

Final Annual Report on Evaluation, Measurement & Verification Findings for Ameren Missouri Program Year 2014

**Prepared by:
EM&V Auditor**



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with



Final Report

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Definition of Key Acronyms

The glossary summarizes the key acronyms used throughout the EM&V reports completed by Ameren Missouri.

- ARCA – Appliance Recycling Centers of America
- ASHP – Air-source heat pump
- C&I – Commercial and Industrial
- CAC – Central air conditioner
- CFL – Compact fluorescent lamp
- CDD – Cooling degree days
- Deemed Savings – A savings estimate for homogenous measures, in which an assumed average savings across a large number of rebated units is applied
- DLC – Residential direct load control
- ECM – Electronically Commuted Motors
- EFLH – Equivalent full load hour
- EISA – Energy Independence and Security Act of 2007
- EM&V – Evaluation, measurement and verification
- *Ex Ante* – A program parameter or value used by implementers/sponsoring utilities in estimating savings before implementation
- *Ex Ante* Net Savings = *Ex Ante* Gross Savings x *Ex Ante* Free Ridership Rate
- Expected Savings – The saving calculated by the implementation contractor, these numbers are developed prior to the evaluator’s analysis.
- *Ex Post* – A program parameter or value as verified by the Evaluators following completion of the evaluation effort
- *Ex Post* Net Savings = *Ex Post* Gross Savings x *Ex Post* Free Ridership Rate
- FAQ – Frequently asked questions
- Free Ridership – Percentage of participants who would have implemented the same energy efficiency measures in a similar timeframe absent the program.
- Gross Savings – Energy savings as determined through engineering analysis, statistical analysis, and/or onsite verification
- Gross Realization Rate = Ratio of *Ex Post* Gross Savings / *Ex Ante* Gross Savings
- HDD – Heating degree days
- HP – Heat pump
- HVAC – Heating, ventilation, and air conditioning
- ICF – ICF International
- ISR – In-service rate
- kW – Kilowatt
- kWh – Kilowatt-hour
- M&V – Measurement and verification
- MW – Megawatt
- MWh – Megawatt hour
- Net Realization Rate = Ratio of *Ex Post* Net Savings / *Ex Ante* Net Savings
- Net Savings – Gross savings factoring off free-ridership and adding in spillover and market effects.

- NTG – Net-to-gross
- NTGR – Net-to-gross-ratio
- NTGR = (1 – Free Ridership % + Spillover % + Market Effects%), also defined as
Net Savings / Gross Savings
- POP – Point-of-purchase
- PCT – Participant Cost Test
- QA – Quality assurance
- QC – Quality control
- ROI – Return on investment
- RR – Realization rate
- RIM – Ratepayer Impact Measure Test
- SCT – Societal Cost Test
- Spillover – Savings generated by a program that are not incentivized
- T&D – Transmission and distribution
- TRC – Total Resource Cost
- TRM – Technical Reference Manual
- UCT– Utility Cost Test
- VFD – Variable Frequency Drive

Executive Summary

As a result of the Missouri Public Service Commission's (PSC) approval of a Stipulation and Agreement¹ in File No. EO-2012-0142, Ameren Missouri launched eleven new demand-side management (DSM) programs in early 2013². Ameren Missouri is required to complete process and impact evaluations³ to assess the progress of its DSM programs towards meeting the energy savings targets⁴ established by the PSC for these programs.

To meet these requirements, Ameren Missouri contracted with two Evaluation, Measurement & Verification (EM&V) contractors: The Cadmus Group, Inc. (Cadmus) and ADM Associates, Inc. (ADM) to conduct comprehensive program evaluations of its energy efficiency portfolio. Cadmus conducted evaluations of the residential energy efficiency programs, while ADM conducted the evaluations of the business energy efficiency programs.

The goal of these evaluations is to comply with the requirements of Section 4 CSR 240-22.070(8):⁵

"The purpose of these evaluations shall be to develop the information necessary to evaluate the cost-effectiveness and improve the design of existing and future demand-side programs and demand-side rates, to improve the forecasts of customer energy consumption and responsiveness to demand-side programs and demand-side rates and to gather data on the implementation costs and load impacts of demand-side programs and demand-side rates for use in future cost-effectiveness screening and integrated resource analysis" (p. 18).

In 2012, the PSC contracted with Johnson Consulting Group to serve as its EM&V Auditor⁶ (Auditor Team) to review and comment on compliance with 4 CSR 240-22.070(8) and on the overall quality, scope and accuracy of the Cadmus and ADM EM&V draft and final reports. The EM&V Auditor Team Members' roles and responsibilities are summarized in the following table.

¹ File No. EO-2012-0142, August 1, 2012, Order Approving Unanimous Stipulation and Agreement Resolving Ameren Missouri's MEEIA Filing and Approving Stipulation and Agreement Between Ameren Missouri and Laclede Gas Company.

² Note the Home Energy Analysis (HEA) launched on March 1, 2013; the others were launched on January 2, 2013.

³ 4 CSR 240-20.093(7) and 4 CSR 240-3.163(7)

⁴ 4 CSR 240-20.094(3)(A) and Union Electric Company's, MO.P.S.C. Schedule No. 6, Original Sheet Nos. 181.3 and 191.3. Ameren Missouri energy savings targets on Sheet No. 181.3 were adjusted in 2014 to account for opt out customers.

⁵ A more complete citation of the requirements of 4 CSR 240-22.070(8) is in the Introduction section of this Report.

⁶ 4 CSR 240-20.093(7) Evaluation, Measurement, and Verification (EM&V) of the Process and Impact of Demand-Side Programs. Each electric utility shall hire an independent contractor to perform and report EM&V of each commission-approved demand-side program in accordance with 4 CSR 240-20.094 Demand-Side Programs. The commission shall hire an independent contractor to audit and report on the work of each utility's independent EM&V contractor.

Table E- 1: Roles and Responsibilities of the EM&V Auditor’s Team

Member	Role	Primary Areas of Responsibility
Dr. Katherine Johnson	Project Manager	Overall Report and Process Evaluations Review and Analysis
Mr. Scott Dimetrosky	Subject Matter Expert: Lighting and Market Effects	Lighting Report Review, Market Effects Model Review, Statistical Review and Analysis
Dr. Jim Bradford	Subject Matter Expert: M&V Issues and TRM	Lead Review for Impact Evaluations for BizSavers Programs, Construction Savers and Performance Savers
Mr. Noah Lieb	Project Analyst	Review and Summarize Cost-Effectiveness Analysis
Ms. Gwen Mizell and Ms. Michele Wynne	Principle Investigators	Summarize and Analyze Key Findings for Remaining Residential Program Portfolio
Mr. Gregg Eisenberg	Principle Investigator	Assist in review of process evaluations recommendations and editorial oversight

The EM&V Auditor Team completed its review and assessment of these reports in several ways. The Team reviewed each report’s key findings, recommendations, and analytical techniques. Next, the key findings and recommendations were organized by topic areas to identify high-level themes and draw conclusions about the overall progress of the Ameren Missouri’s program portfolio.

Based on this review, the EM&V Auditor Team developed both short-term and long-term recommendations on ways to improve the evaluation and reporting processes. This analysis and the recommendations for improvement are based on the EM&V Auditor Team’s collective experience with utility energy efficiency programs, EM&V best practices and professional judgment.

Overall Conclusion

Overall, the two evaluations completed for Ameren Missouri conformed to industry standards and best practices for impact and process evaluations. In particular, the PY2014 EM&V evaluation reports conform to the requirements set forth in the Rider EEIC, and in paragraph 5, b. ii and Appendix B of the 2012 Stipulation and Agreement. The costs and benefits for the annual net shared benefits have been expressed in 2013 dollars. The PY2014 incremental annual *ex post* energy savings are 345,183⁷ MWh and PY2014 annual net shared benefits are \$166,788,267.⁸

The EM&V Auditor identified some concerns regarding the updated market effects and participant spillover numbers that were reported in the Lighting program evaluation. These concerns are explained more fully in Section 4.

⁷ See Table 2.

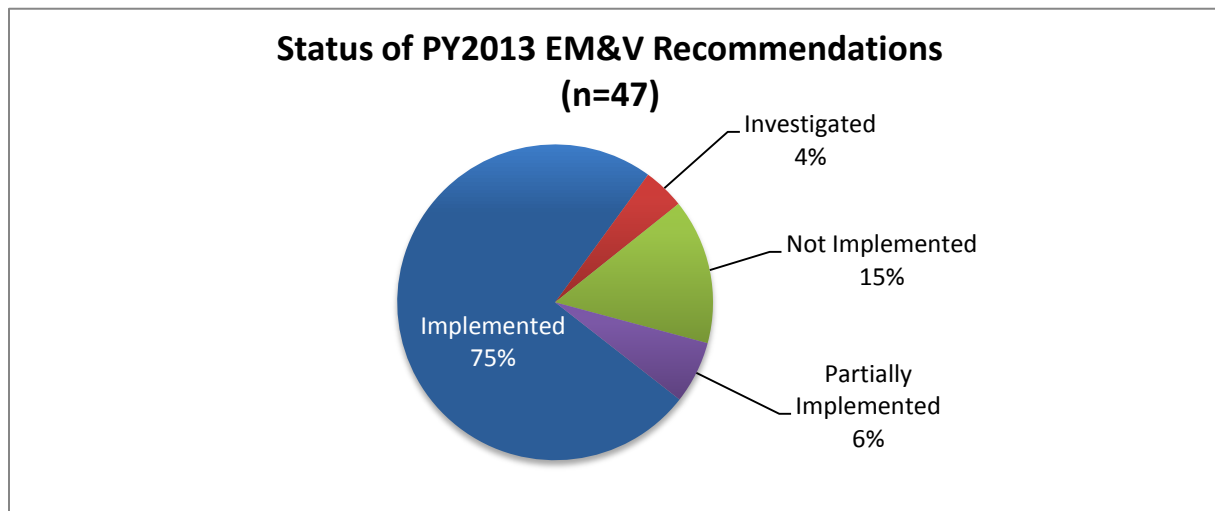
⁸ See Table 18.

Recommendations to Improve the Current EM&V Reports

Based on our initial review, the evaluators were requested to make several changes in the draft report to clarify and provide additional guidance. The disposition of these recommendations is summarized next.

- Track the progress of recommendations from the PY2013 EM&V Reports. The residential program evaluation reports contained status reports for all but one of the residential program-HEA. The BizSavers PY2014 Reports did not include the requested status report.

The following two figures summarize the 47 recommendations reported by both the status and topic area. As this figure shows, 75 percent of the PY2013 recommendations were implemented while only a small percentage (15%) have not been implemented. The remainder of the recommendations was either partially implemented (6%) or investigated but not implemented (4%).

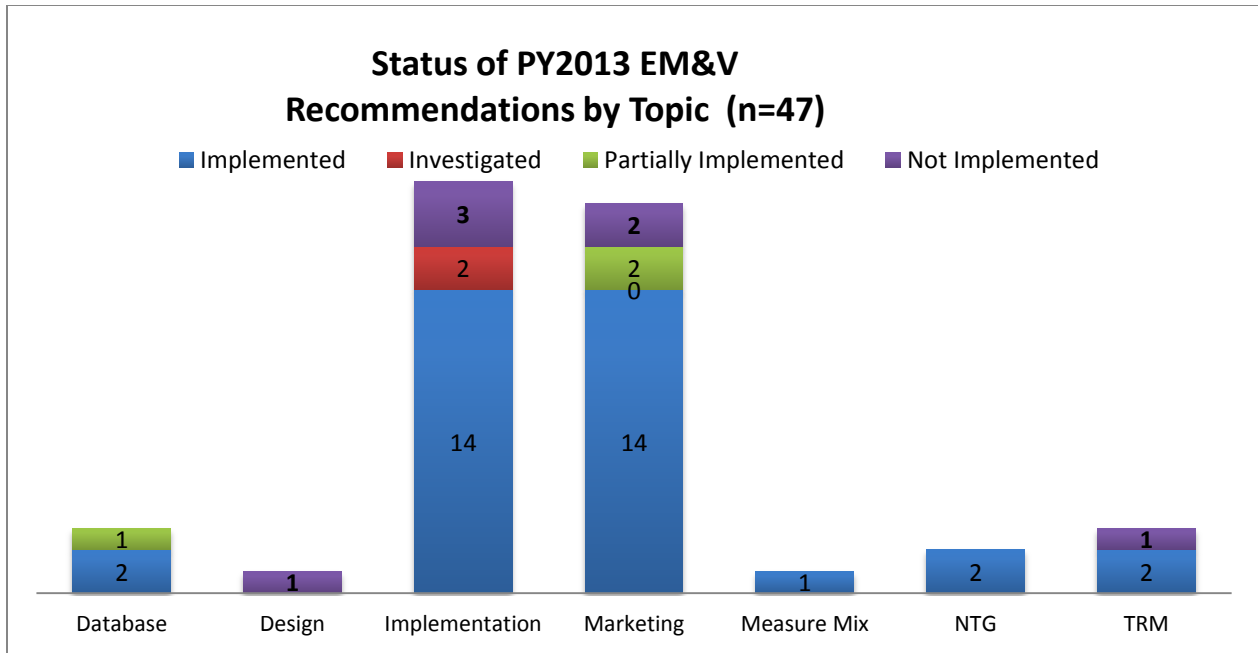


(Sources: Analysis of PY2014 Reports⁹)

Figure E- 1: Status of PY2013 EM&V Recommendations

Figure E-2 summarizes this information by topic area based on the status reports provided in the PY2014 residential reports.

⁹ The evaluators did not provide any status report on the recommendations for the BizSavers and HEA Programs, and therefore this analysis is incomplete.



(Sources: Analysis of PY2014 Reports¹⁰)

Figure E- 2: Status of PY2013 EM&V Recommendations by Topic

- As requested, the residential evaluations now document the history of program name changes to facilitate comparisons with PY2013 EM&V reports;
- The program evaluations for the residential programs partially addressed the recommendation to ensure that the Code of State Regulations (CSR) requirements are met for all programs. The impact CSR requirements were now addressed in all of the residential reports, except for the HEA and BizSavers evaluations. The process evaluation CSR summaries were still mostly verbatim repeats from the PY2013 reports. There were a few new additions for several programs, but this aspect of the final report could have been improved even more by reflect the new information learned from the PY2014 evaluation work; and
- Reconcile the difference between realization rates for residential vs. C&I sectors (83% vs. 102%). Lower realization rates occur for several reasons such as poor *ex ante* estimation of savings, installation and reporting practices, and evaluation practices and approaches. It is suggested that the utility should carefully explore the cause of realization rates to identify and correct any issues with savings estimates, field practices, evaluation approach or other bias.

Recommendations to Improve the Future EM&V Reports

The evaluators were asked to make the following modifications in the PY2014 EM&V Reports for Ameren Missouri’s energy efficiency program portfolio to ensure that these reports comply with accepted industry practices and provide results in a clear and transparent manner.

¹⁰ The evaluators did not provide any status report on the recommendations for the BizSavers and HEA Programs, and therefore this analysis is incomplete.

The market effects and spillover savings from the Lighting Program should be reviewed and updated in PY2015 based on primary data collection. The current calculations for lighting market effects and spillover are based on a trajectory from the PY2013 study and analysis, as opposed to actual updated field data collection. While the EM&V Auditor approves these values for PY2014, market effects and spillover in PY2015 should only be claimed if they are supported by updated primary data collection for PY2015. In addition, the PY2015 findings should be “trued up” with PY2014 values, so any PY2014 overstatement or understatement of market effects and spillover is corrected in PY2015 (e.g., if PY2015 research finds that market effects and spillover claimed in PY2014 is greater than the cumulative market effects and spillover claimed for PY2014 and PY2015 combined, the overstatement of savings for PY2014 should be deducted in the PY2015 savings estimate). In order to avoid potential conflicts of opinion, Ameren Missouri, the EM&V Auditor and stakeholders should be provided with a sampling and analysis plan prior to any data collection or analysis. In this way Ameren Missouri, Cadmus, the EM&V Auditor and stakeholders can come to an *a priori* agreement as to how the updated values will be derived and applied to updating PY2015 market effects and spillover estimates.

The non-participant spillover survey and calculations for the residential programs should be updated in PY2015 using a more rigorous approach. First of all, if measures are part of program offerings and the customers are aware of Ameren Missouri’s program (which is a requirement for spillover) then the customers need to be asked why they or their contractor did not apply for the rebate. The responses should then be reviewed and provided in the evaluation report and to the EM&V Auditor. Secondly, the survey should make sure that homes really qualify for electric spillover. For example, if the measure is a water heater or water heater wrap, the survey should ask whether the respondent has an electric water heater; or for programmable thermostats, the survey should ensure that the home has central air conditioning or electric heat.

Provide additional technical information in the report. When showing confidence and precision values, the evaluators should explain in greater detail how the findings were calculated and how the information was used. These findings can either be part of a technical appendix or included in footnotes for specific program findings. In any case, these methodologies need to be clearly explained in future reports.

The findings from the non-participant surveys should be provided as a standalone appendix in the final report. Given the importance associated with the findings for non-participant spillover in these evaluations, these findings should be provided in a separate appendix to facilitate understanding and conform to industry best practices for both process and impact evaluations. This recommendation was repeated from the PY2013 EM&V Auditor’s Report.

Organization of This Report

This report is organized into the following sections to guide the reader through this summary of the key results:

- Section 1: Summary of Key Findings and Recommendations from the Impact Evaluations
- Section 2: Summary of Key Findings and Recommendations from the Process Evaluations
- Section 3: Cost-Effectiveness Findings
- Section 4: EM&V Auditor’s Findings and Recommendations

Introduction

With the passage of the Missouri Energy Efficiency Investment Act in 2009, the State of Missouri and the stipulated agreement reached with Ameren Missouri and stakeholders signaled a new beginning of energy efficiency program offerings to all customer classes. These programs were launched in January 2013. In accordance with 4 CSR 240-22.070(8), the electric utilities are required to complete process and impact evaluations to assess the progress towards meeting the energy and demand savings targets.

To meet these requirements, Ameren Missouri contracted with two Evaluation, Measurement & Verification (EM&V) contractors: The Cadmus Group, Inc. (Cadmus) and ADM Associates, Inc. (ADM) to conduct comprehensive program evaluations of its energy efficiency portfolio. Cadmus conducted evaluations of the residential energy efficiency programs, while ADM conducted the evaluations of the business energy efficiency programs.

According to 4 CSR 240-22.070(8), the electric utilities are required to complete process and impact evaluations.

...The purpose of these evaluations shall be to develop the information necessary to evaluate the cost-effectiveness and improve the design of existing and future demand-side programs and demand-side rates, to improve the forecasts of customer energy consumption and responsiveness to demand-side programs and demand-side rates and to gather data on the implementation costs and load impacts of demand-side programs and demand-side rates for use in future cost-effectiveness screening and integrated resource analysis.

(A) Process Evaluation. Each demand-side program and demand-side rate that is part of the utility's preferred resource plan shall be subjected to an ongoing evaluation process which addresses at least the following questions about program design.

- 1. What are the primary market imperfections that are common to the target market segment?*
- 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?*
- 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?*
- 4. Are the communication channels and delivery mechanisms appropriate for the target market segment?*
- 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?*

(B) Impact Evaluation. The utility shall develop methods of estimating the actual load impacts of each demand-side program and demand-side rate included in the utility's preferred resource plan to a reasonable degree of accuracy.

