Ameren Missouri Residential Portfolio Evaluation Summary: Program Year 2014

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EXECUTIVE SUMMARY

Ameren Missouri engaged Cadmus and Nexant (the Cadmus team) to perform annual process and impact evaluations of its seven residential energy-efficiency programs for a three-year period, from 2013 through 2015. This annual summary report presents the key energy savings, demand reduction, and cost-effectiveness results for Program Year 2014 (PY14), the period from January 1, 2014, through December 31, 2014.

In addition to these key impact results, this summary report includes: brief descriptions of each residential program; details regarding the cost-effectiveness analysis; and summaries of the Cadmus team's responses to the five process evaluation questions required by the Missouri Code of State Regulations (CSR).

Separate, program-specific PY14 evaluation reports offer significantly more detail regarding our impact methodologies and results as well as key process evaluation findings, conclusions, and recommendations.

Energy Savings

Table 1 summarizes the *ex ante* gross, *ex post* gross, and *ex post* net energy savings (MWh/year) for each program and for the residential portfolio overall in PY14. The table also compares the Cadmus team's *ex post* net energy savings to the program-specific and residential portfolio net energy savings targets approved by Missouri Public Service Commission (MPSC) and other stakeholders.

As shown in the table, the Lighting program greatly exceeded its PY14 MPSC-approved targets (161%) and is responsible for the residential portfolio exceeding its target by more than 20% (124%).

Table 1. Summary of PY14 Residential Program Energy Savings (MWh/Year)

Program	MPSC-Approved Target[1]	*Ex Ante* Gross Savings Utility Reported (Prior to Evaluation)[2]	*Ex Post* Gross Savings Determined by EM&V[3]	*Ex Post* Net Savings Determined by EM&V[4]	Percent of Goal Achieved[5]
Efficient Products	15,768	11,849	6,697	6,089	39%
Home Energy Analysis	1,070	701	442	375	35%
HVAC	36,643	39,777	36,004	34,343	94%
Lighting	96,837	144,913	156,842	155,780	161%
Low Income	4,530	7,484	5,077	4,863	107%
New Homes	1,440	408	275	118	8%
Refrigerator Recycling	11,950	12,932	8,850	6,281	53%
Portfolio*	**168,238**	**218,064**	**214,187**	**207,849**	**124%**

[1] http://www.ameren.com/-/media/missouri-site/Files/Rates/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 the net-to-gross (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.

*May not exactly match sum of program totals due to rounding

Demand Reduction

Similarly to the previous table, Table 2 summarizes the *ex ante* gross, *ex post* gross, and *ex post* net demand reductions (kW) for each program and for the residential portfolio overall, and compares Cadmus team's *ex post* net demand reductions to MPSC-approved targets.

While energy savings and demand reductions do not move in perfect lockstep (as the measure mix for some programs generate more peak savings), the Lighting again exceeded the PY14 MPSC-approved targets (422%) and contributed greatly to the residential portfolio meeting the overall target. Similar to PY13, the high number of upstream CFLs installed in non-residential locations greatly increased the demand savings generated by the program (as these bulbs are used more frequently during peak hours).

Table 2. Summary of PY14 Residential Program Demand Reductions (kW)

Program	MPSC-Approved Target[1]	*Ex Ante* Gross Savings Utility Reported (Prior to Evaluation)[2]	*Ex Post* Gross Savings Determined by EM&V[3]	*Ex Post* Net Savings Determined by EM&V[4]	Percent of Goal Achieved[5]
Efficient Products	2,552	1,610	968	913	36%
Home Energy Analysis	351	101	43	36	10%
HVAC	24,303	14,106	18,111	17,320	71%
Lighting	2,911	12,420	12,378	12,287	423%
Low Income	841	650	1,216	1,167	139%
New Homes	272	61	107	46	17%
Refrigerator Recycling	1,664	1,677	1,698	1,207	73%
Portfolio*	**32,894**	**30,625**	**34,521**	**32,997**	**100%**

[1] http://www.ameren.com/-/media/missouri-site/Files/Rates/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.

*May not exactly match sum of program totals due to rounding

Cost Effectiveness

To analyze the cost-effectiveness of the PY14 programs and residential portfolio, the Cadmus team worked with Morgan Marketing Partners (MMP), which utilized DSMore to assess cost-effectiveness through the following five tests (as defined by the California Standard Practice Manual):

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

As shown in Table 3, five of the seven PY14 residential programs proved cost-effective (benefit/cost ratios greater than 1.0) using the UCT and TRC tests. Four of these five programs had UCT values greater than 2.0, led by the HVAC program at 6.27. The two programs found not to be cost-effective both improved their UCT value in 2014: the New Homes program (0.56 in 2014 ; 0.18 in 2013) and the Home Energy Analysis program (0.75 in 2014; 0.67 in 2013). Six out of seven PY14 residential programs improved their UCT values from PY13 to PY14. The sole decrease was in the Lighting program (7.88 in PY13 and 5.86 in PY14).

As determined through a consensus building process with stakeholders, all the cost-effectiveness results shown include the program's share of portfolio-level or indirect costs. Each program's share of these costs was determined using the present value of each program's UCT lifetime benefits (i.e., the present value in 2013 dollars of avoided generation costs, as well as deferral of capacity capital and transmission and distribution capital costs). More details are provided in the Cost-Effectiveness Details chapter.

Collectively, the seven residential programs resulted in UCT and TRC cost-effective ratios of 4.76 and 3.11, respectively, at portfolio level. In total, the residential portfolio generated just under $90 million dollars in net UCT lifetime benefits less costs (Table 4).

Table 3. Summary of PY14 Residential Program Cost-Effectiveness

Program	UCT	TRC	RIM	Societal	PART[1]
Efficient Products	2.50	1.80	0.55	2.15	4.22
Home Energy Analysis	0.75	0.58	0.38	0.74	2.47
HVAC	6.27	3.37	1.20	3.95	3.40
Lighting	5.86	3.74	0.58	4.45	7.57
Low Income	1.14	1.14	0.50	1.38	N/A
New Homes	0.56	0.52	0.38	0.65	2.63
Refrigerator Recycling	2.53	2.53	0.61	2.87	N/A
Portfolio	**4.76**	**3.11**	**0.74**	**3.68**	**5.74**

[1]There is no cost to participants for the Low Income and Refrigerator Recycling programs, so the ratio of benefits to costs has a denominator of zero.

Table 4 presents detail by program on costs and benefits pertaining to the UCT in particular (in 2013 dollars). The UCT includes only costs bourne by the utility, but no costs bourne by other parties. For example, the incentive cost would accrue to the utility, and be included. The remainder of the incremental measure cost, if it is not fully covered by the incentive, would be paid by the participant, and is not included.

Table 4. Summary of UTC Benefits and Costs

Program	UCT Net Lifetime Benefits*	Costs**	UTC Net Lifetime Benefits Less Costs
Efficient Products	$4,327,129	$1,728,511	$2,598,618
Home Energy Analysis	$231,981	$309,088	($77,106)
HVAC	$50,344,355	$8,028,436	$42,315,918
Lighting	$50,880,366	$8,689,241	$42,191,125
Low Income	$3,889,834	$3,411,292	$478,543
New Homes	$168,199	$300,164	($131,965)
Refrigerator Recycling	$3,389,179	$1,340,676	$2,048,503
Portfolio	**$113,232,407**	**$23,807,408**	**$89,425,000**

* "Net" means the NTG ratio for each program was applied to the measure savings values when calculating the program benefits.

