficient measure right away and for whom the program had less influence over their decision, we assigned a higher free ridership percentage than we assigned to those customers for whom the program may have been less of an influence or whose purchase would like have occurred later in the absence of the program.
- We cross-checked the responses to questions about intentions, efficiency level, and timing by asking: "To summarize, how important was Ameren's energy-efficiency promotion on your decision to purchase the [Measure Name]?" and "Please describe in your own words the process that led you to decide to purchase the more energy-efficient option." Based on responses to these questions, we adjusted some of the free ridership scores, as appropriate (details are in the Results section).

After translating survey responses into each participant's free ridership score, we calculated an average free ridership estimate for each mail-in rebate measure.

Appendix H contains information about the conversion of each raw survey response option into free ridership scoring matrix values and shows the free ridership score combinations and scoring legend we used to categorize customer survey responses.

Kit Measures

For each kit measure that was installed, we assigned free ridership score based on the respondents' reported intentions to purchase the measure in the absence of the free energy-efficiency kit.

For each kit measure, we asked participant if they would have purchased and installed the item had it not been provided for free from Ameren.

- Respondents who said that they would not have purchased a measure within the same year were estimated as 0% free riders.
- Respondents who said that they would have purchased the measure within the same year—or that they did not know when they would have purchased the measure—were estimated as 25% free riders.
- Respondent who said they would have purchased the measure at the same time as they received the kit were estimated as 100% free riders.

Free Ridership Results

As noted above, the Cadmus team's evaluation relied on two data collection methods to assess net savings for mail-in rebate measures: a phone survey (n=213) and an online survey (n=151). We also used

a phone survey to assess net savings for kit measures (n=91). The free ridership results we calculated (shown in Table 42) combine the results of both the phone survey and the online survey, based on the total percentage of savings generated by each channel.

The phone results for mail-in rebate measures showed an average free ridership rate of 32% across all respondents (weighted by measure savings) (n=213), while the online survey results showed a lower average free ridership rate of 15% (n=151). This difference is statistically significant ($p < 0.02$). The reason for the difference between the free ridership scores of phone respondents and online respondents is uncertain, but it may be due to factors such as customer behaviors and differences in decision-making among participants who are more likely to submit a rebate online than mail-in.

The combined average free ridership rate for mail-in rebate measures was 28.2%, and the free ridership for kit measures was 15.1%.

Table 42 provides preliminary free ridership by measure and by survey group.

Table 42. Preliminary RebateSavers Free Ridership Results

Program Measure	Phone Sample Size	Phone FR Estimate	Online Sample Size	Online FR Estimate	Total Weighted free ridership Estimate
Mail-in Rebates					
Electric Water Heater	15	60.0%	8	50.0%	56.6%
Heat Pump Water Heater	38	18.1%	48	8.3%	14.7%
Programmable Thermostat	92	56.7%	84	52.4%	56.1%
Room Air Conditioner	68	58.5%	11	68.2%	59.0%
Overall – Mail-in Rebates	**213**	**31.9%***	**151**	**14.9%***	**28.2%**
Home Energy Kits					
CFLs	66	22.2%	-	-	22.2%
Faucet Aerators	39	7.1%	-	-	7.1%
Low-flow Showerheads	46	6.7%	-	-	6.7%
Advanced Power Strip	44	13.1%	-	-	13.1%
Pipe Wrap	32	7.8%	-	-	7.8%
Overall—Kit Measures	**227**	**15.1%***	-	-	**15.1%**

*Values weighted by total program measure-level savings.

Free ridership for the home energy kit measures was significantly lower than the mail-in rebate measures. Among mail-in rebate measures:

- The results show a wide variation between heat pump water heaters and the other products.
- Room air conditioners had the highest free ridership of 59%.
- Programmable thermostats had a free ridership rate of 56%.
- Electric water heaters had a free ridership rate of 57%.

The high free ridership rates for these measures probably resulted in part to the incentive amount relative to the incremental purchase cost of the measure. Table 43 lists the measure costs, incentive levels, and free ridership scores for mail-in rebate measures.

Table 43. Ameren MO Measure Costs, Incentive Levels, and Free Ridership Estimates

Measure	Average Cost	Ameren Rebate	Percentage of Cost Covered by Rebate	Free Ridership Estimate
Electric Water Heater	$433.97	$25	6%	56.6%
Heat Pump Water Heater	$1,004.39	$300	30%	14.7%
Programmable Thermostat	$92.38	$25	27%	56.1%
Room Air Conditioner	$260.12	$20	8%	59.0%

As shown, electric water heaters received a $25 rebate, which was only 6% of the typical incremental purchase price of approximately $434. Similarly, a $20 incentive only covered about 8% of the typical RAC cost.[15] Interestingly, the incentive amounts for programmable thermostats and heat pump water heaters were 27% and 30% of the measure cost, respectively, but heat pump water heaters experienced significantly lower free ridership rates. The differences here are most likely related to customer decision making and the reason behind the original purchase, as heat pump water heaters are a relatively unknown technology, as compared to programmable thermostats.

Free Ridership Scoring

Mail-in Rebate Measures

The Cadmus team noted a common pattern in the phone respondents' answers to free ridership questions. Fifty-four respondents who purchased a mail-in rebate measure said they first heard of the RebateSavers program after they had planned to purchase the measure; they said they would have purchased the same measure even without the Ameren incentive. These respondents also said they would have installed the measure to the same level of efficiency without the program incentive, and they would have done it at the same time as they did through the program. Every answer from this group indicated free ridership; so we scored them as 100% free riders.

We scored an additional 36 respondents as 100% free riders because they reported purchasing their new equipment *before* they heard about Ameren's Act On Energy campaign. Collectively, these two sets of customers represented 42% of phone respondents.

We applied the same scoring methodology to online survey respondents who purchased a mail-in rebate measure. Among this group, 60 respondents (40%) were considered 100% free riders. Another 26 respondents said that when they first heard of the RebateSavers program, they had already been planning to purchase the measure and that without the incentive they would have purchased the same measure. These respondents also reported they would have installed the measure to the same level of

[15] Average measure cost obtained from SalesForce program data.

efficiency without the program incentive, and they would have done it at the same time as they did through the program. An additional online survey 34 respondents reported they had already purchased their new equipment before they heard about the Act On Energy campaign.

Scoring Adjustments for Mail-In Rebate Measures

As previously discussed, the Cadmus team used a multiple-question approach to assess the free ridership of each participant. Our methodology applied a standardized, rigorous approach to measuring a complex prediction: What would the participant have done in the absence of the program? For most participants, this is a challenging question to answer accurately, which is why we used several questions to determine a participant's score.

Even with the multi-question approach to scoring free ridership, however, bias may be present. For example, social desirability bias occurs when respondents give what they believe is the "best" answer (in this case, saying they would have purchased the most energy-efficient product, even without the rebate). Another type—recall bias—occurs when respondents have difficulty remembering what they did in the past or what their past needs, desires, or motivations were as those factors related to a hypothetical situation.

To control for these common self-report biases in our free ridership results, we included these questions in the free ridership battery not used in the initial scoring process:

> *"To summarize, how important was Ameren's energy-efficiency promotion on your decision to purchase the [SURVEYMEASURE]?"*
>
> *a. Important*
> *b. Somewhat important*
> *c. Not very important*
> *d. Not at all important*

And,

> "*Please describe in your own words the process that led you to decide to purchase the more energy-efficient option.*"

If responses to these questions contradicted the answers reported in the initial free rider scoring questions, we made adjustments to control for any social desirability response bias known to impact self-reported findings. Thus, we made these adjustments for the phone and online survey respondents:

- When respondents to whom we assigned an initial free ridership score of 100% answered that the Ameren energy-efficiency promotion was "important" to their purchasing decision, we assigned them a final free ridership score of 50%.
- When respondents who were assigned an initial free ridership score of 100% answered that the Ameren energy-efficiency promotion was "somewhat important," we assigned them a final free ridership score of 75%.

- When respondents who were assigned an initial free rider score of 0% answered that the Ameren energy-efficiency promotion was "not at all important" to their purchasing decision, we assigned them a final free ridership score of 50%.
- When respondents who were assigned an initial free rider score of 0% answered that the Ameren energy-efficiency promotion was "not very important," we assigned them a final free ridership score of 25%.

After reviewing all responses, we adjusted 84 free ridership scores for mail-in rebate customers (across both the phone and online survey groups) according to the above method. In addition, we adjusted one score based on the open-ended response question. (This phone respondent's score was adjusted from a 50% free rider to a 0% free rider because the open-ended response indicated the RebateSavers rebate caused the purchase of a more efficient model than would have been purchased otherwise.) However, we did not adjust the scores of any online respondents based on information from the open ended question. Table 44 shows the magnitude and direction of the adjustment.

Table 44. Adjusted Free Ridership Scores: Phone and Online Respondents

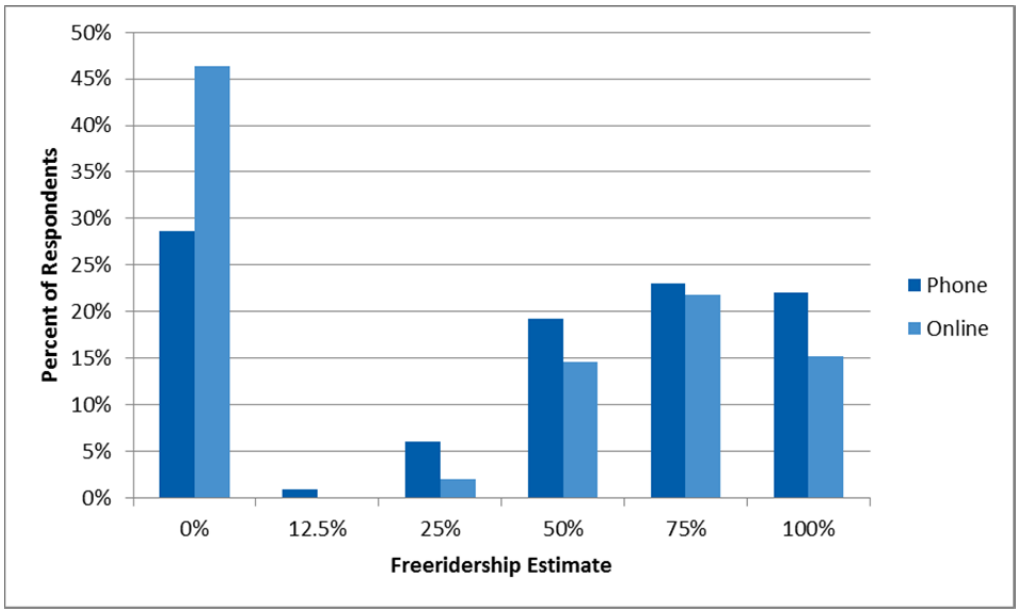
Number of Responses	Original free ridership %	Adjusted free ridership %
48	100%	75%
31	100%	50%
1	50%	0%*
1	0%	50%
3	0%	25%

*Adjustment based on response to open-ended question.

Distribution of Free Ridership Scores: Mail-in Rebate Measures

Figure 14 shows the distribution of mail-in rebate participants by the free ridership score assigned to each respondent by the Cadmus team. Approximately 29% of the phone survey respondents were scored as 0% free riders, while 22% were scored as true free riders (100%). Approximately 46% of online survey respondents were scored as 0% free riders, and 15% were scored as true free riders (100%).

Figure 14. Overall Distribution of Rebate Savers Free Ridership Scores
Mail-In Rebate Participants



Distribution of free ridership Scores: Kit Measures

Table 45 shows the distribution of responses, free ridership scores assigned by measure, and the overall free ridership scores weighted by the quantity installed.

Table 45. Kit Measures free ridership Estimation (n=91)

Purchase Timing In Absence of Receiving Kit	free rider %	CFLs (n)	Faucet Aerators (n)	Showerheads (n)	Smart Strips (n)	Pipe Wrap (n)
At the same time of receiving the kit	100%	10	2	2	4	2
Within the same year / Don't Know	25%	31	2	4	7	2
More than one year / Never	0%	25	35	40	33	28
Weighted Average FR % Estimate		**22.2%**	**7.1%**	**6.7%**	**13.1%**	**7.8%**

Participant Spillover

The Cadmus team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in the RebateSavers program.

Spillover Results

We asked mail-in rebate participants and home energy kit participants if they had undertaken any additional energy-efficient actions since participating in the program. To calculate spillover, we then asked them to rate how important it was to their decision that their RebateSavers measure qualified for a rebate from Ameren. We also asked how important Ameren's educational material was to their decision. We allocated to program spillover only measures for which the respondent answered "Important" to at least one of these two questions. To avoid the double-counting of savings captured by a concurrent program, we eliminated responses for which the respondent received an incentive from another Ameren program.

Although multiple respondents indicated they had purchased CFLs or LED bulbs, we omitted these lighting measures in our analysis to avoid double-counting the savings. The lighting spillover analysis from the home inventory study accounts for non-program bulbs purchased by Ameren customers.

Six phone survey mail-in rebate respondents, five online survey respondents, and eight kit measure respondents reported installing additional energy-efficient measures for which their participation in the RebateSavers program or information from Ameren was "important" to their purchasing decisions. The measures installed by these respondents were: seven refrigerators, two freezers, five clothes washers, two RACs, two central air conditioners, home insulation, and a low-flow showerhead.

We applied deemed savings estimates to the refrigerator, freezer, and clothes washer. We applied PY13 *ex post* savings values to the RAC, central air conditioner, insulation, and showerhead. Using both, we arrived at spillover savings totals. Next, we divided the sample spillover savings by the program gross savings from the survey sample, as shown in this equation:

$$Spillover\ \% = \frac{\sum[Net\ spillover\ measure\ kWh\ savings\ for\ all\ rebate\ survey\ respondents]}{\sum[Gross\ program\ measure\ kWh\ \ for\ all\ rebate\ survey\ respondents]}$$

This yielded a 2.0% spillover estimate for mail-in rebate respondents and a 7.1% spillover estimate for kit measures respondents (Table 46).

Table 46. Participant Spillover by Data Collection Method and Measure

Collection Method	Spillover Measure	Spillover kWh Savings	Total Survey Sample Program Savings
Mail-in Rebate Measures			
Phone	Refrigerator	500	235,326
	Refrigerator	500	
	Central Air Conditioner	281	
	Freezer	61	
	Clothes Washer	309	
	Room Air Conditioner	50	
Online	Refrigerator	500	
	Central Air Conditioner	281	
	Freezer	61	
	Clothes Washer	309	
	Clothes Washer	309	
	Insulation	1,515	
Overall	**All**	**4,676**	**235,326**
Kit Measures			
Phone	Refrigerator	500	47,857
	Refrigerator	500	
	Refrigerator	500	
	Refrigerator	500	
	Refrigerator	500	
	Clothes Washer	309	
	Clothes Washer	309	
	Room Air Conditioner	50	
	Low-flow Showerhead	210	
Overall	**All**	**3,378**	**47,857**

Nonparticipant Spillover

Effective program marketing and outreach generates program participation *and* increases general energy-efficiency awareness among customers. The cumulative effect of sustained utility program marketing (which often occurs concurrently for multiple programs) can affect customers' perceptions of their energy usage and, in some cases, motivates customers to take efficiency actions outside of the utility's program. This phenomenon—called nonparticipant spillover (NPSO)—results in energy savings caused by but not rebated through a utility's demand-side management activity.

During PY13, Ameren Missouri spent over $1.6 million dollars to market individual residential efficiency programs and the portfolio-wide Act on Energy campaign. To understand whether Ameren's program-specific and general Act On Energy marketing efforts generated energy-efficiency improvements outside

of Ameren's incentive programs, the Cadmus team implemented a general population survey of residential customers. We will repeat the survey for both PY14 and PY15 as we continue monitoring nonparticipant activity and tracking potential long-term changes in energy-efficiency awareness among Ameren's residential customers.

Methodology

Using Ameren's entire residential customer information system as the sample frame, the Cadmus team randomly selected and surveyed 401 customers. We determined that our sample contained a small number of customers (n=36) who self-reported that they participated in an Ameren residential program in 2013. When estimating NPSO, we excluded these customers from our analysis, focusing on the 365 identified nonparticipants to avoid the potential double-counting of program-specific spillover.

We limited our NPSO analysis to the same efficiency measures rebated through Ameren programs (known as "like" spillover), with the notable exception of lighting products. Even though lighting is a "like" spillover measure, the analysis excluded it to avoid double-counting NPSO lighting savings already captured through the upstream LightSavers program market affects analysis.

To confirm a relationship between Ameren's energy-efficiency programs and the Act On Energy awareness campaign and actions taken by nonparticipants, the Cadmus team's survey asked about nonparticipants' familiarity with Ameren's energy-efficiency programs and Act On Energy. To be included in the NPSO analysis, nonparticipating respondents had to indicate: a) they were familiar with Ameren's campaign; and b) Ameren's efficiency messaging motivated their purchasing decisions.

