BizSavers Program Evaluation Report

Volume I of II

March 2017 - February 2018

Prepared For:

Ameren Missouri

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Research Into Action

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1. Executive Summary

This report presents the results of the impact, process, and cost effectiveness evaluations of the Standard Program, the Custom Program including the Energy Management System (EMS) Pilot Program, New Construction Program, Retro-Commissioning Program, and the Small Business Direct Install (SBDI) Program implemented during program year 2017 (PY2017), which occurred from the start of March 2017 to the end of February 2018. The evaluation, measurement and verification (EM&V) team was led by ADM Associates, Inc. ADM was joined by Research into Action, Inc., which performed the process evaluation of the programs. These DSM (demand side management) programs are implemented by Lockheed Martin Energy Solutions. The electric distribution and transmission utility is Ameren Missouri. The primary evaluation activities are listed in the following paragraphs.

The evaluation team collected data for the evaluation through review of program materials, on-site inspections, end use metering, and interviews with Ameren Missouri staff members, Lockheed Martin staff members, and participating customers and contractors.

The evaluation team developed sampling for the five BizSavers programs with completed projects to perform on site verification and estimation of the energy savings. The sampling plan for each program was intended to facilitate estimation of energy savings with ±10% statistical precision at the 90% confidence level. The actual statistical precision of energy savings estimates is ±6.3% for the Custom Program, ±6.5% for the Standard Program, ±10.1% for New Construction, ±9.0% for Retro-Commissioning Program and ±4.7% for the SBDI Program. A census approach was performed for the EMS Pilot Program.

Analysts performed ex post gross kWh energy savings calculations for each sampled project. Additionally, measures identified as High Impact Measures (HIM) were sampled within the projects. The evaluation team used the project-level and HIM gross realization rates to estimate the energy savings associated with non-sampled measures.

Program participant surveys provided insight into the participants' decision-making processes, levels of satisfaction, and tendencies to invest in energy efficiency in the future. The results informed the net-to-gross analysis, spillover data collection, as well as the process evaluation.

Trade ally surveys provided insight into the quantitative non-participant spillover impacts.

Program staff interviews provided insight into the continuous improvement of the program to meet the customer's needs.

The evaluation team administered surveys to participants at the Ameren Missouri trade ally training event to assess how well these events deliver program information.

The evaluation team provided data required to perform cost effectiveness analyses to determine portfolio-level and program-level cost benefit ratios with datasets for net energy savings, effective useful life (EUL) and the corresponding end use classification along with measure installation costs.

Table 1-1 provides a summary of the EM&V data collection efforts. The table lists data sources used for the evaluation, the data collection method, the dates during which data collection and/or analysis was performed, the research objectives, and the type of analysis performed (qualitative vs. quantitative).

Table 1-1 Summary of BizSavers EM&V Data Collection Efforts

Data Source	*Method*	*Dates*	*Key Research Topics*	*Analysis Type*
Pre-install site visit (26)	On-site M&V	March 2017 to February 2018	Verify baseline operating conditions	Qualitative
Post-install sample visits (422)	On-site M&V	March 2017 to February 2018	Verify measure installation and collect end use metering data	Qualitative
Program implementer staff (5)	Telephone in-depth interview	August to December 2017	Program management; communication; current and new offerings; goals and progress; trade ally relations; marketing and outreach; tracking and reporting; quality assurance	Qualitative
Participants, all programs (545)	Online survey	August 2017 to March 2018	Program awareness, decision-making, equipment preferences; experience and satisfaction	Quantitative
Participants, Retro-commissioning Program (6)	Telephone interview	November 2017 to January 2018	Program experiences; installed equipment; satisfaction with program	Qualitative
Trade allies, all programs (101)	Online survey	March 2018	Awareness and effect of program changes; customer awareness of BizSavers; awareness of and interest in new programs.	Quantitative and Qualitative
Architects, New Construction program (11)	Telephone interview	November 2017 to February 2018	Program awareness; role in equipment decisions; program effect on decision making and efficiency; experience with program processes.	Qualitative
Retro-commissioning Service Providers	Telephone interview	December 2017 to January 2018	Customer recruitment and awareness of retro-commissioning; identification of upgrades and installations; comparison with other	Qualitative