1. Impact evaluation methods. At a minimum, comparisons of one (1) or both of the following types shall be used to measure program and rate impacts in a manner that is based on sound statistical principles:

A. Comparisons of pre-adoption and post-adoption loads of program or demand-side rate participants, corrected for the effects of weather and other intertemporal differences; and

B. Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same time period.

2. The utility shall develop load-impact measurement protocols that are designed to make the most cost-effective use of the following types of measurements, either individually or in combination:

A. Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses; or B. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics.

(C) The utility shall develop protocols to collect data regarding demand-side program and demand-side rate market potential, participation rates, utility costs, participant costs, and total costs.

In 2012, the Missouri Public Service Commission (PSC) contracted with Johnson Consulting Group to serve as its EM&V Auditor¹¹ (Auditor Team) to review and comment on compliance with 4 CSR 240-22.070(8) and on the overall quality, scope and accuracy of these reports.

This review consisted of the following components. The EM&V Auditor Team Members read each program's draft evaluation report in its entirety, and summarized the key findings and recommendations made by program by topic area. Organizing the findings at this level allows for a comprehensive review of the important trends among the programs and identifies issues that are important at both the program and portfolio level. The EM&V Auditor Team Members also made additional recommendations based on the EM&V Auditor Team's collective experience with utility energy efficiency programs' EM&V best practices and professional judgment.

Lastly, the EM&V Auditor Team Members assessed the overall quality of the program evaluations completed by the two contractors: Cadmus and ADM.

This report is organized into the following sections, to help guide the reader through this summary of the key results:

- Section 1: Summary of Key Findings and Recommendations from the Impact Evaluations
- Section 2: Summary of Key Findings and Recommendations from the Process Evaluations
- Section 3: Cost-Effectiveness Findings
- Section 4: EM&V Auditor Team's Findings and Recommendations

To facilitate the reader, the specific program evaluations are referenced in the text by the program name, year of evaluation and specific page number (i.e., HVAC Program Report, PY2014, p.1) since all of the reports are for Ameren Missouri for the PY2014. A full list of all reports cited is located in the References Section of this report.

In addition, percentages cited in parenthesis (%) are used to denote particular or significant findings from a particular evaluation report and follow standard industry reporting conventions.

¹¹ 4 CSR 240-20.093(7) Evaluation, Measurement, and Verification (EM&V) of the Process and Impact of Demand-Side Programs. Each electric utility shall hire an independent contractor to perform and report EM&V of each commission-approved demand-side program in accordance with 4 CSR 240-20.094 Demand-Side Programs. The commission shall hire an independent contractor to audit and report on the work of each utility's independent EM&V contractor.

Section 1: Summary of Key Findings and Recommendations from the Impact Evaluations

Both Cadmus and ADM conducted comprehensive impact evaluations to determine the savings estimates attributable to each program or measure. *This section summarizes the findings from these impact evaluations*, while Section 4 provides the EM&V Auditor Team’s assessment of the appropriateness of these savings estimates.

The program evaluation duties were divided among the two evaluation firms. Cadmus completed the residential programs evaluations, while ADM conducted the evaluation for the commercial and industrial programs, which is the integrated offering for the commercial and industrial sectors. Table 1 summarizes the types of impact evaluation activities that were completed for Ameren Missouri’s energy efficiency program portfolio.

Table 1: Summary of Impact Evaluation Methodologies Used in the EM&V Reports

Program	Measure Verification		Review Program Databases	Verify Correct Use of TRM Values	Estimate gross energy/ demand impacts at measure category level	Estimate Net Impacts at a Program Level
	Prescriptive Measure Verification (On-Site/Surveys)	Custom Measure Verification				
Efficient Products	N/A	N/A	✓	✓	✓	✓
Home Energy Analysis	✓	✓	✓	✓	✓	✓
HVAC	✓	✓	✓	✓	✓	✓
Lighting	✓	✓	✓	✓	✓	✓
Low Income	✓	✓	✓	✓	✓	✓
ENERGY STAR® New Homes	✓	✓	✓	✓	✓	✓
Refrigerator Recycling	✓	✓	✓	✓	✓	✓
Custom	✓	✓	✓	✓	✓	✓
Standard	✓	✓	✓	✓	✓	✓
New Construction	✓	✓	✓	✓	✓	✓
RetroCommissioning (RCx)	✓	✓	✓	✓	✓	✓

1.1 Summary of Impact Evaluation Findings

Portfolio Level Findings

This section summarizes the key energy savings targets and estimates for both demand kilowatts (kW) and energy kilowatt-hours (kWh) across Ameren Missouri's energy efficiency program portfolio.

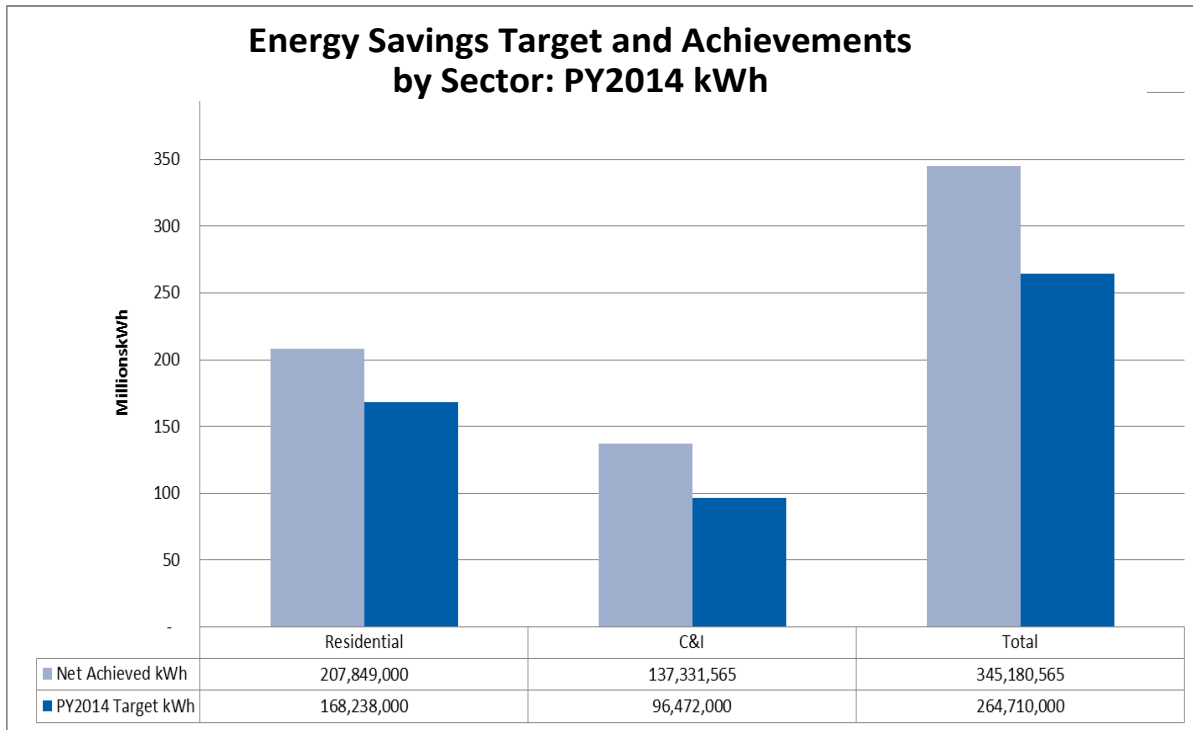
Figures 1 and 2 summarize the energy savings goals and achievements by sector for kWh and kW, respectively for PY2014 as reported by the evaluators.

The total goal for PY2014 of 264.7 million kWh and 53.9 MW represent approximately 0.94 percent of the 2013 total annual energy sales and 0.66 percent of the 2013 total system peak demand. The evaluated savings exceeded the goals by delivering 344.7 million kWh and 62.2 MW, which equates to 1.2 percent of 2013 energy sales and 0.76 percent of the 2013 demand peak.

Note that Union Electric Company MO (aka Ameren Missouri) PSC Schedule 6, Sheet Nos. 181.3 lists 87,208 MWh for C&I and Sheet No 191.396,472 MWh for Residential, for a total target of 255.4 million kWh. The difference in MWh goals occurs because Ameren Missouri adjusted the target for actual Opt Out customers in the C&I sector.¹²¹³

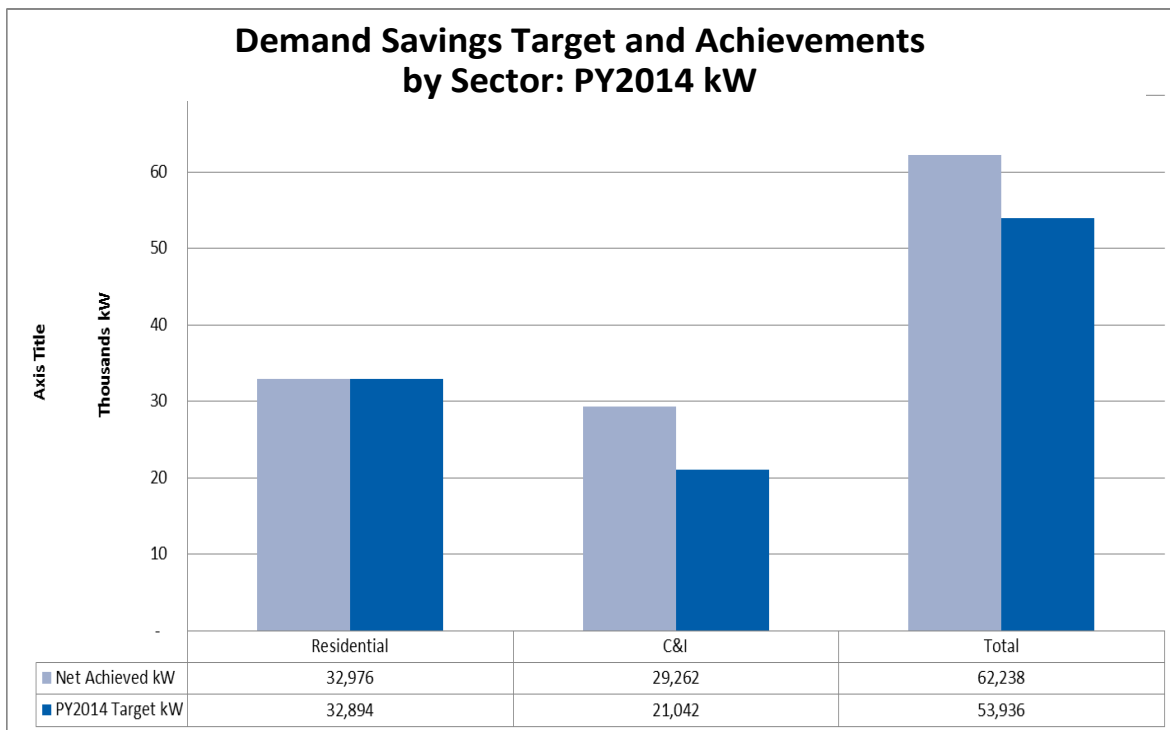
¹² Ameren Missouri Memorandum "2013-2015 Ameren Missouri Energy Efficiency MWh Goal Adjustment for Opt Out" dated January 2014.

¹³ Additionally, PSC Staff indicates that; on the reporting dashboard, in the annual report, and on Page 6 of the Surveillance Monitoring Report, the targets are listed at 263,305 MWh and 55.833 MW.



(Sources: Calculated from ADM and Cadmus 2014 EM&V Reports)

Figure 1: Energy Savings Target and Achievements by Sector: PY2014 kWh

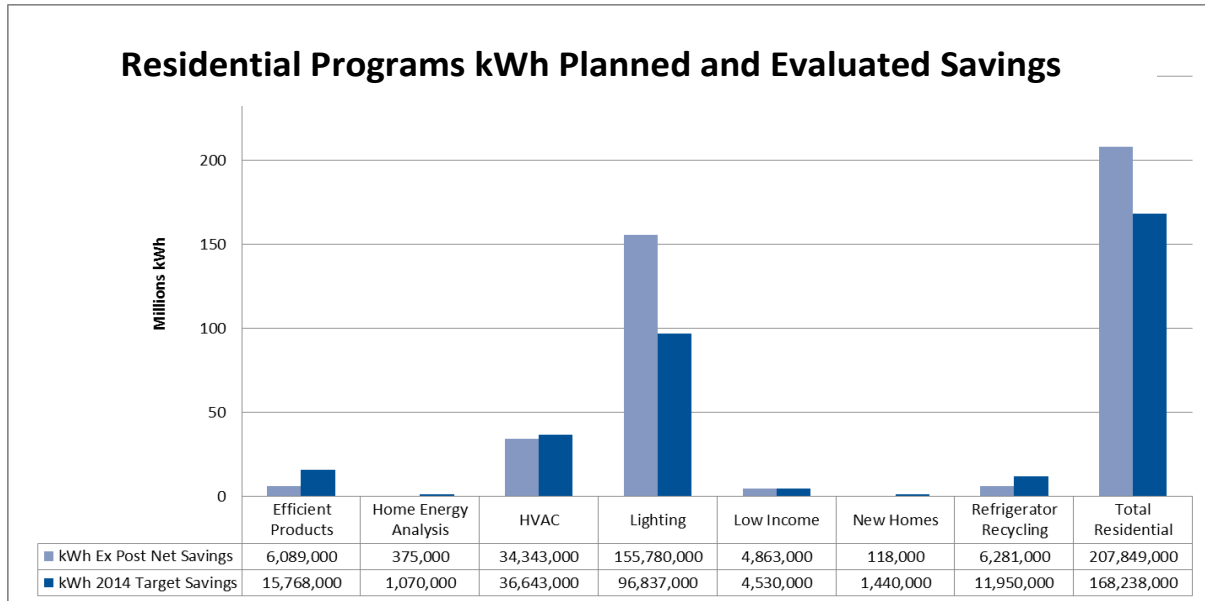


(Sources: Calculated from ADM and Cadmus 2014 EM&V Reports)

Figure 2: Demand Savings Targets and Achievements by Sector: PY2014 kW

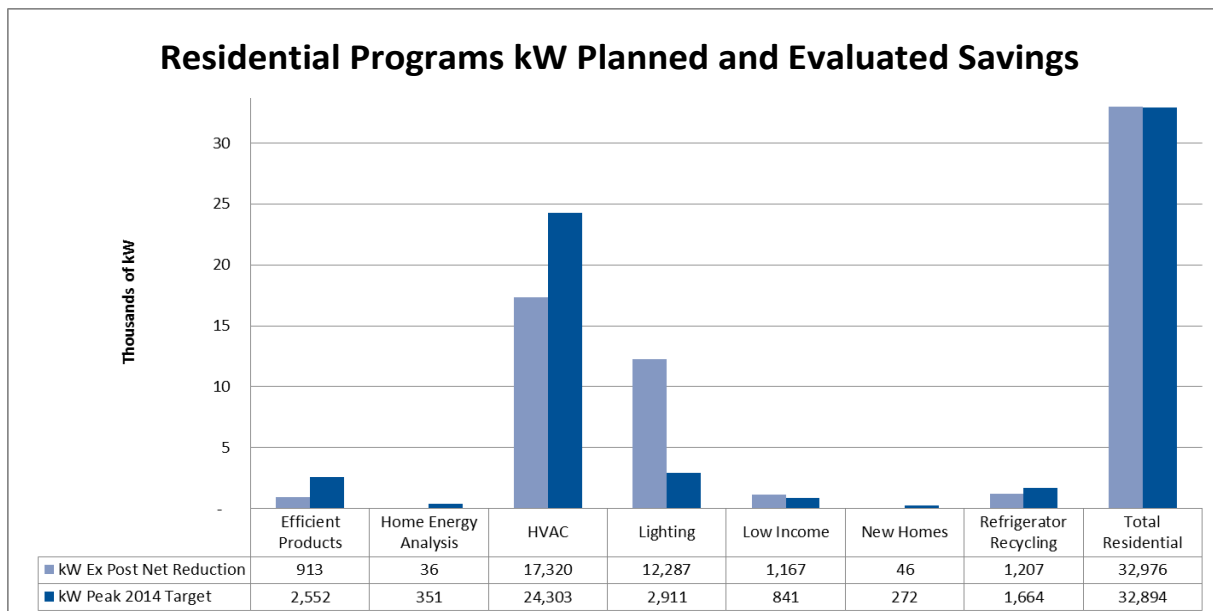
On a portfolio level, both the residential and C&I programs meet or exceed the targets.

Figures 3 and 4 display the key findings for the residential programs while Figures 5 and 6 summarize these findings for the C&I sector on a per program basis.