Results

Of 365 nonparticipants surveyed, 11 cited Ameren's marketing as either "very important" or "somewhat important" in their decisions to purchase non-rebated, high-efficiency measures during 2013:[16]

- Among nonparticipants citing their knowledge of Ameren's energy-efficiency programs or the Act On Energy campaign as "very important," we counted *ex post,* gross, per-unit savings, determined through the PY13 evaluation towards the NPSO analysis.
- If nonparticipants said Ameren was "somewhat important" in their decisions, we applied a 50% decrement and applied one-half of the *ex post* energy savings for the specified measure.

The analysis excluded the responses of nonparticipants who said that Ameren's programs or Act On Energy were "not very important" or "not at all important" to their efficiency actions.

Table 47 shows measures and gross evaluated kWh savings attributed to Ameren, with average savings per spillover measure of 242 kWh.

[16] This translates to approximately 3% of the general population with a range of 90% confidence of 1.54% to 4.49%. Despite the range, the middle point of 3% remains the most likely value. With 3% of the population undertaking actions on their own, the sample size needed to detect such a level with ±10% is nearly 10,000 surveys, a clearly prohibitive undertaking.

Table 47. NPSO Response Summary

Individual Reported Spillover Measures	Influence of Ameren Information on Purchase	Measure Savings (kWh)*	Allocated Savings	Total kWh Savings	Avg kWh Per Spillover Measure
Water Heater	Very	245.7†	100%	245.7	
Central Air Conditioner (CAC)	Somewhat	288*	50%	144.0	
Installed Programmable Thermostat	Somewhat	105†	50%	52.7	
Installed Programmable Thermostat	Somewhat	105†	50%	52.7	
Installed Programmable Thermostat	Somewhat	105†	50%	52.7	
Installed Programmable Thermostat	Somewhat	105†	50%	52.7	A
Installed Programmable Thermostat	Somewhat	105†	50%	52.7	
Removed Refrigerator	Very	1,013ˆ	100%	1,013	
Scheduled CAC Tune-Up	Somewhat	993**	50%	496.5	
Water Heat Pipe Wrap	Very	363.8†	100	363.8	
Windows	Somewhat	271***	50%	136	
Total (n=11)				**2,662**	**242**

†Based on savings calculated for the RebateSavers program.

*Assumption used for the CoolSavers program's gross evaluated savings, based on a 2.5-ton unit rated at 15 SEER, with a baseline of 13 SEER.

ˆBased on savings calculated for the ApplianceSavers program.

**Assumption used for the CoolSavers program's gross evaluated savings, based on a 3-ton unit and a 7.7% efficiency improvement in heating and cooling for condenser cleaning.

***Based on savings calculated for the PerformanceSavers program.

To arrive at a single savings estimate (Variable A in Table 48), the Cadmus team used the numbers in the Total kWh Savings column to calculate an average for the 11 measures assessed for nonparticipant spillover. Thus, the estimate of 242 kWh represents the average nonparticipant energy savings per respondent who attributed spillover to Ameren's residential programs.

To determine the total NPSO generated by Ameren marketing in 2013, we used the following variables (as shown in Table 48):

- **A** is the average kWh savings per NPSO response.
- **B** is the number of NPSO measures attributed to the program.
- **C** is the number of nonparticipants contacted by the survey implementer.
- **D** is Ameren's total residential customer population.
- **E** is NPSO energy savings extrapolated to the customer population, calculated by dividing B by C and then multiplying this result by A and D.

- **F** is the total evaluated savings for the 2013 program year, for ApplianceSavers, CoolSavers, LightSavers, PerformanceSavers, and RebateSavers. (The analysis did not include CommunitySavers and ConstructionSavers.)[17]
- **G,** representing NPSO as a percentage of total evaluated savings, is the nonparticipant percentage used in the NTG calculations.

We estimated overall NPSO at 2.8% for the portfolio level.

Table 48. NPSO Analysis

Variable	Metric	Value	Source
A	Average kWh Savings per Spillover Measure	242	Survey Data/Impact Evaluation
B	Number of Like Spillover Nonparticipant Measures	11	Survey data
C	Number Contacted	365	Survey disposition
D	Total Residential Population	1,040,928	Customer database
E	Non-Part SO MWh Savings Applied to Population	7,592	(((B÷C)×A) × D)/1000
F	Total Evaluated Savings (MWh)	267,918	2013 Program Evaluations
G	NPSO as Percent of Total Evaluated Savings	2.8%	E ÷ F

In some jurisdictions, evaluators apply NPSO as an adjustment at the portfolio-level. Though a reasonable approach, it inherently assumes all programs contributed equally to generating the observed NPSO. However, given the significant differences between the programs' marketing tactics and budgets as well as the programs' designs and scales, an alternate approach is likely to produce better estimate of attribution.

The Cadmus team considered the following three approaches for allocating total observed NPSO to individual programs:

1. **Even Allocation**: The most straightforward approach allocates NPSO evenly across the residential programs (i.e., makes a 2.8% adjustment to each program's NTG). Doing so, however, is equivalent to applying NPSO at the portfolio-level, and therefore, as noted, assumes all programs contribute equally to generating NPSO.
2. **"Like" Programs:** Another approach allocates NSPO savings to specific programs, based on the measure installed by the nonparticipant or by the action they took. For example, one nonparticipant reported tuning up their CAC, based on energy-efficiency messaging from Ameren. Using this approach, we would assign NPSO savings associated with the tune-up to CoolSavers. While this approach establishes a clear connection between a reported NPSO measure and Ameren's program that promotes that measure, our research found this direct

[17] The Cadmus team excluded CommunitySavers and ConstructionSavers as both programs exclusively employ very targeted marketing; so marketing for these programs would likely generate little NPSO. For CommunitySavers, the program works directly with property managers of low-income buildings. For ConstructionSavers, most program marketing targets regional builders.

measure-program relationship did not prove as straightforward as it appeared. Specifically, while our study found all 11 respondents reporting NPSO were familiar with Act on Energy or Ameren's energy-efficiency messaging, only nine could cite specific program names. Further, just over one-half of the customers (6 of 11) who reported NPSO measures were unfamiliar with the program or the programs corresponding to the measure they installed. These findings indicated that Ameren generated NPSO through the cumulative effects of various program-specific and portfolio-level marketing efforts, and mapping NPSO measures solely to the program offering that measure could undervalue the overall impact of cumulative and sustained energy-efficiency messaging.

3. **Marketing Budget and Program Size.** The final allocation approach we considered—and eventually chose to use—assigns overall NSPO as a function of each program's marketing and program budget. This approach remains consistent with the theory that NPSO results from the cumulative effect of program-specific and Act On Energy marketing and program activity over a period of time, not necessarily by a single, program-specific marketing effort. In addition, while NPSO is most commonly associated with mass media marketing campaigns, the scale of program activity also proves to be a factor. For example, even without a significant marketing campaign, a program's size can drive NPSO through word-of-mouth and in-store program messaging. We believe this approach accurately reflects and attributes NSPO to programs, ensuring those total costs (including marketing) and total benefits (net savings including NPSO) are properly accounted for when assessing overall program cost-effectiveness.

The Cadmus team then distributed the portfolio-level result of 7,592 MWh NPSO to Ameren's residential programs (excluding CommunitySavers and ConstructionSavers). As noted, we considered both the PY13 program size (in terms of total gross *ex post* MWh savings) and each program's marketing budget (shown in Table 49) when allocating NPSO across programs.

Table 49. Program-Specific Savings and Marketing

Program	Program *Ex Post* Gross Savings (MWh)	Percentage of Portfolio Savings	Total Marketing	Percentage of Total Marketing
ApplianceSavers	6,963	2.6%	$542,242	35.1%
CoolSavers	25,098	9.4%	$824,949	53.4%
LightSavers	227,132	**84.8%**	$33,146	2.1%
PerformanceSavers	316	0.1%	$73,145	4.7%
RebateSavers	**8,409**	3.1%	**$71,788**	**4.6%**
Total	**267,918**	**100%**	**$1,545,270**	**100%**

The results of this approach (shown in Table 50) reflect the impact of each program on the nonparticipant population, based on marketing expenditures and program magnitudes in the marketplace.

Table 50. Combined Savings and Marketing Allocation Approach

Program	*Ex Post* Gross Energy Savings (A)	Marketing Spending (B)	Combined Savings/Marketing (AxB)	Percentage of Combined Savings/Marketing
ApplianceSavers	2.6%	35.1%	0.9%	11.6%
CoolSavers	9.4%	53.4%	5.0%	63.4%
LightSavers	84.8%	2.1%	1.8%	23.1%
PerformanceSavers	0.1%	4.7%	0.006%	0.07%
RebateSavers	**3.1%**	**4.6%**	**0.1%**	**1.8%**
Total	**100%**	**100%**	**7.9%**	**100%**

Two programs are credited with the greatest NPSO: CoolSavers (accounting for one-half of all marketing dollars) at 4,816 MWh; and LightSavers (accounting for more than 80% of total energy savings) at 1,751 MWh. As NPSO impacts program-specific NTG results,[18] all NPSO estimates have been reported as a percentage of each program's total gross energy savings.

As shown in Table 51, we allocated 140 MWh of NPSO to RebateSavers, representing 1.8% of the combined residential portfolio savings and marketing expenditure. This resulted in a 1.7% adjustment to the program's PY13 NTG.

Table 51. NPSO by Program

Program	Program Gross Savings (MWh)	Total NPSO (MWh)	Percentage of Combined Savings/Marketing	Program-Specific NPSO (MWh)	NPSO as a Percentage of Gross Savings
ApplianceSavers	6,963	7,592	11.6%	878	12.6%
CoolSavers	25,098		63.4%	4,816	19.2%
LightSavers	227,132		23.1%	1,751	0.8%
PerformanceSavers	316		0.07%	5	1.7%
RebateSavers	**8409**		**1.8%**	**140**	**1.7%**
Total	**267,918**		**100%**	**7,592**	**2.8%**

[18] NTG = 1 – Free Ridership + Participant Spillover + NPSO + Market Effects

Net Savings Summary

To estimate the overall program and measure NTG ratios, the Cadmus team used total population *ex post* gross kWh savings to weight results for each data collection method. Table 52 shows the components of each program measure's NTG estimate (free ridership and spillover) and the percentage of total program savings related to each measure's data collection method. We used the percentage of total program savings and NTG ratios specific to each measure to arrive at a savings-weighted NTG estimate of 75.5% for the mail-in rebate portion of the program. The savings-weighted NTG estimate for the kit measures portion of the program is 93.7%.

Table 52. NTG by Measure

Measure	Survey Delivery Channel	% of Program Savings (By Measure & Delivery Channel)	Free Ridership	Participant Spillover	Non-participant Spillover	Net-To-Gross
Mail-in Rebate Measures						
Electric Hot Water Heater	Phone	1.5%	60.0%	2.0%	1.7%	43.7%
	Online	0.8%	50.0%			53.7%
Heat Pump Hot Water heater	Phone	44.3%	18.1%			85.6%
	Online	23.2%	8.3%			95.4%
Programmable Thermostat	Phone	22.0%	56.7%			47.0%
	Online	3.5%	52.4%			51.3%
Room Air Conditioner	Phone	4.5%	58.5%			45.2%
	Online	0.3%	68.2%			35.5%
Total	**Both**	**100.0%**	**28.2%**	**2.0%**	**1.7%**	**75.5%**
Kit Measures						
CFLs	Phone	51.5%	22.2%	7.1%	1.7%	86.6%
Faucet Aerators	Phone	3.5%	7.1%			101.7%
Low-flow Showerheads	Phone	24.5%	6.7%			102.1%
Advanced Power Strip	Phone	3.5%	13.1%			95.7%
Pipe Wrap	Phone	17.0%	7.8%			101.0%
Total	**Phone**	**100.0%**	**15.1%**	**7.1%**	**1.7%**	**93.7%**

The overall weighted-by-total gross program savings NTG estimate for the program as a whole is 92.7%, as shown in Table 53.

Table 53. Overall Program NTG

Subprogram	Total Gross Program kWh Savings	% of Program Savings	NTG	Overall Program NTG
Mail-in Rebate Measures	900,907	10.7%	75.5%	92.7%
Kit Measures	6,530,831	77.7%	93.7%	
Advanced Power Strip-Online	977,738	11.6%	101.9%	

BENCHMARKING

The Cadmus team researched other utilities that offered similar measures as Ameren's RebateSavers program. Table 54 compares the participation levels and gross and net savings of those utilities with Ameren, by measure type, for mail-in Rebates.

PY13 free ridership results for Ameren were higher than the benchmarked utilities for programmable thermostats but fell within the range of other results for the other measures. The table lists each program's incentive amount, but many other factors—such as differences in program design, marketing, and maturity as well as differences between the customers participating—can also contribute to the disparities in free ridership rates.

Table 54. RebateSavers Benchmarking Results: Mail-in Rebates†

State or Utility	Incentive Amount	Participation	*Ex Post* Per Unit Savings (kWh/yr)	Free ridership	Spillover
Electric Hot Water Heaters					
Ameren Missouri	$25	83	246	57%	3.9%*
PacifiCorp (CA)	$40	41	149	50%	25%
PacifiCorp (WY)	$50	n/a	110	65%	14%
Heat Pump Water Heaters					
Ameren Missouri	$300	268	2,275	15%	3.9%*
Ameren Illinois	$300	73	1,802	25%	9%
Room Air Conditioners					
Ameren Missouri	$20	871	50	59%	3.9%*
Ameren Illinois	$35	5,554	104	34%	9%
San Diego Gas & Electric (CA)	-	25,365	47	67%	N/A
PacifiCorp (CA)	$30	10	83	25%	25%
Programmable Thermostats					
Ameren Missouri	$25	2,182	105***	56%	3.9%*
Ameren Illinois	$25	3,703	Electric Heat:776 Cooling:194	26%	9%
Citizens Energy Group (IN)	$20	1,265	N/A**	24%	2%
NIPSCO (IN)	$20	4,259	N/A**	44%	3%

* Includes participant and nonparticipant spillover.
**Evaluation was for natural gas savings only.
***Weighted heating and cooling.
†Appendix I provides a full list of reports used for the benchmarking research.

Table 55 compares Ameren's free home energy kit with the results reported for other, similar programs, specifically the quantity and installation of measures; however, we were not able to obtain free ridership data from these reports. Net savings information is rarely available for free kit programs and is

not often measured. We found that only one program—the Residential Retrofit Program administered by Potomac Edison—provided free home energy kits to non-low-income customers. The other programs we researched provided kits to low-income customers exclusively. This was also the only program to provide an advanced power strip in the kit. Also, all of the programs we compared were implemented by mailing participants a kit and not another delivery mechanism (such as direct install).

Table 55. RebateSavers Benchmarking Results: Free Home Energy Kits*

Utility/ Administrator	Program Type	CFLs		Showerhead		Aerator		Advanced Power Strip	
		ISR	Quantity	ISR	Quantity	ISR	Quantity	ISR	Quantity
Ameren Missouri	Non-low-Income	33%	12	46%	1-2*	23%	2-3*	48%	1
Potomac Edison	Non-low-Income	69%	N/A	59%	N/A	34%	N/A	76%	1
Energy Outreach Colorado	Low-Income	70%	2-4**	36%	1	N/A	N/A	N/A	N/A
Public Service Co. of New Mexico	Low-Income	96%	6	91%	1	78%	2	N/A	N/A
Oregon Department of Housing	Low-Income	77%	4	58%	1	63%	2	N/A	N/A
Rocky Mountain Power (WY)	Low-Income	75%	4	N/A	N/A	N/A	N/A	N/A	N/A

* Appendix I presents a full list of reports used for the benchmarking research.
**Quantity in kit dependent on options selected by customer.

The impact analysis of the programs in Iowa and Oregon included per-unit installation rates for CFLs provided in the energy-saving kits. This research indicated that the per-unit installation rates of CFLs decreased as the number of CFLs in the kit increased. Table 56 illustrates the per-unit CFL installation rates calculated by these two programs. However, the program reports did not explain why installation rates decreased.

Table 56. Per-Unit CFL Installation Rates

Measure	Iowa Program	Oregon Program
CFL 1	94%	91%
CFL 2	90%	90%
CFL 3	N/A	67%
CFL 4	N/A	60%

When participants in the Wyoming program were asked why they chose not to install all four of the CFLs received in their kit, the most-common responses were that participants stored the remaining bulbs or gave the bulbs away.

We found similar results in our research of evaluations of school kit programs: installation rates for multiple units of the same measure decreased with each additional unit provided per kit. However, the installation of measures increased over time.

For these programs, finding the optimal number of CFLs to include per kit for generating the greatest amount of energy savings was a challenge.