**The portion of portfolio costs that were distributed across programs are included in the program costs presented in this table. See Table 9 for details.

Table 4 presents detail by program on costs and benefits pertaining to the UCT in particular (in 2013 dollars). The TRC test includes all costs that are paid by either the utility or the participant. For example, in this case, both the incentive cost, and the incremental measure cost would be included. Costs will be higher because more costs are included. Benefits, however, stay the same.

Table 5. Summary of TRC Benefits and Costs

Program	TRC Net Lifetime Benefits*	Costs**	TRC Net Lifetime Benefits Less Costs
Efficient Products	$4,327,129	$2,406,274	$1,920,855
Home Energy Analysis	$231,981	$401,894	($169,913)
HVAC	$50,344,355	$14,955,301	$35,389,054
Lighting	$50,880,366	$13,606,638	$37,273,728
Low Income	$3,889,834	$3,411,292	$478,543
New Homes	$168,199	$322,176	($153,977)
Refrigerator Recycling	$3,389,179	$1,340,676	$2,048,503
Portfolio	**$113,232,407**	$36,444,251	**$76,786,793**

* "Net" means the NTG ratio for each program was applied to the measure savings values when calculating the program benefits.
**The portion of portfolio costs that were distributed across programs are included in the program costs presented in this table. See Table 9 for details.

The UCT and TRC are the most common cost-effectiveness test, and receive the most analysis in this report. However, we also report on the RIM, the Societal Test and the PCT. Costs included in each of the tests reviewed in this report are shown in Table 6.

Table 6. Costs Associated with Each Cost-effectiveness Test

Test	Costs Included
UCT	All costs paid by the utility directly.
TRC	All costs paid by the utility or the participant.
RIM	All costs paid by utility, participant, and the revenue loss associated with reduced sales.
Societal	All costs paid by the utility or the participant.
PCT	All costs paid by the participant.

PROGRAM DESCRIPTIONS

From PY13 to PY14, Ameren Missouri changed the names of its residential programs. Table 7 shows the program names in PY13 and the corresponding name n PY 14.

Table 7. Program Name Changes

PY14 Name	PY13 Name
Efficient Products	RebateSavers
Home Energy Analysis	PerformanceSavers
HVAC	CoolSavers
Lighting	LightSavers
Low Income	CommunitySavers
New Homes	ConstructionSavers
Refrigerator Recycling	Appliance Savers

The following section describes Ameren Missouri's seven PY14 residential programs.

Efficient Products

The Efficient Products program began in Cycle 1 (2009–2012) as the energy-efficient product rebate component of the combined PY09 Lighting and Appliance program.

In implementing the program, Ameren Missouri partners with two third-party contractors:

- CLEAResult (formerly Applied Proactive Technologies), 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 Missouri's behalf.

Beginning in PY12, Ameren Missouri discontinued the appliance portion of the combined Lighting and Appliance program and focused exclusively on lighting products. Ameren Missouri and APT reintroduced Efficient Products in PY13 (called RebateSavers at that time) as a new, stand-alone appliance program, 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 PY14, the Efficient Products program provided downstream rebates for the following:

- ENERGY STAR®-certified room air conditioners (RACs)
- ENERGY STAR-certified heat pump water heaters
- ENERGY STAR-certified air purifiers
- ENERGY STAR-certified water coolers

- ENERGY STAR-certified two-speed pool pumps
- ENERGY STAR-certified variable-speed pool pumps
- Electric storage water heaters with an Energy Factor (EF) of 0.93 or higher

In addition to providing mail-in and online rebates, Efficient Products offered a free Home Energy Kit upon request to customers with electric hot water heaters. Four variations of the kit were offered in PY14. Kits 1 and 2, representing PY13 kit designs, were distributed to participants between January and June 2014. Kits 3 and 4 were updated to reflect PY13 evaluation findings and were distributed to participants between July and December 2014. Customers could choose between Kit 3 and Kit 4, depending on whether they wanted a free kit (Kit 3) or wanted to pay $4.95 for a kit that included an Advanced Power Strip (Kit 4).

The program also provides direct-install kits for multifamily properties. Eligible properties receive the items from Kit 3 kit, with the expectation that property staff will install the items in each unit. Advanced power strips are available for purchase at a discounted price through Ameren Missouri's online store.

Home Energy Analysis

Ameren Missouri added the HEA program pilot program to the residential ActOnEnergy® portfolio in 2013. This program's design seeks to encourage residents of single-family homes to reduce energy consumption by making improvements to the following: weatherization, lighting, HVAC, and water heating appliances fueled by natural gas.

The program provides direct install energy-efficient measures at no cost to participants and offers rebates for other measures (i.e., air sealing, ceiling insulation, and energy-efficient windows), hereafter referred to as major measures. While all single-family homes receiving electricity and natural gas from Ameren Missouri are eligible to participate, the program requires participants to pay $25 for an in-home energy audit.

Through the program, Ameren Missouri seeks to achieve energy savings in the following three ways:

- Educating customers about their energy consumption via a detailed home energy audit report;
- Implementing the following low-cost, energy-efficiency measures during the home energy audit: compact fluorescent lamps (CFLs), light-emitting diodes (LEDs), high efficient faucet aerators, high efficient showerheads, and water heater pipe wrap; and
- Identifying energy-saving opportunities and recommending major measure improvements to enhance the home's performance (such as infiltration improvements, insulation, and high efficient windows).

The HEA program is implemented by the Honeywell Smart Grid Solutions Division (Honeywell).

HVAC

The HVAC Program offers Ameren Missouri customers living in single-family homes, condos, or townhomes incentives for installing high-efficiency central air conditioners (CAC) or heat pumps (HP) through a participating program contractor. The program changed during PY14, but, at the beginning of the year, the program also offered incentives for the following:

- Diagnostic testing and tuning of existing HVAC systems to manufacturer specifications;
- Installing variable-speed fan motors; and
- Installing programmable thermostats.

ICF International (ICF) implements the HVAC Program.

In PY13, the Cadmus team metered 83 HVAC systems that received tune-ups and 78 new, high-efficiency HVAC systems installed through the program. We used detailed submeter data, collected in conjunction with PY13 program tracking data, to estimate per-unit savings for all program measures.

This year, we used the PY13 metering data and the program's detailed tracking data for PY14 to estimate evaluated (ex post) per-unit savings. Through an engineering analysis, we determined the program realized 90.5% percent of the expected (ex ante) gross savings assumed in Ameren Missouri's Technical Resource Manual (TRM). The PY14 analysis produced a result similar to but higher than last year's, when we determined an 86.4% program-level realization rate.