Data Source	*Method*	*Dates*	*Key Research Topics*	*Analysis Type*
(5)			retro-commissioning programs; training	
Non-participant customers (667)	Online and Telephone survey	January to February 2018	Program awareness, interest, and barriers to participating; equipment decisions	Quantitative and Qualitative
Program documentation	Document review	July 2017 to April 2018	Program function; tracking and reporting; quality control	Qualitative
Database analysis	Database review	January to April 2018	Number of projects; project type and details; data quality	Quantitative

Table 1-2 provides a summary of the PY2017 evaluated energy savings of the portfolio of BizSavers Programs. The table presents the ex ante kWh, ex post gross kWh, and ex post net kWh energy savings as compared with the PY2017 energy savings goals.

Table 1-2 Summary of kWh Savings for BizSavers Programs

Program	*2017 Savings Targets kWh*	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*	*Ex Post Net kWh Savings*	*Net-to-Gross Ratio*	*Percent of Goal Achieved*
Custom[1]	89,061,000	66,166,976	64,651,256	98%	63,056,074	98%	72%
EMS		901,141	838,270	93%	838,270		
Standard	32,462,000	96,866,043	90,498,491	93%	88,368,892	98%	272%
New Construction	5,642,000	25,911,761	25,660,346	99%	26,272,150	102%	466%
Retro-Commissioning	7,639,000	3,413,154	3,494,286	102%	3,494,286	100%	46%
SBDI	11,400,000	5,891,046	6,155,195	104%	6,244,820	101%	55%
Total	146,204,000	199,150,121	191,297,845	96%	188,274,492	98%	129%

Net savings are equal to gross savings, minus free ridership, plus participant spillovers and non-participant spillovers. ADM completed a net program impact analysis to determine what portion of gross energy savings and kWh reductions achieved by participants in the program are attributable to the effects of the program.

[1] While the EMS Pilot Program is a component of the Custom Program, in this report EMS Pilot Program results are generally presently separately from those associated with the rest of the Custom Program. In this report, "Custom Program" generally refers to the non-EMS Pilot Program component of the Custom Program.

$$Net\ Savings = Gross\ Savings - Free\text{-}ridership + (SO_{part} + SO_{non\text{-}part})$$

The disparity in achievement of energy savings relative to goal – with the Custom Program achieving 72% of goal and the Standard Program achieving 272% of goal – is partly due to changes in program offerings throughout the 2016 to 2017 program years that increased the number of lighting measures with available standard incentives.

The evaluation team collected data from trade allies to gain an understanding of how the BizSavers Program is influencing the un-incented lighting equipment being sold in the Ameren Missouri service territory. The report refers to program-influenced, un-incented lighting sales as program non-participant spillover. Volume II of this report presents detailed information regarding the non-participant spillover evaluation methodology and findings.

Table 1-3 summarizes the PY2017 ex post peak kW reductions. While the Custom Program kWh savings were short of the goal, the program's net peak kW exceeded the goal, as the custom measures included cooling and HVAC measures with relatively high peak coincident factors.

Table 1-3 Summary of Peak kW Savings for BizSavers Programs

Program Component	*PY2017 Peak kW Savings Targets*	*Ex Ante Peak kW Savings*	*Ex Post Gross Peak kW Savings*	*Gross kW Savings Realization Rate*	*Ex Post Net Peak kW Savings*	*Percent of Goal Achieved*
Custom	15,073.2	17,537.0	17,173.3	98%	16,625.1	113%
EMS		488.3	435.0	89%	435.0	
Standard	6,278.6	18,281.7	17,076.8	93%	16,677.1	266%
New Construction	1,861.4	4,601.1	4,552.3	99%	4,635.1	249%
Retro-Commissioning	1,737.9	1,858.7	1,936.3	104%	1,936.3	111%
SBDI	2,150.8	1,118.5	1,168.3	104%	1,185.3	55%
Total	27,101.9	43,885.5	42,342.1	96%	41,494.0	153%

1.1 Impact Conclusions

Below is a summary of conclusions from the impact evaluation.