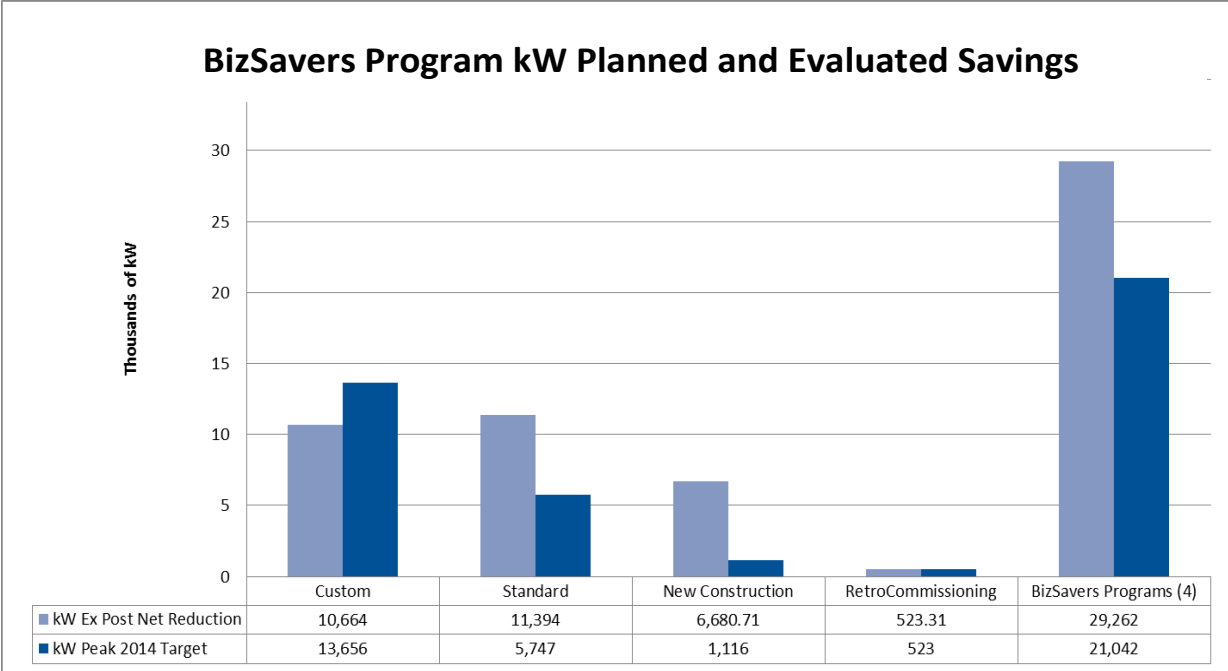
(Sources: Calculated from ADM and Cadmus 2014 EM&V Reports)

Figure 3: Residential Programs kWh Planned and Evaluated Savings



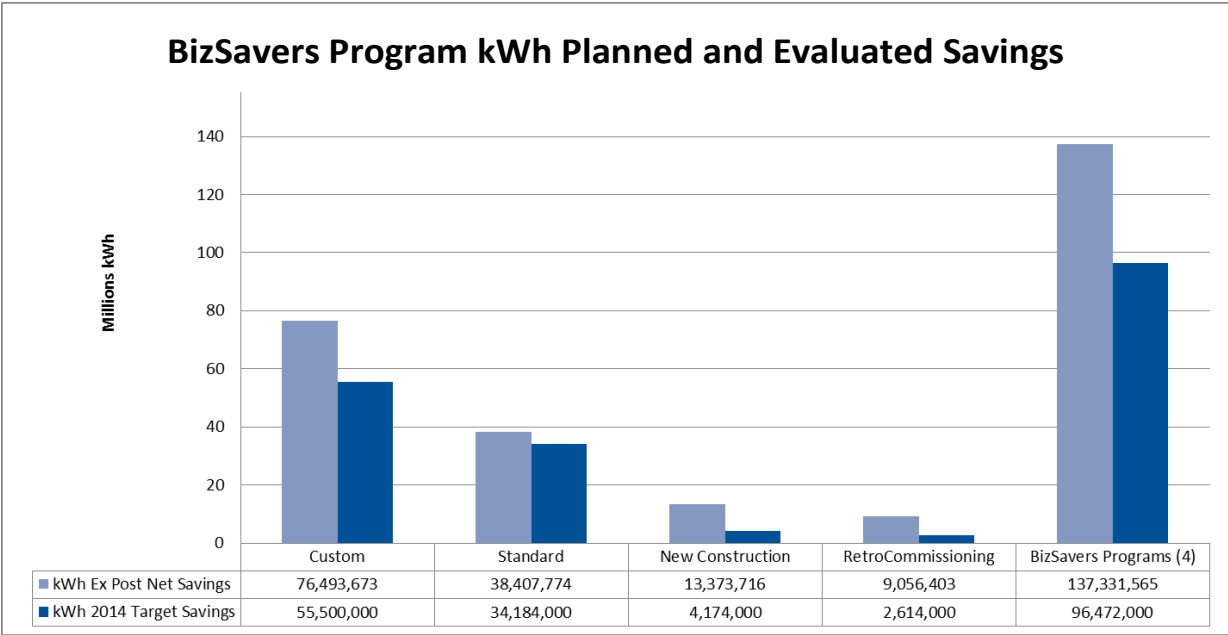
(Sources: Calculated from PY2014 EM&V Reports)

Figure 4: Residential Programs kW Planned and Evaluated Savings



(Sources: Calculated from PY2014 EM&V Reports)

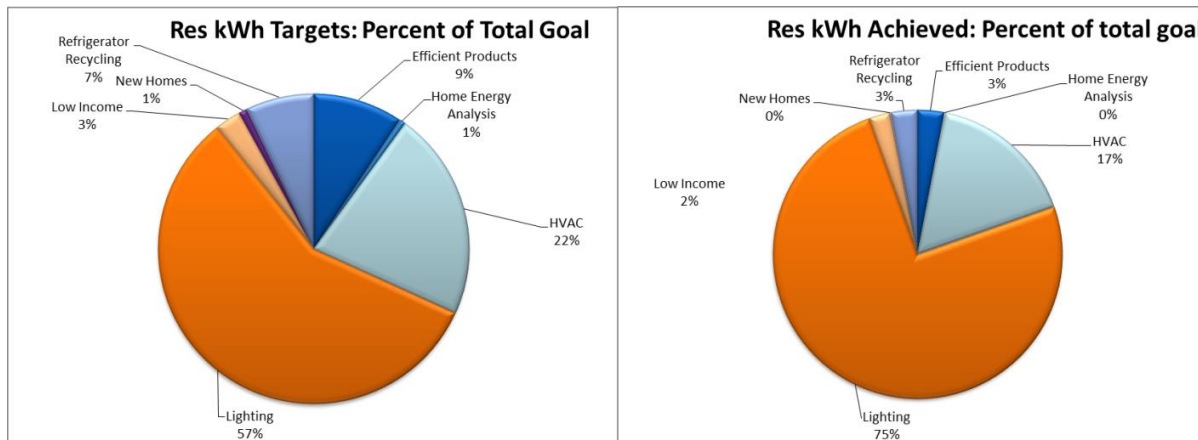
Figure 5: BizSavers Program kW Planned and Evaluated Savings



(Sources: PY2014 EM&V Reports)

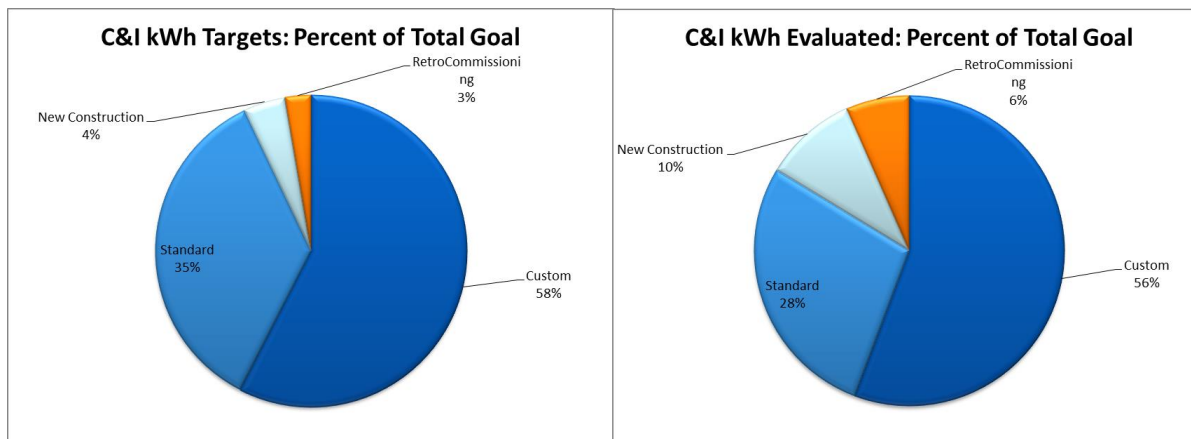
Figure 6: BizSavers Program kWh Planned and Evaluated Savings

The Lighting Program accounted for the 75 percent of the savings achieved in the residential energy program, far exceeding its goal of 57 percent of the total. For the BizSavers program, the Custom Program accounted for the largest percentage (56%) of total savings, which was consistent with its target of 58 percent. The HVAC Program was the next largest contributor for the residential programs and the Standard program was the third largest contributor to savings on the C&I side. The relative targets and savings for each of the other programs are compared in Figures 7 and 8.



(Sources: PY2014 EM&V Reports)

Figure 7: Summary of Residential kWh Targets vs. Achieved



(Sources: PY2014 EM&V Reports)

Figure 8: Summary of Commercial & Industrial kWh Targets vs. Achieved

Tables 2 and 3 show the Ameren Missouri’s energy efficiency targets, *ex ante* gross values, *ex post* gross values, *ex post* net savings (evaluated) and net achievement compared to the targets for energy savings (kWh) and demand reductions (kW), respectively. To ensure clarity, these terms are defined as follows:

- **PSC-Approved Targets** – Target values are annualized savings targets for the residential, commercial, and industrial sectors. The residential goals are as presented in MO P.S.C. Schedule number 6, sheets 191 through 191.4 and dated May 31, 2013.
- **Ex Ante Gross Savings** – *Ex ante* gross savings are annualized savings either reported by Ameren Missouri, or as calculated by applying tracked program activity to TRM savings values. In the evaluation reports, the *ex ante* gross values are known variously as “expected gross savings,” “expected kWh savings,” “Ameren Missouri’s *ex ante* savings.”
- **Ex Post Gross Savings** – *Ex post* gross savings are annualized savings as calculated and presented by the evaluators. In the evaluation report, this is known variously as “Realized Gross kWh Savings,” “Achieved Gross Peak,” and “Team’s evaluated Savings.”
- **Net Savings Ex Post** – *Ex post* net savings is the *ex post* savings multiplied by the net-to-gross (NTG) ratio, which accounts for free ridership, spillover effect, and market effects. In the evaluation reports, this was known variably as “Realized Net kWh Savings,” and “Achieved Net Peak.”

Table 2: Ameren Missouri Portfolio Energy Savings in PY2014, MWh

Program	PSC-Approved Targets	Ex Ante Gross Savings	Ex Post Gross Savings	Net Savings Ex Post: 2014	% of Target Achieved	NTG Ratio
Efficient Products	15,768	11,849	6,697	6,089	39%	90.9%
Home Energy Analysis	1,070	701	442	375	35%	85.0%
HVAC	36,643	39,777	36,004	34,343	94%	95.4%
Lighting	96,837	144,913	156,842	155,780	161%	99.2%
Low Income ¹⁴	4,530	6,561	5,081	4,867	107%	95.8%
ENERGY STAR® New Homes	1,440	408	275	118	8%	42.9%
Refrigerator ¹⁵ Recycling	11,950	12,932	8,850	6,281	53%	71.0%
BizSavers Custom	55,500	80,380	83,161	76,494	138%	92.0%
BizSavers Standard	34,184	38,590	40,071	38,407	112%	95.8%
BizSavers New Construction	4,174	13,171	13,400	13,373	320%	99.8%
BizSavers RCx	2,614	11,641	9,626	9,056	346%	94.1%
Total	264,710	361,923	360,449	345,183	130%	95.8%

(Sources: PY2014 Program Evaluation Reports; <http://www.ameren.com/-/media/missouri-site/Files/Rates/UECSheet191EEResidential.pdf>)

¹⁴ There is a discrepancy between the PY2014 Low Income Evaluation Report (Table 3, p. 3) as compared to the PY2014 Residential Portfolio Summary Report (Table 1, p. 4). This table presents the results using the Low Income Evaluation Report.

¹⁵ This program is also referred to as the Fridge/Freezer Recycling Program by Ameren Missouri staff, but this is the formal name used in the EM&V reports. For consistency’s sake, we will be using its formal name in our report.

The BizSavers Programs significantly exceeded the MWh goals while two residential programs exceeded their MWh targets. The Lighting Program and Low Income programs exceeded the MWh goals while the other residential programs did not. The ENERGY STAR® New Home Program significantly fell below its goals, achieving 17 percent of its target, while the other residential programs met between 36 and 73 percent of the goals (PY2014 Residential Portfolio Summary Report, p. 4).

The PSC-approved targets and achieved demand savings are summarized in Table 3.

Table 3: Summary of PSC-Approved Targets for Demand Savings

Program	PSC-Approved Target	Ex Ante Gross Saving	Ex Post Gross Savings	Net Savings Ex Post	% of Target Achieved
Efficient Products	2,552	1,610	968	913	36%
Home Energy Analysis	351	101	43	36	10%
HVAC	24,303	14,106	18,111	17,043 ¹⁶	70%
Lighting	2,911	12,420	12,378	12,287	423%
Low Income	841	650	1,216	1,167	139%
ENERGY STAR® New Homes	272	61	107	46	17%
Refrigerator Recycling	1,664	1,677	1,698	1,207	73%
BizSavers Custom	13,656	12,717	11,855	10,664	78%
BizSavers Standard	5,747	7,782	11,861	11,394	198%
BizSavers New Construction	1,116	990	6,934	6,681	599%
BizSavers RCx	523	479	542	523	100%
Total	53,936	52,484	65,589	61,960	115%

(Sources: PY2014 Program Evaluation Reports from ADM and Cadmus, Ameren Missouri Tariff Filings); <http://www.ameren.com/-/media/missouri-site/Files/Rates/UECSheet191EEResidential.pdf>

In terms of reaching demand-reduction goals, the larger programs performed better than the smaller programs. On the C&I side, however, the evaluator indicates that the high realization rates for New Construction and for the Standard program, this is due to under-reporting of the *ex ante* demand savings for multiple measures (BizSavers Evaluation Report, p. 1-5). On the residential side, the Lighting Program (422%) significantly exceeded their demand reduction goals that contributed to Ameren Missouri achieving, at the portfolio level, 100 percent of its overall goals (PY14 Residential Portfolio Summary Report, p. 5). However, it was not clear from the evaluation why the demand and energy savings percent achievement for the lighting programs were not similar.

¹⁶ There is a discrepancy between the PY2014 HVAC Evaluation Report (Table 3, p. 4) as compared to the PY2014 Residential Portfolio Summary Report (Table 1, p. 4). This table presents the results using the HVAC Evaluation Report.

Free ridership, spillover, and market effects percentage rates calculated for each programs are shown in Table 4.¹⁷ These factors are used to calculate the net-to-gross ratio (NTG), which is, in turn, used to calculate net savings from estimated gross savings.

Table 4: Estimated Free Ridership, Spillover Market Effect Rates and NTG for Each Program

Program	Estimated Free Ridership Rates	Estimated Spillover Rates	Estimated Non-participant Spillover	Estimated Market Effects	NTG Ratio
Efficient Products	13.1%	3.3%	0.7%	Not estimated	90.9%
Home Energy Analysis	17.1%	1.6%	0.5%	Not estimated	85.0%
HVAC	17.0%	0.1%	12.3%	Not estimated*	95.4%
Lighting	25.3%	1.0%	13.7%	9.8%	99.2%
Low Income	4.2%	0%	N/A	Not estimated	95.8%
ENERGY STAR® New Homes	60.2%	3.1%	0%	Not estimated	42.9%
Refrigerator Recycling	35.5%	0%	6.5%	Not Estimated	71.0%
BizSavers Custom	10.6%	2.6%	0%	Not Estimated	92.0%
BizSavers Standard	4.2%	0.0%	0%	Not Estimated	95.8%
BizSavers New Construction	0.7%	0.5%	0%	Not Estimated	99.8%
Biz Savers RCx	5.9%	0%	0%	Not Estimated	94.1%

(Source: PY2014 Evaluation Reports)

*Will be estimated in PY2015

In general, free ridership rates for were fairly low relative to industry norms. The program experienced high free ridership rates, which was one of the primary reasons for its termination in PY2014 (ESNH Report, PY2014, p. 1). Free ridership rates were also relatively high for the Lighting Program – however the market effects of 9.8 percent offset this. Overall, program spillover remains relatively low across the entire Ameren Missouri portfolio.

Program Level Findings

This summarizes the overall program performance by program.

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.

¹⁷ Note that estimates for market effects and non-participant spillover for BizSavers were not reported in the final EM&V Report.

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

- CLEARResult, 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.

As Table 5, shows, the program did not meet its PY2014 energy savings goal of 15,768 kWh/year, as specified in the Ameren Missouri tariff. The program goals were based on assumed participation levels; so they differ from *ex ante* savings, of which Ameren Missouri achieved 39 percent of its energy savings goal and 36 percent of its demand goal (Efficient Products Program Report, 2014, p. 6).

Table 5: Summary of Efficient Products Program

	Energy (kWh)	Demand (kW)
Target	15,768	2,552
<i>Ex Ante</i> Gross	11,849	1,610
<i>Ex Post</i> Gross	6,697	968
<i>Ex Post</i> Net	6,089	913

(Source: Efficient Program Report PY2014)

The evaluators calculated two separate free ridership rates for this program; one for the mail-in rebate delivery path and one for the online rebates delivery path. The PY2013 telephone survey results for equipment mail-in rebate measures showed an average free ridership rate of 18 percent across all respondents while the PY2014 online rebate survey results showed an average free ridership rate of 23.5 percent. Combining these two surveys resulted in a savings-weighted average free ridership rate of 19.4 percent. The evaluators calculated an overall weighted-by-total gross program savings NTG estimate of 90.9 percent for the program as a whole (Efficient Products Program, PY2014, pp. 6, 61, 63).

Energy Star® New Homes Program (ESNH)

Ameren Missouri added the ESNH program to its residential Act On Energy® portfolio in 2013. The program, previously known as ConstructionSavers, was implemented by ICF International (ICF) and promoted energy-efficient new home construction. It targeted builders and offered a package of training, technical assistance, marketing assistance, and incentives for constructing ENERGY STAR® homes.

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 ESNH program in one of two 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 (ESNH Program, PY2014, p. 1).

Due to limited participation, as well as the Program Year 2013 (PY13) evaluation results, which showed low gross savings realization rates, high free ridership levels, and non-cost-effectiveness, a tariff was approved in June 2014 to discontinue the ESNH program effective December 31, 2014. Ameren Missouri honored the applications for builders who had applied to build homes under the program prior to the program’s cancellation. As a result, a small number of homes (31 total: one Tier 1 and 30 Tier 2) were constructed by participating builders during PY2014 (ESNH Report, PY2014, p. 1). Table 6 summarizes the impact findings for this program.

Table 6: Summary of ESNH Program’s Impact Findings

	Energy (kWh)	Demand (kW)
Target	1,444,000	272
<i>Ex Ante</i> Gross	407,790	61
<i>Ex Post</i> Gross	274,577	107
<i>Ex Post</i> Net	118,000	46

(Source: ESNH Report PY2014)

However, the program experienced a high free ridership rate (i.e., 77.6% for Tier I and 60.0% for Tier II homes), which drastically reduced the program’s net savings. The program had limited participant spillover — only 3.2 percent for Tier II homes and 0.0 percent for Tier 1 homes. Since the same builders made up the PY2014 population as those in PY2013, the free ridership and spillover findings were applicable to PY2014 program performance (ESNH PY2014, p. 2).

HVAC Program

The HVAC Program (formerly called CoolSavers) offers Ameren Missouri customers living in single-family homes, condominiums, or townhomes incentives for installing high-efficiency central air conditioners (CAC) or heat pumps (HP) through a participating program contractor. The program also offers incentives for HVAC tune-ups, variable-speed fan motors and programmable thermostats. The HVAC program’s PY2014 impact results are summarized in Table 7.

Table 7: Summary of HVAC Program Impact Findings

	Energy (kWh)	Demand (kW)
Target	36,643	24,303
<i>Ex Ante</i> Gross	39,777	14,106
<i>Ex Post</i> Gross	36,004	18,111
<i>Ex Post</i> Net	34,343	17,043

(Sources: Ameren Missouri Tariffs and HVAC PY2014 Report)

The program exceeded its goals for several reasons. These factors included; high volume, a focus on air side heat pumps, high realization rates for Electronically Commutated Motor (ECM) running in a continuous mode (375%), HVAC systems receiving refrigerant charge adjustment (287%) and the installations of ground source heat pumps (182%). However, three measures had realization rates of less than 50 percent. Overall, its gross savings realization rate was 70 percent of its target (HVAC Report, PY2014, p. 3).

The evaluators determined an overall weighted NTG of 95.4 percent based on three findings:

- Free ridership for new CAC installations was 14 percent and the free ridership rate for tune-up was 41.7 percent. Overall free ridership rates declined slightly from the PY2013 levels (17% vs. 23%).
- Participant spillover was 0.1 percent (of “other non-HVAC actions taken by HVAC participants”).
- Non-participant spillover was estimated to be 12.3 percent, which increased NTG. The non-participant spillover was attributed to the heavy advertising and marketing budgets allocated to the program (HVAC Report, PY2014, p. 4).

Home Energy Analysis (HEA)

Ameren Missouri added the HEA pilot program to the residential Act On Energy® 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. This program was promoted as PerformanceSavers in PY2013.

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 are eligible to participate, the program requires participants to pay \$25.00 for an in-home energy audit (HEA Report, PY2014, p. 1).