Lighting

The Lighting program's design seeks to increase sales of energy-efficient lighting products through a variety of retail channels. Ameren Missouri works with CLEAResult (formerly Applied Proactive Technologies) the Lighting program implementer, to provide a per-unit discount for eligible CFLs, LEDs, and lighting occupancy sensors. In addition to reducing prices, CLEAResult leverages its relationships with participating retailers to place discounted lighting in prominent locations within stores and locate Ameren Missouri signage and marketing materials nearby. Energy Federated Incorporated (EFI) also assists in markdown program implementation by maintaining the tracking system and selling discounted lighting products through an online store.

Lighting primarily operates through a point-of-sale markdown system at major chain retailers. In addition to the markdown channel, the Lighting program includes two other channels: coupons and social marketing distribution (SMD). The coupon channel is available to retailers without a point-of-sale system (i.e., a computer software system that tracks all purchases). For these retailers, Ameren Missouri provides coupons that customers complete at the register to receive a discount. Through the SMD channel, Ameren Missouri distributes free 13W CFLs and 23W CFLs to lower income customers through partnerships with area food banks and related community organizations.

Low Income

Through the Low Income program, Ameren Missouri delivers cost-effective, energy-efficiency services to low-income residents in single-family homes and multifamily properties having three or more dwelling units.

Honeywell Smart Grid Solutions (Honeywell), the program implementer, contracts the direct installation of all energy-efficiency measures (EEMs) to multiple contractors. The EEMs consist of the following low-cost technologies:

- Lighting (CFLs);
- Insulation of hot water heaters and pipes;
- Showerheads and faucet aerators; and
- Programmable thermostats.

Additionally, the program offers replacements of older appliances—such as refrigerators and air conditioners (both room and through-the-wall units)—with ENERGY STAR® models. In Program Year 2013 (PY13), the program also began offering tune-ups for central air conditioning (CAC) systems, which continued during PY14.

Program participants for multifamily buildings are defined as program-enrolled owners, operators, and managers of income-eligible, multifamily residential properties; these individuals determine whether or not a property participates. Program participants for multifamily buildings must commit to implementing standard lighting installations in property common areas, as applicable through Ameren Missouri's Business or Residential Energy Efficiency Program.

New Homes

Ameren Missouri added the New Construction program to its residential Act On Energy® portfolio in 2013. The program, implemented by ICF International (ICF), promoted energy-efficient new home construction. Targeting builders, the program offered a package of training, technical assistance, marketing assistance, and incentives for constructing ENERGY STAR homes. The program's design sought to increase consumer awareness of and demand for ENERGY STAR version 3.0 single-family homes, while increasing the building industry's willingness and ability to construct ENERGY STAR homes. To verify energy savings and program compliance, the ESNH program used independent, third-party, Home Energy Rating System (HERS) raters.

All homebuilders constructing new homes or conducting major renovations of existing single-family homes (or townhouses) in Ameren Missouri's service territory were eligible to participate in the New Construction program. The program provided two tiers for building options:

- Tier I homes were eligible for a $500 rebate and had to meet the previous version (version 2.5) of ENERGY STAR guidelines.

- Tier II homes were eligible for an $800 dollar rebate and had to meet current ENERGY STAR guidelines.

Due to limited participation and the Program Year 2013 (PY13) evaluation results, which showed low gross savings realization rates and high free ridership levels, Ameren Missouri cancelled the New Construction program in June 2014. Despite the program's midyear cancellation, a small number of homes (31 total: one Tier 1 and 30 Tier 2) participated during PY14.

Refrigerator Recycling

The Refrigerator Recycling program offers Ameren Missouri's residential customers a $50 incentive and free pickup service for recycling an operable refrigerator and stand-alone freezer manufactured before 2002 (up to a total of three per customer per year). Customers may also recycle a working room air conditioner or dehumidifier, along with a qualifying refrigerator or freezer. Incentives are not provided for air conditioners or dehumidifiers. The program is implemented by the Appliance Recycling Centers of America, Inc. (ARCA).

During PY14, the Refrigerator Recycling Program recycled 8,397 appliances (6,508 refrigerators and 1,889 freezers). ARCA also collected a limited number of room air conditioners (38) and dehumidifiers (48). The scale of the program in PY14 was considerably larger than in PY13 (6,881). However, participation in PY14 was less than the program's peak collection efforts in PY11 (9,084).

COST-EFFECTIVENESS DETAILS

Methodology

To analyze the PY14 Lighting program's cost-effectiveness, MMP utilized DSMore and assessed cost-effectiveness using the following five tests, defined by the California Standard Practice Manual:[1]

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

DSMore took hourly energy prices and hourly energy savings from specific measures installed through the Lighting program and correlated prices and savings to 30 years of historic weather data. Using long-term weather ensured the model captured low-probability but high-consequence weather events and appropriately valued these. Consequently, the model's produced an accurate evaluation of the demand-side efficiency measure relative to other alternative supply options.

Table 8 presents key assumptions and the source for the assumption.

Table 8. Assumptions and Sources for Cost-effectiveness Analysis

Assumption	Source
Discount Rate = 6.95%	Ameren Missouri 2012 MEEIA Filing
Line Losses = 5.72%	Ameren Missouri 2012 MEEIA Filing
Summer Peak occurred during the 16th hour of a July day, on average.	Ameren Missouri 2012 MEEIA Filing
Avoided Electric T&D = $31.01/kW	Ameren Missouri 2012 MEEIA Filing
Escalation rates for different costs occurred at the component level, with separate escalation rates for fuel, capacity, generation, transmission and distribution, and customer rates carried out over 25 years.	Ameren Missouri 2012 MEEIA Filing

In addition, MMP utilized the "Batch Tools" (model inputs) used by Ameren Missouri in its original analysis as input into the *ex post* DSMore analysis. By starting with the original DSMore Batch Tool used by Ameren Missouri and modifying it solely with new data from the evaluation (e.g., PY14-specific Lighting participation counts, per-unit gross savings, and NTG) ensured consistency. Particularly, model assumptions were driven by measure load shapes, which told the model when to apply savings during the day. This ensured the load shape for an end-use matched the system peak impacts of that end use and provided the correct summer coincident savings. MMP used measure lifetime assumptions and

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

incremental costs based on the following: the program's database, the Ameren Missouri Missouri TRM, or the original Batch Tool.

A key step in the analysis process required acquiring PY14 Ameren Missouri 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 can be useful for planning purposes, it proves unnecessary for cost-effectiveness modeling as results are based on a program overall. Table 9 summarizing PY14 electric spending by program and for other portfolio-related activities.