- The evaluation of one Midwestern program found that CFLs were the most likely kit measure to be installed, but installation occurred at decreasing rates for each CFL in the kit. More than 90% of respondents installed the first CFL, while the second and third CFLs were less likely to be installed (68% and 51% were installed, respectively). However, given the evidence from a persistence survey conducted one year later, at least half of the bulbs not installed at the time of the first program year survey had been installed a year later.
- The evaluation of another Midwestern program found that 77% of CFLs were installed within six to 12 months after participating in the program. Roughly one-quarter of all CFLs installed were installed after families completed the family home installation survey, and very few families (approximately 2%) removed CFLs after installing them. Note that this program provided four CFLs per kit, but the program experienced a significantly reduced installation rate by the fourth CFL, suggesting four CFLs was not the optimal number to provide in a kit.

COST-EFFECTIVENESS RESULTS

To analyze the cost-effectiveness of the PY13 RebateSavers program, MMP utilizing DSMore. MMP assessed cost-effectiveness using the following five tests as defined by the California Standard Practice Manual:[19]

- 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 the specific measures installed through RebateSavers, and correlates both prices and savings to 30 years of historic weather data. Using long-term weather ensures the model captures low-probability, high-consequence weather events and appropriately values them. As a result, the model's produces an accurate evaluation of the demand-side efficiency measure relative to other alternative supply options.

Key assumptions include the following:

- Discount Rate = 6.95%
- Line Losses = 5.72%
- Summer Peak would occur during the 16th hour of a July day on average.
- Avoided Electric T&D = $31.01/kW
- 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.

In addition, MMP leveraged the "Batch Tools" (model inputs) used by Ameren in its original analysis as input into the *ex post* DSMore analysis. By starting with the original DSMore Batch Tool used by Ameren and only modifying it with new data from the evaluation (PY13-specific RebateSavers participation counts, per-unit gross savings and NTG), consistency is assured. In particular the assumptions in the model are driven by measure load shapes, which tells the model when to apply the savings during the day. This assures the load shape for that end use matches the system peak impacts of that end use and provides the correct summer coincident savings. MMP used measure lifetime assumptions and incremental costs, based the program's database, the Ameren Missouri TRM, or the original Batch Tool.

A key step in the analysis process was acquiring PY13 Ameren program spending data: actual spending broken down into implementation, incentives, and administration costs. MMP applied these numbers at the program level, not the measure level. While applying incentives at the measure level is useful for

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

planning purposes, it is unnecessary for cost effectiveness modeling as results are based on the program overall. MMP applied administrative costs (e.g., evaluation, potential study costs, and data tracking) in the portfolio summary analysis, not by program, as they apply to the whole residential effort.

Table 57 summarizes the cost-effectiveness findings by test. Any benefit/cost score above 1.0 passes the test as cost-effective. The table also includes the cost of conserved energy (CCE), which describes the costs of acquiring those savings based on the lifetime benefits. In addition, the table includes the present value of the net lifetime benefits (net avoided costs minus program costs). As shown, the RebateSavers program passes the TRC, UCT, PART, and Societal TRC tests; the RIM test is not critical to pass. The CCE is $0.019 per kWh and net lifetime benefits are nearly $1M.

Table 57. Cost-Effectiveness Results (PY13)

	TRC	UCT	RIM	PART	Societal	CCE - $/kWh	Net Lifetime Benefits
RebateSavers	1.45	2.31	0.53	3.55	1.69	$0.019	$993,833

APPENDIX A. *EX POST* DEMAND REDUCTIONS

MMP determined *ex post* demand reductions using the *ex post* energy savings estimated in this PY13 report and DSMore (using load shapes provided by Ameren)..

Table 58. PY13 Summary: *Ex Post* Per-Unit Demand Reductions

Measure	PY13 Participation	Net Per-Unit *Ex Post* Demand Reduction (kW)	Total *Ex Post* Savings (kW)
Mail-in Rebates			
Electric Water Heaters	83	0.013	1.071
Heat Pump Water Heaters	268	0.226	60.49
Room Air Conditioners	871	0.044	38.691
Programmable Thermostats	2,182	-0.011	-24.536
Kit Measures			
CFLs	105,804	0.002	122.35
Advanced Power Strips – Load Sensing	8,817	0.008	34.427
Faucet Aerators	24,942	0.004	25.987
Low-Flow Showerheads	16,133	0.024 – SF 0.026 – MF	181.898
Water Heater Pipe Wrap	8,817	0.041 – SF 0.010 - MF	125.02
Upstream Discounts—Online Store			
Advanced Power Strips, Load Sensing	16,442	0.010	156.369
Advanced Power Strips, Motion Sensing	78	0.010	.089
Total	**184,437**	**n/a**	**723**

APPENDIX B. STAKEHOLDER INTERVIEW GUIDE

Respondent name:_____

Respondent phone: _____

Interview date: _____ Interviewer initials: _____

For the PY5, PY6 and PY7 evaluations, Cadmus will interview stakeholders bi-annually. The first interview (Wave 1) will focus on the program's launch and changes to the previous program design. The second interview (Wave 2) will assess the program at year end and identify recommendations for improving subsequent programs. In general, the first interview will focus more prospectively, while the second interview is more retrospective.

A. Introduction

1) What are your main responsibilities for Ameren Missouri's RebateSavers Program?

2) What percent of your time is dedicated to RebateSavers?

3) What tasks do you regularly spend the majority of your time on?

B. Program Design and Implementation

5) How is communication, both formal and informal, between APT and Ameren conducted?

6) How does APT communicate with retailers?

7) How does APT communicate with EFI?

8) Can you provide a summary of how the program is intended to perform?

9) In Cycle 1, efficient product rebates were included as part of a combined Lighting and Appliance program. How does the new stand-alone program differ from the combined program? (In program theory? Design?)

10) How did Ameren determine which measures to rebate?

11) Do you expect any new measures to be added this year, or later in the cycle?

12) What would you say is working particularly well so far in PY5? Why is that?

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

14) Have there been any lessons learned from the PY5 launch?

15) What do you think have been the most influential program or market factors to attract program participation this year?

16) What program or market factors have you seen serve as a barrier to participation this year?

C. Program Goals

17) What are the program's participation and savings goals for PY5? By equipment type?

18) How are these goals determined?

19) Does the program have any process or non-impact goals for PY5? (Probe: retailer participation, increased awareness, customer satisfaction, etc)

20) How were these goals determined?

21) In your opinion, how has the program performed so far in PY5 (in terms of both process and savings/participation goals)?

22) Why do you think this is?

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

24) Have you identified the triggers for contingency plans in case goals are not being met?

D. Measures

24) In your opinion, should any additional measures be considered for inclusion in future programs? If so, what measures? Did HVAC contractors regularly request a specific measure not included in the program? If so, what measure? Did home-owners?

25) Conversely, should any current measures be excluded?

26) How were incentive amounts determined?

E. Marketing Efforts

27) What are the main channels for marketing the program?

28) Can you talk more about the information and educational material that is distributed through retailers? (Probe: where are materials located in the store? Are there in-store promotions or demonstrations?)

29) Do you feel that marketing has been effective? (If no, what could be done to improve it?)

30) Have you done any cross-marketing of any other Ameren Missouri program to ApplianceSavers participants?

F. Retailer Participation

31) How many retailers currently participate in the program?

32) What does that participation process entail? (Probe: do they need to sign an agreement with APT, and what are their obligations?)

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33) Does APT provide training to store managers or floor representatives on the eligible measures?

34) Have any retailers been unwilling to work with the program? Why do you think that is?

35) What kind of retailer feedback are you receiving? (probe about rebate levels, measure mix, Ameren marketing support)

G. Rebate Processing

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

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

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

39) What was the decisionmaking behind creating the online rebate submission? (Do you perceive differences among customer groups? Are you doing this for any other Ameren programs?)

H. Quality Control

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

42) Does Ameren perform any ride-alongs or independent quality control checks? Please explain.

I. Customer Feedback

43) Have you received any customer feedback about the program?

J. Summary

44) From your perspective, what are the biggest challenges facing the program in PY5?

45) Is there anything else you'd like us to know about your experience administrating/implementing the program so far this year?

46) Cadmus is reaching out to program stakeholders earlier in the year for PY5 to figure out how each stakeholder group can best benefit from the program evaluation process. Is there anything specific you were hoping to learn from this evaluation?

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

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APPENDIX C. PARTICIPANT SURVEY INSTRUMENTS

Mail-in Rebate Products Survey

Researchable Questions	Survey Question Mapping
How do participants primarily learn about the RebateSavers program?	PA1
What are the reasons why customers are purchasing new equipment, and which factors influence the type of product they purchase?	PP1,PP3, PP4
From whom do participants purchase the eligible equipment, and how effective are these upstream actors in promoting the program?	PP2, RC1-RC2
How satisfied are participants with the program?	PS1-PS5
What is the installation rate?	QA2-QA4
Are participants using programmable thermostats correctly?	PT1-PT6
Would the participant have purchased the product without the program? (Free ridership)	FR1-FR10
Did the Ameren program influence the participant purchase any other energy-efficient equipment? (Spillover)	SO1-SO9
Participant Demographics	D1-D5

Note: Answers in parentheses are never read by the interviewer.

Introduction

I1. Hello, my name is _____, calling from Pragmatic Research on behalf of Ameren Missouri. May I please speak with [CUSTOMER FIRST NAME + CUSTOMER LAST NAME]?

I2. [IF DIFFERENT PERSON INSERT] "Hello, my name is _____ calling from Pragmatic Research on behalf of Ameren Missouri". Our records show that your household received a rebate from Ameren Missouri for purchasing energy efficiency equipment. Are you the best person to talk with about this?

1. (Yes)
2. (No) [TRY TO REACH RIGHT PESRON; OTHERWISE THANK AND TERMINATE]
3. (Don't know) [TRY TO REACH RIGHT PESRON; OTHERWISE THANK AND TERMINATE]

99. (Refused) [THANK AND TERMINATE]

[**IF NEEDED**: We are conducting a short survey with customers who recently applied for or received a rebate for purchasing energy-efficiency equipment. We'd like to ask you a few questions about the product you purchased – this survey should take no more than 10 minutes and your answers are completely confidential. Let me assure you, this is not a sales call.]

MEASURE CODES

Programmable Thermostat = PT
Room Air Conditioner = AC
Electric Storage Water Heater = WH
Heat Pump Water Heater = HP

I3. Our records show that you applied for an Ameren Missouri rebate for [QTY] [MEASURE](s). Is that correct? [NOTE TO INTERVIEWER: READ ALL MEASURES AND QUANTITIES LISTED]

1. (Yes, all information is correct)[SKIP TO VERIFIED FLAG]
2. (No, quantity is incorrect)
3. (No, measure is incorrect) [SKIP TO I5]
98. (Don't Know) [SKIP TO I5]
99. (Refused) [THANK AND TERMINATE]

[ASK I4a-d IF I3=2. ASK FOR EACH MEASURE IN DATABASE]
I4a. [IF MEASURE=PT] For how many programmable thermostats did you request a rebate? [NUMERIC OPEN END] [SKIP TO VERIFIED FLAG]

I4b. [IF MEASURE=AC] For how many room air conditioners did you request a rebate? [NUMERIC OPEN END] [SKIP TO VERIFIED FLAG]

I4C. [IF MEASURE=WH] For how many water heaters did you request a rebate? [NUMERIC OPEN END] [SKIP TO VERIFIED FLAG]

I4D. [IF MEASURE=HP] For how many heat pump water heaters did you request a rebate? [NUMERIC OPEN END] [SKIP TO VERIFIED FLAG]

[ASK IF I3=3 OR 98]

I5. Please tell me which products you purchased and requested a rebate. [DO NOT READ LIST, PROMPT IF NECESSARY.] [MARK ALL THAT APPLY]

1. (Room air conditioner)
2. (Heat pump water heater)
3. (Electric storage water heater)
4. (Programmable thermostat)
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

[ASK FOR EACH MEASURE LISTED IN I5]

I6. For how many [insert answer from I5(s) did you purchase and request a rebate?

[NUMERIC OPEN END]

VERIFIED FLAG.

CREATE VERIFIED FLAG “VER_QTY” AND “SURVEYMEASURE”

IF MULTIPLE MEASURES USE THE FOLLOWING PRIORITIES FOR DETERMINING “SURVEYMEASURE” FOR REMAINDER OF SURVEY:

Priority		POPULATION IN SAMPLE	TARGET COMPLETE
1	Electric Water Heater	16	5
2	Heat Pump Water Heater	54	20
3	Room Air Conditioner	311	35
4	Programmable Thermostat	428	40

[ASK IF MULTIPLE MEASURES ONLY]. For the remainder of this survey, we’d like to focus on [SURVEYMEASURE]

Program Awareness

PA1. How did you first learn about Ameren Missouri’s rebate program?
[DO NOT READ; MARK JUST ONE]

1. (Bill insert)
2. (Radio)
3. (Family, friend, co-worker)
4. (Representative at the store)
5. (Signage at the store)
6. (A brochure at the check-out at the store)
7. (Online research)
8. (Ameren Missouri website)
9. (Ameren Missouri Personal Energy Report)
10. (Contractor or installer)
11. (Other. Please specify: ____)
98. (Don’t know)
99. (Refused)

Purchase Patterns and Decision-making

PP1. What was the primary reason for your purchase of the [SURVEYMEASURE]?
[DO NOT READ,MARK JUST ONE]

1. (To replace broken equipment)
2. (To replace aging equipment)
3. (To improve the comfort of my home)
4. (The purchase was part of a larger home renovation)
5. (The equipment is for a newly constructed home)
6. (To save money on energy costs)
7. (To help the environment)
8. (Other. Please specify: ___)

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

PP2. Did you purchase the [SURVEYMEASURE] at a store, or from a contractor?
[DO NOT READ, MARK JUST ONE]

1. (Store)
2. (Contractor)
3. (Other Please specify:_____)

PP3. At what point did you determine the exact model and brand you wanted to buy? Would you say you… [READ LIST]

1. Knew which type you wanted before [If PP2=1, say: "Going to the store"] [IF PP2 = 2 say, "Calling a contractor"], or that
2. [IF PP2=1] You decided at the store?
3. [IF PP2=2] You decided after your contractor provided you with options?

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

PP4. Which factors were important in your decision to purchase the specific model and brand you selected?
[DO NOT READ, MARK ALL THAT APPLY]

1. (Price)
2. (Quality/reputation)
3. (Energy efficiency/long term savings)
4. (The store representative recommended it to me)
5. (My contractor or installer recommended it to me)
6. (It qualified for an Ameren Missouri rebate)
7. (It had specific features I was looking for)
8. (It has the least impact on the environment)
9. (It was available when I needed it)
98. (Don't know)
99. (Refused)

[ASK IF PP4 RESPONSES >1]

PP4. And if you had to choose just one, which factor would you say was the *most* important in your decision to purchase the specific model and brand you selected?
[DO NOT READ, MARK ONLY ONE]

1. (Price)
2. (Quality/reputation)
3. (Energy efficiency/long term savings)
4. (The store representative recommended it to me)
5. (My contractor or installer recommended it to me)
6. (It qualified for an Ameren Missouri rebate)
7. (It had specific features I was looking for)
8. (It has the least impact on the environment)
9. (It was available when I needed it)
98. (Don't know)
99. (Refused)

PP5. Did you or someone else in your household install the [SURVEYMEASURE], or did you have a contractor install it? [DO NOT READ]

1. (I installed it myself OR someone in the household installed it)
2. (A contractor installed it)
96. (Not installed yet)
98. (Don't know)
99. (Refused)

Retailer and Contractor Program Promotion

RC1***. [ASK IF 0=1 AND 0≠ 4]*** Did a store representative inform you the [SURVEYMEASURE] qualified for an Ameren Missouri Rebate?

1. (Yes)
2. (No)

RC2. ***[ASK IF 0=2 OR PP5=2 AND 0 ≠ 9]*** Did your contractor inform you the [SURVEYMEASURE] qualified for an Ameren Missouri Rebate?

1. (Yes)
2. (No)

Program Satisfaction

PS1. Thinking about your overall satisfaction with the rebate program, would you say you are… [READ LIST]

1. Very satisfied

2. Somewhat satisfied
3. Not too satisfied, or
4. Not satisfied at all?
98. (Don't know)
99. (Refused)

PS2. Using the same scale, how satisfied are you with the time it took to receive your rebate in the mail? [READ LIST IF NEEDED]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied, or
4. Not satisfied at all?
98. (Don't know)
99. (Refused)

PS2a. After you submitted the rebate application for the [MEASURE], how long did it take to receive the rebate check from Ameren Missouri? Was it: [READ LIST]

1. Less than 4 weeks,
2. Between 4 and 6 weeks,
3. Between 7 and 8 weeks, or
4. More than 8 weeks
5. (Have not received the rebate yet)
98. (Don't know)
99. (Refused)

PS3. Thinking about the rebate check that you received, how satisfied are you with the amount of the rebate? [READ LIST IF NEEDED]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied, or
4. Not satisfied at all?
98. (Don't know)
99. (Refused)

PS4. And using the same scale, how satisfied are you with the [SURVEYMEASURE] you purchased? [READ LIST IF NEEDED]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied, or
4. Not satisfied at all?
98. (Don't know)
99. (Refused)

[ASK IF PS1, PS2, PS3 OR PS4 = 3,4]

PS5. You mentioned you were less than satisfied with some aspect of the rebate program. Why do you say that? [OPEN END, RECORD RESPONSE]

[NOTE: IF RESPONDENT HAS ALREADY PROVIDED A REASON WHY THEY WERE LESS THAN SATISFIED, ASK IN A CONFIRMATORY WAY BY CONFIRMING THEIR CONCERNS OR ISSUES.]