- Ex ante energy savings estimates were, on average, relatively accurate, with program-level gross realization rates ranging between 93% and 104%. The ex ante project review procedures appear to effectively mitigate the risk of divergent gross realization rates.
- While Custom Program ex post net kWh savings fell short of the goal energy savings goal, the program's ex post net peak kW exceeded the goal. Part of the Custom Program shortfall in net kWh savings relative to goal can be explained by

changes in program offerings throughout the 2016 to 2017 program years that increased the number of lighting measures with available standard incentives. The program performed better at meeting the kW goal as compared to the kWh goal because a large share of Custom Program kWh savings were associated with cooling and HVAC projects. The coincident factor for these end uses is higher than for other end uses such as lighting. HVAC and Cooling measures accounted for 21% of the program kWh savings and 51% of the kW savings.

- As noted in the PY2016 EM&V report, there is a negative correlation between the number of application rows of measure data and the variability in the gross realization rate of measures within projects. Applicant provision of more rows of data for a single project measure is associated with lower variability in measure-level, project-level gross realization rates. Applicant provision of multiple rows of application data for a single measure typically is associated with differences in the application data fields for one or more of the energy savings calculation algorithm input variables. The most significant variables impacting variation in gross realization rates of lighting measures are the existing lighting wattage and the annual lighting hours of operation.
- During ADM's review of ex ante energy savings for non-lighting projects that require energy use modeling, it was discovered that additional guidelines or requirements regarding model inputs and development procedures may be appropriate to more accurately reflect energy impacts for submitted projects. While ex ante energy savings calculations developed through bin analysis were generally accurate, they could be further improved through increased reliance upon primary data.
- The New Construction Program requires applicants to perform building energy modeling to receive incentives for efficient equipment. For smaller buildings or smaller projects, applicants may be unable to recover all the costs for designing the model. Two project site contacts stated that the modeling costs were high relative to the incentive amount.

1.2 Impact Recommendations

The evaluation team offers the following impact recommendations for consideration.

- For projects that require energy use modeling, consider developing additional guidelines, including requiring that applicants provide model files in their native format and that assumptions associated with baseline models be clearly identified.
- Consider expanding Standard incentives to include additional HVAC equipment.

- The Custom and Standard Incentive Application form should be revised to further direct applicants to provide unique lighting operating hours, where applicable. ADM recommends that the application form prompt applicants to disaggregate single measures, where appropriate, such that quantities of measures are associated with the applicable annual hours of operation.
- Update the Ameren Missouri TRM to account for impact evaluation results presented in Table 1-4.

Table 1-4 Ex Post kWh Savings of Select Ameren Missouri TRM Measures

Ameren Missouri TRM Measures	*Program Measure IDs*	*Ex Post kWh Savings*	*Total Monitoring Days*[2]	*Lamp Quantity*	*Ex Post kWh/ Lamp Savings*	*Ameren Missouri TRM kWh/Lamp Savings*
3024 LED Linear Lamp replacing T8 4' Lamp 28W	305402 100104	392,686	2,610	5,829	67.4	42.5
3025 LED Linear Lamp replacing T8 4' Lamp 32W	305402 100104 200102	8,779,360	17,890	95,279	92.1	54.7
3026 LED Linear Lamp replacing T12 4' Lamp	305401 100101	2,927,154	19,119	31,655	92.5	54.7
3007 LED BR/R EISA Compliant	200909	540,653	6,422	2,682	201.6	181.3
3008 LED PAR	201010	812,482	6,418	3,485	233.1	209.5
3009 LED 12-20 W A-Lamp	201212 301132	1,240,912	10,932	11,212	110.7	148.8
3011 LED 5-11 W A-Lamp	201111	452,991	5,711	5,612	80.7	85
3012 LED MR16 12W	200808	56,137	1,676	356	157.7	173.1

Information regarding the disposition of previous year recommendations is presented in section 7.4 on page 7-7.

1.3 Regulator Research Questions – Process Conclusions and Recommendations

The results of the process evaluation research are largely positive. Program participant satisfaction was high across all program facets. This report provides an overview of program operations and suggests recommendations for consideration as the program evolves.

[2] The monitoring days of a single lighting logger is the total number of days during which it was deployed and collecting data used to support calculation of ex post kWh savings. Total monitoring days is the sum of the monitoring days of all loggers deployed and collecting data used to support calculation of ex post kWh savings.

Below, conclusions and recommendations are organized according to the five regulatory research questions specified in 4 CSR 240-22.070(8). The conclusions address the first four questions; the fifth question speaks to recommendations.