Table 9. Ameren Missouri Spending Data - PY14

Ameren Missouri Energy Efficiency Expenses - PY14			
Residential EE PROGRAM COSTS	**Non-Incentive Costs**	**Incentive Costs**	**Total Costs**
2014			
Efficient Products	$788,010	$939,459	$1,727,468
Home Energy Analysis	$276,443	$46,958	$323,401
HVAC	$2,398,785	$4,776,895	$7,275,800
Lighting	$1,948,280	$5,923,002	$7,871,282
Low Income	$3,539,448	$0	$3,539,448
New Construction	$274,215	$42,100	$316,315
Refrigerator Recycling	$1,345,143	$0	$1,345,143
Total Residential Programs	$10,570,324	$11,728,414	$22,298,738
OTHER PORTFOLIO COSTS			
2014			
Residential Evaluation, Measurement, & Verification	$1,117,588	$0	$1,117,588
Educational Outreach	$43,882	$0	$43,882
Portfolio Administration	$1,815,442	$0	$1,815,442
Potential Study Costs	$0	$0	$0
Data Tracking Costs	$186,372	$0	$186,372
Total Other	**$3,163,284**	**$0**	**$3,163,284**
Total Portfolio Costs	**$13,733,608**	**$11,728,414**	**$25,462,022**

As noted previously, all the program-specific cost-effectiveness results include the program's share of portfolio-level or indirect costs ($3,163,284) as determined through a consensus building process with stakeholders. Each program's share of these costs was determined using the present value of each program's UCT lifetime benefits (i.e., the present value in 2013 dollars of avoided generation costs, as well as deferral of capacity capital and transmission and distribution capital costs). Table 10 shows these UCT

benefits (gross, not net) for each program, as well as resulting share of other portfolio costs allocated to it.

Table 10. Allocation of Portfolio/Other Costs to Programs*

Program	PV of UCT Benefits	Percent of Portfolio/ Allocation	Total Other Portfolio Costs	Allocated Portfolio Costs
Efficient Products	$4,327,129	3.8%	$3,163,284	$121,174
Home Energy Analysis	$231,981	0.2%		$7,168
HVAC	$50,344,355	44.6%		$1,410,733
Lighting	$50,880,366	44.9%		$1,421,861
Low Income	$3,889,834	3.4%		$108,929
New Homes	$168,199	0.1%		$4,710
Refrigerator Recycling	$3,389,179	2.8%		$88,710
Portfolio	**$113,231,044**	**100.0%**		**$3,163,284**

*The Cadmus team used the UCT benefits in 2013 dollars to determine the percentage allocation to each program. The Total Other Portfolio Costs are in 2014 dollars, and were added to the individual program costs in 2014 dollars as an input to DSMore.

Table 11 below is a summary of benefit and cost inputs for each cost test.

Table 11. Summary of Benefits and Costs Included in each Cost Effectiveness Test

Test	Benefits	Costs
UCT	**Perspective of utility, government agency, or third party implementing the program**	
	▪ Energy-related avoided costs, ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Utility/program administrator incentive costs, ▪ Utility/program administrator installation costs
TRC	**Perspective of all utility customers (participants and non-participants) in the utility service territory**	
	▪ Energy-related avoided costs, ▪ Capacity-related avoided costs, including generation, transmission, and distribution, ▪ Additional resource savings ▪ Applicable tax credits	▪ Program overhead costs, ▪ Program installation costs, ▪ Incremental measure costs (Whether paid by the customer of utility)
RIM	**Impact of efficiency measure on non-participating ratepayers overall**	
	▪ Energy-related avoided costs, ▪ Capacity-related avoided costs, including generation, transmission, and distribution	▪ Program overhead costs, ▪ Utility/program administrator incentives, ▪ Utility/program administrator installation costs, ▪ Lost revenue due to reduced energy bills
PCT	**Benefits and costs from the perspective of the customer installing the measure**	
	▪ Bill savings, ▪ Incremental installation costs ▪ Applicable tax credits or incentives	▪ Incentive payments, ▪ Incremental equipment costs

*Incentives are considered in the incremental measure costs

The majority of costs and savings are presented on a net basis, meaning that the net-to-gross ratio was applied to account for the impact of free ridership and spillovers. However, the participant borne costs, as applied to the Participant Cost Test (PCT), are presented on a gro6ss basis.

Residential Portfolio

Table 12. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	Costs
Avoided Electric Production	$78,103,364	
Avoided Electric Capacity	$25,367,668	
Avoided T&D Electric	$9,761,375	
Incentives		$10,966,259
Program overhead costs		$12,841,149
Total	**$113,232,407**	**$23,807,408**
UCT Benefit - Cost Ratio	**4.76**	

Table 13. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	Costs
Avoided Electric Production	$78,103,364	
Avoided Electric Capacity	$25,367,668	
Avoided T&D Electric	$9,761,375	
Participant Costs (Net)		$23,603,101
Program overhead costs		$12,841,149
Total	**$113,232,407**	**$36,444,250**
TRC Benefit - Cost Ratio	**3.11**	

Table 14. Ratepayer Impact Measure Test (RIM) Inputs and Results

RIM Calculations		
	Benefits	Costs
Avoided Electric Production	$78,103,364	
Avoided Electric Capacity	$25,367,668	
Avoided T&D Electric	$9,761,375	
Program overhead costs		$12,841,149
Incentives		$10,966,259
Lost Revenue		$128,480,135
Total	**$113,232,407**	**$152,287,543**
RIM Benefit - Cost Ratio	**0.74**	

Table 15. Societal Test (SCT) Inputs and Results

SCT Calculations		
	Benefits	Costs
Avoided Electric Production	$100,538,937	
Avoided Electric Capacity	$25,367,668	
Avoided T&D Electric	$13,178,427	
Program overhead costs		$13,333,601
Participant Costs (Net)		$24,508,269
Total	**$139,085,033**	**$37,841,870**
SCT Benefit - Cost Ratio	**3.68**	

Table 16. Participant Cost Test (PCT) Inputs and Results

PCT Calculations		
	Benefits	Costs
Participant Bill Savings (Gross)	$133,522,424	
Incentives	$10,966,259	
Participant Costs (Gross)		$25,187,361
Total	**$144,488,683**	**$25,187,361**
PTC Benefit - Cost Ratio	**5.74**	

Efficient Products

Table 17. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	Costs
Avoided Electric Production	$3,570,633	
Avoided Electric Capacity	$523,666	
Avoided T&D Electric	$232,831	
Incentives		$878,409
Program overhead costs		$850,102
Total	**$4,327,129**	**$1,728,511**
UCT Benefit - Cost Ratio	**2.50**	

Table 18. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	**Costs**
Avoided Electric Production	$3,570,633	
Avoided Electric Capacity	$523,666	
Avoided T&D Electric	$232,831	
Participant Costs (Net)		$1,556,172
Program overhead costs		$850,102
Total	**$4,327,129**	**$2,406,274**
TRC Benefit - Cost Ratio	**1.80**	

Table 19. Ratepayer Impact Measure Test (RIM) Inputs and Results

RIM Calculations		
	Benefits	**Costs**
Avoided Electric Production	$3,570,633	
Avoided Electric Capacity	$523,666	
Avoided T&D Electric	$232,831	
Program overhead costs		$850,102
Incentives		$878,409
Lost Revenue		$6,113,085
Total	**$4,327,129**	**$7,841,596**
RIM Benefit - Cost Ratio	**0.55**	

Table 20. Societal Test (SCT) Inputs and Results

SCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$4,553,245	
Avoided Electric Capacity	$523,666	
Avoided T&D Electric	$290,585	
Program overhead costs		$882,703
Participant Cost (Net)		$1,615,851
Total	**$5,367,495**	**$2,498,553**
SCT Benefit - Cost Ratio	**2.15**	