Measure Installation

Now, I'd like to ask a few questions about the [SURVEYMEASURE] that you purchased and installed. The answers to these questions are important because they will help Ameren Missouri figure out how much energy is being saved as a direct result of their energy efficiency program.

QA2. [IF QTY=1 READ "Is the [SURVEYMEASURE] currently installed?" IF QTY >1 READ "are the [QTY] [SURVEYMEASUREs] currently installed?"

1. (Yes) [SKIP TO NEXT SECTION]
2. (No) [SKIP TO QA3 if QTY>1 ELSE SKIP TO QA4]
98. (Don't Know) [SKIP TO NEXT SECTION]
99. (Refuse) [SKIP TO NEXT SECTION]

[ASK IF QTY >1 and QA2=2]

QA3. How many are installed now?

_____RECORD NUMBER (RANGE 0 – 997)

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

[ASK QA4A and QA4B IF QA2 =2 AND SURVEY MEAS=AC OR I5=1]

QA4A. Was the room air conditioner you purchased installed at any point this summer?

1. (Yes)
2. (No) [SKIP TO QA4C]
98. (Don't know)
99. (Refused)

QA4B. About how many months did you use the room air conditioner for?
[OPEN END NUMERIC RESPONSE] [NEXT, SKIP TO RAC1]

[ASK IF QA2 =2]

QA4C. [IF QTY > 1 SAY "Why haven't you had a chance to install all [QTY] of the [SURVEYMEASURE]s?"]
[IF QTY=1 SAY "Why haven't you had a chance to install the [SURVEYMEASURE]?]
[MULTIPLE RESPONSE UP TO 3]

1. (Failed or broken unit)

2. (Removed because did not like it)
3. (Have not had time to install it yet)
4. (In storage)
5. (Back up equipment to install when other equipment fails)
00. (Other, specify:_____)
98. (Don't Know)
99. (Refused)

[ASK THIS SECTION ONLY IF SURVEYMEASURE=PT and QA2=1]

Programmable Thermostat

PT1. Does the programmable thermostat control heating equipment, cooling equipment or both?

1. (Heating)
2. (Cooling)
3. (Both)
98. (Don't know)
99. (Refused)

[ASK IF PT1 = 1 OR 3]

PT2. What type of heating system do you have in your home?

1. (Heat pump)
2. (Electric furnace)
3. (Electric resistance/baseboard)
4. (Gas furnace)
00. (Other) [SPECIFY TYPE AND FUEL_____]
98. (Don't know)
99. (Refused)

PT3. Please describe the way you use your thermostat most often. Would you say you…[READ LIST]

1. Program the thermostat so that it changes temperature at scheduled times,
2. Program it, but then sometimes manually adjust it when you want the house to be warmer or cooler,
3. Do not program it and manually adjust it instead, or
4. Leave it at the same temperature most or all of the time

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

PT4. What type of thermostat did you previously have in place before installing the programmable thermostat, Was it a manual thermostat or programmable?

1. (Programmable)
2. (Manual)

96. (Not applicable)
98. (Don't know)
99. (Refused)

[ASK IF PT4=1]

PT5. Please describe the way you used your previous thermostat most often. Would you say you…

1. Programmed the thermostat so that it changed temperature at scheduled times,
2. Programmed it, but then sometimes manually adjusted it when you wanted the house to be warmer or cooler,
3. Did not program it and manually adjusted it instead, or
4. Left it at the same temperature most or all of the time

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

[ASK IF PT4=2]
PT6. Please describe the way you used your previous thermostat most often. Would you say you…

1. Adjusted it regularly to account for when your home was unoccupied, or
2. Left it at the same temperature most or all of the time, or
3. (Some other approach)

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

[ASK IF PT6=3]
PT7. What was your approach for using your previous thermostat?

[ASK THIS SECTION ONLY IF SURVEYMEASURE=RAC and QA2=1 or QA4A=1]

RAC1. If QTY=1 READ: "In which room did you install the room air conditioner?" IF QTY > 1 READ: "In which rooms did you install the room air conditioners?"
[MULTIPLE RESPONSE, MARK ALL THAT APPLY]

1. (Bedroom)
2. (Living Room)
3. (Dining Room)
4. (Kitchen)
5. (Office)
6. (Bathroom)

00. (Other) [SPECIFY:_____]
98. (Don't know)
99. (Refused)

RAC2. Was the room air conditioner the primary way you cooled that room?

1. (Yes)
2. (No)

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

RAC3. Do you have any other air conditioning equipment you use to cool your home?

1. (Yes) [SPECIFY: _____]
2. (No)

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

Free ridership Questions

FR1. Had you already purchased your new [SURVEYMEASURE] before hearing about the Ameren energy efficiency promotion?

1. (Yes)
2. (No) ***[SKIP TO FR2]***
98. (Don't know) ***[SKIP TO FR2]***
99. (Refused) ***[SKIP TO FR2]***

FR1a. To confirm, you purchased your new [SURVEYMEASURE] and *then* found out it qualified for an Ameren Act On Energy rebate, is that correct?

1. (Yes, that's correct) ***[SKIP TO 0]***
2. (No, that's not correct)
98. (Don't know)
99. (Refused)

FR2. Before learning about the Ameren's energy efficiency promotion, were you already planning to purchase a [SURVEYMEASURE]?

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

FR3. Would you have purchased the same make and model of [SURVEYMEASURE] had you not heard about the Ameren promotion or the rebate?

1. (Yes) ***[SKIP TOFR6]***
2. (No)
98. (Don't know)
99. (Refused)

FR4. Without having heard of Ameren's energy efficiency promotion, would you have purchased a different make and model [SURVEYMEASURE], or would you have decided not to purchase one at all?

1. (I would have purchased a different one) ***[CONTINUE]***
2. (I would not have purchased one at all) ***[SKIP TO FR7]***
98. (Don't know) ***[SKIP TO 0]***
99. (Refused) ***[SKIP TO 0]***

100% FREERIDER PATH

FR5. [SKIP [SURVEYMEASURE=PT] When you say you would have purchased the [SURVEYMEASURE] without having heard of Ameren's energy efficiency promotion, would you have purchased one that was just as energy efficient?

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

FR6. Thinking about timing, without the Ameren's energy efficiency promotion, is it most likely that you would have purchased the [SURVEYMEASURE]…[READ LIST]

1. At the same time
2. Within the same year
3. One to two years out
4. More than two years out
5. Never
98. (Don't know)
99. (Refused)

[SKIP TO 0]

PARTIAL FREE RIDER PATH

FR7. To confirm, you indicated that *without* hearing of Ameren's energy efficiency promotion, you would not have purchased your [SURVEYMEASURE] at all, is that correct?

1. (Yes) **[SKIP TO 0]**
2. (No)
98. (Don't know)
99. (Refused)

FR8. [SKIP IF SURVEYMEASURE=PT] Without the Ameren energy efficiency promotion, would you have purchased a [SURVEYMEASURE]that was just as energy-efficient?

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

FR9. With respect to timing, without the Ameren energy efficiency promotion, is it most likely that you would have purchased the [SURVEYMEASURE]…

1. At the same time
2. Within the same year
3. One to two years out
4. More than two years out
5. Never
98. (Don't know)
99. (Refused)

[ASK If SurveyMeasure =AC, WH, or HP]

FR10. Please describe in your own words why you chose the energy efficient [MEASURE] over one that was less energy efficient. [OPEN END]

[ASK If SurveyMeasure =PT]

FR10a. Please describe in your own words why you chose this particular thermostat?
[OPEN END]

FR11. To summarize, how important was Ameren's energy efficiency promotion on your decision to purchase the [SURVEYMEASURE], would you say it was: [READ LIST]

1. Important
2. Somewhat important
3. Not very important
4. Not at all important
98. (Don't know)
99. (Refused)

Spillover

SO1. Did you purchase any other energy-efficient products at the same time you purchased the [SURVEYMEASURE] or since purchasing the [SURVEYMEASURE]? This could include things like ENERGY STAR appliances, compact fluorescent light bulbs (CFLs), installing home insulation, etc.

1. (Yes)
2. (No) [SKIP TOAM1]
98. (Don't know) [SKIP TO AM1]
99. (Refused) [SKIP TO D1]

[ASK IF 0=1]

SO2. Which additional energy-efficient products did you purchase?
[DO NOT READ] [MARK ALL THAT APPLY]

1. Compact Fluorescent Light Bulbs
2. LED light bulbs
3. ENERGY STAR light fixtures or ceiling fan
4. ENERGY STAR refrigerator
5. ENERGY STAR freezer
6. ENERGY STAR clothes washer
7. ENERGY STAR dishwasher
8. ENERGY STAR room air conditioner
9. ENERGY STAR electronics (e.g. TV, DVD, computer)
10. ENERGY STAR dehumidifier
11. ENERGY STAR water heater
12. Central air conditioner
13. Air source heat pump
14. Geothermal heat pump

15. Heat pump water heater
16. Low-flow showerhead
17. Faucet aerator
18. Programmable thermostat
19. Installed insulation?
20. Other. [SPECIFY VERBATIM] _____

[ASK FOR PRODUCT 1-3; 8-10, 16-18 MENTIONED IN 0, ***DO NOT ASK SO3 IF SO2 IS 4-7; 11-15***]

SO3. How many ***[INSERT APPLIANCE FROM 0]*** did you purchase?

[ASK IF 0=19]
SO4. How many square feet of insulation did you purchase?
[NUMERIC OPEN-END RESPONSE, 98=DON'T KNOW, 99= REFUSED]

[ASK IF 0=19]
SO5. In what location in your home was the insulation installed?
[OPEN END, 98=DON'T KNOW, 99= REFUSED]

[ASK FOR EACH PRODUCT MENTIONED IN SO2] [ASK of SO2=1,2, 3]
SO6. Were any of these [INSERT APPLIANCE FROM SO2] discounted by Ameren Missouri?
1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[ASK FOR EACH PRODUCT MENTIONED IN 0][SKIP IF SO2=1,2,3,4,5,6,7,9,10,16,17]

SO7. Did you receive or apply for an Ameren Missouri rebate for ***[INSERT PRODUCT FROM 0]***?
1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[ASK FOR EACH PRODUCT MENTIONED IN 0]
SO8. How important was the fact that your [SURVEYMEASURE] qualified for a rebate from Ameren Missouri in your decision to purchase ***[INSERT PRODUCT FROM 0]***? Would you say it was:
1. Important
2. Somewhat Important
3. Not too Important
4. Not at all important
98. (Don't know)
99. (Refused)

[ASK FOR EACH PRODUCT MENTIONED IN 0]
SO9. How important was Ameren Missouri's in-store advertising or educational information about

energy efficiency in your decision to purchase ***[INSERT PRODUCT FROM 0]***? Would you say it was:

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

96. (Did not see any Ameren information about energy efficiency)
98. (Don't know)
99. (Refused)

Satisfaction with Ameren Missouri

AM1. Generally speaking, how satisfied are you with your experience as an Ameren Missouri customer overall? Would you say… [READ LIST]

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

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

AM2. Based on your experience with the rebate program, would you say your opinion of Ameren Missouri… [READ LIST]

1. Increased
2. Stayed about the same, or
3. Decreased?

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

Demographics

I'm almost finished, and just have a few final questions about you and your home that will help us with our analysis.

D1. Which of the following best describes your home/residence? You can stop me when I read your home type. **[READ LIST]**

1. Single-family home [NOT A DUPLEX, TOWNHOME, OR APARTMENT; ATTACHED GARAGE IS OK]
2. Manufactured or modular
3. Mobile home
4. Row house/townhome
5. Two or three family attached residence
6. Apartment with 4 units or greater

7. Condominium
8. (Other (Specify):_____)

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

D2. Do you own or rent this residence?

1. (Own)
2. (Rent)

D3. What is the highest level of education that you have completed so far?

3. (Less than ninth grade)
4. (Ninth to twelfth grade; no diploma)
5. (High school graduate (includes GED))
6. (Some college, no degree)
7. (Associates degree)
8. (Bachelor's degree)
9. (Graduate or professional degree)

D4. Counting yourself, how many people normally live in your household on a full-time basis? Please include everyone who lives in your home, whether or not they are related to you, and exclude anyone just visiting or children who may be away at college or in the military.

[NUMERIC OPEN END]

D5. Is your home:

1. All electric
2. Gas and electric
3. Some other combination of energy sources

98. (DON'T KNOW)
99. (REFUSED)

D6. In what year were you born?
[NUMERIC OPEN END]

D7. Which category best describes your total household income in 2012 before taxes? Please stop me when I read your category.

4. $15,000 or less
5. $15,000 to $24,999
6. $25,000 to $49,999
7. $50,000 to $74,999
8. $75,000 to $99,999
9. $100,000 to $149,999
10. $150,000 to $199,999

11. $200,000 or more
98. (Don’t know)
99. (Refused)

Thank you for your time. Ameren Missouri appreciates your responses, and I hope you have a good evening.

Home Energy Kit Participant Survey

Researchable Questions	Survey Question Mapping
How do participants primarily learn about the Home Efficiency Kit?	DM1
What are the reasons why customers request a kit?	DM2
How easy was it to participate and how useful was the instructional information in the kit?	P1-P3
What are the installation rates of the various measures?	IR2a-m
How easy was the process of installing the measures?	IR3-IR5
How satisfied were participants with the process and the products?	PS1-PS4
Are kit-users aware of other Ameren rebates?	PA1-PA2
Are participants using Advanced Strips correctly?	SS1-SS4
Did the Ameren program influence the participant purchase any other energy-efficient equipment? (Spillover)	SO1-SO9
Participant Demographics	D1-D5

INTRODUCTION

Hello. I'm [INSERT NAME], calling from Pragmatic Research, on behalf of Ameren Missouri.

- [If name available] Can I speak with {INSERT NAME]?

(IF NEEDED) This phone call is designed to last no longer than 15 minutes.
Let me assure you this is not a sales call.
Your individual responses will be kept confidential.

Our records show that your household received a kit of energy saving items from Ameren Missouri, your electric utility.The kit contained an energy efficient showerhead, compact fluorescent light bulbs, and other energy saving tools, which you requested from Ameren Missouri. We're talking with customers about the energy saving items provided in the kit they received so Ameren Missouri can improve the program. Are you the best person to talk with about this?

(ONCE CORRECT PERSON IS ON THE PHONE:)

S1. To confirm our records, did you receive a kit of energy saving items?

1. Yes [CONTINUE]
2. No [THANK AND TERMINATE]
98. (Don't Know) [ASK IF THERE IS SOMEONE ELSE TO SPEAK WITH WHO WOULD KNOW, OTHERWISE THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

S2. Do you currently have an electric hot water heater?

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

DM. PARTICIPANT DECISION-MAKING

DM1. How did you hear about the free Home Energy Kit?

1. (Postcard in the mail)
2. (Friend, family, or colleague)

00. (Other) [SPECIFY:_____]
98. (Don't know)
99. (Refused)

DM2. What were the reasons you decided to request the energy saving kit? [MULTIPLE RESPONSE, UP TO 3]

1. (Interest in the kit items)
2. (Recommended by friend, relative, colleague)
3. (To reduce electric bill costs)
4. (To reduce water bill costs)
5. (To save water)
6. (To save energy)
7. (To reduce maintenance and operational costs)
8. (Easy/convenient)
9. (To protect the environment)
10. (To receive free items)
11. (To learn more about energy in my home)

00. (Other) [Specify: _____]
98. (Don't know)
99. (Refused)

DM3. How familiar are you with the term RebateSavers? Would you say…[READ LIST]

a) Not at all familiar
b) Not too familiar
c) Somewhat familiar
d) Very familiar

98. (DON'T KNOW) **[DO NOT READ]**

P. PARTICIPATION PROCESS

P1. About how long did it take for you to receive your kit after you requested it? Was it…
[READ LIST, 98= Don't know, 99= Refused]

1. Less than one week
2. 1 to 2 weeks
3. 3 to 4 weeks
4. More than 4 weeks
98. (Don't know)
99. (Refused)

P1a. How satisfied were you with the process to request the kit? Would you say… [READ LIST]

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

P2. Do you remember receiving written information in your kit on how to install the energy efficient items in your home?