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

- Educating customers about their energy consumption via a detailed home energy audit report.
- Installing a range of a low-cost, energy efficiency measures during the home energy audit: CFLs, LEDs, high efficient faucet aerators, high efficient showerheads, and water heater pipe wrap.
- Identifying energy-saving opportunities and recommending major measure improvements to enhance the home’s performance (such as infiltration improvements, insulation, and high efficient windows) (HEA Report, 2014, p. 1).

Unlike the other six residential programs—which address electric measures program exclusively — the program requires participants have both gas and electric in their homes. Table 8 summarizes the impact findings for this program.

Table 8: Summary of Home Energy Analysis Program Impact Findings

	Energy (kWh)	Demand (kW)
Target	1,070,000	351
<i>Ex Ante</i> Gross	701,000	101
<i>Ex Post</i> Gross	442,000	43
<i>Ex Post</i> Net	375,000	36

(Source: HEA Report PY2014)

The HEA program savings values eroded significantly from the PY2013 levels. The overall gross energy realization rate was 63 percent for electricity and 78.3 percent for gas (HEA Evaluation Report, PY2014, p. 1). This realization rate was calculated by comparing the Ameren Missouri TRM to the evaluator’s savings values, indicating the need for a review and revision of the TRM. The evaluator points out that the window realization rate was low at 27.2 percent, while other measures yielded high realization rates, which partially mitigated the poor overall realization rate.

The NTG ratio for the HEA program was 85 percent and this rate was based on participant surveys. Both CFLs and windows had high free ridership rates while other measures such as LEDs and pipe wrap had much lower free ridership rates (HEA Report, PY2014, p. 3).

Lighting Program

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 products in prominent locations within stores and locate Ameren Missouri signage and marketing materials nearby.

Lighting primarily operates through a point-of-sale markdown system at major chain retailers – these bulbs make up 97 percent of the program bulbs. In addition to the markdown channel, the Lighting Program includes two other channels: coupons and social marketing distribution (SMD). The coupon channel (accounting for 0.1% of program bulbs) is available to retailers without a point-of-sale system (i.e., a computer software system that tracks all purchases). Through the SMD channel (accounting for 2.6% of program bulbs), Ameren Missouri distributes free 13W CFLs and 23W CFLs to lower income customers through partnerships with area food banks and related community organizations (Lighting Report, PY2014, p. 1).

The program impacts are summarized in Table 9. Overall, per-unit, *ex post* savings and realization rates dropped since the PY2013 evaluation, primarily due to new information about average hours-of-use (HOU). This decrease was partially offset by shelf survey-based market data from participating lighting retailers that indicated 40W and 60W non-compliant EISA bulbs are still available within Ameren’ Missouri’s service territory (Lighting Report, PY2014, p. 2). Ultimately, the evaluation determined that the program achieved 161 percent of its proposed net energy savings target for PY2014 (96,837 MWh) as well as 422 percent of its proposed net demand savings target (2,911 kW).

Table 9: Summary of Lighting Program Impact Findings

	Energy (kWh)	Demand (kW)
Target	96,837,000	2,911
<i>Ex Ante</i> Gross	144,913,000	12,420
<i>Ex Post</i> Gross	156,842,000	12,358
<i>Ex Post</i> Net	155,780,000	12,287

(Source: Lighting Report PY2014)

Low Income Program

Through the Low Income Program (formerly called CommunitySavers), Ameren Missouri delivers cost-effective, energy-efficiency services to low-income multifamily properties that have three or more dwelling units. The program impacts are summarized in Table 10 (Low Income, 2014, p. 1).

Table 10: Summary of Low Income Impact Findings

	Energy (kWh)	Demand (kW)
Target	4,530	841
<i>Ex Ante</i> Gross	6,561	650
<i>Ex Post</i> Gross	5,081	1,216
<i>Ex Post</i> Net	4,867	1,167

(Source: Low Income Report, PY2014, p. 3)

This program exceeded both energy and demand targets. *Ex post* savings values for several measures including 13W, 18W and 23W CFLs, refrigerators, programmable thermostats, pipe wrap and advanced power strips were lower than the *ex ante* values estimated using the Ameren Missouri TRM.

Cooling measures (room air conditioners, HVAC tune-ups, and HVAC charging) showed a much higher savings rate than the TRM or *ex ante* values. Therefore, the TRM values should be carefully reviewed and updated (Low Income Program, 2014, p. 1).

Because the program is targeted for a low-income group only and not the general public, non participant spillover was deemed not applicable by the evaluators. Market effects were not assessed because the marketing efforts target property managers or owners of units, not the income-eligible occupants.

This program had an overall NTG of 95.8 percent resulting in a program net savings of 4,863 MWh per year, which is consistent with the savings achieved by the low-income programs from the previous two evaluation program years (Low Income Report, PY2014, p 3).

Refrigerator Recycling Program

The Refrigerator Recycling program branding (previously known as “ApplianceSavers”) offers Ameren Missouri’s residential customers a \$50.00 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) (Refrigerator Recycling Report, PY2014, p. 1). Table 11 summarizes these findings.

Table 11: Summary of Refrigerator Recycling Program Impact Findings

	Energy (kWh)	Demand (kW)
Target	11,950,000	1,664
<i>Ex Ante</i> Gross	12,932,000	1,667
<i>Ex Post</i> Gross	8,850,000	1,698
<i>Ex Post</i> Net	6,281,000	1,207

(Source: Refrigerator Recycling Report, 2014, p. 3)

The program achieved 53% of its proposed net energy savings target for PY2014 (11,950 MWh). The program achieved a greater percentage (73%) of the demand reduction. The scale of PY2014 program was considerably larger than PY2013. However, PY2014 participation was less than that of PY2011 (9,084), the program’s most successful year (Refrigerator Recycling Report, PY2014, pp. 3, 6).

During PY2014, the Refrigerator Recycling program recycled 8,988 appliances (6,938 refrigerators and 2,010 freezers). As in previous years, the majority of the units recycled (78%) were refrigerators (Refrigerator Recycling Report, PY2014, p. 6).

The evaluators determined NTG using the UMP Protocols. The evaluators compared the program’s discard rates with other programs through a benchmarking analysis. The evaluators determined that the percentage of Ameren Missouri’s participants (in all program years) who stated they would have kept their appliance in the absence of the Refrigerator Recycling program is considerably higher than the benchmarked programs. The percentage of participants self-reporting that they would have kept their refrigerators independent of the program increased to 47 percent in PY2014 from 40 percent in PY2013 (Refrigerator Recycling Report, 2014, p. 33).

BizSavers

The BizSavers Program is an umbrella program comprised of four programs which include: The Standard incentive program, the Custom program, the Retro-Commissioning (RCx) program, and a New Construction (NC) program. The RCx and NC programs have grown significantly, but are still small compared to the standard and custom offerings. Table 12 summarizes the PY2014 results for BizSavers Programs overall, while Tables 13-16 summarize the individual results for each BizSavers program (BizSavers, 2014, p. 2-1).

Table 12: Summary of BizSavers Overall Impact Findings

BizSavers	Energy (kWh)	Demand, kW
Target	96, 472,000	21,042
<i>Ex Ante</i> Gross	143,781,435	21,969
<i>Ex Post</i> Gross	146,257,547	31,197
<i>Ex Post</i> Net	137,331,565	29,262

(Source: BizSavers 2014. pp. 1-3-1-5)

The BizSavers Programs performed exceptionally well in PY2014. The *ex post* net savings exceeded by 142 percent of the target. There was also fairly wide variation in some of the programs – for instance RCx and NC both delivered more than triple their program targets (BizSavers, 2014, p. 1-5). These findings are summarized in Tables 13-16).

Table 13: Summary of BizSavers Custom Program Impact Findings

Custom Program	Energy (kWh)	Demand, kW
Target	55,500,000	13,656
<i>Ex Ante</i> Gross	80,379,926	12,717
<i>Ex Post</i> Gross	83,161,231	11,855
<i>Ex Post</i> Net	76,493,673	10,664

(Source: BizSavers PY2014, pp. 1-3-1-5)

Table 14: Summary of BizSavers Standard Program Impact Findings

Standard Program	Energy (kWh)	Demand, kW
Target	34,184,000	5,747
<i>Ex Ante</i> Gross	38,589,848	7,782
<i>Ex Post</i> Gross	40,070,742	11,861
<i>Ex Post</i> Net	38,407,774	11,394

(Source: BizSavers PY2014, pp. 1-3-1-5)

Table 15: Summary of BizSavers New Construction Program Impact Findings

New Construction	Energy (kWh)	Demand, kW
Target	4,174,000	1,116
<i>Ex Ante</i> Gross	13,170,801	990
<i>Ex Post</i> Gross	13,399,531	6,940
<i>Ex Post</i> Net	13,373,716	6,681

(Source: BizSavers PY2014, pp. 1-3-1-5)

As Table 16 shows, the high gross peak kW realization rates for the New Construction Program and the Standard Program are largely a result the 0 *ex ante* peak kW estimate for a number of controls measures. There are actually positive peak demand savings associated with these measures (BizSavers Report, 2014, p. 1-5).

Table 16: Summary of BizSavers RCx Program Impact Findings

RCx Program	Energy (kWh)	Demand, kW
Target	2,614,000	523
<i>Ex Ante</i> Gross	11,640,860	479
<i>Ex Post</i> Gross	9,626,043	542
<i>Ex Post</i> Net	9,056,403	523

(Source: BizSavers PY2014, pp. 1-3-1-5)

The report explains the evaluators' approach to analyzing savings of the various measures (BizSavers Report, 2014, pp. 3-8 to 3-8) and provides project, measure and program level detail regarding realization rates (BizSavers Report, 2014, pp. 3-16 to 3-8). The evaluation reveals a significant variation across both measures and projects (BizSavers Report, PY2014, pp. 3-16-3-20).

The NTG ratios of the BizSavers program were all in the 90-100 percent range. The evaluator based the NTG analysis primarily on a survey of a sample of projects. Free ridership is low for across all programs for a total free ridership rate of 94 percent (BizSavers Report, PY2014, p. 1-3).

Findings from the TRM Review

The evaluators identified several areas in which the program savings were affected by the TRM values. These findings are highlighted next.

- **ESNH:** Missouri's internal analyses of the ESNH program determined its initial deemed savings (codified in the TRM) were inflated, and the program could not operate cost-effectively. Given these factors and the poor PY2013 evaluation results, Ameren Missouri terminated the program in PY2014 and effectively stopped program enrollment in June 2014 (ESNH Report, PY2014, p. 4).
- **HEA:** Some the measures in the HEA program had low realization rates that reflected inaccuracies in the TRM-deemed savings assumptions (HEA Report, PY2014, p. 7).
- **Low Income:** Low-income households have lower lighting hours of use (HOU) per installed CFL (1.6) than other Ameren Missouri lighting customers. However, CFLs installed in apartments with families had higher HOU at 1.9 hours, while those installed in homes with seniors had much lower HOU at 1 hour (Low Income, PY2014, p. 5).

Findings from the Data Tracking Review

In PY2014, the program managers saw improvements in data collection and reporting across several programs. For example, the online data tracking system toward the end of PY2014 helped to ease the reporting requirements for the Low Income Program. In addition, the program implementers moved to data entry on computers and tablets (Low Income, PY2014, p. 5).

However, data tracking issues still remain challenging for several programs. These issues continue to be problematic for the HVAC Program where approximately 20% of data collected on tune-up measures were still incorrect. The evaluators felt confident however that they could calculate reliable efficiency improvements from the program-tracking database for a robust dataset of PY2014 participants where approximately 2,000 tune-up measures were performed (HVAC Report, PY2014, p. 4).

The Low Income Program also experienced several critical data tracking issues in PY2014. Ameren Missouri staff rolled out a new database to track its energy efficiency programs, but the program implementer tracked data in two separate databases. Adding Laclede Gas to the program required updating measure costs and savings. It took a long time to get the database up and running and to generate accurate reports. The Low Income Program database also presented challenges to the installation subcontractors, requiring time-consuming data entry (Low Income Report, PY2014, p. 21).

Changes made to the data tracking and reporting system are expected to improve future program reporting and evaluation activities going forward for the Efficient Products Program. The transition to the new program database was not complete at the end of the program year, and thus limited the evaluators' ability to use these data (Efficient Products Report, PY2014, p. 8).

Data tracking for the demand elasticity model of the Lighting Program continues to be challenging. The PY2013 LightSavers evaluation determined that promotion/display was equal to, if not more important than, retail price discounts in terms of increasing sales of efficient bulbs. For PY2014, the evaluator attempted to include promotional display data in the elasticity model, but because there were multiple display types at many locations, this resulted in nearly continuous displays at the store locations that were sampled (Lighting Program Report, PY2014, p. 47). Since variation is required to model the impact of promotional displays, the display variable that nearly always indicated a display has been present proved problematic. In addition, the usefulness of the display data is limited because the data do not track which specific products are on display as seen in other programs. This additional detail, which the evaluator is recommending that CLEAResult collect during PY15, will allow the evaluator to directly associate sales with specific SKUs and thereby avoid using a more generic — and largely consistent — display indicator variable tied to all sales at a given retail location.

Improvements to Tracking System

However, there were some positive developments in PY2014. In mid-2014, Ameren Missouri launched the Vision database, which will house all of its residential and commercial efficiency program data in one location. Ameren Missouri assigned staff to manage development of the database; these staff consulted closely with program staff. Cadmus and CLEAResult also participated in the database design. The Cadmus team submitted a list data fields necessary for the evaluation and reviewed several database models including ensuring that the model was capturing critical data for the Lighting Program's demand elasticity model (Efficient Products Program, PY2014, p. 21; Lighting Report, PY2014, pp. 34-35).

The Low Income Program subcontractor reported a steep reduction in the amount of data required for each CAC cleaning and tune-up. All of the subcontractors said the reporting requirements for the Laclede Gas portion were easy to implement and did not introduce an additional burden on its program staff (Low Income Report, PY2014, p. 21).

The BizSavers Program also benefited from the upgraded project tracking system, which makes it easier to locate key data. It is also easier to track multiple projects. In addition, the new database allows for a more accurate assessment of the total energy savings for a large, multi-stage upgrade or construction project.

Staff also reported the establishment of a new standard-only measure identifier that facilitates energy analysis and the ability to generate automatic notifications when the project status changes or a milestone date occurs for better project tracking. The new database also features an internal office "scoreboard" which provides a summary of key program metrics that are updated on a daily basis (BizSavers PY2014, p. 5-19).

1.2 Summary of Key Impact Evaluation Recommendations

The evaluators provided the following recommendations on ways to improve the impact evaluations in the future. These recommendations have been organized by topic and program.

Recommended Changes to the TRM

Update the Ameren Missouri TRM to better account for program activity for the 2016-2018 program cycle. For instance, *ex ante* savings assumptions for windows assume a single home installs 350 square feet of new windows; the evaluation found, however, customers install an average of 119 square feet of new windows. Therefore, the savings realized by installing windows is significantly less than currently reported in the TRM (HEA Program Report, PY2014, p. 7).

Ameren Missouri should continue discussions with the project implementer and the evaluation team to better understand the implications of the segmentation strategy that was implemented for lighting control measures. While it is a step in the right direction, and maintains adherence to the TRM deemed values, there is still an opportunity to improve the accuracy of deemed savings for lighting control measure types. One approach would be to apply the TRM calculation for custom savings (BizSavers Report, PY2014, pp. 1-7-1-8).

ADM suggests that program staff apply HCIFs by building type, as defined in the TRM, to more accurately estimate lighting project savings. As project documentation already requires the customer to indicate the building type and space heating fuel source, applying the HCIF should not require the collection of additional information savings (BizSavers Report, PY2014, p. 1-9).

Customer surveys indicated Ameren Missouri's installation rate at 50 percent for CFLs, compared with 33 percent in PY2013. The Cadmus team estimates a future installation rate of 75 percent, compared with 63 percent in PY2013. Installation rates for LEDs were even higher, with surveys indicating 75 percent installed, for a final installation rate projected at 92 percent.¹⁸ Including future installations, CFL installations align with other direct-mail kit programs reviewed in PY2013, which ranged from 69 to 96 percent. This likely resulted from the reduction of CFLs and inclusion of LEDs in PY2014 (Efficient Products Program, PY2014, pp. 7-8).

PY2014 Recommendations

Update the Ameren Missouri TRM to better account for program activity for the 2016-2018 program cycle. For instance, *ex ante* savings assumptions for windows assume a single home installs 350 square feet of new windows; the evaluation found, however, customers install an average of 119 square feet of new windows. Therefore, the savings realized by installing windows is significantly less than currently reported in the TRM (HEA PY2014, p. 7).

¹⁸ To account for Ameren Missouri 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). Using these data, we determined the probable rate of future installations applicable to Ameren results.

Recommended Updates to Data Tracking

Improve better program tracking protocols and methodologies to enhance data collection and analysis for the residential programs. For example, the evaluators recommended that the HVAC had to develop a systematic methodology for sampling which tune-ups receive both test-in and test-out measurements. The evaluators believed that the contractors who reported a higher proportion of test-in and test-out measurements could perform the tune-up differently than an HVAC contractor electing not to report test-in measurements (HVAC Report, PY2014, p. 4).

The evaluators need to develop better protocols for data tracking for the Efficient Products Program. The property management staff should report the number and location of items installed at each property and should report these data along with current data, showing the number of kits delivered through the program. This will increase the accuracy of reported participation rates in this delivery channel and improve verification activities. In addition, the evaluators recommended that implementation staff should report the number of items and kits returned by property management staff. This will increase the ability to track items and kits distributed through the program (Efficient Products Program, PY2014, p. 8)

PY2014 Recommendations

Move internal tracking system to computers and laptops. In PY2014, Honeywell did move its internal tracking system from the Nextel phone data entry system to data entry using computers and tablets (Low Income Report, PY2014, p.4). However, there still continues to be errors in the program records.

Contractor reported tune-up data could be improved. ICF developed a systematic sampling methodology where tune-ups received both test-in and test-out measurements. Cadmus could not assess the randomness of errors. They believe the bias is possible as contractors that report a higher proportion of test-in and test-out measurements could perform the tune-up differently from an HVAC contractor who elects not to report test-in measurements (HVAC Report, PY2014, p. 4). This recommendation was repeated from the PY2013 report but no action has been taken.

Consider working with the evaluator and implementer to revisit data currently unpopulated in Vision and identify changes to would help improve program and evaluation activities. For example, while a field exists for EER values for RACs in the Vision database, these data were not captured. Detailed program data would help ensure rebated items qualify for the program and would improve verification (Efficient Products Report, PY2014, pp. 8-9).

Develop a protocol for assigning dates to participant and program activities and define the date used to establish participation year. Inconsistent dating protocols may have contributed to differences between Vision data and reported participation in PY2014 (Efficient Products Report, PY2014, p. 9).

Section 2: Summary of Key Findings and Recommendations from the Process Evaluations

This section summarizes the key findings from the process evaluations of Ameren Missouri's energy efficiency program portfolio targeting both residential and business customers. It is based on a thorough review of each EM&V report prepared for each program. Note, the residential program evaluations were reported in separate reports for each program while the business program evaluations were summarized in one report. References to each report are provided throughout to aid the reader.

This review also included documenting the progress of the previous process evaluation recommendations that were presented in PY2013. As we note in Section 4 of this report, the PY2013 process and impact recommendations were not tracked in a consistent manner. This departure from industry standards and best practices should be corrected in the final PY2014 report, and best practices regarding tracking the disposition of previous-year recommendations be documented in each Ameren Missouri program evaluation.