Table 21. Participant Cost Test (PCT) Inputs and Results

PCT Calculations		
	Benefits	Costs
Participant Bill Savings (Electric) (gross)	$6,729,949	
Participant Bill Savings (Gas) (gross)	$0	
Incentives	$878,409	
Participant Costs (Gross)		$1,802,392
Total	**$7,608,359**	**$1,802,392**
PTC Benefit - Cost Ratio	**4.22**	

Home Energy Analysis

Table 22. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	Costs
Avoided Electric Production	$179,594	
Avoided Electric Capacity	$38,547	
Avoided T&D Electric	$13,841	
Incentives		$43,907
Program overhead costs		$265,181
Total	**$231,981**	**$309,088**
UCT Benefit - Cost Ratio	**0.75**	

Table 23. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	Costs
Avoided Electric Production	$179,594	
Avoided Electric Capacity	$38,547	
Avoided T&D Electric	$13,841	
Participant Costs (Net)		$136,713.17
Program overhead costs		$265,181
Total	$231,981	$401,894
TRC Benefit - Cost Ratio	**0.58**	

Table 24. Ratepayer Impact Measure Test (RIM) Inputs and Results

RIM Calculations		
	Benefits	**Costs**
Avoided Electric Production	$179,594	
Avoided Electric Capacity	$38,547	
Avoided T&D Electric	$13,841	
Program overhead costs		$265,181
Incentives		$43,907
Lost Revenue (Electric)		$299,820
Total	**$231,981**	**$608,908**
RIM Benefit - Cost Ratio	**0.38**	

Table 25. Societal Test (SCT) Inputs and Results

SCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$248,258	
Avoided Electric Capacity	$38,547	
Avoided T&D Electric	$20,004	
Program overhead costs		$275,351
Participant Costs (Net)		$141,956
Total	**$306,809**	**$417,307**
SCT Benefit - Cost Ratio	**0.74**	

Table 26. Participant Cost Test (PCT) Inputs and Results

PTC Calculations		
	Benefits	**Costs**
Participant Bill Savings (Electric) (gross)	$352,729	
Incentives	$43,907	
Participant Costs (Gross)		$160,839
Total	$396,636.07	$160,839.02
PTC Benefit - Cost Ratio	**2.47**	

HVAC Program

Table 27. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$23,365,434	

Avoided Electric Capacity	$19,898,445	
Avoided T&D Electric	$7,080,475	
Incentives		$4,466,475
Program overhead costs		$3,561,961
Total	**$50,344,355**	**$8,028,436**
UCT Benefit - Cost Ratio	**6.27**	

Table 28. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	**Costs**
Avoided Electric Production	$23,365,434	
Avoided Electric Capacity	$19,898,445	
Avoided T&D Electric	$7,080,475	
Participant Costs (Net)		$11,393,339
Program overhead costs		$3,561,961
Total	**$50,344,355**	**$14,955,301**
TRC Benefit - Cost Ratio	**3.37**	

Table 29. Ratepayer Impact Measure Test (RIM) Inputs and Results

RIM Calculations		
	Benefits	**Costs**
Avoided Electric Production	$23,365,434	
Avoided Electric Capacity	$19,898,445	
Avoided T&D Electric	$7,080,475	
Program overhead costs		$3,561,961
Incentives		$4,466,475
Lost Revenue		$34,051,168
Total	**$50,344,355**	**$42,079,605**
RIM Benefit - Cost Ratio	**1.20**	

Table 30. Societal Test (SCT) Inputs and Results

SCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$31,608,143	
Avoided Electric Capacity	$19,898,445	
Avoided T&D Electric	$9,881,723	
Program overhead costs		$3,698,561
Participant Costs (Net)		$11,830,268

Total	**$61,388,312**	**$15,528,829**
SCT Benefit - Cost Ratio	**3.95**	

Table 31. Participant Cost Test (PCT) Inputs and Results

PCT Calculations		
	Benefits	**Costs**
Participant Bill Savings (Electric) (gross)	$35,634,188	
Participant Bill Savings (Gas) (gross)	$0	
Incentives	$4,466,475	
Participant Costs (Gross)		$11,797,290
Total	**$40,100,663**	**$11,797,290**
PTC Benefit - Cost Ratio	**3.40**	

Lighting

Table 32. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$45,799,499	
Avoided Electric Capacity	$3,309,707	
Avoided T&D Electric	$1,771,160	
Incentives		$5,538,104
Program overhead costs		$3,151,138
Total	**$50,880,366**	**$8,689,241**
UCT Benefit - Cost Ratio	**5.86**	

Table 33. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	**Costs**
Avoided Electric Production	$45,799,499	
Avoided Electric Capacity	$3,309,707	
Avoided T&D Electric	$1,771,160	
Participant Costs (Net)		$10,455,501
Program overhead costs		$3,151,138
Total	**$50,880,366**	**$13,606,638**
TRC Benefit - Cost Ratio	**3.74**	

Table 34. Ratepayer Impact Measure Test (RIM) Inputs and Results

RIM Calculations		
	Benefits	Costs
Avoided Electric Production	$45,799,499	
Avoided Electric Capacity	$3,309,707	
Avoided T&D Electric	$1,771,160	
Program overhead costs		$3,151,138
Incentives		$5,538,104
Lost Revenue		$79,207,739
Total	**$50,880,366**	**$87,896,981**
RIM Benefit - Cost Ratio	**0.58**	

Table 35. Societal Test (SCT) Inputs and Results

SCT Calculations		
	Benefits	Costs
Avoided Electric Production	$57,471,347	
Avoided Electric Capacity	$3,309,707	
Avoided T&D Electric	$2,147,789	
Program overhead costs		$3,271,982
Participant Costs (Net)		$10,856,464
Total	**$62,928,842**	**$14,128,446**
SCT Benefit - Cost Ratio	**4.45**	

Table 36. Participant Cost Test (PCT) Inputs and Results

PCT Calculations		
	Benefits	Costs
Participant Bill Savings (Electric) (gross)	$79,926,124	
Incentives	$5,538,104	
Participant Costs (Gross)		$11,283,773
Total	**$85,464,228**	**$11,283,773**
PTC Benefit - Cost Ratio	**7.57**	

Low Income

The benefit-cost ratio for the PCT test is “N/A.” as there are no participant costs.

Table 37. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$2,657,826	
Avoided Electric Capacity	$882,708	
Avoided T&D Electric	$349,300	
Incentives		$0
Program overhead costs		$3,411,292
Total	**$3,889,834**	**$3,411,292**
UCT Benefit - Cost Ratio	**1.14**	

Table 38. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	**Costs**
Avoided Electric Production	$2,657,826	
Avoided Electric Capacity	$882,708	
Avoided T&D Electric	$349,300	
Participant Costs (Net)		$0
Program overhead costs		$3,411,292
Total	**$3,889,834**	**$3,411,292**
TRC Benefit - Cost Ratio	**1.14**	

Table 39. Ratepayer Impact Measure Test (RIM) Inputs and Results

RIM Calculations		
	Benefits	**Costs**
Avoided Electric Production	$2,657,826	
Avoided Electric Capacity	$882,708	
Avoided T&D Electric	$349,300	
Program overhead costs		$3,411,292
Incentives		$0
Lost Revenue		$4,400,979
Total	**$3,889,834**	**$7,812,270**
RIM Benefit - Cost Ratio	**0.50**	