1. (Yes)
2. (No) [SKIP TO IR1a]
98. (Don't know) [SKIP TO IR1]
99. (Refused) [SKIP TO IR1]

P3. How useful did you find the instructions that were provided in the kit? Would you say…[READ LIST]

1. Very useful
2. Useful
4. Not too useful, or
5. Not useful at all?
96. (Not applicable – respondent has not installed items yet).
98. (Don't know)
99. (Refused)

IR. INSTALLATION RATES

IR1. Did the kit you received contain one, or two, efficient showerheads?

1. (One showerhead)
2. (Two showerheads)

98. (Don't know)

99. (Refused)

IR2. Have you had a chance to install any of the items from the kit yet?

1. (Yes) [SKIP TO IR5a]
2. (No)

98. (Don't know) [SKIP TO SO1]

99. (refused) [SKIP TO SO1]

IR3. What has prevented you from installing the items?
[OPEN END]

IR4. Do you have plans to install any of the items in the kit?
[RECORD VERBATIM COMMENTS]

1. (Yes) [ASK WHICH ONES: _____] [SKIP TO SO1]
2. (No) [SKIP TO SO1]

98. (Don't know) [SKIP TO SO1]

99. (Refused) [SKIP TO SO1]

Please tell me which of the each items you've had a chance to install in your home so far.

IR5a. How many compact fluorescent light-bulb(s) did you install? [If NEEDED: CFLs are the Spiral or swirl shaped light-bulbs that came in your kit.]
[numeric open-end, 98=DON'T KNOW, 99=REFUSED, 96= NOT APPLICABLE]

[IF IR5a>or=1]
IR5b. Are these bulbs still installed?

1. (Yes)
2. (No)

98. (Don't know)

99. (Refused)

[IF IR5b=2]
IR5c. Why did you remove the bulb(s)?
[OPEN END]

IR6a. How many faucet aerators did you install? [IF NEEDED, These are the small devices that screw into kitchen and bathroom faucets.]
[numeric open-end, 98=DON'T KNOW, 99=REFUSED, 96= NOT APPLICABLE]

[IF IR6a>or=1]
IR6b. [Are the faucet aerators]/[is the faucet aerator] still installed?

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

[IF IR6b=2]
IR6c. Why did you remove the faucet aerator(s)?
[OPEN END]

[ASK if IR1=1]
IR7a. Did you install the energy-efficient showerhead?
[1=YES, 2=NO, 98=DON'T KNOW, 99=REFUSED, 96= NOT APPLICABLE]

[IF IR7a=1]
IR7b. Is the showerhead still installed?

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

[IF IR7b=2]
IR7c. Why did you remove the showerhead?
[OPEN END]

[ASK if IR1=2]
IR8a. How many energy-efficient showerheads did you install?
[numeric open-end, 98=DON'T KNOW, 99=REFUSED, 96= NOT APPLICABLE]

[IF IR8a>or=1]
IR8b. [Are the showerheads] [Is the showerhead] still installed?

1. (Yes)
2. (No) [record if one of them is installed]
98. (Don't know)
99. (Refused)

[IF IR8b=2]
IR8c. Why did you remove the showerhead(s)?

[OPEN END]

IR9a. Did you install the pipe wrap insulation?
[1=YES, 2=NO, 98=DON'T KNOW, 99=REFUSED, 96= NOT APPLICABLE]

[IF IR9a=1]
IR9b. Is the pipe wrap still installed?

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

[IF IR9b=2]
IR9c. Why did you remove the pipe wrap?
[OPEN END]

IR10a. Did you install the Advanced Power Strip? [IF NEEDED: This device is a type of surge protector or power strip].
[1=YES, 2=NO, 98=DON'T KNOW, 99=REFUSED, 96= NOT APPLICABLE]

[IF IR10a=1]
IR10b. Is the Advanced Power Strip still installed?

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

[IF IR10b=2]
IR10c. Why did you remove the Advanced Power Strip?
[OPEN END]

[ASK IR11-IR12 IF ANY IR5a-IR10a = 2 OR IF IR5a<12, or IR6a<2, or IR8a<2]
IR11. You mentioned that you may not have installed one of the items. What has prevented you from installing all of the items in the kit?
[OPEN END]

IR12. Do you have plans to install the remaining items?

1. (Yes) [ASK WHICH ONES: _____]

2. (No)
98. (Don't know)
99. (Refused)

IR13. Did you have any difficulty installing any of the items in the energy kit?

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

[ASK IF IR13=1]

IR14. Which items were difficult to install? [DO NOT READ; MARK ALL MENTIONED] [NOTE: IF RESPONDENT HAS ALREADY ANSWERED THE QUESTION, ASK IN A CONFIRMATORY WAY]

1. (Compact fluorescent light-bulb(s))
2. (Showerhead)
3. (Faucet Aerator)
4. (Pipe wrap)
5. (Advanced Power Strip)
98. (Don't know)
99. (Refused)

[ASK IF 1R14=1, 2, 3, 4, 5] [FOR EACH ITEM IDENTIFIED]

IR15. What was difficult about installing the [COMPACT FLUORESCENT LIGHT-BULB(S)] [SHOWERHEAD] [FAUCET AERATOR] [PIPE WRAP] [ADVANCED POWER STRIP]?

[MULTIPLE RESPONSE, MARK ALL THAT APPLY]

1. (Did not fit)
2. (Did not like quality)
3. (Missing parts or equipment)
4. (Did not have proper tools for installation)
00. (Other) [SPECIFY: _____]
98. (Don't know)
99. (Refused)

SO. SPILLOVER

SO1. Have you or anyone in your household installed any other energy-efficient products since receiving the home energy kit? This could include things like ENERGY STAR appliances, additional efficient light bulbs , installing insulation, etc.

1. (Yes)
2. (No) [SKIP TO PS1D1]

98. (Don't know) [SKIP TO PS1]

99. (Refused) [SKIP TO PS1]

[ASK IF SO1=1]

SO2. Which additional energy-efficient products did you install?
[DO NOT READ] [MARK ALL THAT APPLY]

1. CFLs
2. LED light bulbs
3. ENERGY STAR light fixtures or ceiling fan
4. ENERGY STAR refrigerator
5. ENERGY STAR freezer
6. ENERGY STAR clothes washer
7. ENERGY STAR dishwasher
8. ENERGY STAR room air conditioner
9. ENERGY STAR electronics (e.g. TV, DVD, computer)
10. ENERGY STAR dehumidifier
11. ENERGY STAR water heater
12. Central air conditioner
13. Air source heat pump
14. Geothermal heat pump
15. Heat pump water heater
16. Low-flow showerhead
17. Faucet aerator
18. Programmable thermostat
19. Installed insulation?
20. Efficient windows
21. Other. [SPECIFY VERBATIM] _____

[ASK FOR PRODUCT 1-3; 8-10, 16-18 MENTIONED INSO2, DO NOT ASK SO3 IF SO2 IS 4-7; 11-15]

SO3. How many ***[INSERT APPLIANCE FROM*** SO2***]*** did you purchase?

[ASK IF SO2***=19]***

SO4. How many square feet of insulation did you purchase?
[NUMERIC OPEN-END RESPONSE, 98=DON'T KNOW, 99= REFUSED]

[ASK IF SO2***=19]***

SO5. In what location in your home was the insulation installed?

[OPEN END, 98=DON'T KNOW, 99= REFUSED]

[ASK if SO2=1,2]

SO6. Were any of these [INSERT APPLIANCE FROM SO2] discounted by Ameren Missouri?

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

[ASK FOR EACH PRODUCT MENTIONED IN SO2***][SKIP IF SO2=1,2,3,4,5,6,7,9,10,16,17]***

SO7. Did you receive or apply for an Ameren Missouri rebate for ***[INSERT PRODUCT FROM*** SO2***]***?

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

[ASK FOR EACH PRODUCT MENTIONED IN SO2***]***

SO8. How important were the items and the information in the free home energy kit in your decision to purchase ***[INSERT PRODUCT FROM*** SO2***]***? Would you say it was:

1. Very Important
2. Somewhat Important
3. Not too Important
4. Not important
98. (Don't know)
99. (Refused)

[ASK FOR EACH PRODUCT MENTIONED IN SO2***]***

SO9. How important was Ameren Missouri's advertising or educational information about energy efficiency in your decision to purchase ***[INSERT PRODUCT FROM*** SO2***]***? Would you say it was:

1. Very Important
2. Somewhat Important
3. Not too Important
4. Not important
96. (Did not see any Ameren information about energy efficiency)
98. (Don't know)
99. (Refused)

PS. PROGRAM SATISFACTION

Now I'd like to ask you a few questions about your experience with the kit items you have installed.

PS1. Please let me know if you are very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied with each of the products that I read to you. [1=very satisfied 2= somewhat 3= not too satisfied 4= not at all satisfied, 98=Don't know 99= Refused]

a. [SKIP IF IR5a=0, 98,96] The CFLs? [IF NEEDED: Compact Flourescent Light bulbs]
b. [SKIP IF IR6a=0,98,96] The faucet aerators?
c. [SKIP IF IR7a=2,98,96 or IR8a=0,98,96] The efficient showerheads?
d. [SKIP IF IR9a=2,98,96] The pipe wrap insulation?
e. [SKIP IF IR0a=2,98,96] The Advanced Power Strip?

[ASK IF PS1a-e=3, 4 (DISSATISFIED)]

PS2. You indicated that you were dissatisfied about something with the [insert measure]. Could you please briefly explain why? [OPEN END]

PS3. Do you have any suggestions for improving the kit? [DO NOT READ] [MULTIPLE RESPONSE, MARK ALL THAT APPLY]

1. (More help filling out the forms)
2. (Provide more verbal instruction)
3. (Provide more written instruction)
4. (Provide in-person instruction)
5. (Provide materials and instruction in more languages)
6. (Add things to the kit) (Specify___)
7. (Install items for me)

96. (No suggestion)
00. (Other, record verbatim)
98. (Don't know)
99. (Refused)

PA. PROGRAM AWARENESS

Ameren is interested in learning more about other ways they can help customers save energy.

PA1. Are you aware of any other Ameren Missouri rebate programs that help customers save on energy costs?

1. (Yes)
2. (No)

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

[ASK IF PA1=1]

PA2. Which programs are you aware of? [MULTIPLE RESPONSE]

1. (Central Air Conditioning rebates)
2. (CFLs)
3. (LEDs)
4. (Occupancy sensors)
5. (Efficient product or appliance rebates)
6. (Refrigerator/Freezer recycling rebates)
7. (Low income housing upgrades)
8. (New construction/ENERGY STAR Homes)
9. (Home energy audits)
00. (Other) [SPECIFY: _____]
98. (Don't know)
99. (Refused)

[ASK SECTION IF IR10b=1]

SS. ADVANCED STRIP USAGE

Next, I have a few questions for you about the Advanced Power Strip you mentioned you are using.

SS1. Is the power strip plugged in and operating?

1. (Yes)
2. (No) [SKIP TO FR1]
98. (Don't know) [SKIP TO FR1]
99. (Refused) [SKIP TO FR1]

[SKIP IF SS2=98 OR 99]

SS2a. I have a few questions for you about the types of equipment plugged into various outlets on the strip. If you need to put the phone down to look at the strip, that's fine, I will hold on. First, which device, or devices, are plugged into the black outlets labeled, "Always on"?

[MULTIPLE RESPONSE UP TO 2]

1. (TV)
2. Cable/dish box
3. (DVD Player)
4. (Media Player)
5. (Gaming System)
6. (Stereo system)
7. (Computer)
8. (Printer)
9. (Fax or scanner)
00. (Other [specify] _____)
96. (N/A)
98. (Don't know)
99. (Refused)

SS2b. And which device is plugged into the black outlet labeled, "Controller"? [IF RESPONDENT NEEDS TO PUT DOWN THE PHONE AGAIN, SAY: "Ok, no problem. While you're looking, in addition to looking at which device is plugged into the black outlet, I'll also need to know which devices are plugged into the green outlets labeled "switched." WHEN RESPONDENT GETS BACK ASK AGAIN: "Which device was plugged into the black outlet?"]

[ALLOW ONLY ONE]

1. (TV)
2. Cable/dish box
3. (DVD Player)
4. (Media Player)
5. (Gaming System)
6. (Stereo system)
7. (Computer)
8. (Printer)
9. (Fax or scanner)

00. (Other [specify] _____)
96. (N/A)
98. (Don't know)
99. (Refused)

SS2c. And lastly, which device or devices are plugged into the green outlets, labeled "Switched"? [MULTIPLE RESPONSE UP TO 4]

1. (TV)
2. Cable/dish box
3. (DVD Player)
4. (Media Player)
5. (Gaming System)
6. (Stereo system)
7. (Computer)
8. (Printer)
9. (Fax or scanner)
01. (Other [specify] _____)
96. (N/A)
98. (Don't know)
99. (Refused)

[ASK IF SS2a-c =7]

SS3. Is your computer a laptop or a desktop computer?

1. (Laptop)
2. (Desktop)

[ASK IF SS2c=1]

SS4a. What type of television is plugged into the strip? Is it a… [READ LIST]

1. LED,
2. Plasma,
3. CRT,
4. LCD,
5. Rear Projection, or
6. Projector?

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

[ASK IF SS2c=1]

SS4b. About how old is your TV?

[NUMERIC OPEN END, IN YEARS][ASK IF SS2c=1]

SS5. About what size is it? Your best estimate is fine.

[NUMERIC OPEN END, IN INCHES]

SS6. Using your best estimate, about how many hours a day is your [INSERT ANSWER FROM SS2b] turned on?

[OPEN END NUMERIC RESPONSE]

FR. Freeridership

Next, I'd like to ask you some questions about your decision to request the home energy kit from Ameren Missouri.

FR1. Would you have purchased and installed the items in the kit on your own, without receiving them for free from Ameren Missouri?

1. (Yes) [CONTINUE TO FR2]
2. (No) [SKIP TO FR3]
3. (I would have purchased some items, but not all) [SKIP TO FR4]

98. (Don't know) [CONTINUE TO FR2]
99. (Refused) [CONTINUE TO FR2]

[If FR1=1,98,99]
FR2. Would have you have purchased the same type and number of each item in the kit?

1. (Yes) [SKIP TO FR5]
2. (No) [SKIP TO FR4]

98. (Don't know) [SKIP TO FR4]
99. (Refused) [SKIP TO FR6]

[IF FR1=2]
FR3. To confirm, you would <u>not</u> have purchased or installed any items at all, is that correct?

1. (Yes, correct) [SKIP TO FR6]
2. (No) [CONTINUE TO FR4]

98. (Don't know) [CONTINUE TO FR4]
99. (Refused) [SKIP TO FR6]

FR4. Which items would you have purchased and installed? [DO NOT READ; MARK ALL THAT APPLY]

1. (CFL(s))
2. (Faucet aerator(s))
3. (Energy-efficient showerhead)
4. (Pipe wrap)
5. (Advanced power strip/smart strip)

00. (Other) [SPECIFY:_____]
98. (Don't know)
99. (Refused)

[IF FR4=1]
FR4a. The kit came with 12 CFLs. How many would you have purchased and installed without the kit?
[NUMERIC OPEN END]

[IF FR4=2]
FR4b. The kit came with either 2 or 3 faucet aerators for your kitchen and bathroom. How many would you have purchased and installed without the kit?
[NUMERIC OPEN END]

[IF FR4=3 AND IR1=2]
FR4c. The kit came with two energy efficient showerheads. How many would you have purchased and installed without the kit?
[NUMERIC OPEN END]

FR5. And thinking about timing, without the free kit from Ameren Missouri, when would you most likely have purchased and installed the..

[IF FR2=1 OR FR4=1]
a. CFLs? Would you say…[READ LIST]

[IF FR2=1 OR FR4=2]
b. Faucet aerators? Would you say…[READ LIST]

[IF FR2=1 OR FR4=3]
c. Efficient showerhead? Would you say…[READ LIST]

[IF FR2=1 OR FR4=4]
d. Pipe wrap? Would you say…[READ LIST]

[IF FR2=1 OR FR4=5]
e. Advanced Power Strip? Would you say… [READ LIST]

[READ LIST FOR EACH FR5a-e. MARK ONLY ONE]

1. At the same time you received the kit,
2. Within the same year,
3. One to two years out,
4. More than two years out, or
5. Never?
98. (Don't know)
99. (Refused)

FR6. Please describe in your own words the process that led you to request the home energy efficiency kit from Ameren Missouri.
[OPEN END]

AM. SATISFACTION WITH AMEREN MISSOURI

AM1. Generally speaking, how satisfied are you with your experience as an Ameren Missouri customer overall? Would you say… [READ LIST]

1. Very satisfied,
2. Somewhat satisfied,
3. Not very satisfied, or

4. Not at all satisfied
-98. (Don't know)
-99. (Refused)

AM2. Based on your experience with the kit program, would you say your opinion of Ameren Missouri… [READ LIST]

4. Increased,
5. Stayed about the same, or
6. Decreased?
98. (Don't know)
99. (Refused)

D. DEMOGRAPHICS

D1. Which of the following best describes your home/residence? **[READ LIST]**

1. Single-family home [NOT A DUPLEX, TOWNHOME, OR APARTMENT; ATTACHED GARAGE IS OK]
2. Manufactured or modular
3. Mobile home
4. Row house/townhome
5. Two or three family attached residence
6. Apartment with 4 units or greater
7. Condominium
8. (Other (Specify):_____)
98. (Don't know)
99. (Refused

D2. Do you own or rent this residence?