Research Question 1: What are the primary market imperfections common to target market segment?

Findings from previous evaluations have pointed to four factors that may affect the ability of Ameren Missouri customers to take advantage of the BizSavers programs to undertake energy efficiency upgrades: cost, lack of program awareness, business size, and geography. High up-front costs continue to be commonly cited barriers to efficiency upgrades, and the continued high net-to-gross ratios for the BizSavers Program, together with feedback from participants about the value of the incentives, again emphasize the importance of incentives in driving the efficiency upgrades.

Analyses of program participation data as it compares to customer population data indicate that various business sizes and geographic areas are well represented in the program.

Consistent with most of the evaluations in the past several years (excluding PY2016), this year's evaluation found that about half of nonparticipants were aware of the BizSavers program. This is more than twice the level of nonparticipant program awareness reported in the PY2016 evaluation. In the PY2016 report, the evaluation team conjectured that the low awareness may have been related to the program's three-month suspension in early 2016. Previously, awareness was assessed in the middle of the program cycle, and the assessment for the current evaluation came after nearly two years of continuous program operation. This suggests that maintaining program awareness may depend on continuous program operation, with its associated marketing, outreach, and trade ally engagement.

Research Question 2: Is target market segment appropriately defined, or does it need further subdivision or merging with other segments?

In general, the BizSavers Program does a good job of reaching all parts of the nonresidential market: for most building end uses, the distribution of program participants matches relatively well with the distribution of businesses in the population.

Evaluation findings continue to support the establishment of the SBDI Program to serve small businesses. Many small customers have little LED lighting installed and are motivated to replace lighting to reduce their electricity bill, and surveyed nonparticipants indicated moderate-to-high likelihood of agreeing to schedule a walk-through assessment if approached by an SBDI Service Provider. While most small customer types are about equally good targets for SBDI than others, Food and Beverage customers may provide the best return on recruitment effort, as a high percentage of

such customers are responsible for lighting purchases and are motivated to change lighting to reduce their energy bills.

By contrast, while healthcare customers show a high need for lighting replacements (nearly two-thirds had “none or very little” LEDs), they are the customer type that is least likely to be responsible for buying lighting and is least motivated to replace lighting to reduce electricity costs. Thus, the SBDI Program may not be the best vehicle to meet what may be a clear need for lighting replacement for this customer type. More broadly, the program may be challenged in serving businesses that lease their space and are not responsible for lighting purchases. A recent evaluation of a small business program for the State of Connecticut[3] found that a key success factor was to bring the landlord and tenant together to present savings opportunities.

While the SBDI Program in general serves small businesses, it achieved only about half of its savings goals. The program continues to rely on a few highly active Service Providers, with five providers accounting for three-quarters of savings and one responsible for about half of savings. Reasons for low activity are not entirely clear. Surveyed Service Providers, who well represented the population of all Service Providers, reported good success at scheduling walk-through assessments and in converting those to projects. They also cited few barriers to doing more projects and generally said that no business was too small to approach. The most common suggestion they made for helping them accomplish more projects was to increase program marketing.

More than one-third of lighting trade allies said they would be interested in becoming a Service Provider, but about half of them reported being aware of the program. Thus, the program still has the opportunity to increase program participation through recruitment of new Service Providers as well as by driving greater participation among those already in the program.

The EMS pilot has achieved limited participation. Like SBDI, it also achieved about half of its savings goals. About half of interviewed trade allies who reported doing relevant work were aware of its existence. One-quarter of tax-exempt respondents (and one-third of those with at least 50,000 kWh annual usage) reported being very interested in learning more about Ameren’s EMS incentives.

[3] Connecticut EEB SBEA Process Evaluation. Final Report – Project C1639. Prepared by Energy & Resource Solutions (ERS) and Research Into Action, Inc. for Connecticut Energy Efficiency Board (EEB). June 30, 2017. https://www.energizect.com/sites/default/files/C1639_SBEA%20Process%20Evaluation%20Report__Final_6.30.17.pdf

Research Question 3: Do program measures reflect the diversity of end-use needs and available technologies for target segment?

Participant surveys and interviews showed satisfaction with the range of program-eligible equipment, delivery time for ordered equipment, and the quality of the equipment and the installation.