Table 40. Societal Test (SCT) Inputs and Results

SCT Calculations		
	Benefits	Costs
Avoided Electric Production	$3,544,355	
Avoided Electric Capacity	$882,708	
Avoided T&D Electric	$454,171	
Program overhead costs		$3,542,113
Total	**$4,881,234**	**$3,542,113**
SCT Benefit - Cost Ratio	**1.38**	

Table 41. Participant Cost Test (PCT) Inputs and Results

PCT Calculations		
	Benefits	Costs
Participant Bill Savings (Electric) (gross)	$4,568,030	
Incentives	$0	
Participant Costs (Gross)		$0
Total	**$4,568,030**	**$0.00**
PTC Benefit - Cost Ratio	**N/A**	

New Homes

Table 42. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	Costs
Avoided Electric Production	$96,749	
Avoided Electric Capacity	$52,881	
Avoided T&D Electric	$18,568	
Incentives		$39,364
Program overhead costs		$260,800
Total	**$168,199**	**$300,164**
UCT Benefit - Cost Ratio	**0.56**	

Table 43. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	Costs
Avoided Electric Production	$96,749	
Avoided Electric Capacity	$52,881	
Avoided T&D Electric	$18,568	

Participant Costs (Net)		$61,376
Program overhead costs		$260,800
Total	**$168,199**	**$322,176**
TRC Benefit - Cost Ratio	**0.52**	

Table 44. Ratepayer Impact Measure Test (RIM) Inputs and Results

RIM Calculations		
	Benefits	**Costs**
Avoided Electric Production	$96,749	
Avoided Electric Capacity	$52,881	
Avoided T&D Electric	$18,568	
Program overhead costs		$260,800
Incentives		$39,364
Lost Revenue		$144,488
Total	**$168,199**	**$444,652**
RIM Benefit - Cost Ratio	**0.38**	

Table 45. Societal Test (SCT) Inputs and Results

SCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$138,580	
Avoided Electric Capacity	$52,881	
Avoided T&D Electric	$26,196	
Program overhead costs		$270,801
Participant Costs (Net)		$63,730
Total	**$217,657**	**$334,531**
SCT Benefit - Cost Ratio	**0.65**	

Table 46. Participant Cost Test (PCT) Inputs and Results

PCT Calculations		
	Benefits	**Costs**
Participant Bill Savings (Electric) (gross)	$336,802	
Participant Bill Savings (Gas) (gross)	$0	
Incentives	$39,364	
Participant Costs (Gross)		$143,068
Total	**$376,166**	**$143,068**
PTC Benefit - Cost Ratio	**2.63**	

Refrigerator Recycling

Table 47. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$2,432,376	
Avoided Electric Capacity	$661,638	
Avoided T&D Electric	$295,164	
Incentives		$0
Program overhead costs		$1,340,676
Total	**$3,389,179**	**$1,340,676**
UCT Benefit - Cost Ratio	**2.53**	

Table 48. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	**Costs**
Avoided Electric Production	$2,432,376	
Avoided Electric Capacity	$661,638	
Avoided T&D Electric	$295,164	
Participant Costs (Net)		$0.00
Program overhead costs		$1,340,676
Total	**$3,389,179**	**$1,340,676**
TRC Benefit - Cost Ratio	**2.36**	

Table 49. Ratepayer Impact Measure Test (RIM) Inputs and Results

RIM Calculations		
	Benefits	**Costs**
Avoided Electric Production	$2,432,376	
Avoided Electric Capacity	$661,638	
Avoided T&D Electric	$295,164	
Program overhead costs		$1,340,676
Incentives		$0
Lost Revenue		$4,260,640
Total	**$3,389,179**	**$5,601,315**
RIM Benefit - Cost Ratio	**0.61**	

Table 50. Societal Test (SCT) Inputs and Results

SCT Calculations		
	Benefits	**Costs**
Avoided Electric Production	$2,973,496	
Avoided Electric Capacity	$661,638	
Avoided T&D Electric	$357,918	
Program overhead costs		$1,392,090
Total	**$3,993,052**	**$1,392,090**
SCT Benefit - Cost Ratio	**2.87**	

Table 51. Participant Cost Test (PCT) Inputs and Results

PCT Calculations		
	Benefits	**Costs**
Participant Bill Savings (Electric) (gross)	$5,972,288	
Incentives	$0	
Participant Costs (Gross)	$0	
Total	**$5,972,288**	**$0**
PTC Benefit - Cost Ratio	**N/A**	

CSR EVALUATION SUMMARIES

According to the Missouri Code of State Regulations (CSR), demand-side programs operating as 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 52 through Table 58. In addition, each program must meet the data requirements listed in Tables 54 through 59. This section offers the Cadmus team's summary responses for the specified CSR requirements for each of the seven PY14 residential programs.

Process CSR Summaries

Table 52. Efficient Products: Summary CSR Responses

CSR Requirement Number	CSR Requirement Description	Summary Response
1	What are the primary market imperfections common to the target market segment?	It is assumed that the primary market remains largely unchanged from PY13, and lack of energy-efficiency awareness and the higher upfront cost of energy-efficient products are common barriers to this market segment. While energy efficiency and savings were identified most frequently when Equipment Rebate participants were asked for the primary factor in deciding on specific equipment, most respondents indicated a factor other than energy efficiency was primary in their decision.
2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The target market segments remain unchanged from PY13 and it was determined that a market study would not be completed in PY14. Based on PY13 findings, the target market of all residential customers is appropriate for the equipment 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 equipment rebates and free kit measures, a total of 13 energy-efficient home technologies (four more than the previous year) are offered through this highly diverse program. These include HVAC, lighting, plug-load, pumps, and water heating end-uses. This is a highly diverse program.
4	Are the communication channels and delivery mechanisms appropriate for the target market segment?	The delivery channels are appropriate and reach customers through retail and direct-mail efforts, including in-store advertisements, bill inserts, contractors, postcards, and Ameren Missouri's website.

CSR Requirement Number	CSR Requirement Description	Summary Response
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?	Continued promotion and education can continue to overcome market imperfections. In PY14, we found that Installation rates were lowest for measures included in the kits containing advanced power strips. (See Conclusions and Recommendations for specific suggestions).

Table 53. Home Energy Analysis: Summary CSR Responses

CSR Requirement Number	CSR Requirement Description	Summary Response
1	What are the primary market imperfections common to the target market segment?	The primary market imperfection common to the target market is inadequate information and/or knowledge regarding the benefits of increasing energy efficiency within existing homes.
2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Yes, the current market segment is appropriately designed. The program may realize higher audit rates or uptake of rebated measures through additional population segmentation of the current target market.
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?	The mix of end-use measures offered through the program is appropriate; however, measure eligibility should be reviewed to include water heater measures with electric water heaters.
4	Are the communication channels and delivery mechanisms appropriate for the target market segment?	Yes, current communication and delivery channels are appropriate.
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?	Additional customer education and awareness is needed regarding the benefits—financial and nonfinancial—of increasing the efficiency and comfort of their homes. This should be especially communicated with regard to air sealing.