1. (Own)
2. (Rent)

D3. What is the highest level of education that you have completed so far?

3. (Less than ninth grade)
4. (Ninth to twelfth grade; no diploma)
5. (High school graduate (includes GED))
6. (Some college, no degree)
7. (Associates degree)
8. (Bachelor's degree)
9. (Graduate or professional degree)

D4. Counting yourself, how many people normally live in your household on a full-time basis? Please

include everyone who lives in your home, whether or not they are related to you, and exclude anyone just visiting or children who may be away at college or in the military.

[NUMERIC OPEN END]

D5. Is your home's energy source: [READ LIST]

1. All electric
2. Natural gas and electric
3. Some other combination of energy sources
98. (DON'T KNOW)
99. (REFUSED)

D5a. Do you have an electric heat pump?

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

[IF D5a=1]
D5b. To the best of you knowledge, was the heat pump installed before 2006?

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

D5c. Do you have electric baseboard heating?

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

D5d. Do you have central air conditioning?

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

D6. In what year were you born?
[NUMERIC OPEN END]

D7. Which category best describes your total household income in 2012 before taxes? Please stop me when I read your category.

7. $15,000 or less
8. $15,000 to $24,999
9. $25,000 to $49,999
10. $50,000 to $74,999

11. $75,000 to $99,999
12. $100,000 to $149,999
13. $150,000 to $199,999
14. $200,000 or more

98. (Don’t know)

99. (Refused)

CLOSING

Thank you for your participation in this survey. Ameren Missouri appreciates your responses. Have a wonderful evening.

COMPLETE INTERVIEW.

APPENDIX D. RETAILER SURVEY INSTRUMENT

Retailer Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

Note:

Questions may be best suited for various retailer roles. The following codes were used to indicate which questions are geared toward different audiences.

C = Corporate representative
SM = Store manager
DM = Department manager/floor staff

Researchable Questions	Interview Question Mapping
Why do stores participate in the program?	PP1, PP2
How do stores interact with the program? Are APT resources useful to store staff?	PP4a-e
Did stores' stocking practices change since participating?	PP5-PP6
How is the program marketed?	M1-M7
What is the market share for energy-efficient products and specifically those eligible for rebates?	M8
How influential is the Ameren rebate information in customer decision-making?	A1-A6
How satisfied are retailers with the program?	C1-C2, M9

INTRODUCTION

Hello, my name is [INSERT FIRST NAME] and I am calling from the Cadmus Group on behalf of Ameren Missouri. May I please speak with [NAME]?

[IF CONTACT IS AVAILABLE, CONTINUE; IF UNAVAILABE TRY TO RESCHEDULE]

Hello, my name is [INSERT FIRST NAME] and I am calling from the Cadmus Group on behalf of Ameren Missouri. I received your contact information from Ameren Missouri. . I understand you are the contact for the RebateSavers program and are therefore the best person to talk with about your store's energy efficient products, is that correct? [IF NEEDED: We're actually interested in talking with you about the products sold at your specific location.]

1. Yes [SAY: Great, do you have a few minutes to speak with me about the program? If not, reschedule]
2. No [SAY: Can you provide me with a contact name and phone number for the best person to speak with about this?]

[IF NEEDED: RebateSavers is a program run by Ameren Missouri that offers rebates to customers who purchase qualifying energy efficient products or equipment for their home. The program offers rebates for electric water heaters, heat pump water heaters, programmable thermostats, and room air conditioners.]

PROGRAM PARTICIPATION

To begin, I'd like to talk a little bit about your participation in the program and your experiences with Ameren's representative who may have visited your store.

PP1. [SM] What were the main reasons why your store decided to participate in the program? [RECORD VERBATIM] [DO NOT READ LIST]

1. Corporate decision
2. Helps boost sales
3. Provides value to customers/customers like it
4. Like to support energy-efficiency
5. We did it last year

00. Other (SPECIFY)

PP2. [SM] Before this year, had your store ever participated in in Ameren's Lighting and Appliance program?

1. Yes (Since when?)
2. No

98. Don't know

PP3. Which products does your store sell that qualify for Ameren's RebateSavers program?

PP4. [SM or DM] I'd like to understand a little more about how your store interacts with the program.

a. About how often would you an Ameren representative visits your store?

1. Once a week
2. Once a month
3. Once every few months
4. Once a year
5. Never

[ASK IF PP4a=4 or 5]

b. Are you the contact person for the program, and typically the person who is in contact with the Ameren representatives when they visit?
1. Yes
2. No

c. What do visits typically entail?
[OPEN END]

d. Have you had a meeting with the Ameren representative to discuss the details of the program and the eligible products?

1. Yes
2. No

e. How useful would you say that meeting was? Would you say…

1. Very useful,
2. Somewhat useful
3. Not too useful, or
4. Not at all useful?

f. Why do you say that?

g. Do you know approximately how many staff at your store Ameren field representatives have discussed the program with?

PP5. [DM or SM] Upon signing up to participate in the program, did your store make any changes to its available product mix? [If yes, WHAT WERE THEY?]

PP6. [DM] Since participating in the program, how have your stocking practices changed? [PROBE FOR DIFFERENCES BETWEEN MEASURES]

NOTE: Cadmus would also like to ask Corporate Representatives about specific sales for qualifying measures before and after participating in the program for stores in the Ameren territory.

[ASK IF PP6=Yes]
PP7a. Hypothetically, If Ameren Missouri stopped offering rebates, do you think that your store is likely to continue with current stocking practices?

1. Yes
2. No

PP7b. Why do you say that?

MARKETING AND SALES

The next few questions focus on how you market energy efficiency and the RebateSavers program.

M1. [DM or SM] How does your store typically inform your customers of the incentives available for energy-efficient products that qualify for an Ameren Missouri Rebate?
[DO NOT READ; RECORD MULTIPLE RESPONSES]

1. Radio ads
2. TV ads
3. Print ads
4. Pallet displays/End-cap displays
5. Product clings on qualifying appliances
6. Shelf labeling
7. Put out mail-in rebates
8. Direct them to the website
9. I mention the program/rebate when I assist customers
10. I only mention if they ask about energy efficient appliances
11. Don't need to inform, they already know about it
12. I rely on marketing by the program (Ameren).
13. Other [SPECIFY:_____]
14. Did not promote the Program **[PROBE: WHY NOT?]**
98. DON'T KNOW
99. REFUSED

M2. [DM] What seems to be the most effective method for informing customers about the rebates offered by Ameren Missouri?

[DO NOT READ; RECORD MULTIPLE RESPONSES]

1. Product clings
2. Mail-in Rebate
3. Shelf labeling
4. Talking with salesperson
5. End-caps
6. Pallet displays
7. In-store tabling and promotions
8. Other [SPECIFY:_____]
98. DON'T KNOW
99. REFUSED

M3. [DM or SM] Is in-store marketing something that the Ameren representative comes to set up and rotate? Or do they provide you with the materials and you display them on your own schedule? [OPEN END]

M4. [DM or SM] How frequently would you say you have either end cap or pallet displays on [ENTER SPECIFIC PRODUCTS FROM QUESTION PP3] on the floor? Would you say…

1. Never,
2. Rarely,
3. Sometimes,
4. Often, or
5. Always?

M5. [DM or SM] Are there any marketing materials or information that you think would be helpful in promoting the products that you don't already have?

[OPEN END]

M6. [DM] How often do you recommend the more energy-efficient options to customers in general? Would you say…[READ LIST]

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always
98. DON'T KNOW
99. REFUSED

[RECORD VERBATIM COMMENTS]

M6a. And how about specifically for… [ENTER SPECIFIC PRODUCTS FROM QUESTION PP3]?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always
98. DON'T KNOW

99. REFUSED

M7. [DM] Before participating in the Ameren program, how often would you say you recommended the more efficient options to customers, generally speaking?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always
98. DON'T KNOW
99. REFUSED

[RECORD VERBATIM COMMENTS]

M7a. And how about specifically for… [ENTER SPECIFIC PRODUCTS FROM QUESTION PP3]?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always
98. DON'T KNOW
99. REFUSED

M8. [DM] About what percent of the items you stock are eligible for an Ameren Missouri Rebate? I'll ask you for each product category:

a. Thermostats _____%
b. Room air conditioners _____%
c. Electric water heaters _____%
d. Heat pump water heaters_____%

M9. [DM or SM] Are there any other products outside of the current program where you see opportunities to incentivize high-efficiency or ENERGY STAR options?

CUSTOMER AWARENESS AND RESPONSE

A1. [DM] How would you rate the interest of a typical customer when your sales staff tells them about the energy-saving potential of the efficient products? Would you say they are: [READ LIST]

1. Not at all interested
2. Not very interested
3. Somewhat interested
4. Very interested
98. DON'T KNOW
99. REFUSED

A2. [DM] What tends to be the selling point for the higher efficiency products? [DO NOT READ]

1. Cost saving on bill
2. Energy savings
3. Incentive Amount
4. Environmental benefits
5. Other [SPECIFY:_____]
98. DON'T KNOW
99. REFUSED

[RECORD VERBATIM]

A3. [DM] In your experience, are customers influenced by the rebate options? If yes, When customers are informed about the rebate options, about what percent of time do you estimate that this affects their purchase decisions?

[RECORD VERBATIM COMMENTS]

A4. [DM] Of all the energy-efficient products that qualify for an Ameren rebate that you sell, which products do you feel customers are most aware of the energy-saving benefits for? For which products are customers least aware of the energy savings benefits? [OPEN END]

A5. [DM] Do you have any suggestions for how Ameren Missouri could help promote these/this product(s)?
[OPEN END]

A6. [DM] Of all the energy-efficient products you sell that qualify for an Ameren rebate, which one or two do you believe customers are the most likely to purchase without any additional advertising or promotions? [DO NOT READ]

1. Efficient Light bulbs [Next ask, what about other than light bulbs?]
2. Programmable Thermostat
3. Heat Pump Water Heater
4. Electric Hot Water Heater
5. Room Air Conditioners
96. None – they all need promotions.

A7. [DM or SM] Does your store offer home installation for water heaters?
1. Yes
2. No

CLOSING

C1. [DM OR SM] How satisfied are you with your overall program experience? Would you say you are…

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. DON'T KNOW
99. REFUSED

C2. [DM or SM] Are there any changes you would recommend to improve the RebateSavers Program?

[OPEN END]

Thank you very much for your time.

APPENDIX E. SEGMENTATION STUDY RESULTS

Ameren has conducted segmentation, potential, and usability studies to inform program design and outreach efforts. The segmentation study, conducted by the Shelton Group, revealed the following high-level findings and implications for Ameren's rebate and incentive offerings, pertaining to propensity, participation barriers, and message and media considerations. While the study was not conducted solely on a program-specific basis, the following findings prove relevant to measures included in the RebateSavers program or to Ameren customers overall:

- Profile of those who are aware of all Ameren's energy-efficiency rebates/incentives include the following (compared to overall customers surveyed):
    - Equally likely to be male or female.
    - Ages 45+ (61% vs. 54% overall).
    - Likely to have average education levels in line with the overall population: 45% of overall respondents have attained a college degree or more.
    - Slightly more likely to have a household income of $35,000 or higher annually (71% of customers who are aware vs. 65% of the population).
    - Shelton segmented the target audience as predominantly Concerned Parents (31%), but slightly more likely than the overall population to be Cautious Conservatives (24% vs. 22% overall). Message and media preferences follow below, and the study discussed more specific segment characteristics.
    - Potential program participants in Shelton-identified segments are more likely than the overall population to respond to the following types of *Performance/Waste* and *Control/Financial Security* messages developed by Shelton:
        - Example of *Performance/Waste* message: "*You take your responsibilities seriously and take pride in your home. Making energy-efficient home improvements is the best way to make sure that your home is operating at peak efficiency and that you're not wasting your hard-earned resources."*
        - Example of *Control/Financial Security* message: *"When you make changes to use less energy, you can feel more financially secure because you're better controlling your energy consumption and expenses."*

The Shelton study also sought to identify profiles of those most likely to purchase certain types of energy-efficient products. This effort resulted in the following findings for high-efficiency HPWH:

- Profile of those of those most likely to purchase a high-efficiency HPWH:
    - More likely to be male vs. female (54% vs. 46%).
    - Ages 18–44 (60% vs. 46% overall).
    - Well-educated, with 25% having a master's degree (vs. 19% overall).
    - More likely to have a household income of $100K+ (25% vs. 17% overall).
  - Shelton segmented the target audience as follows: predominantly Concerned Parents (29%), but more likely than overall population to be True Believers (28% vs. 21% overall). Message preferences follow below.
  - Potential HPHW participants in these Shelton-identified segments are more likely than the overall population to respond to the following types of *Performance/Waste*, *Control/Financial Security* and *Environmental* messages:
    - *Performance/Waste* and *Control/Financial Security* Messages: Same as above.
    - *Environmental*: *"Reducing your energy consumption is one of the most important things you can do to help protect the environment. When you use less energy, you're helping to slow the impact of the climate crisis and conserve natural resources."*

Per the Shelton study**,** only 44% of customers know of Ameren's energy-efficiency rebates/incentives. Further, when asked if Ameren offers a rebate or incentive for the products discounted through the RebateSavers program, the following percentage of respondents answered "Yes":

- Programmable Thermostats: 16%;
- Electric Water Heaters: 15%;
- HPWH: 12%.; and
- Room AC: Less than 1%.

APPENDIX F.ADVANCED POWER STRIP SAVING METHODOLOGY

INTRODUCTION

Smart-strip technology has been available for several years. Although it is becoming more common, the technology has not yet been widely evaluated. In this document, Cadmus reviews some of the leading research on smart-strip technology to date, summarizes differences among the three Ameren programs offering smart strips, and offers a preliminary estimate of the gross energy savings for each program.

Smart strips typically have one master or controller outlet, several controlled or switched outlets, and one or two uncontrolled or always-on outlets. The controlled outlets automatically draw no power when the homeowner turns off the controller device. This creates energy savings by reducing the power draw from the controlled devices' standby mode. (Devices continue to draw power when inactive but still plugged into a live outlet.)

Some smart strips contain occupancy sensors. These turn off controlled outlets when no motion has been detected for 30 minutes in the room containing the smart strip. When motion is again detected, the smart strip turns the controlled devices back on.

Devices plugged into the always-on socket will not save energy, as we assume that the installation of a smart strip will not cause the homeowner's behavior to change.

Ameren offers smart-strip technology to its residential customers as part of three programs:

- RebateSavers
- PerformanceSavers
- CommunitySavers.

Each of these programs has different smart-strip technologies, delivery mechanisms, and installation requirements. These differences can greatly impact evaluated savings. We have listed these differences in Table 1 and Table 2.

Table 1. Available Smart Strips

Manufacturer and Model	Type	Image
TrickleStar 12 Outlet Advanced Power Strip	Load-sensing	
TrickleStar Motion Sensor Advanced Power Strip	Occupancy-sensing/load-sensing	
TrickleStar 7-Outlet Advanced Power Strip	Load-sensing	

Table 2. Program Differences

Program	Available Smart Strips	Delivery	Direct Installation Requirements
RebateSavers (Participation: Home Energy Kit – 2,248*; On-line Store – 10,061**)	All three TrickleStar devices	Purchased and installed by customers at their discretion through Ameren's online store, or received in free home energy kit and installed by customer	Not Applicable
CommunitySavers (Participation: 619*)	TrickleStar 7-Outlet Advanced Power Strip	Directly installed by program implementer staff.	Installed only if two or more peripherals are attached to primary device. Cable boxes and DVRs are not considered an eligible peripheral device
PerformanceSavers (Participation: 192*)	TrickleStar 7-Outlet Advanced Power Strip	Directly installed by program implementer staff.	Installed only if two or more peripherals are attached to primary device. Cable boxes and DVRs are not considered an eligible peripheral device.

*As of September 30, 2013
**As of November 26, 2013

CURRENT AVAILABLE RESEARCH

Few reports have documented the usage and savings of smart strips. All research on the measure applies different data collection models and different assumptions to determine usage and savings.

Below, we have summarized the two reports providing the best data on smart strips. We believe these represent the best primary research conducted on smart strips to date. We also reviewed other reports and TRMs and include their findings and assumptions following the review of the two highlighted reports.