2.1 Summary of Process Evaluation Findings

Program Name Changes

Ameren Missouri's program portfolio underwent significant changes during PY2014. As we point out in Section 4.4, all the residential program names were changed; however these name changes were not documented consistently in either the individual reports or in the residential program summary. For readers unfamiliar with these changes from one year to the next, the lack of documentation of these program name changes led to confusion. Since a critical aspect of conducting a process evaluation is to preserve program history, these name changes should have been identified clearly in each report and in the residential evaluation summary report.

Refrigerator Recycling: The name change was noted positively, indicating it led to "clearer program branding," but this did not help the program reach either its annual participation or energy savings targets (Refrigerator Recycling Program, PY2014, p. 3). In addition, the program evaluator noted that name changes can "hurt marketing continuity" (Refrigerator Recycling Report, PY2014, p. 17).

Program Termination

ENERGY STAR® New Home Program: This program (formerly ConstructionSavers) was terminated mid-year in PY2014 due to lack of program participation that made it not cost-effective. This is not surprising given the challenges that were documented in the PY2013 process evaluation.

Changes in Program Design

Several other programs underwent changes in program design during PY2014, which were identified in the individual process evaluation findings.

BizSavers: In response to feedback from the 2013 process evaluation, the program implementer made several improvements to program processes, including redesigning the online application process and making upgrades to the project tracking system (BizSavers Report, PY2014, p. 5-3).

HVAC: The program design changed to include:

- Nearly doubling the incentive for geothermal HPs;
- Increasing the incentive for early replacement Central Air Conditioners (CACs); increasing various incentives for all types of ASHP installations;
- Adding one dual fuel HP (DFHP) measure; and
- Removing of the programmable thermostat incentive (HVAC Report, PY2014, p. 15).

Low Income: This program experienced two major program changes:

- The program's neighborhood sweep portion, targeting single-family properties, was officially cancelled; and
- Laclede Gas began funding natural gas-saving measures for units with gas heating or gas water heating (Low Income Report, PY2014, p. 17).

Program Participation

Participation rates remain high for some Ameren Missouri programs. Several Ameren Missouri programs reported significant increases in overall program participation. This was especially true for the Lighting Program, in which the program recorded sales of 4 million bulbs distributed through upstream channels and 3.9 million bulbs through discount channels. LED sales accounted for a higher proportion of bulb sales compared to previous years (Lighting Report, PY2014, p. 5).

The Low Income program experienced a significant increase in the number of Low Income Housing Tax Credit (LIHTC) properties participating in PY2014, a sharp change from PY2013. In addition, cross-program participation increased as several properties participated in the business portion of Ameren Missouri's programs and installed common area lighting they committed to at the beginning of the application process (Low Income Report, PY2014, p. 4).

The BizSavers Program experienced increased participation in both small and large C&I sectors. The proportion of projects completed in smaller buildings (5,000 square feet or less) was nearly double of that from 2013; this suggests that BizSavers is successfully expanding project activity in the small business population (BizSavers Report, PY2014, p. 5-4).

However, program participation fell short of its goals for the Efficient Products and programs.

The slow ramp-up associated with new measures along with a desire to wait until PY2013 evaluation was completed and the recommendations were implemented meant that the program did not have sufficient market momentum to meet its goals (Efficient Products Report, PY2014, p. 5; HEA Report, PY2014, p. 7).

Changes made to the type and quantity of items included in the PY2014 Home Energy Kits appeared to be successful. The PY2014 survey respondents reported higher installation rates, along with an increased interest in Home Energy Kit items. However, participants requesting and paying for the Home Energy Kits containing advanced power strips reported lower installation rates for other items included in the kits. Ironically, while the program was popular, it did not achieve its goals due to resource constraints in conducting audits and installing the measures (HEA Report, PY2014, pp. 4, 8).

Low participation rates for the ESNH program led to its termination. The evaluation identified the following factors that led to a decline in interest in this program:

- A fragmented local new construction market;
- Regional macroeconomic factors driving builders to focus more heavily on profit margins; and
- Energy efficiency not being a priority for many Missouri new construction builders (ESNH Report, PY2014, p. 3).

Reasons for Participation

The desire to make energy efficiency improvements was a major driver of participation, rather than any specific marketing or outreach activity. Efficient Products Program online survey respondents mentioned the desire to replace aging (33%) or broken equipment (30%) as the major reasons for program interest. The Home Energy Kit participants wanted to receive the free measures (35%) (Efficient Products Report, PY2014, p. 24).

Similarly, participation in BizSavers Retro-commissioning Program was driven by an internal desire to make an energy efficiency improvement, rather than as a result of program outreach. As program participants researched how to fix or replace the failing equipment, they learned about the retro-commissioning program and available incentives to help them complete the project (BizSavers Report, PY2014, p. 5-51).

Customer Satisfaction

Customer satisfaction remains high for most Ameren Missouri programs. For example, the HEA participants reported very high participant satisfaction levels (96% rated themselves as very or somewhat satisfied (HEA Report, PY2014, pp. 4, 8, 20-21).

Most tune-up (77%) and early replacement participants (82%) were also very satisfied with the program overall program, new equipment performance, improved comfort and decreased bills as a result of the new equipment (HVAC Report, PY2014, p. 18).

As in previous program years, participants expressed very high satisfaction levels (100%) with Refrigerator Recycling in PY2014. Furthermore, all but one participant reported they would recommend the program to a friend or family member, and nearly two thirds of respondents said they were more likely to participate in another Ameren Missouri energy efficiency program as a result of their experience with this program (Refrigerator Recycling, PY2014, pp. 3-4).

Most program participants were also satisfied with all aspects of the Efficient Products Program, including the processing time, and the measures received. LED bulbs generated the highest satisfaction ratings (100%) among these program participants (Efficient Products Report, PY2014, pp. 28-29).

The BizSavers program participants were satisfied with training events and the program incentives (BizSavers Report, PY2014, pp. 5-61, 5-83). However, they were least satisfied with the program's participation requirements. Satisfaction was lowest regarding the aspects of participation most directly relating to program rules and procedures – the program steps, the incentive turnaround time, and the range of eligible equipment (BizSavers Report, PY2014, p. 5-44).

Customer Satisfaction with Ameren Missouri

Most customers were also satisfied with Ameren Missouri. While this issue was not addressed in all of the process evaluations, the findings from the participant surveys for the HEA, and Efficient Products programs were all positive.

For example, 66% of HEA participants said they were very satisfied with their overall experience with Ameren (HEA Report, PY2014, pp. 20-21) while 71% of the Home Energy Kit respondents were very satisfied with Ameren Missouri as a power utility (Efficient Products Report, PY2014, p. 31).

Trade Ally Satisfaction

HVAC participants were very satisfied with the contractors who installed the equipment. Of participants installing a new HVAC system, 90% described themselves as very satisfied with the contractor performing the installation; among tune-up customers, 77% described themselves as very satisfied with the contractor performing the installation (HVAC Report, PY2014, p. 15).

Program Marketing

Customers learn about Ameren Missouri's program offerings in a variety of ways. For the Efficient Products Program, most (73%) Home Energy Kit customers became aware of the program through postcards mailed by the utility (Efficient Products Program, 2014, p. 23).

BizSavers participants learned about the program from an equipment vendor or building contractor directly or from direct contact by an Ameren Missouri key account representative, customer account advisor or a program business development representative. These were more effective in reaching program participants compared to other marketing methods (BizSavers Report, PY2014, pp. 5-4, 5-36).

The BizSavers also increased its use of social media during PY2014 to publicize case studies of energy efficiency projects. A video case study was sent to nearly 4,700 customers and trade allies in June of 2014 (BizSavers 2014, p. 5-11).

The program implementer enhanced direct outreach activities to attract large customers through continued coordination with Ameren Missouri Key Account Executives (KAEs) including the new "10 Most Wanted" campaign. The staff also used Ameren Missouri customer account data to better identify the key decision-makers for these large customers (BizSavers PY2014, p. 5-11).

Ameren Missouri devoted a significant portion (58%) of its PY2014 marketing budget to promote the HVAC program. This program was marketed aggressively using a variety of tactics including: customer emails, website banners and Ameren’s website, gas pump toppers, newspaper and radio advertisements, bill inserts, including personal energy reports, Internet radio ads, television commercials, a shelf marketing campaign and related promotions (HVAC Report, PY2014, p. 18).

Several programs updated their marketing approaches to make them more effective in reaching customers. The HEA program focused on increasing customer comfort and reducing energy costs through insulation, a shift away from the previous focus on the audit component (HEA Report, PY2014, pp. 4, 7). Marketing activities included redesigning the program mailer, marketing via bill inserts, community outreach and improvements to the website (HEA Report, PY2014, p. 18).

The Efficient Products Program works through retailers to place program materials in stores, coordinate in-store activities, and provide training on rebates and applications. Implementers also conducted more than 200 on-site promotions by October 2014. The program also promoted the availability of discounted advanced power strips through Ameren’s online store and free Home Energy Kits (Efficient Products Report, PY2014, pp. 21-22).

The Refrigerator Recycling Program simplified its marketing materials (relying on simple block text and green coloring to associate with environmental benefits), and placed a greater focus on the program’s incentive. This program also used more targeted marketing to identify 200,000 Ameren Missouri customers that may be interested in participating in this program (Refrigerator Recycling Report, 2014, p. 17).

The Lighting Program added manufacturer promotions and two new education pieces related to LEDs, which were distributed through in-store promotions during 2014. These activities were enhanced through in-store promotions, in-store meetings and a weekly visit to certain big box stores.

Ameren Missouri also worked with the program implementer to send a mailer promoting the online store. Ameren launched an online banner advertising for most of the year. In addition, Ameren Missouri offered free shipping for LED “four packs” through the online store (Lighting Report, PY2014, p. 5).

The Low Income Program successfully relied on word-of-mouth promotion to attract new program participants in this community. The program implementer has gained ground by promoting the program to different housing complexes and housing associations (Low Income Report, PY2014, p. 18).

In addition, the Efficient Products Program included several cross-promotions with the Low Income program as a way to identify eligible multifamily properties for the direct-install component. These methods included: cross-marketing with other programs; following up with contractors researching upgrades but not qualifying for other programs; and using Ameren Missouri’s low income multifamily program to identify contacts that manage additional properties (Efficient Products Report, PY2014, pp. 21-22).

Program Management

Several Ameren Missouri's programs streamlined operations as a way to improve and enhance operating efficiencies.

BizSavers: Both Ameren Missouri and the implementer for the BizSavers program (added staff for the 2014 program year. The program implementer also has provided additional internal and external staff training, and two staff members have completed CEM certification (BizSavers Report, PY2014, pp. 5-2-5-3).

Lighting Program: In 2014, CLEAResult merged with former program implementer but the operations team remained intact. In addition, Ameren Missouri staff performed several quality controls on program operations including comparing invoices to manufacturer records from EFI and participating in periodic store visits with a CLEAResult representative (Lighting Report, PY2014, pp. 32-33).

Communication and Program Processes

Communications with program implementation and evaluation staff has improved in PY2014. Implementation staff mentioned that that the approval process has become more efficient since Ameren Missouri hired a new energy-efficiency marketing manager (BizSavers PY2014, p. 5-10).

Both Ameren Missouri and Lockheed staff report good communication within and between their staffs, and contacts reported that Ameren Missouri Key Account Executives and Customer Support Agents continued to play an important role in educating customers about incentives (BizSavers Report, PY2014, p. 5-3).

In addition, weekly calls between ADM and Ameren Missouri were an effective strategy for facilitating interim program feedback and mid-year course corrections. ADM relayed evaluation findings to Ameren Missouri to provide staff with an understanding of what was going well and what factors were driving down project savings. The implementation team used this real-time feedback, determined the root cause, and was able to respond accordingly (BizSavers Report, PY2014, p. 1-5).

Stakeholders responded positively to this year's marketing approaches and to the new marketing manager that joined the staff in PY2014. Respondents reported that discussions about leveraging the HVAC Program's heat pump water heater marketing to multiple programs are continuing (Efficient Products Report, PY2014, p. 25).

Communication among program staff again succeeded for the Low Income Program in PY2014. Program staff and implementers reported easy, consistent communications regarding all program delivery aspects. Improved communications with property managers reduced the waiting time for follow-up visits by the implementation staff (Low Income Report, PY2014, pp. 18-19).

Program Delivery/Implementation

Several Ameren Missouri programs also changed the program delivery methods in PY2014 to better meet the need of program participants. For example, the program implementer for the HEA program brought on additional auditors located throughout Ameren Missouri's service territory that significantly reduced the time between scheduling and implementing audits. The program also increased the number of participating contractors, making the program more accessible to customers throughout Ameren Missouri's territory. Many contractors also take a more active role by following up directly with participants after they receive audits (HEA Report, PY2014, p. 4).

The Lighting Program added two discount retailer chains, which expanded the program to 100 new locations. One former coupon-only partner also operated as a markdown retailer for LED sales (Lighting Report PY2014, p. 5).

To access harder-to-reach customers, the program implementers shifted sales into 116 store locations, which accounted for a significant share of markdown sales, (up to 13% in 2014 from 2% in 2013). One large mass merchandise retailer made a corporate-level decision to better leverage the utility's program in their stores, including lifting stocking decisions for some products from the store to the regional level. This led to more bulbs going to residential applications (Lighting Report, PY2014, p. 30).

The refrigerator recycling program implementer and Ameren Missouri made two specific improvements to simplify the participation process. First, the implementer opened up a local decommissioning facility which allowed it develop more efficient pick-up routes, better accommodate customers in need of flexibility, and reduce the time between a customer's first contact with the program and their pick-up appointment. The program implementer also established a dedicated set of call center staff that handled all of program-related calls. This reduced the customer wait time and improved call center familiarity with Ameren Missouri's program and customers (Refrigerator Recycling Report, PY2014, p. 17).

BizSavers also implemented experienced several program changes mid-year including streamlining the applications to provide greater clarity by using a "watts per controlled unit" on the new application for occupancy sensors. These changes also led to speedy delivery of incentives. On average, the program delivered the incentive within the contractually mandated forty-five days for 99% of the Inspection Track projects (BizSavers Report, PY2014, pp. 1-5, 5-4).

Changes in the Measure Mix

Several programs made significant adjustments to the Ameren Missouri programs as a way to better help improve both measure installation and energy savings rates.

These changes including adding measures some programs while eliminating them in others. The Efficient Products reduced the number of CFLs, removed programmable thermostats while adding the LED bulbs and advanced power strips (Efficient Products Program, 2014, pp. 8, 9, 25). However, the HEA and Low Income programs removed smart power strips. HEA also removed the water heater setback from the direct-install measure offerings in PY2014 as they were determined not to be cost effective (HEA Report, PY2014, p. 15; Low Income Report, PY2014, p. 17).

The Lighting Program increased its emphasis on LEDs in 2014. Specifically, the implementer added 15W and 18W LED flood bulbs through three big box retailers and one mass merchandise retailer. As a result, LED sales increased significantly in PY2014 and accounted for 6.55 percent of total program participation in 2014 (Lighting Report, PY2014, p. 30).

Role of Trade Allies

Ameren Missouri continues to develop outreach and training materials for its trade allies. In PY2014, the HVAC program implementer initiated a contractor newsletter to provide a formal, consistent communication channel and used it to send relevant information to contractors about the program. The implementer also started a contractor advisory group that includes contractors of varying participation rates and size. Selection specifically included contractors that historically reported problems with the program as well as those previously electing not to participate.

The program implementer continued to develop relationships with local HVAC system distributors and encouraged them to provide more affordable, program-eligible HVAC systems (14+ SEER). Distributors provided access to their facilities, and, with help from their territory managers, trained local contractors. Distributors also provided AHRI certificate information, making the rebate application process easier for contractors (HVAC Report, PY2014, p. 14).

The BizSavers program also included outreach to distributors and contractors as way to raise program awareness. The program implementer is currently working with six local equipment distributors to try to raise program awareness with smaller business “walk in” customers. In addition, they are working through specific trade ally channels, such as lighting vendors, as a way to better reach small business customers (BizSavers Report, PY2014, p. 5-12).

In 2014, the program implementation staff expanded the BizSavers Trade Ally Network (TAN) from about 190 members in PY2013 to 280 in 2014. They were able to increase trade ally participation in several ways including identifying members of trade ally networks run by program administrators bordering Ameren Missouri’s service territory and attempting to recruit those that also do business within Ameren Missouri’s territory; developing a national trade ally task force comprised of trade ally coordinators in other Lockheed-implemented program and attending national conferences focusing on this audience (BizSavers Report, PY2014, p. 5 -14).

The BizSavers evaluation also reiterated the importance of the program representatives guiding the participant through the lengthy application process (BizSavers Program, PY2014, p. 5-54).

Challenges with Program Delivery

The HVAC and ESNH Programs both faced challenges with effective program delivery. Several HVAC contractors pushed back on Ameren Missouri’s test-in requirement, saying that it would prevent them from participating in the program. Upon review, the program implementer reduced the test-in requirements so only a sample (at least 1,000) of tune-up systems required testing (HVAC Report, PY2014, p. 14).

As way to meet the aggressive savings goals, the program tried to recruit 500 contractors; however many of these recruited contractors did not actively participate in the program either due to stringent program requirements or a lack of interest or expertise in the residential market (HVAC Report, PY2014, p. 14).

Program staff reported that tax credit changes might have impacted participation in PY2014, as the \$300 tax credit for heat pump water heaters was discontinued. Additionally, respondents reported that plumbers might still be hesitant to install this technology. Respondents reported, however, that Ameren Missouri's decision to help compensate for the tax credit change by increasing the rebate proved successful. Stakeholders also reported confidence that plumbers' hesitation will diminish as they gain experience with heat pump water heaters.

The ESNH Program suffered from low builder participation and a high free ridership rate. Similarly to PY2013, energy-efficient builders or low income builders (required to build to high-efficiency standards outside of the program) comprised this year's participating builders (ESNH Report, PY2014, p. 4).

The Efficient Products program also had a challenging year with changes in measure mix delaying program ramp-up. While stakeholders reported these changes beneficial to the program, they found the process of making the changes time-consuming, given the timing of evaluation results, filing deadlines, and additional analysis. As a result, updated Home Energy Kits and new equipment rebates did not become available until mid-year (Efficient Products Report, PY2014, pp. 26).

Lack of Interest in the Measures

Although the Lighting Program was able to attract new retailers, several dropped out of the program during PY2014. As the evaluators noted, not all new retailers lasted for the duration of the program including one of the new discount retailers, representing 90 locations, which dropped out after the third quarter (Lighting Report, PY2014, p. 31).

In addition, one discount retailer was slow to reorder product when stocks ran low, and declined to participate in the fourth quarter. Sales at big box DIY stores declined as a percentage of total program sales for a number of reasons. By the fourth quarter it was apparent the manufacturer was not going to increase supply, so the program worked with stores to stock alternative products. More significantly for the program going forward, one larger DIY retailer in this category decided at a corporate level to highlight LEDs in their stores, and was reluctant to stock many of the program CFLs, or dedicate as much shelf space to them. This retail chain led the program in sales of LEDs (Lighting Report, PY2014, p. 32).

Barriers to Program Participation

ADM interviewed program "near" participants who are representatives from organizations that initiated a BizSavers application but ultimately discontinued it before receiving any incentives. The reasons for such discontinued applications included change of ownership, lack of interest, lack of funding, or other reasons (BizSavers Report, PY2014, pp. 5-63- 5-65).