Table 54. HVAC Program: Summary CSR Responses

CSR Requirement Number	CSR Requirement Description	Summary Response
1	What are the primary market imperfections common to the target market segment?	The primary market imperfection common to the target market is inadequate information and/or knowledge regarding the energy-saving benefits of proper HVAC maintenance and high-efficiency HVAC systems for cooling and electric heating. Additionally, the investment/cost of installing a new HVAC unit deters customers from ultimately making the decision to purchase until absolutely necessary. Further, when customers replace a system, the greater upfront cost of high-efficiency systems can cause them to purchase a lower-efficiency unit, even if the lifetime operating costs of the system are greater.
2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The target market segment is appropriately defined and comprehensively serves for the single-family residential market. The program could include multi-family homes to increase participation. Specifically, the HVAC Program is designed to help customers maintain the efficiency of operable systems (through tune-ups), and offers tiered incentives for customers replacing a failed and functional system (early retirement).
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?	The program targets the primary end-use technologies within the targeted market segment.

CSR Requirement Number	CSR Requirement Description	Summary Response
4	Are the communication channels and delivery mechanisms appropriate for the target market segment?	Yes, current communication channels are appropriate as the program uses both mass media marketing to generate demand and interest in the program as well as targeted marketing through trained local HVAC contractors.
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?	The current marketing materials allocate a significant proportion of resources specific to the targeted market. In the first program year, the most common suggestion for improvement from program participants surveyed was the need to increase program awareness and benefits, an indication that marketing efforts should continue or increase. The number of participants surveyed in PY14 who suggested increasing program marketing declined from PY13 to PY14. This is an indication that marketing is effectively reaching more Ameren Missouri customers but should continue in PY15.

Table 55. Lighting Program: Summary CSR Responses

CSR Requirement Number	CSR Requirement Description	Summary Response
1	What are the primary market imperfections common to the target market segment?	Customers lack information about energy-efficient lighting options (e.g., the difference in HOU, energy use, lighting quality), and the prices for some energy-efficient bulbs remain much higher than the incandescent baseline.
2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The Lighting market is broadly defined, though the program is moving in the direction of targeting bulbs to new audiences, such as discount-retail shoppers. Recent market research shows younger customers could be a more interested audience.
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?	Yes. The program offers a diversity of products that represent the majority of common consumer lighting needs, including a range of wattages, and specialty bulbs such as dimmables, globes, and reflectors, and LED bulbs. This year the program added occupancy sensors as well.
4	Are the communication channels and delivery mechanisms appropriate for the target market segment?	Retailers report Ameren signage is effective. New market research indicates greater online activity could effectively target younger customers.
5	What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	Ameren Missouri continues to reach out to more retailers and audiences and to expand the list of eligible measures, but awareness of the program remains low. Ameren Missouri has commissioned market research to identify market segments and should use this information to experiment with new messaging and market channels.

Table 56: Low Income: Summary CSR Responses

CSR Requirement Number	CSR Requirement Description	Summary Response
1	What are the primary market imperfections common to the target market segment?	The primary market imperfections include: split incentives between property managers and tenants; and the work required by the property manager/maintenance staff to facilitate installations.
2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The low-income, multifamily market could be merged with a low-income, single-family market; however, this concept has been suspended because of stakeholder concerns.
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?	The mix of measures provides cost-effective electric savings in multifamily buildings housing low-income residents. Current measures address lighting, water heating, appliances, and heating, and cooling. In PY13 and early PY14, Advanced Power Strips were distributed through the program to address electronics usage. However, this measure was discontinued because of low evaluated savings. Additional measures are supplied beginning this program year for households with natural gas heating or water heating. Program stakeholders have also suggested including air-sealing measures and LEDs.
4	Are the communication channels and delivery mechanisms appropriate for the target market segment?	The communication channels for the target market include direct contact with property managers by Honeywell staff. Communication with tenants is handled by property managers, through workshops with Honeywell staff, and directly with installation contractors in apartments. The delivery mechanism is direct installation, performed by program subcontractors. The communication and delivery mechanism are necessarily direct and hands-on as both the tenant and property managers are considered a hard-to-reach population and have split incentives.
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?	The Low Income Program design and implementation has had great success for several years, with high levels of participation and tenant acceptance of new measures. Many federally-subsidized properties have been treated, and LIHTC properties are generating additional participation. It is likely that most multifamily properties with at least 50% low-income residents will be treated in the next few years. It may behoove the program to consider drawing in some market rate properties under different cost-effectiveness criteria.

Table 57: New Homes: Summary CSR Responses

Because the New Homes program was cancelled in PY14, we did not provide updates to the CSR summary listed below. The content of the table reflects findings from PY13.

CSR Requirement Description	Summary Response
1. What are the primary market imperfections common to the target market segment?	The primary market imperfection common to the target market is inadequate information and/or knowledge regarding the benefits of high efficient new construction homes. Additionally, there is lack of marketing infrastructure to expose the target market segment to these benefits.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The current target segment market would benefit from additional stratification. However, it may be difficult to successfully define and segment additional strata to builder types, such as high efficient/green builders.
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?	No. The program should include additional end-use technologies, including appliances.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Yes, current communication channels are appropriate.
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?	Additional networking with the target market segment to spread program awareness is needed.

Table 58: Refrigerator Recycling: Summary CSR Responses

CSR Number	CSR Requirement Description	Summary Response
1	What are the primary market imperfections common to the target market segment?	The primary market imperfection common to the target market is inadequate understanding of the operating costs of old or secondary refrigerators, misconceptions regarding the market for used appliances or costs associated with appliance disposal, and, in many cases, the inability to physically discard the appliance without assistance.
2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Yes, the target market segment is appropriately defined as it serves all single-family residential customers regardless of the appliance's usage type (primary or secondary), age, part-use, or aesthetic condition.
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?	Yes, the current mix of end-use measures included in the program is appropriate. In PY13 the program began collecting room air conditioners and dehumidifiers with eligible refrigerators and freezers, providing additional benefits for customers and savings for Ameren Missouri. The program continued this practice in PY14. As recommended in PY13, the program could also provide energy-efficiency kits (including CFLs and other easy-to-install measures) to achieve deeper savings and encourage participation in other programs.
4	Are the communication channels and delivery mechanisms appropriate for the target market segment?	The implementer ARCA handles the scheduling and pickup for appliances recycled through the program, which makes the program convenient for participants. Participants consistently express very high satisfaction with the program, suggesting that the communication channels and delivery mechanisms are appropriate.
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?	In PY13 Cadmus suggested that customer acceptance and awareness of appliance operating costs could potentially be increased through additional online advertising (such as Google AdWords or Pandora targeted ads) and earned media (through partnerships with local non-profit organizations). In PY14 Ameren Missouri implemented the advertising recommended by Cadmus, but there is still an opportunity to increase awareness through earned media in PY15.