In the PY2016 evaluation, the primary measures-related concern was the elimination of incentives for exterior lighting, which reportedly had a largely adverse impact on trade allies. The current evaluation confirmed that the elimination of exterior lighting incentives in 2016 had a negative effect on business for trade allies involved in lighting sales and installations, particularly among lighting vendors (that is, those who largely sell lighting to installers or directly to customers who self-install). The evaluation found that reinstatement of exterior lighting incentives in 2017 produced a positive change in their business.

Research Question 4: Are communication and delivery channels/mechanisms appropriate for the target market segment?

The program implementer reported using a wide range of marketing outreach channels and methods to reach end-use customers and service providers (e.g., contractors, vendors, and distributors), including targeted outreach to decision makers representing customer account aggregates or “towers.”

While general program marketing may play an important role in generating overall program awareness and targeted outreach may be important in acquiring large projects, the importance of the program trade allies in generating savings cannot be underestimated. Using participant and non-participant reports on the source of program awareness, together with the estimated percentage of participation among customers, the evaluation team was able to calculate that trade allies are about ten times as effective at generating projects as are other means: specifically, as much as one-third of customers who learn about BizSavers incentives from a contractor or vendor become participants, compared to about 3% of those who learn about the program from other means.

Given the above, the program’s outreach efforts to trade allies are valuable. In this light, it is important feedback that half of equipment-appropriate trade allies are not aware of the SBDI Program or EMS pilot. Similarly, interviewed design professionals indicate limited awareness of New Construction program incentives, among themselves and their customers.

The potential for lost opportunities for savings in new construction projects (as it often will be more expensive to carry out deep-savings retrofits than to build the savings into the construction design) merits some attention to the New Construction Program. While the program exceeded its goals and achieved savings comparable to those achieved in

several other large jurisdictions, program staff reported that the savings achieved are "expensive," relative to those achieved through the Standard and Custom programs. Activities that help achieve deeper savings in each project may improve the cost-effectiveness of the program.

One such activity may be to engage more effectively with design firms. Interviewed design professionals reported low-to-moderate program engagement and said they would like greater engagement. While New Construction participants learn about the availability of Ameren Missouri's New Construction incentives relatively early in their project, they do so primarily from a source other than their architecture or design firm. Possibly related to this, New Construction participants continue to be unsure about the requirement to apply for incentives before incorporating equipment into a project's plan, and thus they and the program may lose out on energy-saving opportunities.

The evaluation team identified two other factors that may point to the need for continuing and possibly increased program efforts at communicating program rules. First, about half of participants were not aware that the rules for Fast Track applications required customers to purchase and install all equipment *before* applying for incentives; lack of proper understanding of the program rules could result in project disqualification and loss of savings. Second, as before, the evaluation found that about one-quarter of Custom Program participants need to resubmit applications with additional documentation or revised calculations, suggesting a continued need to clarify and communicate the application requirements to customers and trade allies.

Process Recommendations

Research Question 5: Are there better ways to address market imperfections to increase adoption of each program measure?

The evaluation team repeats the recommendation to continue to attempt to recruit more SBDI Service Providers and work with existing service providers to increase the number of projects they deliver to decrease the risk of relying on a single provider to deliver most program savings. One way to achieve the latter may be to work with Service Providers to help them penetrate businesses that are not responsible for buying or maintaining their lighting equipment. Small healthcare customers (such as medical and dental offices) may be special, but not exclusive, targets for such an effort. One way in which the program may help Service Providers is in facilitating efforts to bring landlords and tenants together to present savings opportunities.

Although the New Construction program is exceeding goals, the program implementer should consider increasing engagement with architects and design firms to increase their awareness of the program and its rules and help ensure that the most possible savings are achieved with each project. In addition, the evaluators repeat last year's recommendation to increase awareness of the New Construction program and its rules

among all contractors and vendors, such as by providing special recognition to contractors who attend specific training on, and demonstrate knowledge of, New Construction Program rules and processes.

The implementer should augment efforts to improve awareness of the rules governing Fast Track applications to avoid loss of savings from disqualified applications. Working with lighting distributors to ensure that they fully explain the requirement to customers may be valuable.