Of the 34 respondents, six had completed projects, seven were in process, and one respondent had Ameren Missouri deny his application. The remaining ten respondents said project was delayed for internal reasons but that they did not consider them to be abandoned. All other respondents indicated that their applications were discontinued for internal company reasons or did not specify a reason other than project discontinuation (BizSavers Report, PY2014, pp. 5-64-5-65).

For the HEA program, the major barriers to installing measures were high initial costs as their primary reason for not following through with installation of recommended major measures (44%). Other common responses included not having sufficient time to complete the installs (9%) (HEA Report, PY2014, p. 22).

No Effective Program Bridging

The programs are still not effective at encouraging participation in multiple programs. As the evaluation notes, 92 percent of respondents indicated they had not participated in any other Ameren Missouri energy efficiency programs since recycling their appliance through the Refrigerator Recycling program (Refrigerator Recycling Report, PY2014, pp. 4, 15).

However, the HEA participants asked for additional information about available rebates for major measures (i.e., better bridging between programs) (HEA Report, PY2014, p. 21).

Reasons for Non Participation

Barriers to program participation in the BizSavers program included lack of awareness or lack of understanding about energy savings and the need for applicant support (BizSavers PY2014, p. 5-5, 5-76).

Areas for Program Improvement

Despite the significant strides made in application processing, several BizSavers respondents suggested ways to improve the application process including providing a single point of contact for the application and having the application spreadsheet estimate the impact of implementation costs that came in higher or lower than the study's estimate (BizSavers Report, PY2014, p. 5-52).

BizSavers respondents also wanted more sector-specific topics covered during the training events, such as information on HVAC, VFDs, kitchen appliances and refrigeration, lighting, controls and thermostats (BizSavers Report, PY2014, p. 5-85).

Very few tenants use their programmable thermostats in a manner that saves energy. Installation crews work with families to set programmable thermostats in a manner comfortable for them while saving energy. However, our metering study showed only a few of the households (14%) maintained a thermostat schedule that saved energy. Most tenants set their thermostats on hold, while others sporadically set highly variable temperatures (Low Income Report, PY2014, p. 4)

2.2 Summary of Key Process Evaluation Recommendations

The process evaluations identified 26 recommendations on ways in which Ameren Missouri's energy efficiency portfolio could improve. These recommendations ranged from marketing opportunities to better methods for data tracking, and are organized in this report by topic as a way to summarize the cross-cutting themes. Details for each specific recommendation are provided in each of the referenced evaluation reports; moreover, the EM&V Auditor has prepared a table of Summary Recommendations in an MS Excel Spreadsheet to facilitate tracking and follow-up in future program evaluations.

Changes to Program Design

Ameren Missouri should consider modifying the incentive structure for its HVAC tune-up program. Ameren Missouri could offer \$65 for a tune-up that does not require a refrigerant charge adjustment and \$85 for a tune-up that requires a refrigerant charge adjustment. This change could also help make the program more attractive to contractors by offsetting the cost of additional refrigerant; not discourage contractors from participation, and encouraging contractors to offer units with lower-operating efficiencies.

Future new construction programs should target builders not currently constructing to high-energy efficiency building standards to avoid high free ridership rates. Program outreach should include networking with builders, HERS raters, realtors, local Home Builders Associations, and other stakeholders to encourage program acceptance, spread awareness of program benefits among the builder community, and capture a wider range of builders (ESNH Report, 2014, p. 4).

Continue to investigate the cost-effectiveness of adding new measures for the Efficient Products, HEA and Low Income programs. For the Efficient Products Program, Ameren Missouri staff should consider increasing the number of LEDs in the energy kits. High LED installation rates indicate participants may be willing to replace older bulbs prior to burn out (Efficient Products Program, PY2014, p. 9).

Ameren Missouri should follow through on its planned revamp HEA program to offer water-heating measures (e.g., aerators, showerheads, and pipe wrap) to customers with electric water heaters in PY15. This should increase the program's savings opportunities, as an estimated 15% of customers eligible for the HEA program use electric water heaters (HEA Report, PY2014, p. 15).

In addition, Ameren Missouri should consider adding insulation measures, especially attic insulation in multifamily buildings with electric heating and cooling; some small air-sealing measures, such as caulking or window repairs; CAC repairs identified during cleaning and tuning; and LED lighting, especially in outdoor fixtures known to remain on continuously (Low Income Program, PY2014, p. 18).

Ameren Missouri should consider discontinuing the programmable thermostat measure or offering it to targeted households. Ameren Missouri has determined they will discontinue offering programmable thermostats for the 2016–2018 program filing; given the very low savings, it should consider whether it may be best to discontinue the measure for the 2015 program year. Alternatively, the program implementer could target households that are most engaged in energy efficiency and have a consistent schedule to provide programmable thermostats (Low Income Program, PY2014, pp. 4-5).

Expanding Program Eligibility

Consider additional multifamily buildings to the HVAC program. By making these building types eligible, the program may be able to achieve greater energy savings opportunities for both the program's tune-up and replacement elements, especially those with electric resistance heat (HVAC Report, PY2014, pp. 4-5).

Program staff and the implementer are currently exploring options to include big-box home improvement retailers in support of major measure installations (HEA Report, PY2014, p. 4).

Ameren Missouri and the program implementer should review the cost effectiveness of eligible measures. If measures are not cost effective, then funds would be better spent on measures that provide greater or more cost effective savings (BizSavers, PY2014 p. 1-8)

Continue Improvements to Application Processing

Although there have been tremendous improvements in application processing, the BizSavers program still faces some challenges. Currently the BizSavers website does not show a separate icon for applying for standard incentives above the \$10,000 cap for the Fast Track application. Therefore the program implementers should consider revising the wording in the icon for the custom application to make it clearer that it is for larger standard projects and combined projects as well (BizSavers, PY2014, p. 5-17).

Continue Improvements to Program Marketing

The evaluators continued to recommend that Ameren Missouri should aggressively promote major measures, with an emphasis on both financial and non-financial benefits. This recommendation, which is repeated from the PY2014, reinforces the importance of communicating the benefits of measure installations through case studies, customer testimonials, or documentation explaining the benefits that could lead to increased participation in a variety of programs (ESNH Report, PY2014, p. 4; HEA Report, PY2014, p. 5).

Ameren Missouri should also leverage customer satisfaction by promoting success stories through testimonials, case studies, local news features, and online channels. The HEA program landing page on Ameren Missouri's website should also direct customers to other programs as a way to enhance program bridging (HEA Report, PY2014, p. 8).

The evaluators continued to emphasize developing marketing material focusing on LEDs, a recommendation repeated from the PY2013 evaluation. Ameren Missouri should incorporate marketing strategies that have been used successfully in other LED program efforts (Lighting Report, PY2014, p. 6).

Revise and enhance the program website. Despite improvements to the landing page, improvements for the HEA program are still needed. In its current form, it still causes customer confusion that should be resolved (HEA Report, PY2014, pp. 18-19).

Link kit measures directly with a call to action to increase installation rates. Ameren Missouri should consider tying installation of kit items to receipt of the advanced power strip through "call to action" marketing to help capture savings associated with these other measures (Efficient Products Report, PY2014, p. 8).

Continue the targeted marketing efforts initiated in PY2014, and research into how to get Refrigerator Recycling participant to enroll in other programs. Similar to PY2013, we recommend considering additional incentives for participating in other programs (such as HEA, which offers a range of energy-saving measures) that will leverage the participants' recent and positive experience with Refrigerator Recycling and make them more likely to take additional energy efficiency actions (Refrigerator Recycling Report, PY2014, p. 4).

Ameren Missouri should provide more targeted tenant education. Tenant education could provide more information, dollar savings expectations, and recommended settings to help encourage tenants set energy-efficient temperatures (Low Income Program, 2014, pp. 4-5).

Become Involved in Program Projects Earlier in the Process

Ameren Missouri should become involved earlier in new construction projects. This will help program representatives to better influence the types of equipment that are installed in these projects (BizSavers Report, 2014, p. 5-17).

Adapt Program to Changes in the Market

Ameren Missouri needs to make additional program changes as a way to address changes in the residential lighting market. EISA regulations ending the manufacture of incandescent bulbs had a more gradual effect on the market than Ameren Missouri anticipated in its TRM. As a result, baseline wattages used to calculate energy savings were higher than expected. Therefore, Ameren Missouri should develop a slow phase out will "float" the baseline wattage above the "post-EISA" value for 40W and 60W at least one to two years after EISA implementation (Lighting Report, PY2014, p. 6).

Continue to work with discount retailers to increase uptake at discount retail stores, however, be sure that these activities do not lead to high free ridership. The program deliberately shifted more program sales into discount retailers in 2014; however the market does appear to be receptive to the program (Lighting Report, PY2014, p. 7).

Consider only installing CFLs in areas where requested in senior apartments. The program served a larger number of senior housing complexes earlier in its history. A larger percentage of the housing being served now is for families, and stakeholders expect this trend to continue. When the program serves seniors, it may consider only installing CFLs where residents request them or that seniors indicate are highest use fixtures (Low Income Report, PY2014, p. 5).

Continue to promote the common area lighting measure to property managers. Since the Low Income Program transitioned to including for-profit property management firms in PY2014, the program should continue to promote the business rebates. These firms will more likely have access to the resources necessary to undertake common area improvements (Low Income Report, PY2014, p. 5).

Consider revising the lighting options offered in the BizSavers programs. Program staff should consider continuing only the T-12 to LED measures beyond April 2015. This could reduce the possibility of incentivizing the same facility to step up to T-8/T-5 lighting, then again to LED lighting in following program years (BizSavers, PY2014 p. 1-8).

Provide Better Documentation of Program Changes

Changes to program design and implementation should be better documented. Specifically, the evaluators noted that it was important to document key program design and implementation aspects in 2014, including incentive levels, numbers and types of retail partners, frequency of promotional activities, and staffing levels. In addition, it is also critical to assess the impacts of those changes on overall program performance (Lighting Report, PY2014, p. 12).

Develop Better Cross Promotion Strategies

The Ameren Missouri residential programs should have more effective bridging strategies in place to encourage cross-program participation. The evaluators recommended specifically that Ameren Missouri should continue its targeted marketing efforts and research how to encourage Refrigerator Recycling participants to enroll in other programs. In addition, the evaluators recommended considering additional incentives for participating in other programs (such as HEA) that will leverage the participants' previous experience with these program (Refrigerator Recycling Report, PY2014, p. 4).

Section 3: Review of Cost-Effectiveness

As part of the review process, the EM&V Auditor team reviewed the following aspects of the cost-effectiveness analysis:

- Confirm summary values reported matched the values in the DSMore results file;
- Confirm values reported in aggregate (portfolio-level) matched the sum of the individually reported (by program);
- Confirm that the reported costs matched the costs input into the DSMore cost-effectiveness input files (both incentive and overhead);
- Confirm a random selection of measures received appropriate cost-effectiveness input values from the Ameren Missouri TRM (i.e., kWh savings, expected usable life (EUL), incremental cost)¹⁹ and;
- Report current (2014) program results and compare against previous year results (2013)

As part of this review, the EM&V Auditor team reviewed all of the residential and commercial summary findings from the portfolio reports and the accompanying DSMore output files. The EM&V Auditor was only able to spot check the residential DSMore input or batch files due to the complexity of the commercial inputs. It should be noted here that the cost-effectiveness results presented below and contained within the residential and commercial portfolio reports are reported in 2013 dollars. According to the regulatory document, *“Rider EEIC, paragraph 5. b. ii” coupled with the “2012 Stipulation and Agreement, Appendix B”, the annual net shared benefits amounts for PY2013, PY2014 and PY2015 must be reported in 2013 dollars to allow summation of net benefits across program years.* While both Cadmus and ADM reported most of the cost effectiveness inputs and assumptions, neither evaluation report included the Societal Discount Rate used for the SCT tests (which 3%). The specific audit tasks and findings are reviewed next.

- Confirm summary values reported matched the values in the DSMore results file.

The EM&V Auditor team did not find any errors between reported and DSMore results file for the residential program. The review included crosschecking the five perspective tests (UCT, TRC, RIM, SCT, PCT) and the net lifetime benefits. The BizSavers did have one issue that was uncovered during review of the original draft report, but has since been corrected for the final draft of the BizSavers report.

- Confirm values reported in aggregate (portfolio-level) matched the sum of the individually reported (by program).

The EM&V Auditor found several errors in the initial draft version of the report for the residential and BizSavers portfolio total relative to the program-based totals; however all these issues have since been addressed for the final versions of the report. It should be noted that these issues were merely a reporting error and did not impact the actual calculations or cost-effectiveness.

¹⁹ Ameren Missouri, Appendix A – Technical Resource Manual (2012).

- Confirm that the reported costs matched the costs input into the DSMore cost-effectiveness input files (both incentive and overhead).

The EM&V Auditor Team found slight reporting error in the residential lighting program costs in the initial draft version of the report but this issue has since been corrected for the final draft version of the report. Similar to the issues above, this issue is most likely merely a reporting error and neither affects the actual calculations nor cost-effectiveness.

- Confirm a random selection of measures received appropriate cost-effectiveness input values from the Ameren Missouri TRM.

The EM&V Auditor team focused on the Lighting and Efficient Products programs to validate the appropriate use of TRM-based assumptions were applied to a random selection of measures. There were no issues uncovered during the review of the input value as input in the DSMore files.

- Report current (2014) program results and compare against previous year results (2013).

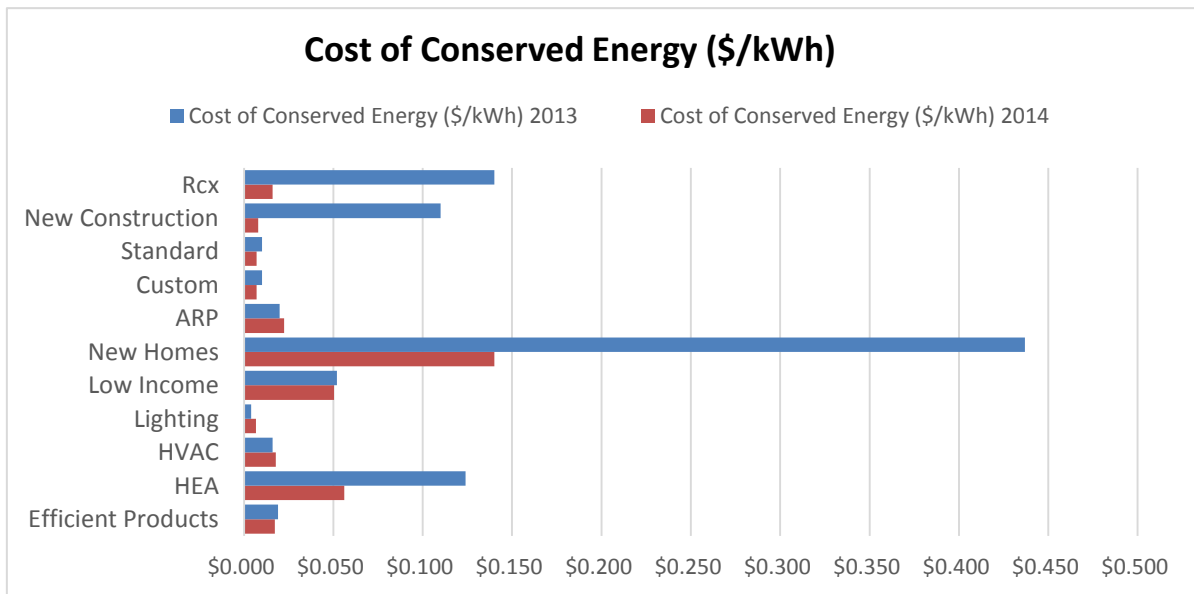
The residential and commercial cost of conserved energy is reported in Table 17. At this point, the values were derived from the reports and DSMore files, which have introduced some concern regarding their validity. Ameren Missouri has correctly expressed concern that the cost of conserved energy currently does not discount the projected energy savings to the present, but only sums the value of conserved energy. Therefore, CCE is slightly understated, which was further confirmed by Integral Analytics. However, the new iterations of the DSMore program now include the levelized cost (discounting the future value of conserved energy).

As Table 17 and Figure 9 show, the Lighting, Custom, and Standard Commercial programs had the lowest cost of conserved energy at \$0.007 per kWh, followed by the New Construction commercial program at \$0.008 per kWh. The New Homes program, even with a steep decline in cost of conserved energy relative to PY2013, is yet again noticeably higher than the other programs at \$0.14 per kWh. Figure 11 also highlights the significant reductions in cost of conserved energy (\$/kWh) for several of these programs (i.e., Retro-Commissioning, New Construction, New Homes).

Table 17: Cost of Conserved Energy (\$/kWh)

Program	Cost of Conserved Energy (\$/kWh) 2013	Cost of Conserved Energy (\$/kWh) 2014
Efficient Products	\$0.019	\$0.017
Home Energy Analysis	\$0.062	\$0.056
HVAC	\$0.016	\$0.018
Lighting	\$0.003	\$0.007
Low Income	\$0.052	\$0.050
New Homes	\$0.437	\$0.140
Appliance Recycling	\$0.020	\$0.022
Custom	\$0.010	\$0.007
Standard	\$0.007	\$0.007
New Construction	\$0.112	\$0.008
Retro-Commissioning	\$0.137	\$0.016

(Sources: PY2013 Evaluation Reports from Cadmus & ADM and DSMore files)



(Sources: PY2013 and PY2014 Evaluation Reports from Cadmus & ADM and DSMore)

Figure 9: Cost of Conserved Energy (\$/kWh)

Table 18 summarizes the total net lifetime benefits from these programs as reported by the EM&V reports.

Two residential programs were not cost effective: the Home Energy Analysis program and the New Homes programs are not cost-effective over the life of the program. Forty-eight percent of the net benefits were derived from the residential program while 52 percent was derived from the commercial programs. The PY2014 results show that the custom, lighting, and HVAC programs to have the largest net benefits in the portfolio.

Table 18: Net Lifetime Benefits (in dollars) per Program

Program	Net Lifetime Benefits (Reported) 2014
Efficient Products	\$2,598,618
Home Energy Analysis	(\$77,106)
HVAC	\$26,009,258
Lighting	\$42,191,125
Low Income	\$479,907
New Homes	(\$131,965)
Appliance Recycling	\$2,048,503
Custom	\$55,152,500
Standard	\$24,034,160
New Construction	\$9,096,053
Retro-Commissioning	\$5,387,214
Total	\$166,788,267

(Sources: PY2014 Evaluation Reports from Cadmus & ADM)

Table 19 summarizes the cost-benefit analysis from the five standard economic tests, including the Utility Cost Test (UCT), Total Resource Cost (TRC), Ratepayer Impact (RIM), Participant Cost Test (PCT), and the Societal Cost Test (SCT). The non-cost-effective results are highlighted in red below.

Table 19: Program Cost Effectiveness Test Results

Program	UCT	TRC	RIM	PCT	SCT
Efficient Products	2.50	1.80	0.55	4.22	2.15
Home Energy Analysis	0.75	0.58	0.38	2.47	0.74
HVAC	4.24	2.28	0.81	3.40	2.77
Lighting	5.86	3.74	0.58	7.57	4.45
Low Income	1.14	1.14	0.50	N/A	1.38
New Homes	0.56	0.52	0.38	2.63	0.65
Appliance Recycling	2.53	2.53	0.61	N/A	2.87
Custom	8.16	2.56	0.89	3.00	3.11
Standard	6.98	3.34	0.81	4.90	4.09
New Construction	6.69	1.73	0.87	2.08	2.10
Retro-Commissioning	4.18	4.17	0.88	8.74	4.82

(Sources: PY2014 Evaluation Reports;)

Section 4: EM&V Auditor Findings and Recommendations

The EM&V Auditor Team summarized program evaluation methodologies used in Section 4.1 followed by a summary of the ways in which these program evaluations met the specific 4 CSR 240-22.070(8)Requirements in Section 4.2.