Impact CSR Summaries

Table 59. Efficienct Products: Summary Impact CSR Responses

CSR Requirement	Method Used	Description of Program Method
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:		
Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences	x	The program compares the pre-adoption load based on assumed baseline technology with the post-adoption load based on program technology, and estimates weather and interactive effects using TRM and industry assumptions, metering, and modeling, when necessary.
Comparisons between program participants' loads and those of an appropriate control group over the same time period		
Data: The evaluation must use one or more of the following types of data to assess program impact:		
Monthly billing data		
Hourly load data		
Load research data		
End-use load metered data	x	Metered lighting hours of use by room in a sample of homes in the program area during 2013-2014.
Building and equipment simulation models	x	Use simulation modeling to determine the waste-heat impact of efficient lighting.
Survey responses	x	Surveyed metering participants on purchasing practices and other product participants to determine installation rates.
Audit and survey data on:		
Equipment type/size efficiency	x	Evaluation team conducted an audit of all lighting in sample of homes in program area. Evaluation team conducted an audit of equipment type/efficiency for other products through review and analysis of the program database.
Household or business characteristics	x	Evaluation team collected household characteristics from homes participating in lighting audit: home type, own/rent home, as well as kit participants and Low Income program participants.
Energy-related building characteristics		

Table 60. Home Energy Analysis: Summary Impact CSR Responses

CSR Requirement	Method Used	Description of Program Method

Approach: The evaluation must use one or both of the following comparisons to determine the program impact:		
Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences	X	The evaluation compares the pre-adoption load based on assumed baseline technology with the post-adoption load based on program technology, estimates of lighting hours of use and water usage (based on metered data), waste-heat impact (based on equipment simulation), and survey data (based on feedback from program participants).
Comparisons between program participants' loads and those of an appropriate control group over the same time period		
Data: The evaluation must use one or more of the following types of data to assess program impact:		
Monthly billing data		
Hourly load data		
Load research data		
End-use load metered data	x	Metered lighting hours of use for a sample of homes in the program area during 2013-2014.
Building and equipment simulation models	x	Use simulation modeling to determine the waste-heat mpact of efficient lighting
Survey responses	x	Surveyed program participants regarding measure verification, installation rates, free ridership, and spillover.
Audit and survey data on:		
Equipment type/size efficiency	x	Evaluation team conducted surveys to verify installation and use of each direct install and rebated measure type.
Household or business characteristics	x	Evaluation team verified program audit data.
Energy-related building characteristics		

Table 61. HVAC: Summary Impact CSR Responses

CSR Requirement	Method Used	Description of Program Method
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:		

Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences	X	The program compares the pre-adoption load based on assumed baseline technology with the post-adoption load based on program technology, and savings based on sub-metered data from sample of participants.
Comparisons between program participants' loads and those of an appropriate control group over the same time period		
Data: The evaluation must use one or more of the following types of data to assess program impact:		
Monthly billing data		
Hourly load data		
Load research data		
End-use load metered data	x	Metered HVAC power, indoor temperature, and outdoor conditions at 2-minute intervals during 2013
Building and equipment simulation models		
Survey responses	x	Verified measure installation through participant surveys in 2013 and 2014 to
Audit and survey data on:		
Equipment type/size efficiency	x	Evaluation team gathered equipment information from homes participating in metering, and from program data
Household or business characteristics	x	Evaluation team collected household characteristics from homes participating in metering, and from program data.
Energy-related building characteristics		

Table 62. Lighting: Summary Impact CSR Responses

CSR Requirement	Method Used	Description of Program Method
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:		
Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences	X	The program compares the pre-adoption load based on assumed baseline technology with the post-adoption load based on program technology, and estimates hours of use (based on metered data) and waste-heat impact (based on equipment simulation).
Comparisons between program participants' loads and those of an appropriate control group over the same time period		

CSR Requirement	Method Used	Description of Program Method
Data: The evaluation must use one or more of the following types of data to assess program impact:		
Monthly billing data		
Hourly load data		
Load research data		
End-use load metered data	x	Metered lighting hours of use by room in a sample of homes in the program area during 2013-2014.
Building and equipment simulation models	x	Use simulation modeling to determine the waste-heat impact of efficient lighting
Survey responses	x	Surveyed metering participants on purchasing practices and date of purchase of efficient technology to determine installation rates.
Audit and survey data on:		
Equipment type/size efficiency	x	Evaluation team conducted an audit of all lighting in sample of homes in program area.
Household or business characteristics	x	Evaluation team Collected household characteristics from homes participating in lighting audit: home type, own/rent home
Energy-related building characteristics		

Table 63. Low Income: Summary Impact CSR Responses

CSR Requirement	Method Used	Description of Program Method
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:		
Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences	X	The program compares the pre-adoption load based on assumed baseline technology with the post-adoption load based on program technology, and estimates hours of use (based on metered data) and waste-heat impact (based on equipment simulation).
Comparisons between program participants' loads and those of an appropriate control group over the same time period		
Data: The evaluation must use one or more of the following types of data to assess program impact:		

Monthly billing data		
Hourly load data		
Load research data		
End-use load metered data	x	Metered lighting hours of use by room and hourly thermostat usage in a sample of program properties during 2013-2014.
Building and equipment simulation models		
Survey responses		
Audit and survey data on:		
Equipment type/size efficiency	x	Evaluation team gathered equipment information from homes participating in metering, and from program data.
Household or business characteristics	x	Evaluation team collected household characteristics from homes participating in metering, and from program data.
Energy-related building characteristics		

Table 64. New Homes: Summary Impact CSR Responses

CSR Requirement	Method Used	Description of Program Method
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:		
Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences		
Comparisons between program participants' loads and those of an appropriate control group over the same time period	X	The evaluation approach compares the building practices and techniques for both program participating builders as well as non-participating builders. These differences were applied to building simulations of program home.
Data: The evaluation must use one or more of the following types of data to assess program impact:		
Monthly billing data		
Hourly load data		
Load research data		

End-use load metered data		
Building and equipment simulation models	x	Use simulation modeling to determine energy impacts of the program.
Survey responses	x	Surveyed program participants and non-participants regarding building practices and spillover.
Audit and survey data on:		
Equipment type/size efficiency		
Household or business characteristics	x	Evaluation team verified program home characteristics via home models.
Energy-related building characteristics		

Table 65. Refrigerator Recycling: Summary Impact CSR Responses

CSR Requirement	Method Used	Description of Program Method
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:		
Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences	X	The program compares the estimated pre-participation load based on the characteristics of recycled appliances, usage data from surveys, weather, and participants' self-reported alternative disposal methods, with the estimated post-participation load based upon these same data given that the appliance was taken off the grid by the program.
Comparisons between program participants' loads and those of an appropriate control group over the same time period		
Data: The evaluation must use one or more of the following types of data to assess program impact:		
Monthly billing data		
Hourly load data		
Load research data		
End-use load metered data	x	Cadmus used yearly energy consumption data from 563 appliances metered in DTE, Consumer's Energy, PGE, SCE, and SDGE service territories to model annual unit energy consumption as a function of each unit's age and configuration and Ameren Missouri PY14 average part-use and appliance location (conditioned or unconditioned space).
Building and equipment simulation models		
Survey responses	x	Cadmus surveyed PY14 RRP program participants to determine average part-use, freeridership, and secondary market impacts.
Audit and survey data on:		
Equipment type/size efficiency	x	Evaluation team received the age and configuration of all appliances recycled through the program from ARCA and used this data in combination with the survey results (see above) to determine unit energy consumption and gross and net savings.
Household or business characteristics		
Energy-related building characteristics		