2. Introduction

This report presents the results of the impact, process, and cost effectiveness evaluations of the BizSavers Custom, Standard, Energy Management System (EMS) Pilot, New Construction, Retro-Commissioning, and Small Business Direct Install (SBDI) programs. These programs are available to Ameren Missouri's business sector customers. This report presents results of activity during program year 2017 (PY2017), which occurred during March 2017 through February 2018.

2.1 Program Descriptions

The design of the BizSavers Program is to help businesses identify and implement energy saving projects. The programs evaluated in this report are as follows:

Standard Program: prescriptive incentives for purchasing and installing efficient equipment.

Custom Program[4]: incentives determined by a custom savings calculation comparing the base case to the efficient case, paid at a rate by technology:

Table 2-1 Custom Incentive with End-Use Category

End Use	*$/kWh Incentive Rate*
Cooling	$0.15
Building Shell	$0.08
HVAC (Ventilation)	$0.08
Cooking	$0.08
Lighting (Interior)	$0.08
Water Heating	$0.08
Air Comp	$0.07
Motors	$0.07
Process	$0.07
Miscellaneous	$0.06
Refrigeration	$0.06
Exterior Lighting	$0.05

[4] While the EMS Pilot Program is a component of the Custom Program, in this report results and narrative associated with the Custom Program generally account refer to the non-EMS component of the Custom Program. Results associated with the EMS Pilot Program are generally reported separately.

New Construction Program incents building with increased energy efficient design and equipment.

Table 2-2 New Construction Whole Building Incentive

From Baseline	*Whole Building (Design)*
0-19% energy savings	$0.02/kWh
20-29% energy savings	$0.03/kWh
30% energy savings and above	$0.04/kWh

Interior lighting incentives are based on $0.40 per watt below the wattage required under the applicable ASHRAE standard multiplied by the building area measured in square feet.

Standard non-lighting and Custom incentives within New Construction are approved following the Design Team meeting and follow the rules and current incentive rates.

Retro-Commissioning Program: Incentives are based on estimated energy savings. The study incentive is up to 100% of the program approved study cost, based on the table below and is payable when the recommended measures have been installed and verified.

Table 2-3 Retro-Commissioning Incentive

Total Verified Annual kWh Saved	*RCx Study Incentive Tracks & Rates*			*Verification Type*
	Compressed Air	*Refrigeration*	*Buildings*	
≤ 500,000kWh	$0.01/kWh	$0.01/kWh	$0.02/kWh	Installation
> 500,000KWh	$0.02/kWh	$0.02/kWh	$0.03/kWh	Operational

Small Business Direct Install Program (SBDI) Program: To qualify for this program, participants must be classified under the Ameren Missouri 2M Small General Service electric rate category and use an approved Small Business Direct Install Service Provider. SBDI incentives are capped at $2,500 per electric account. The service provider will purchase and install the lighting equipment as well as handle the application process.

Energy Management System Pilot Program[5]: The EMS Pilot Program provides incentives for the installation of EMS equipment and software designed to control,

[5] While the EMS Pilot Program is a component of the Custom Program, in this report results associated with the EMS Pilot Program are generally presented separately from those associated with the non-EMS component of the Custom Program.

monitor, and log real-time energy consumption. Incentives to eligible public and private schools and tax-exempt organizations can cover 50% of the total EMS project cost.

Table 2-4 shows the PY2017 ex ante kWh savings by program. Note that the sum of the Program-Projects cited (4,390) exceed the total number of projects in the Lockheed Martin tracking database (4,095) because some projects were associated with both the Standard and Custom Programs.

Table 2-4 Ex Ante kWh and Peak kW Savings of BizSavers Programs

Program	*Number of Program-Projects*	*Ex Ante kWh Savings*	*Ex Ante Peak kW Savings*
Custom	979	66,166,976	17,537.0
EMS Pilot	7	901,141	488.3
Standard	2,847	96,866,043	18,281.7
New Construction	28	25,911,761	4,601.1
Retro-Commissioning	9	3,413,154	1,858.7
SBDI	520	5,891,046	1,118.5
Total	4,390	199,150,121	43,885

2.2 Program Trends in PY2017

The program year started in March with the continued offering of the Custom, Standard, New Construction, Retro Commissioning, EMS and SBDI programs.

Figure 2-1 plots the Custom Program ex ante energy savings by project completion month and cumulative energy savings through the program year.