4.1 Evaluation Methodologies

Table 20 summarizes the overall evaluation methodologies that were used in the program evaluations. The differences within these program evaluation activities are provided in the explanatory footnotes.

Table 20: Summary of Residential Program Evaluation Activities

Evaluation Activity	Process	Impact	Rationale
Review the Technical Resource Manual		✓	Review TRM values and assumptions and then conduct an engineering analysis to provide updated information for future program years
Review the Data Tracking	✓	✓	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 information and insights into program design and delivery
Review Marketing Materials ²⁰	✓		Identify gaps and opportunities in marketing and outreach strategies and activities
Survey Participants	✓	✓	Verify measure installation; collect data to inform net-to-gross ratio; collect process-related data
Survey Non-participants ²¹	✓	✓	Obtain an in-depth understanding of the program and identify successes and challenges
Analyze Gross and Net Impacts		✓	Develop per-unit gross savings from the impact analysis, using appliance characteristics data from the program database and <i>in situ</i> metering data from existing industry/evaluation databases
Analyze Cost-Effectiveness		✓	Measure the cost-effectiveness of the program through five standard perspectives: Total resource cost, utility cost, societal cost test

(Source: Residential Evaluation Reports, PY2014)

Table 21 summarizes the methodologies used for the residential program evaluations while Table 22 summarizes the approaches used for the program evaluations.

²⁰ The marketing materials review was limited to just the Lighting and HEA programs in PY2014.

²¹ Only the BizSavers evaluation surveyed non-participants in PY2014.

Table 21: Summary of Residential Program Evaluation Methodologies

Activity	Efficient Products	Home Energy Analysis	HVAC	Lighting	Low Income	ENERGY STAR® New Homes	Refrigerator Recycling
Review the Technical Resource Manual	✓	✓	✓	✓	✓	✓	✓
Review the Data Tracking	✓	✓	✓	✓	✓	✓	✓
Interview Stakeholders	✓	✓	✓	✓	✓	✓	✓
Review Marketing Materials	✓	✓	✓	✓	✓	✓	✓
Survey Participants	✓	✓	✓	✓	✓	✓	✓
Survey Non-participants	✓	✓	✓	✓	✓	✓	✓
Analyze Gross and Net Impacts	✓	✓	✓	✓	✓	✓	✓
Analyze Cost-Effectiveness	✓	✓	✓	✓	✓	✓	✓
Conduct Metering Study			✓				✓
Conduct Site Visits				✓		✓	
Conduct Program Home REM/Rate Reviews and On-Site Spot Checks				✓			
Site Visits and Metering		✓					
Conduct an Engineering Analysis		✓			✓		
Conduct Store Intercepts					✓		
Conduct SMD Surveys					✓		
Interview Retailers					✓		✓

(Source: Residential Evaluation Reports, PY2014)

Table 22: Summary of Data Collection Activities for the BizSavers Program Evaluation

Data Source	Outcome	Purpose	Period of Data Collection
Impact Analysis			
On-site M&V			
Pre-Install Site Visits	6 Visits	Install monitoring equipment to establish project baseline	All Year 2014
Post-Install Site Visits	94 Projects	Verify project energy savings	All Year 2014
Spillover Analysis			
Lockheed Martin Measure Report	145 Projects/ 297 Measures	Identify measures that did not qualify for program incentives, but were installed	Jan 2015
Participant Survey	452 Responses/2 with Spillover	Identify customers that said they were "likely to buy or have already bought efficiency equipment because of their experience with the program"	Aug 2014 – Jan 2015
Process Analysis			
Participants			
On-line Survey	452 Responses	Collect data about customer satisfaction, free ridership, and spillover	Aug 2014 – Jan 2015
Participants			
In-Depth Interviews	17 Interviews	Collect data about program experiences; installed equipment; satisfaction with program	Sept-Dec 2014
Near Participants			
In-Depth Interviews	18 Interviews	Investigate the reasons for discontinuation of the application and possibly prevent future lost savings opportunities	Dec 2014 – Jan 2015
Non-participants			
On-line Survey	280 Responses	Collect non-participant data on program awareness, energy decision-making, upgrades to energy-using equipment, barriers to participating in program, and interest in Missouri programs.	Sep 2014
Program Staff			
In-Depth Interviews	6 Interviews	Update information on the program's goals, implementation, and delivery for the current program cycle	May, June, Dec 2014
Training Events			
Telephone and On-line Surveys	5 Events/ 71 Responses	Assess how well these events deliver program information to service providers and customers	May-Oct 2014

Data Source	Outcome	Purpose	Period of Data Collection
Cost-Effectiveness Analysis			
Economic and Financial Assumptions	Delivered to MMP	Used to develop the economic model, these assumptions include Ameren Missouri's discount rate, line losses, avoided electric T&D	Jan 2015
2013 Spending Data	Delivered to MMP	Financial data to be used as inputs for the Cost-Effectiveness Analysis (program level)	Jan 2015
DSMore Batch Tools	Delivered to MMP	Measure level EUL and incremental costs, to be input into the model	Jan 2015
Aggregation Results	Delivered to ADM	Included the calculations for each cost test	Jan 2015
Write up	Delivered to ADM	A summary document that provides a detailed account of the analysis	Feb 2015

(Source: BizSavers PY2014, p. 1-2)

4.2 Summary of 4 CSR 240-22.070(8) Requirements

As part of the 4 CSR 240-22.070(8) requirements, the program evaluations were required to meet specific requirements specified in 4 CSR 240-22.070(8). With the exception of the process evaluations conducted by ADM's subcontractor, Research Into Action, the CSR summaries were identical to the ones provided in the PY2013 evaluations. Furthermore, none of the impact evaluations explicitly identified how these evaluations conformed to the specific CSR requirements. Therefore, these evaluations did not conform to the MEEIA requirements and this analysis should be revised accordingly.

Process Evaluation Findings

The process evaluation CSR summaries were largely unchanged. Research Into Action did provide some additional insights; however the purpose of the process evaluations is to provide greater insight into the issues raised by each CSR topic based on the findings from each process evaluations.

In most cases, Cadmus did not incorporate any new insight into the barriers regarding primary market imperfections in the PY2014 residential reports, thereby failing to address this deficiency that was highlighted in the draft reports. BizSavers evaluation did note the specific challenges that currently fact small business customers, which does provide some insight into the challenges facing small commercial customers.

Table 23 summarizes the findings from Issue 1, but little new information was presented in this analysis.

Table 23: Summary of Findings for 4 CSR 240-22.070(8) Issue #1

4 CSR 240-22.070(8) Issue #1: What are the primary market imperfections common to the target market segment?		
	PY2013	FINAL PY2014
Refrigerator Recycling (formerly ApplianceSavers)	<i>Inadequate understanding of the operating costs of old or secondary refrigerators, and, in many cases, the inability to physically discard the appliance without assistance.</i>	The primary market imperfection <i>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.</i>
HVAC Program (formerly CoolSavers)	<i>In adequate 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.</i>	The primary market imperfection common to the target market is <i>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.</i> 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.
Low Income (Formerly Community Savers)	<i>Split incentives between property managers and tenants; and the work required by the property manager /maintenance staff to facilitate installations.</i>	The primary market imperfections include: <i>split incentives between property managers and tenants; and the work required by the property manager/maintenance staff to facilitate installations.</i>
ESNH (formerly Construction Savers)	<i>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.</i>	The primary market imperfection <i>common to the target market is inadequate information and/or knowledge regarding the benefits of high efficient new construction homes.</i> The new construction market in Missouri is fragmented and energy efficiency is not a priority for Missouri homebuilders.
Lighting (formerly Light Savers)	<i>Customers lack information about energy efficient lighting options (difference in hours of use, energy use, lighting quality, etc.) and the prices for some energy efficient bulbs remain much higher than the incandescent baseline.</i>	<i>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.</i>

4 CSR 240-22.070(8) Issue #1: What are the primary market imperfections common to the target market segment?		
	PY2013	FINAL PY2014
Home Energy Analysis (formerly Performance Savers)	<i>Inadequate information and/or knowledge regarding the benefits of increasing energy efficiency within existing homes.</i>	The primary market imperfection common to the target market is <i>inadequate information and/or knowledge regarding the benefits of increasing energy efficiency within existing homes.</i>
Energy Efficient Products (formerly Rebate Savers)	<i>Lack of energy efficiency awareness and the higher upfront cost of energy efficient products.</i>	It is assumed that the primary market remains largely unchanged from PY13, and <i>lack of energy-efficiency awareness and the higher upfront cost of energy-efficient products</i> 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.
BizSavers	<i>Lack of up-front capital. This disproportionately affects small businesses, which also appear to be less aware of BizSavers incentives, on average, than larger businesses.</i>	<i>The lack of capital issue disproportionately affects small businesses, which constitute a slightly smaller percentage of total program savings than their share of total building area would predict.</i> Small businesses are notoriously difficult to reach, and Lockheed Martin staff reported a wide range of activities designed to improve the program's reach into that segment. Lockheed has not yet distributed free direct-install measures, which is a cost-effective method for achieving savings in the small business segment.

(Source: Appliance Savers, PY2013 p. 26; CoolSavers PY2013, p. 29; CommunitySavers PY2013, pp. 43-44; ConstructionSavers PY2013, p. 28; LightSavers PY2013, p. 38; 2013, p. 22; RebateSavers PY2013, p. 39; PY2013 BizSavers 2013, pp. 7-3-7-4; Refrigerator Recycling, PY2014, p.21; HVAC PY2014, pp. 21-22; Low Income Program, PY2014, p. 23; ESNH, PY2014, p. 13; Lighting Program, PY2014, p. 37; HEA, PY2014, p. 23; Efficient Products Program, PY2014, p. 38; BizSavers Report, PY2014, pp. 1-10-1-14).

Most programs are currently targeting the appropriate markets; however, the additional stratifications or recommendations from PY2013 have still not been addressed. As Table 24 shows, the evaluators provided little new insights regarding the residential programs.

Table 24: Summary of Findings for 4 CSR 240-22.070(8) Issue #2

4 CSR 240-22.070(8) Issue #2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?		
	PY2013	PY2014
Refrigerator Recycling (formerly Appliance Savers)	<i>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).</i>	<i>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.</i>
HVAC Program (formerly CoolSavers)	<i>Yes, the target market segment is appropriately defined and comprehensively serves the single-family residential market. Specifically, the CoolSavers 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).</i>	<i>The target market segment is appropriately defined and comprehensively serves 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).</i>
Low Income (formerly Community Savers)	<i>The low income multifamily market could be merged with a low income single-family market if concerns about serving non-low-income households can be resolved.</i>	<i>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.</i>
ESNH (formerly Construction Savers)	<i>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.</i>	<i>The current target segment market would benefit from additional stratification to attract builders that do not typically build high efficient or "green" homes and/or are not low income multifamily builders who are required to build to higher efficiency standards.</i>
Lighting (formerly LightSavers)	<i>The LightSavers market is broadly defined, though the program is moving in the direction of targeting bulbs to new audiences, such as discount-retail shoppers. New market research shows that younger customers could be a more interested audience.</i>	<i>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.</i>
Home Energy Analysis (formerly Performance Savers)	<i>Yes, the current market segment is appropriately designed. The program may realize higher audit rates through segmentation and targeted marketing of the current target market.</i>	<i>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.</i>

4 CSR 240-22.070(8) Issue #2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?		
	PY2013	PY2014
Energy Efficient Products (formerly Rebate Savers)	<i>The target market of all residential customers is appropriate for the mail-in rebate programs and it is subdivided for the Efficiency Kits to just those with electric water heating.</i>	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.
BizSavers	<i>Projects were distributed across a range of Business types in rough proportion to the distribution of business types in the general population. Projects were disproportionately concentrated in large buildings. Projects also were concentrated in St. Louis and its suburbs, suggesting a possible need to work toward increasing marketing and outreach in other parts of the state.</i>	<i>As was found in the 2013 evaluation, projects Were distributed across a range of business types in rough proportion to the distribution of business types in the general population, suggesting that the program is effectively reaching the main segments of the target market. As noted above, small businesses constitute a slightly smaller percentage of total program savings than their share of total building area would predict.</i>

(Source: Appliance Savers, PY2013 p. 26; CoolSavers PY2013, p. 29; CommunitySavers PY2013, pp. 43-44; ConstructionSavers PY2013, p. 28; LightSavers PY2013, p. 38; 2013, p. 22; RebateSavers PY2013, p. 39; PY2013 BizSavers 2013, pp. 7-3-7-4; Refrigerator Recycling, PY2014, p.21; HVAC PY2014, pp. 21-22; Low Income Program, PY2014, p. 23, ESNH, PY2014, p. 13; Lighting Program, PY2014, p. 37; HEA, PY2014, p. 23; Efficient Products Program, PY2014, p. 38; BizSavers Report, PY2014, pp. 1-10-1-14).

None of the findings from the residential process evaluations is reflected into this analysis of measure mix, even though several programs including Lighting, HVAC, and Efficient Products all featured changes in the measure mix from PY2013 to PY2014. The BizSavers analysis reflected some new information, which is helpful in partially addressing this CSR requirement (see Table 25).

Table 25: Summary of Findings for 4 CSR 240-22.070(8) Issue #3:

4 CSR 240-22.070(8) Issue #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?		
	PY2013	PY2014
Refrigerator Recycling (formerly Appliance Savers)	<i>Yes, the current mix of end-use measures included in the program is appropriate. In PY2013 the program began collecting room air conditioners and dehumidifiers with eligible refrigerators and freezers, providing additional benefits for customers and savings for Ameren Missouri. However, providing energy-efficiency kits (including CFLs and other easy-to-install measures) could further improve customers' awareness and participation in other programs.</i>	<i>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.</i>
HVAC Program (formerly CoolSavers)	<i>The program targets the primary end-use technologies within the targeted market segment.</i>	<i>The program targets the primary end-use technologies within the targeted market segment.</i>
Low income (formerly Community Savers)	<i>The mix of measures provides cost-effective electric savings in multifamily buildings housing low income residents. Current measures address lighting, water heating, appliances, electronics, heating, and cooling. Additional measures could be supplied for households with natural gas heating or water heating if natural gas utilities co-sponsored.</i>	<i>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.</i>
ESNH (formerly Construction Savers)	<i>No. The program should include additional end-use technologies including appliances.</i>	<i>No. The program should include additional end-use technologies, including appliances.</i>
Lighting (formerly LightSavers)	<i>Yes. The program offers a diversity of products that represent the majority of common consumer lighting needs, including a range of wattages, specialty bulbs such as dimmables, globes, and reflectors, and LED bulbs. This year occupancy sensors were added as well.</i>	<i>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.</i>
Home Energy Analysis (formerly Performance Savers)	<i>Yes, the mix of end-use measures offered through the program is appropriate. However, the program sets specific restrictions (e.g., electric water heater customers not eligible for hot water measures) that should be reviewed for appropriateness.</i>	<i>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.</i>

4 CSR 240-22.070(8) Issue #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?		
	PY2013	PY2014
BizSavers	<p><i>The range of equipment meets the needs of respondents. Equipment generally is delivered with little delay, and participants are largely satisfied with the range of program-qualified equipment and the quality both of the equipment they installed and of the installation. Standard program component participants that opt not to pursue the custom program component option do so primarily because the standard program component option covers their equipment needs.</i></p>	<p><i>The range of equipment generally meets the needs of respondents. Equipment is generally delivered with little delay. Participants are largely satisfied with the quality of the installed equipment and the quality of installation. Standard program participants that decided not to pursue the custom option did so primarily because the standard option covers their equipment needs. However, one-third of surveyed participants did not find the range of qualified equipment to be acceptable although none provided details on what might be missing. One possible cause of dissatisfaction may have been a requirement that lighting upgrades from T-12 to more efficient lamping use T-8 as the baseline case. Program staff reported that the T-8 baseline did not provide adequate incentive for changing T-12s. Late in the year, Lockheed obtained permission to begin using a T-12 baseline, and staff reported positive feedback. The evaluation team will investigate the response to the change in baseline more formally in the 2015 evaluation.</i></p>

(Source: ApplianceSavers, PY2013 p. 26; CoolSavers PY2013, p. 29; CommunitySavers PY2013, pp. 43-44; ConstructionSavers PY2013, p. 28; LightSavers PY2013, p. 38; 2013, p. 22; RebateSavers PY2013, p. 39; PY2013 BizSavers 2013, pp. 7-3-7-4; Efficient Products Program, PY2014, p. 38; ESNH Program, PYPY2014, p. 22; HVAC Program, PY2014, p. 21, Lighting Program, PY2014, p. 18; Low Income Program, PY2014, p. 21; Refrigerator Recycling, PY2014, p. 21; BizSavers Report, PY2014, pp. 1-10-1-14).

The changes and improvements in communications activities to the target market, especially for the HVAC and Lighting Program, were not reflected in this analysis. Only the BizSavers analysis identified these enhancements, as Table 26 shows. The majority of this analysis is merely a duplication of last year's write up.