Ecos Report

The 2009 Ecos Report, "Smart Plug Strips: Draft Report," reviews a variety of smart-strip technologies and, like the SDG&E report, provides estimated savings for both home office and home entertainment center applications.

To verify that installing smart strips results in energy savings, Ecos conducted a field study, using power metering equipment to track the energy consumption before and after installation of the smart strip. Ecos was able to verify that the use of smart strips resulted in energy savings for these applications. In addition, the Ecos study found an incremental increase in energy use from the smart strip itself of 8.8 kWh per year.

The controlled devices for both home office and home entertainment center are shown in Table 3.

Table 3. Controlled Devices by Smart Strip Application

Home Office	Home Entertainment
LCD Monitor	Audio Receiver
Computer Speaker	DVD Player
Multi-Function Device	-

Ecos calculated smart strip energy savings by accounting for the device power consumption (active, low, and standby mode), hours of use, and saturation in the home. These variables are based on a 2006 technical report "Final Field Research Report." [1] In this study, each metered smart power strip had all of the devices plugged in.

In the Ecos report, smart-strip savings are calculated in three steps:

1. Calculate the consumption associated with the controlled devices in active, low, and standby mode without the hours of use being impacted by the controller device.
2. Calculate the consumption associated with the controlled devices in active, low, and standby mode with the hours of use being impacted by the controller device.
3. Take the difference in consumption between steps 1 and 2 and remove 8.8 kWh to account for the added load from the smart strip.

The overall calculated smart-strip savings are shown in Table 4.

Table 4. Ecos Report Calculated Savings per Smart Strip Application

Smart Strip Location	Energy Savings (in kWh/yr)	Per Unit
Home Office	38.4	Per Home Office
Home Entertainment	79.0	Per Home Entertainment Center

NYSERDA Report

The 2011 NYSERDA report, "Advanced Power Strip Research Report" was developed by Lockheed Martin, Inc and provides potential savings for both home office and home entertainment center smart strip applications.

To establish which peripheral technologies would be considered for home office and entertainment smart strip savings, the NYSERDA report looked at a consumer electronics market characterization and included peripherals with an average New York household saturation of 50% or greater. The peripherals chosen for inclusion in the smart strip analysis are listed below in Table 5.

Table 5. Controlled Devices by Smart Strip Application

Home Office	Home Entertainment
LCD Monitor	Cable Set Top Box
Printer	DVD Player
-	VCR
-	Video Game Console

Similar to the Ecos report, the NYSERDA report uses the device power consumption (active, low, and standby mode), hours of use, and saturation in the home in order to calculate smart strip energy savings. The NYSERDA report compiles data from six sources to establish the power consumption and hours of use for the devices.

[1] Moorefield, L., Porter, S., May-Ostendorp, P. Final Field Research Report. Technical Report. California Energy Commission Public Interest Energy Research Program, October 31, 2006.

1. Energy Center of Wisconsin[2]
2. IT Energy – Denmark[3]
3. Ecos Consulting[4]
4. Lawrence Berkeley National Laboratory[5]
5. TIAX LLC[6]
6. Energy Efficient Strategies[7]

To calculate smart strip savings, the NYSERDA report uses the combined savings from the following two calculations:

$$\frac{\Delta kWh_e}{Year} = \sum_m SDW_{e,m} \times \frac{SDHrs_{e,m}}{Day} \times \frac{kW_e}{1000\ W_e} \times \frac{365\ Days}{Year}$$

Where:

- e = type of home electronic equipment
- m = shutdown mode (standby or off)
- $\mathbf{SDW_{e,m}}$ = shutdown watts, the watts drawn by e in shutdown mode m
- $\mathbf{SDHrs_{e,m}}$ = number of hours e is in shutdown mode m with respect to the number of hours the product in the master control is in shutdown mode

$$\frac{\Delta kWh_e}{Year} = \sum_m SDW_{e,m} \times \frac{SDHrs_{i,m}}{Day} \times \frac{kW_e}{1000\ W_e} \times \frac{365\ Days}{Year}$$

Where:

- e = type of home electronic equipment
- i = type of home electronic equipment in the master control outlet
- m = shutdown mode (standby or off)
- $\mathbf{SDW_{e,m}}$ = shutdown watts, the watts drawn by e in shutdown mode m
- $\mathbf{SDHrs_{i,m}}$ = number of hours i is in shutdown mode m; = 24 – Number of operating hrs

[2] Energy Center of Wisconsin. 2010 May. Electricity Savings Opportunities for Home Electronics and Other Plug-In Devices in Minnesota Homes. Madison, Wis.: Energy Center of Wisconsin.
[3] Fjordbak Larson, Troels. 2007 Dec 7. Standby and Energy Savings Sockets. Herlev, Denmark.: IT Energy.
[4] Ecos Consulting. 2009 Jul 31. Energy Trust of Oregon Smart Plug Strip Project: Final Meeting.
[5] Lawrence Berkeley National Laboratory. 2011. Standby Power Summary Table. Berkeley, Calif.: Lawrence Berkeley National Laboratory.
[6] Roth, Kurt W. and McKenney, Kurtis. 2007 Jan. Energy Consumption by Consumer Electronics in U.S. Residences. Cambridge, Mass.: TIAX LLC.
[7] Energy Efficient Strategies. 2006 Mar. 2005 Intrusive Residential Standby Survey Report.

The overall calculated smart-strip savings are shown below in Table 6.

Table 6. NYSERDA Report Calculated Savings per Smart Strip Application

Smart Strip Location	Energy Savings (in kWh/yr)	Per Unit
Home Office	31.0	Per Home Office
Home Entertainment	75.1	Per Home Entertainment Center

Additional Studies

Cadmus reviewed additional studies to understand the range of savings values being considered for smart strips. It should be noted that many of these studies and reports were intended to determine potential savings for smart strips and hence do not include factors that can affect final savings values such as installation rates and net-to-gross ratios. The studies and reports are listed below in Table 7, along with some of the key assumptions made in each.

Table 7. Smart Strip References and Estimated Savings

Source	Smart Strip Location	Controlled Devices	Smart Strip Type	Savings (kWh)
Ameren Technical Reference Manual 2012 Filing	Home Office	4	Load-Sensing Smart Strip	146.7
Michigan Energy Measures Database 2009	Home Office	4	Load-Sensing Smart Strip	146.7
ECEEE 2009 Summer Study, Jensen & Fjorkbak	Home Office	2.5	Load-Sensing Smart Strip	90
Arkansas Technical Reference Manual, Version 3.0, 2013	Home Office	4	Load-Sensing Smart Strip	84
Ecos Field Study 2009 Metering Exercise	Home Office	3	Load-Sensing Smart Strip	82
Ecos Field Study 2009	Home Office	3	Load-Sensing Smart Strip	38.4
NYSERDA Report, 2011	Home Office	2	Load-Sensing Smart Strip	31
SDG&E Report, 2009	Home Office	Unknown	Load-Sensing Smart Strip	26.3
Advanced Power Strip Measure Workbook, Regional Technical Forum, 2013	Home Office	2.5	Load-Sensing Smart Strip, Direct-Install	20
BPA Smart Power Strip Energy Savings Evaluation, 2011	Office Cubicle	3	Load-Sensing Smart Strip, Direct-Install	145
Ecos Field Study 2009 Metering Exercise	Home Entertainment	5	Remote Control Smart Strip and Timer	626.3
Ecos Field Study 2009 Metering Exercise	Home Entertainment	5	Load-Sensing Smart Strip and Timer	610.3
Ecos Field Study 2009 Metering Exercise	Home Entertainment	5	Remote Control Smart Strip	265
Ecos Field Study 2009 Metering Exercise	Home Entertainment	5	Load-Sensing Smart Strip	248.9
Ameren Technical Reference Manual 2012 Filing	Home Entertainment	5	Load-Sensing Smart Strip	221.9
Michigan Energy Measures Database 2009	Home Entertainment	5	Load-Sensing Smart Strip	221.9

Source	Smart Strip Location	Controlled Devices	Smart Strip Type	Savings (kWh)
Arkansas Technical Reference Manual, Version 3.0, 2013	Home Entertainment	4	Load-Sensing Smart Strip	141
Ecos Field Study 2009	Home Entertainment	2	Load-Sensing and Occupancy-Sensing Smart Strip	86
Ecos Field Study 2009	Home Entertainment	2	Load-Sensing Smart Strip	79
NYSERDA Report, 2011	Home Entertainment	4	Load-Sensing Smart Strip	75.1
ECEEE 2009 Summer Study, Jensen & Fjorkbak	Home Entertainment	3.4	Load-Sensing Smart Strip	61
Advanced Power Strip Measure Workbook, Regional Technical Forum, 2013	Home Entertainment	2.3	Load-Sensing Smart Strip, Direct-Install	40
SDG&E Report, 2009	Home Entertainment	Unknown	Load-Sensing Smart Strip	21.7
Embertec Field Trials (as reported in Research Plan: Residential Advanced Power Strips by Bonneville Power Administration, 2013)	Unknown	Unknown	Load-Sensing and Occupancy-Sensing Smart Strip, Direct-Install	258
Advanced Power Strip Measure Workbook, Regional Technical Forum, 2013	Either	Unknown	Occupancy-Sensing Smart Strip, owner- or direct-installed.	70
PECO's Smart House Call Program Filing, 2013	Either	Unknown	Unknown	57

Cadmus reviewed each of these reports in detail, examining the assumptions, secondary sources, engineering algorithms, and metering tests used to calculate savings. As shown in the table, the notable differences between all these findings are largely the average number of controlled devices assumed in each equation and the type of smart-strip technologies used.

The Ecos field study found especially large savings for smart strips and remote-control smart strips having five controlled peripherals. Even higher savings are achieved when those smart strips are plugged into a programmable timer, which turns off all electronics on the smart strip, not just those in the controlled socket.

Table 8 and Table 9 below show the range of savings claimed in the studies above for load-sensing smart strips.

Table 8. Home Entertainment Range of Savings and Number of Controlled Devices

Home Entertainment	Savings	Controlled Devices
Min	21.7	Unknown
Max	248.9	5.0
Mean	130.5	3.6

Table 9. Home Office Range of Savings and Number of Controlled Devices

Home Office	Savings	Controlled Devices
Min	20	2.5
Max	146.7	4.0
Mean	73.9	3.1

CADMUS APPROACH

This memo section reviews the following for the above studies and for the suggested Cadmus approach:

- Energy-savings algorithm
- Input assumptions (number and type of peripherals)
- Hours of use
- Modes of use
- Installation rates

Following this detailed information is a discussion of the smart-strip data-collection efforts undertaken by Cadmus to date. Finally, we propose using the findings of the NYSERDA report of 75.1 kWh savings for home entertainment systems and 31.0 kWh savings for home office applications (adjusted by installation/retention rates). Cadmus believes this report combines the most in-depth research with the most reasonable assumptions to calculate energy savings.

Our conclusion will provide a summary of expected savings for each of the types of smart strips by program, considering the differing installation rates and applications as found in participant surveys.

Energy-Savings Algorithm

The Ameren TRM determines savings from the smart strip using the algorithm below:

$$Energy\ Savings\ \left(\frac{kWh}{Year}\right) = \left(\frac{(Base\ Watts_{AVG} - Efficient\ Watts_{AVG}) \times 24 \times 365}{1{,}000}\right)$$

Where:

- Base Idle $Watts_{AVG}$ = weighted average of controlled devices' energy used when in standby mode.
- Idle Hours per Day_{AVG} = weighted average hours per day by device when system is assumed to be turned off.
- Base $Watts_{AVG}$ = weighted average of all devices' energy use.
- Efficient Idle $Watts_{AVG}$ = weighted average of controlled all device(s) energy used when controlled devices are turned off by controller device.

This algorithm is similar to those used to calculate savings in the other reports and studies we cited above. Below we review the inputs to the Ameren TRM algorithm versus those used in the NYSERDA Report.

Input Assumptions

The most critical algorithm input assumptions relate to the type and number of peripherals plugged into the smart strip, as this determines the base idle watts and efficient idle watts. As shown in Table 7, the number of peripherals assumed to be present in each study varied greatly, as did the associated savings estimates. In addition, we consider the type of peripherals assumed to be plugged into the smart strip. Table 10 below shows the assumptions made by Morgan Measures Library in calculating the average watts of controlled devices for the Ameren TRM.

Table 10. Ameren TRM: Controlled Devices by Smart Strip Application

Home Office	Home Entertainment
Computer Speakers	Audio System
Inkjet Printer	Speakers
Internet Terminal	DVD
Phone/Fax/Copier	VCR
-	Cable Box
-	Video Game Console
Average Daily Wattage Decrease: 20W	**Average Daily Wattage Decrease: 32W**

In contrast to these assumptions, the NYSERDA report (see Table 5 on page 4) researched the average number of peripherals present and found two peripherals for home office applications and four for home entertainment centers.

While we expect that homes will have internet terminals (i.e., modems and wireless internet routers), we do not anticipate that participants will control these devices with their smart strips, as household electronics other than computers (e.g., phones, tablets, and some home entertainment systems) rely on internet access when the home office computer is not in use. Similarly, we do expect most homes to have cable boxes and HD-DVRs but do not believe these should be included as a controlled device, as these devices often do not function properly if powered down. Both CommunitySavers and PerformanceSavers have officially excluded these as eligible controlled devices for this reason.

Hours of Use

The hours of use for the controller and controlled device contribute to the savings estimates. The Ameren TRM assumes that the television is on for 5 hours per day and that the computer is on for 4 hours per day (citing the Morgan Measure Library for both assumptions). These assumptions result in a total time in standby mode of 19 hours for the television and 20 for the computer. The NYSERDA report shows that televisions are in active use 5.3 hours per day, and that computers are in active use 3.2 hours per day. This results in 18.7 hours in standby for the television and 4.1 hours in standby for the computer with 16.7 hours switched off completely.

Modes of Use

Most of the above referenced studies consider the amount of time each controller and controlled device is in each of four modes during an average day:

- Active use – where a device is switched on and being actively used
- Low-power mode – where the device is switched on, but is not being actively used

- Standby mode – where the device is switched off, but still plugged in and able to be turned on with a remote control

- Unplugged mode – where the device is unplugged or power to the device is turned off through use of a smart strip

The Ameren TRM calculations do not differentiate among these types of use, but assumes that all measures plugged into the smart strip are on and in active use while the controlled device is turned on. The NYSERDA report opts for the more common approach[8], where device hours of use are divided into these different modes and savings are calculated from the difference between the baseline scenario without a smart strip and the smart strip scenario.

Occupancy Sensors

A few smart strips come with occupancy sensors that turn off peripherals when a room is unoccupied for a length of time.[9] These are mainly designed to work in an office setting, where computers may remain turned on for long periods of time without being used. Almost no research exists on the improvement in savings from this type of device. The Ecos field study estimates an increase of savings of 9% for an occupancy-sensing smart strip used with entertainment centers.

CADMUS SAVINGS ESTIMATES

In an effort to gather as much Ameren and program-specific primary data as possible to inform the savings algorithm and inputs shown above, Cadmus surveyed participants in all three programs to determine how participants were using smart strips in their homes. The survey responses led to several conclusions:

1. People are generally confused about smart-strip technology, its purpose, and how to use it.[10]

2. This technology is not a good candidate for survey self-reports. Participants were unable or unwilling to correctly report the number and type of devices plugged into the smart strip.

Since the self-reported peripheral data we collected were unreliable, Cadmus has decided to use the NYSERDA report savings estimates to estimate savings for all three Ameren programs. This report combines data from numerous other studies and provides a detailed picture of all the inputs into their savings estimates. These savings are detailed in Table 11.

Table 11. NYSERDA Report Savings Estimates

Home Office	Home Entertainment
31.0 kWh	75.1 kWh

[8] This approach is mapped out in the Ecos field study, and followed in the ECEEE report, the Arkansas TRM, and the Regional Technical Forum estimates.

[9] The occupancy-sensing smart strip available for reduced cost through Ameren turn off peripherals after a room has been vacant for 30 minutes.

[10] This was also shown in the NYSERDA report, where respondents indicated their level of knowledge of phantom load averaged at 1.65 on a scale of 1 to 5. Respondents also indicated a lack of familiarity with smart strips, 42% said they had never heard of them and 30% had heard of them but knew little about them.

The NYSERDA report was written to assess the potential of savings in the market, and therefore leaves out a key variable for evaluation. The in-service rate for the smart strips was determined through participant surveys and will be used for each of the three programs.[11]

Table 12 shows the in-service rates for smart strips found through participant surveys[12], as well as the percentage of smart strips used for each application: home office or home entertainment center.

Table 12. Participant Survey Findings on Installation of Smart Strips

Program/Measure	ISR	Home Office Saturation	Entertainment Center Saturation
CommunitySavers Smart Strip	100%*	0%	100%
PerformanceSavers Smart Strip	90%	36%	64%
RebateSavers – Home Energy Kit Smart Strip	46%	48%	52%
RebateSavers - Online Store Smart Strip	100%	36%**	64%**

*As of October 31, 2013, all CommunitySavers respondents indicated their smart strips were still installed and functioning. A second wave of surveys is currently in the field and this number may change.
** We have assumed that the application of these smart strips is consistent with the PerformanceSavers program.