Table 26: Summary of Findings for 4 CSR 240-22.070(8) Issue #4:

4 CSR 240-22.070(8) Issue #4: Are the communication channels and delivery mechanisms appropriate for the target market segment?		
	PY2013	PY2014
Refrigerator Recycling (formerly Appliance Savers)	<i>The implementer ARCA handles scheduling and pickup for appliances recycled through the program. Participants expressed very high satisfaction with the program, suggesting that the communication channels and delivery mechanisms are appropriate.</i>	<i>The implementer ARCA handles the scheduling and pickup for appliances recycled through the program. Participants expressed very high satisfaction with the program, suggesting that the communication channels and delivery mechanisms are appropriate.</i>
HVAC Program (formerly CoolSavers)	<i>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</i>	<i>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.</i>
Low income (Formerly Community Savers)	<i>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.</i>	<i>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.</i>
ESNH (formerly ConstructionSavers)	<i>Yes, current communication channels are appropriate.</i>	<i>Yes, current communication channels are appropriate.</i>
Lighting (formerly LightSavers)	<i>Retailers report that the Ameren Missouri signage is effective. New market research indicates greater online activity could be effective at targeting younger customers.</i>	<i>Retailers report Ameren Missouri signage is effective. New market research indicates greater online activity could effectively target younger customers.</i>
Home Energy Analysis (formerly Performance Savers)	<i>Yes, current communication and delivery channels are appropriate.</i>	<i>Yes, current communication and delivery channels are appropriate.</i>
Energy Efficient Products (formerly Rebate Savers)	<i>The delivery channels are appropriate but can be improved to overcome market barriers.</i>	<i>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.</i>

4 CSR 240-22.070(8) Issue #4: Are the communication channels and delivery mechanisms appropriate for the target market segment?		
	PY2013	PY2014
<i>BizSavers</i>	<p>The program is marketed through multiple channels and the implementer reports active outreach to end-use customers and trade allies. Trade allies are critical to program communication and delivery. However, many trade allies who are not members of the trade ally network are not aware of its existence. Lack of clarity in application instructions may be a barrier to effective program delivery, creating delays in and possibly abandonment of project implementation.</p>	<p>The program implementer uses a wide range of marketing outreach channels and methods to reach end-use customers and carries out active outreach to service providers. Engagement of services providers is important, as they are critical to program communication and delivery and play a key role in shaping upgrade decisions. In 2014, Lockheed added four full-time staff, including an outreach coordinator to coordinate between business development staff and trade allies; provided additional training to staff to improve service; and increased the size of the BizSavers Trade Ally Network by about 50%.</p>
<i>BizSavers</i>	<p>Program rules and requirements may be too stringent for the retro-commissioning market, as program rules sometimes prevent participation, keep customers from capitalizing on incentives, and do not allow them to capture custom program component project opportunities.</p>	<p>Several additional efforts undertaken in 2014 to improve program awareness and participation included rolling out the Distributor Partnership Program (DPP) to raise program awareness, particularly among small businesses, through point-of-purchase information at local distributorships; targeted marketing and outreach to K-12 schools, the hospitality industry, government agencies, commercial kitchens, and IT data centers; implementation of the “Fast Track” standard application, which waives pre-approval for standard projects with incentives below \$10,000; and revisions to the look, feel, and functioning of the online application.</p> <p>Several evaluation findings speak to the appropriateness of program communication and delivery channels and mechanisms. The non-participant survey showed moderate program awareness, driven by BizSavers marketing and information from contractors and associates. The participant survey showed that vendors and contractors were the most common source of program awareness, but program staff tended to bring in larger projects and accounted for nearly as much total savings as contractors and vendors. Only about one-third of non-participants were aware of new construction incentives, and awareness was lower for retro-commissioning incentives.</p>

(Sources: ApplianceSavers, PY2013 p. 26; CoolSavers PY2013, p. 29; CommunitySavers PY2013, pp. 43-44; ConstructionSavers PY2013, p. 28; LightSavers PY2013, p. 38; 2013, p. 22; RebateSavers PY2013, p. 39; PY2013 BizSavers 2013, pp. 7-3-7-4; Efficient Products Program, PY2014, p. 38; ESNH Program, PYPY2014, p. 22; HVAC Program, PY2014, p. 21, Lighting Program, PY2014, p. 18; Low Income Program, PY2014, p. 21; Refrigerator Recycling, PY2014, p. 21; BizSavers Report, PY2014, pp. 1-10-1-14).

Some additional information was provided in several residential reports including the Refrigerator Recycling, HVAC Program, Low income, and Efficient Products evaluation reports. These additions were made based on the EM&V Auditors' recommendations to provide more insight based on the process evaluations. The BizSavers program evaluations provided additional context in the draft and final reports (see Table 27).

Table 27: Summary of Findings for 4 CSR 240-22.070(8) Issue #5:

4 CSR 240-22.070(8) #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?		
	PY2013	PY2014
Refrigerator Recycling (formerly Appliance Savers)	<i>Customer acceptance and awareness of appliance operating costs can be increased through additional online advertising (such as Google AdWords or Pandora targeted ads) and earned media (through partnerships with local non-profit organizations).</i>	<i>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 implemented the advertising recommended by Cadmus, but there is still an opportunity to increase awareness through earned media in PY15.</i>
HVAC Program (formerly CoolSavers)	<i>The current marketing materials allocate a significant proportion of resources specific to the targeted market. However, the most common suggestion for improvement from program participants surveyed was the need to increase program awareness and benefits, which indicate these efforts should continue.</i>	<i>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.</i>
Low Income (Formerly CommunitySavers)	<i>The CommunitySavers design and implementation has had great success for several years, with high levels of participation and tenant acceptance of new measures. While many of the federally-subsidized properties have been treated, there are still LIHTC properties that can be served through the program. The program can help these property managers understand their eligibility for the program.</i>	<i>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.</i>

4 CSR 240-22.070(8) #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?

	PY2013	PY2014
ESNH (formerly Construction Savers)	<i>Additional networking with the target market segment to spread program awareness is needed.</i>	<i>Additional networking with the target market segment to spread program awareness is needed.</i>
Lighting (formerly LightSavers)	<i>Ameren Missouri continues to reach out to more retailers and more audiences, and expand the list eligible measures, but awareness of the program is low. Ameren Missouri has commissioned market research to identify market segments and should use this information to experiment with new messaging and market channels.</i>	<i>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.</i>
Home Energy Analysis (formerly Performance Savers)	<i>Additional customer education and awareness is needed regarding the benefits, both financial and non-financial, of increasing the efficiency of their homes.</i>	<i>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.</i>
Energy Efficient Products (Formerly Rebate Savers)	<i>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.</i>	<i>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.</i>
BizSavers	<i>Lockheed Martin should continue working to expand the trade ally network and educate non-member trade allies about program offerings and application processes; Lockheed Martin should continue to work to clarify application instructions. Lockheed Martin should solicit feedback from customers and trade allies on sources of confusion or difficulty.</i>	<i>Lockheed Martin should continue to work to clarify application instructions, particularly for the custom program, and ensure that service providers and end-users know whom they can contact to get assistance with applications. Lockheed should consider relabeling the “Custom” icon on the online application to say “Standard and Custom” or provide separate icons for accessing the standard and custom worksheets.</i>
	<i>Ameren Missouri and Lockheed Martin staff should work together to formalize orientation materials for new trade allies, possibly including a brief online orientation video. Such materials should stress that learning how to fill out the application correctly up front will save them time in the end.</i>	<i>Lockheed Martin staff should continue to work to improve program penetration of the small business sector and should consider additional approaches that may include free direct install of low-cost measures to generate immediate cost-effective savings and generate interest in future projects. Staff should also consider conducting additional market research to provide information on specific needs and motives of small business segments.</i>
		<i>Ameren Missouri and Lockheed Martin should continue to work together to increase awareness of the new</i>

4 CSR 240-22.070(8) #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?		
	PY2013	PY2014
<i>BizSavers</i>		<i>construction and retro-commissioning incentives and of the benefits of participation in those programs. In particular, Ameren Missouri and Lockheed Martin should make efforts to ensure that Account Executives, Customer Support Agents, and trade allies promote the new construction program in all discussions with customers, as achieving that program's full potential requires identifying projects before the design phase has begun.</i>

(Source: ApplianceSavers, PY2013 p. 26; CoolSavers PY2013, p. 29; CommunitySavers PY2013, pp. 43-44; ConstructionSavers PY2013, p. 28; LightSavers PY2013, p. 38; 2013, p. 22; RebateSavers PY2013, p. 39; PY2013 BizSavers 2013, pp. 7-3-7-4; Efficient Products Program, PY2014, p. 38; ESNH Program, PYPY2014, p. 22; HVAC Program, PY2014, p. 21, Lighting Program, PY2014, p. 18; Low Income Program, PY2014, p. 21; Refrigerator Recycling, PY2014, p. 21; BizSavers Report, PY2014, pp. 1-10-1-14).

Impact Evaluation Findings

As part of the 4 CSR 240-22.070(8) requirements, the program evaluations were required to meet specific requirements specified in 4 CSR 240-22.070(8) for impact evaluations. These requirements are summarized next.

The utility shall develop methods of estimating the actual load impacts of each demand-side program and demand-side rate included in the utility's preferred resource plan to a reasonable degree of accuracy.

1. Impact evaluation methods. At a minimum, comparisons of one (1) or both of the following types shall be used to measure program and rate impacts in a manner that is based on sound statistical principles:
 - A. Comparisons of pre-adoption and post-adoption loads of program or demand side rate participants, corrected for the effects of weather and other intertemporal differences; and
 - B. Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same time period.
2. The utility shall develop load-impact measurement protocols that are designed to make the most cost-effective use of the following types of measurements, either individually or in combination:
 - A. Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses; or
 - B. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics.
 - C. The utility shall develop protocols to collect data regarding demand-side program and demand-side rate market potential, participation rates, utility costs, participant costs, and total costs.

AUTHORITY: sections 386.040, 386.250, 386.610, and 393.140, RSMo 2000.* Original rule filed June 12, 1992, effective May 6, 1993. Amended: Filed Oct. 25, 2010, effective June 30, 2011.

*Original authority: 386.040, RSMo 1939; 386.250 RSMo 1939, amended 1963, 1967, 1977, 1980, 1987, 1988, 1991, 1993, 1995, 1996; 386.610, RSMo 1939; and 393.140, RSMo 1939, amended 1949, 1967.

None of the PY2014 draft impact evaluations for either the residential or C&I programs documented the ways in which the PY2014 impact evaluations addressed these requirements. In the final reports, this issue was partially addressed. Cadmus corrected this by providing this information in standalone tables for all programs except the Home Energy Analysis. ADM did not specifically provide this information in its final evaluation report on the BizSavers programs. Table 28 summarizes these findings.

Table 28: Summary of the Impact CSR Approaches Used for the Residential Impact Evaluations

	Refrigerator Recycling	HVAC Program	Low Income	ESNH	Lighting	Efficient Products
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:						
Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences	The program compares the 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.	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.	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).			The program compares the preadoption 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				The evaluation approach compares the building practices and techniques for both program participating builders and non-participating builders. These differences were applied to building simulations of program home.		

	Refrigerator Recycling	HVAC Program	Low Income	ESNH	Lighting	Efficient Products
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	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, configuration and Ameren Missouri PY14 average part-use and appliance location (conditioned or unconditioned space).	Metered HVAC power, indoor temperature, and outdoor conditions at 2-minute intervals during 2013	Metered lighting hours of use by room and hourly thermostat usage in a sample of program properties during 2013-2014.		Metered lighting hours of use by room in a sample of homes in the program area during 2013-2014.	Metered lighting hours of use by room in a sample of homes in the program area during 2013-2014.
Building and equipment simulation models				Use simulation modeling to determine energy impacts of the program.	Use simulation model-in to determine the waste-heat impact of efficient lighting	Use simulation modeling to determine the waste-heat impact of efficient lighting.
Survey responses	Cadmus surveyed PY14 RRP program participants to determine average part-use, free ridership, and secondary market impacts.	Verified measure installation through participant surveys in 2013 and 2014 to		Surveyed program participants and non-participants regarding building practices and spillover.	Surveyed metering participants on purchasing practices and date of purchase of efficient technology to determine installation rates.	Surveyed metering participants on purchasing practices and other product participants to determine installation rates.

	Refrigerator Recycling	HVAC Program	Low Income	ESNH	Lighting	Efficient Products
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:	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.	Evaluation team gathered equipment information from homes participating in metering, and from program data	Evaluation team gathered equipment information from homes participating in metering, and from program data.			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 projects through review and analysis of the program database.
Household or business characteristics		Evaluation team collected household characteristics from homes participating in metering, and from program data.	Evaluation team collected household characteristics from homes participating in metering, and from program data.	Evaluation team verified program home characteristics via home models.	Evaluation team collected household characteristics from homes participating in lighting audit: home type, own/rent home	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						

4.3 EM&V Auditor's Assessment of Impact Evaluations

There were several places where either the program or the evaluation could be improved. These areas of concern are described as follows.

The evaluation does not appear to provide a discussion and comparison of recommended changes from the 2013 evaluation compared to 2014 operations. Such a comparison is important to ensure that the programs are continuously improving and are addressing specific issues raised in evaluation.

Equipment was monitored to “accurately measure the hours of operations of new lighting equipment and the motors/VFDs” but it does not appear that ADM compiled these numbers in the EM&V report and made a comparison to TRM or other *ex ante* values. It would be helpful to make comparisons to see where deemed values do not reconcile well with field observations (BizSavers Report, PY2014, p. 1-1)

Similar to last year, the evaluator did not present the data displayed by technology or measure type; such information would have been useful and interesting so that measures could be categorized into high, medium and low impact on the portfolio performance. It is suggested that the evaluation should present information regarding TRM measure use and accounting.

An important change to the lighting portion of the BizSavers programs is that a baseline using T-12 was allowed. This change yielded significant additional savings and likely address an important segment of the commercial lighting. However, the evaluators have not presented the case for allowing the T-12 lighting baseline. Given the significant contribution of lighting to the program, it is especially important the evaluator assesses and reports on the reliability and appropriateness of using the T-12 baseline in the savings analysis.

Lighting Program: In general, the Lighting Program evaluation continued to follow “best practices” evaluation techniques for an upstream lighting program, including following many of the recommendations of the Uniform Methods Project Residential Lighting Protocol. The key updates to the PY2014 evaluation tend to focus on the HOU, the baseline assumptions, and the NTG ratios. Each of these is addressed below.

- **HOU.** The evaluation appears to have conducted a rigorous analysis of metered data on a statistical sample of homes, with generally adequate precision levels. The report should also present any updates to the peak coincidence factor.
- **Baseline Assumptions.** The EM&V Auditor agrees that the widespread availability of incandescent lamps suggests that using an EISA baseline is a conservative estimate for lighting savings. However, the Auditor recommends that for PY2015 it would be far preferable to try to quantify the baseline by attempting to quantify sales by bulb type (based on shelf space, POS data, or maybe best by the in-home audits asking about all bulbs purchased in the last year). This market sales baseline, approach, should incorporate a more refined “what if” analysis for the counterfactual. For example, under the current logic the LEDs in stores with 10 or more incandescent are considered an incandescent, while in stores without incandescent it is considered a halogen. But a market sales based approach would also have to assume some CFL to LED replacement (e.g., certain club stores only carry CFLs

and LEDs, so using the available bulbs in the store would suggest that in these cases the baseline should be CFLs).

- Net-to-Gross. The Auditor makes the following comments and suggestions regarding the NTG estimate.
 - **The market effects and spillover savings from the Lighting Program should be reviewed and updated in PY2015 based on updated primary data collection.** The current calculations for lighting market effects and spillover are based on a trajectory from the PY2013 study and analysis, as opposed to actual updated field data collection. While the Auditor approves these values for PY2014, market effects and spillover in PY2015 should only be claimed if they are supported by updated primary data collection for PY2015. In addition, the PY2015 findings should be “trued up” with PY2014 values, so any PY2014 overstatement or understatement of market effects and spillover is corrected in PY2015 (e.g., if PY2015 research finds that market effects and spillover claimed in PY2014 is greater than the cumulative market effects and spillover claimed for PY2014 and PY2015 combined, the overstatement of savings for PY2014 should be deducted in the PY2015 savings estimate). In order to avoid potential conflicts of opinion, Ameren Missouri, the EM&V Auditor and stakeholders should be provided with a sampling and analysis plan prior to any data collection or analysis. In this way Ameren Missouri, the evaluation contractor, the EM&V Auditor and stakeholders can come to an a priori agreement as to how the updated values will be derived and applied to updating PY2015 market effects and spillover estimates.

Recommendations to Improve Current Program Evaluation Reports

The EM&V Auditor made the following recommendations that should have been addressed before the impact evaluations were finalized. The following recommendations were not incorporated into the final EM&V reports.

In the 2013 evaluation, the evaluators suggested that Ameren Missouri should account for interactive effects (BizSavers 2013, p. 1-8). However, this recommendation did not lead to program changes, as the PY2014 evaluation reports again discuss interactive effects at some length and gives savings credit for interactive effects in calculating the realization rate. ***This recommendation was not been addressed in the PY2014 program evaluations.***

Recommendations to Improve Future Program Evaluation Reports

The evaluators should make the following modifications in the PY2014 EM&V Reports for Ameren Missouri’s energy efficiency program portfolio to ensure that these reports comply with accepted industry practices and provide results in a clear and transparent manner.

The market effects and spillover savings from Lighting Program should be reviewed, and if possible claimed in PY2015 after the next audit is complete. The current calculations for lighting market effects and spillover assume that residential efficient bulb saturation increased by approximately 11 percent (Lighting Program Report, 2014, p. 4). This would place Ameren Missouri above states such as California and Massachusetts in terms of efficient lighting bulb saturation, an assumption that would need to be verified with field data collection before savings could be claimed for these impacts. The EM&V Auditor recommends that either a more modest market effects and spillover number be assumed for PY2014, or preferably the market effects and spillover numbers be updated in PY2015 based on field data collection, and if any savings are determined that they be claimed at that time for both PY2014 and PY2015.

The non-participant spillover calculations for the residential programs should be updated in PY2015 using a more rigorous approach. The EM&V Auditor believes it's important to explore this issue more fully. First of all, if measures are part program offerings and they are aware of Ameren Missouri's program (which is a requirement for spillover) then need to ask why they, or their contractor, did not apply for the rebate. These responses should then be reviewed and provided in the report and to the EM&V Auditor. Secondly, the survey should make sure that homes really qualify for electric spillover. For example, if the measure is a water heater or water heater wrap, the survey should ask whether or not the respondent has an electric water heater; or for programmable thermostats ensure that the home has central air conditioning or electric heat.

Provide additional technical information in the report. When showing confidence and precision values, the evaluators should explain in greater detail how these findings were calculated and how the data were used. These findings can either be part of a technical appendix or included in footnotes for specific program findings. In any case, these findings need to be clearly provided in future reports.

The findings from the non-participant surveys should be provided as a standalone appendix in the final report. Given the importance associated with the findings for non-participant spillover, these findings should be provided in an appendix to facilitate understanding and conform to industry best practices for both process and impact evaluations.

Provide more detailed information regarding measure findings. For example, the NTG rates should be for each measure. In addition, the evaluators should report peak demand savings associated with all measures installed through these programs (BizSavers Report, 2014, p. 1-5).

4.4 EM&V Auditor's Assessment of Process Evaluations

Recommendations to Improve Current Process Evaluations

Document Program Name Changes: There were significant changes made in program operations during PY2014, specifically regarding the program names used by Ameren Missouri. Based on the recommendations from the EM&V Auditor, the final report did include a reference to the new program name in all the final residential reports as summarized in Table 29.

Table 29: Document Program Name Changes from PY2013 to PY2014

Program Old Name	Program New Name
ApplianceSavers	Refrigerator Recycling Program
CoolSavers	HVAC Program
CommunitySavers	Low Income Program
ConstructionSavers	ENERGY STAR® New Homes
LightSavers	Lighting Program
PerformanceSavers	Home Energy Analysis
RebateSavers	Efficient Products Program
BizSavers Custom	NA
BizSavers Standard	NA
BizSavers New Construction	NA
BizSavers Rx	NA

Report on the Status of the PY2014 Recommendations: Specifically, the evaluators did provide updates on the status of each recommendation in accordance with industry best practices.

Review and update the CSR Process Evaluation Requirements: Despite the EM&V Auditor’s recommendations, most of the current summaries were simply repeated from the last year’s program evaluation.

Recommendations to Improve Future Process Evaluations

In addition, the EM&V auditor repeats the following recommendation from the previous report, which has not been addressed.

The findings from the non-participant surveys should be provided as a standalone appendix in the final report. Given the importance associated with the findings for spillover, these findings should be provided in an appendix to facilitate understanding and conform to industry best practices for both process and impact evaluations. This is the same recommendation made in PY2013 but it was not addressed in the current program evaluation.

4.5 Overall Conclusion from the EM&V Auditor Team

Overall, these evaluations conformed to most industry standards and best practices for impact and process evaluations. However, there are clear areas that require additional information and explanation in order to fully determine the true progress of Ameren Missouri’s energy efficiency portfolio.

References

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- _____, 2015. *Ameren Missouri Refrigerator Recycling Impact and Process Evaluation: Program Year 2014*. May.
- _____, 2015. *Ameren Missouri Residential Portfolio Evaluation Summary: Program Year 2014*. February.