The savings by measure and application type, considering in-service rates and the baseline energy use of the smart strips, are shown in Table 13.

Table 13. Smart-Strip Savings by Program and Measure

Program/ Measure	Number Purchased/ Direct-Installed	Home Office Application kWh Savings (adjusted for ISR)	Entertainment Center Application kWh Savings (adjusted for ISR)
CommunitySavers Smart Strip	619	31	75
PerformanceSavers Smart Strip	192	28	67
RebateSavers - Kit Participant Smart Strip	2,248	14	35
RebateSavers - Online Store Smart Strip	10,006	31	75
RebateSavers - Online Store Smart Strip with Occupancy Sensor	55	34	82

[11] While survey respondents struggled to report the number and type of devices plugged into the smart strip, they were able to confirm whether or not they were using the smart strip.
[12] The evaluation team expected most smart strips to be delivered through the PerformanceSavers and CommunitySavers direct-install programs as well as through the RebateSavers Home Energy Kit program. Initially, Ameren did not collect contact data for participants purchasing smart strips through the on-line store. Hence, the evaluation team did not conduct surveys of these participants. In lieu of primary data on installation rates, we are assuming a 100% in-service rate as the customer sought out and purchased the strips (which indicates their likely intention to use them).

APPENDIX H. FREERIDERSHIP SCORING TABLES

Table 59 illustrates how initial survey responses are translated into whether the response is 'yes", "no", or "partially" indicative of free ridership (in parentheses).

Table 59. Raw Survey Responses Translation to Free ridership Scoring Matrix Terminology

FR1. Had you already purchased your new [APPLIANCE] before hearing about the Ameren Act On Energy promotion?	FR1a. To confirm, you purchased your new [APPLIANCE] and then found out it qualified for an Ameren Act On Energy rebate program, is that correct?	FR2. Before learning about the Ameren rebate, were you already planning to purchase a [APPLIANCE]?	FR3. Would you have purchased the same make and model of [APPLIANCE] without the [INSERT INCENTIVE] rebate from Ameren?	FR4. Without the Ameren rebate, would you have purchased a different make and model [APPLIANCE], or would you have decided not to purchase one at all?	FR5. When you say you would have purchased the [APPLIANCE]] without the rebate from Ameren, would you have purchased one that was just as energy efficient?	FR6. Thinking about timing, without the Ameren Missouri rebate, would you have purchased the [APPLIANCE]…	FR7. To confirm, you indicated that without an Ameren rebate, you would not have purchased your [APPLIANCE] at all, is that correct?	FR8. Without the Ameren rebate, would you have purchased a [IAPPLIANCE] that was just as energy-efficient?	FR9. With respect to timing, would you have purchased the [APPLIANCE]
Yes (Yes)	Yes, that's correct (Yes)	Yes (Yes)	Yes (Yes)	I would have installed a different [APPLIANCE] (Yes)	Yes (Yes)	At the same time (Yes)	Yes (No)	Yes (No)	At the same time (Yes)
No (No)	No, that's not correct (No)	No (No)	No (No)	I would not have purchased one at all (No)	No (No)	Within the same year (Partial)	No (Partial)	No (Partial)	Within the same year (Partial)
Not sure (No)	Not sure (No)	Not sure (Partial)	Not sure (Partial)	Not sure (No)	Not sure (Partial)	One to two years out (No)	Not sure (Partial)	Not sure (Partial)	One to two years out (No)
						More than two years out (No)			More than two years out (No)
						Never (No)			Never (No)
						Not sure (Partial)			Not sure (Partial)

Table 60 shows how the string of responses from Table 59 is then translated into a free ridership score.

Table 60. Sample of Free ridership Scores

FR1. Had you already purchased your new [APPLIANCE] before hearing about the Ameren Act On Energy promotion?	FR1a. To confirm, you purchased your new [APPLIANCE] and then found out it qualified for an Ameren Act On Energy rebate program, is that correct?	FR2. Before learning about the Ameren rebate, were you already planning to purchase a [APPLIANCE]?	FR3. Would you have purchased the same make and model of [APPLIANCE] without the [INSERT INCENTIVE] rebate from Ameren?	FR4. Without the Ameren rebate, would you have purchased a different make and model [APPLIANCE], or would you have decided not to purchase one at all?	FR5. When you say you would have purchased the [APPLIANCE]] without the rebate from Ameren, would you have purchased one that was just as energy efficient?	FR6. Thinking about timing, without the Ameren Missouri rebate, would you have purchased the [APPLIANCE]...	FR7. To confirm, you indicated that without an Ameren rebate, you would not have purchased your [APPLIANCE] at all, is that correct?	FR8. Without the Ameren rebate, would you have purchased a [IAPPLIANCE] that was just as energy-efficient?	FR9. With respect to timing, would you have purchased the [APPLIANCE]	FR Score
Yes	Yes	x	x	x	x	x	x	x	x	100%
Yes	No	Yes	Yes	x	x	Yes	x	x	x	100%
Yes	No	Yes	Yes	x	x	Partial	x	x	x	75%
Yes	No	Yes	Yes	x	x	No	x	x	x	0%
Yes	No	Yes	Yes	x	x	Partial	x	x	x	50%
Yes	No	Yes	Partial	Yes	Yes	Yes	x	x	x	75%
Yes	No	Yes	Partial	Yes	Yes	Partial	x	x	x	50%
Yes	No	Yes	Partial	Yes	Yes	No	x	x	x	0%
Yes	No	Yes	Partial	Yes	Partial	Yes	x	x	x	50%
Yes	No	Yes	Partial	Yes	Partial	Partial	x	x	x	25%
Yes	No	Yes	Partial	Yes	Partial	No	x	x	x	0%
Yes	No	Yes	Partial	Yes	No	x	x	x	x	0%
Yes	No	Yes	Partial	No	x	x	x	x	x	75%
Yes	No	Yes	Partial	No	x	Yes	x	x	x	75%
Yes	No	Yes	Partial	No	x	Partial	x	x	x	50%
Yes	No	Yes	Partial	No	x	No	x	x	x	0%
No	x	Yes	Yes	x	x	Yes	x	x	x	100%
No	x	Yes	Yes	x	x	Partial	x	x	x	75%
No	x	Yes	Yes	x	x	No	x	x	x	0%
No	x	Yes	Partial	Yes	Yes	Yes	x	x	x	75%
No	x	Yes	Partial	Yes	Yes	Partial	x	x	x	50%
No	x	Yes	Partial	Yes	Yes	No	x	x	x	0%
No	x	Yes	Partial	Yes	Partial	Yes	x	x	x	50%
No	x	Yes	Partial	Yes	Partial	Partial	x	x	x	25%
No	x	Yes	Partial	Yes	Partial	No	x	x	x	0%
No	x	Yes	Partial	Yes	No	x	x	x	x	0%
No	x	Yes	Partial	Yes	x	Yes	x	x	x	75%
No	x	Yes	Partial	Yes	x	Partial	x	x	x	50%
No	x	Yes	Partial	Yes	x	No	x	x	x	0%
No	x	Yes	Partial	No	x	x	x	x	x	0%
No	x	Yes	Partial	No	x	x	Yes	Yes	Yes	75%
No	x	Yes	Partial	No	x	x	Yes	Yes	Partial	50%
No	x	Yes	Partial	No	x	x	Yes	Yes	No	0%
No	x	Yes	Partial	No	x	x	Yes	Partial	Yes	50%
No	x	Yes	Partial	No	x	x	Yes	Partial	Partial	25%
No	x	Yes	Partial	No	x	x	Yes	Partial	No	0%
No	x	Yes	Partial	No	x	x	Yes	No	x	0%
No	x	Yes	Partial	No	x	x	No	x	x	0%
No	x	Yes	No	Yes	Yes	Yes	x	x	x	50%
No	x	Yes	No	Yes	Yes	Partial	x	x	x	25%
No	x	Yes	No	Yes	Yes	No	x	x	x	0%
No	x	Yes	No	Yes	Partial	Yes	x	x	x	25%
No	x	Yes	No	Yes	Partial	Partial	x	x	x	12.5%
No	x	Yes	No	Yes	Partial	No	x	x	x	0%
No	x	Yes	No	Yes	No	x	x	x	x	0%
No	x	Yes	No	Yes	x	Yes	x	x	x	50%
No	x	Yes	No	Yes	x	Partial	x	x	x	25%
No	x	Yes	No	Yes	x	No	x	x	x	0%

Each participant free ridership score starts with 100%, which we decrement based on their responses to the nine questions as shown in Table 61.

Table 61. Free ridership Scoring Legend

Q#	Decrement
FR1	0% decrement for "No", Partial level not needed
FR2	100% FR if "Yes", "No" level not needed, "Partial" level not needed
FR3	50% decrement for "No", 25% decrement for "Partial"
FR4	50% decrement for "No", 25% decrement for "Partial"
FR5	0% decrement for "No", Partial level not needed
FR6	100% decrement for "No", 25% decrement for "Partial"
FR7	100% decrement for "No", 25% decrement for "Partial"
FR8	100% decrement for "No", 25% decrement for "Partial"
FR9	100% decrement for "No", 25% decrement for "Partial"
FR10	100% decrement for "No", 25% decrement for "Partial"

Below, we illustrate the unique response combinations from applicants answering the Rebate Savers online survey (actual responses mapped to “yes”, “no”, or “partial”, as indicative of freeridership); the freeridership score assigned to each combination; and the number of responses.

Table 62 shows phone respondents.

Table 63 shows online survey respondents.

We calculated freeridership scores for each measure category, based on the distribution of scores within the matrix.

Table 62. Frequency of Free ridership Scoring Combinations – Phone Results

FR1. Had you already purchased your new [APPLIANCE] before hearing about the Ameren Act On Energy promotion?	FR1a. To confirm, you purchased your new [APPLIANCE] and then found out it qualified for an Ameren Act On Energy rebate program, is that correct?	FR2. Before learning about the Ameren rebate, were you already planning to purchase a [APPLIANCE] ?	FR3. Would you have purchased the same make and model of [APPLIANCE] without the [INSERT INCENTIVE] rebate from Ameren?	FR4. Without the Ameren rebate, would you have purchased a different make and model [APPLIANCE] , or would you have decided not to purchase one at all?	FR5. When you say you would have purchased the [APPLIANCE] without the rebate from Ameren, would you have purchased one that was just as energy efficient?	FR6. Thinking about timing, without the Ameren Missouri rebate, would you have purchased the [APPLIANCE] ...	FR7. To confirm, you indicated that without an Ameren rebate, you would not have purchased your [APPLIANCE] at all, is that correct?	FR8. Without the Ameren rebate, would you have purchased a [APPLIANCE] that was just as energy-efficient?	FR9. With respect to timing, would you have purchased the [APPLIANCE] ...	FR Score	Frequency
Yes	Yes	x	x	x	x	x	x	x	x	100%	36
Yes	No	Yes	Yes	x	x	Yes	x	x	x	100%	2
Yes	No	Yes	Partial	Yes	No	x	x	x	x	0%	1
Yes	No	Yes	Partial	No	x	x	x	x	x	75%	1
No	x	Yes	Yes	x	x	Yes	x	x	x	100%	52
No	x	Yes	Yes	x	x	Partial	x	x	x	75%	14
No	x	Yes	Yes	x	x	No	x	x	x	0%	4
No	x	Yes	Partial	Yes	Yes	Yes	x	x	x	75%	9
No	x	Yes	Partial	Yes	x	Partial	x	x	x	50%	1
No	x	Yes	Partial	No	x	x	x	x	x	0%	5
No	x	Yes	No	Yes	Yes	Yes	x	x	x	50%	5
No	x	Yes	No	Yes	Yes	Partial	x	x	x	25%	1
No	x	Yes	No	Yes	Yes	No	x	x	x	0%	1
No	x	Yes	No	Yes	Partial	Yes	x	x	x	25%	1
No	x	Yes	No	Yes	Partial	Partial	x	x	x	13%	1
No	x	Yes	No	Yes	No	x	x	x	x	0%	5
No	x	Yes	No	Yes	x	Yes	x	x	x	50%	4
No	x	Yes	No	Yes	x	Partial	x	x	x	25%	1
No	x	Yes	No	Yes	x	No	x	x	x	0%	1
No	x	Yes	No	No	x	x	No	x	x	0%	6
No	x	Partial	Yes	x	x	Yes	x	x	x	75%	1
No	x	Partial	Yes	x	x	No	x	x	x	0%	1
No	x	Partial	No	No	x	x	No	x	x	0%	1
No	x	No	Yes	x	x	Yes	x	x	x	50%	12
No	x	No	Yes	x	x	Partial	x	x	x	25%	6
No	x	No	Yes	x	x	No	x	x	x	0%	4
No	x	No	Partial	Yes	Yes	Yes	x	x	x	25%	1
No	x	No	Partial	Yes	x	Yes	x	x	x	25%	2
No	x	No	Partial	Yes	x	No	x	x	x	0%	1
No	x	No	Partial	No	x	x	x	x	x	0%	6
No	x	No	No	Yes	Yes	No	x	x	x	0%	1
No	x	No	No	Yes	No	x	x	x	x	0%	5
No	x	No	No	Yes	x	Yes	x	x	x	13%	1
No	x	No	No	No	x	x	No	x	x	0%	12
No	x	Yes	No	No	x	x	x	x	x	0%	4
No	x	x	x	x	x	x	x	x	x	0%	2
No	x	No	No	No	x	x	x	x	x	0%	2

Table 63. Frequency of Free ridership Scoring Combinations – Online Measures

FR1. Had you already purchased your new [APPLIANCE] before hearing about the Ameren Act On Energy promotion?	FR1a. To confirm, you purchased your new [APPLIANCE] and then found out it qualified for an Ameren Act On Energy rebate program, is that correct?	FR2. Before learning about the Ameren rebate, were you already planning to purchase a [APPLIANCE] ?	FR3. Would you have purchased the same make and model of [APPLIANCE] without the [INSERT INCENTIVE] rebate from Ameren?	FR4. Without the Ameren rebate, would you have purchased a different make and model [APPLIANCE] , or would you have decided not to purchase one at all?	FR5. When you say you would have purchased the [APPLIANCE] without the rebate from Ameren, would you have purchased one that was just as energy efficient?	FR6. Thinking about timing, without the Ameren Missouri rebate, would you have purchased the [APPLIANCE] ...	FR7. To confirm, you indicated that without an Ameren rebate, you would not have purchased your [APPLIANCE] at all, is that correct?	FR8. Without the Ameren rebate, would you have purchased a [APPLIANCE] that was just as energy-efficient?	FR9. With respect to timing, would you have purchased the [APPLIANCE] ...	FR Score	Frequency
Yes	Yes	x	x	x	x	x	x	x	x	100%	34
Yes	No	No	Yes	x	x	No	x	x	x	0%	1
No	x	Yes	Yes	x	x	Yes	x	x	x	100%	26
No	x	Yes	Yes	x	x	Partial	x	x	x	75%	8
No	x	Yes	Yes	x	x	No	x	x	x	0%	7
No	x	Yes	Partial	Yes	Yes	Partial	x	x	x	50%	1
No	x	Yes	Partial	No	x	x	x	x	x	0%	10
No	x	Yes	No	Yes	Yes	Yes	x	x	x	50%	1
No	x	Yes	No	Yes	No	x	x	x	x	0%	4
No	x	Partial	Yes	x	x	Yes	x	x	x	75%	1
No	x	Partial	Yes	x	x	Partial	x	x	x	50%	1
No	x	Partial	Yes	x	x	No	x	x	x	0%	1
No	x	Partial	Partial	No	x	x	x	x	x	0%	1
No	x	Partial	No	No	x	x	No	x	x	0%	1
No	x	No	Yes	x	x	Yes	x	x	x	50%	6
No	x	No	Yes	x	x	Partial	x	x	x	25%	1
No	x	No	Yes	x	x	No	x	x	x	0%	3
No	x	No	Partial	Yes	No	x	x	x	x	0%	1
No	x	No	Partial	No	x	x	No	x	x	0%	2
No	x	No	Partial	No	x	x	x	x	x	0%	12
No	x	No	No	Yes	Partial	Partial	x	x	x	0%	1
No	x	No	No	Yes	Partial	No	x	x	x	0%	1
No	x	No	No	Yes	No	x	x	x	x	0%	1
No	x	No	No	No	x	x	No	x	x	0%	16
No	x	Yes	No	No	x	x	x	x	x	0%	2
No	x	x	x	x	x	x	x	x	x	0%	2
No	x	No	No	No	x	x	x	x	x	0%	6

APPENDIX I. REFERENCES

The Cadmus team used these reports in the benchmarking research.

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