Figure 2-1 Custom Program Ex Ante kWh Savings by Project Completion Month

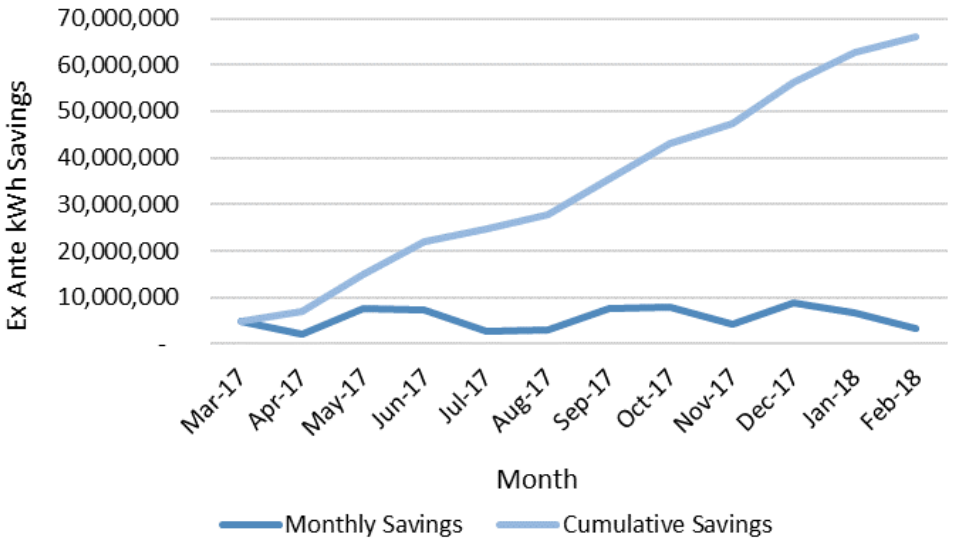


Figure 2-2 plots the Standard Program ex ante energy savings by project completion month and cumulative ex ante energy savings through the program year.

Figure 2-2 Standard Program Ex Ante kWh Savings by Project Completion Month

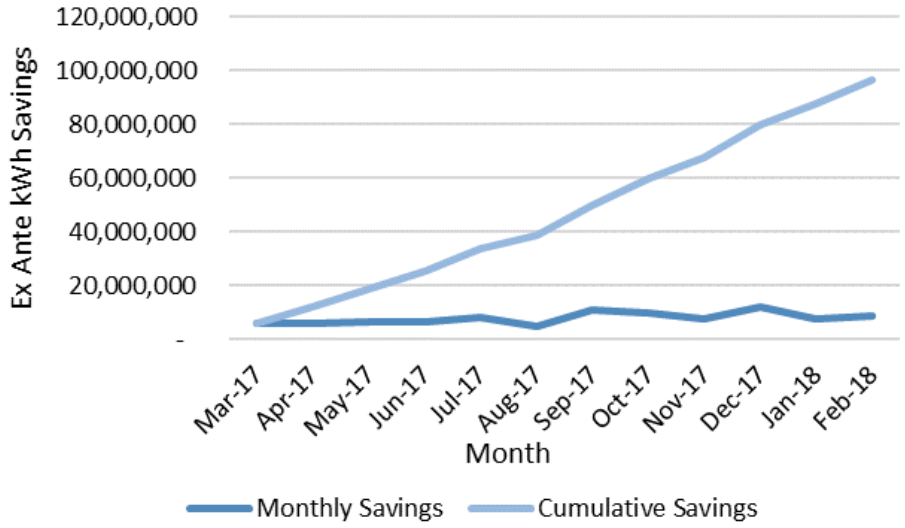


Figure 2-3 and Figure 2-4 below display the ex ante program energy savings by month as well as cumulatively for the New Construction Program and Retro-Commissioning Program respectively. Projects completed through these programs typically have a longer project life cycle than Standard Program projects. In late August, the largest New Construction Program project was completed with ex ante energy savings of 15,256,422 kWh. The steep increase in Retro-Commissioning Program project ex ante kWh savings later in the program year was largely driven by completion of five projects for air compressor optimization and air leak repair associated with a single trade ally.

Figure 2-3 New Construction Ex Ante kWh Savings by Project Completion Month

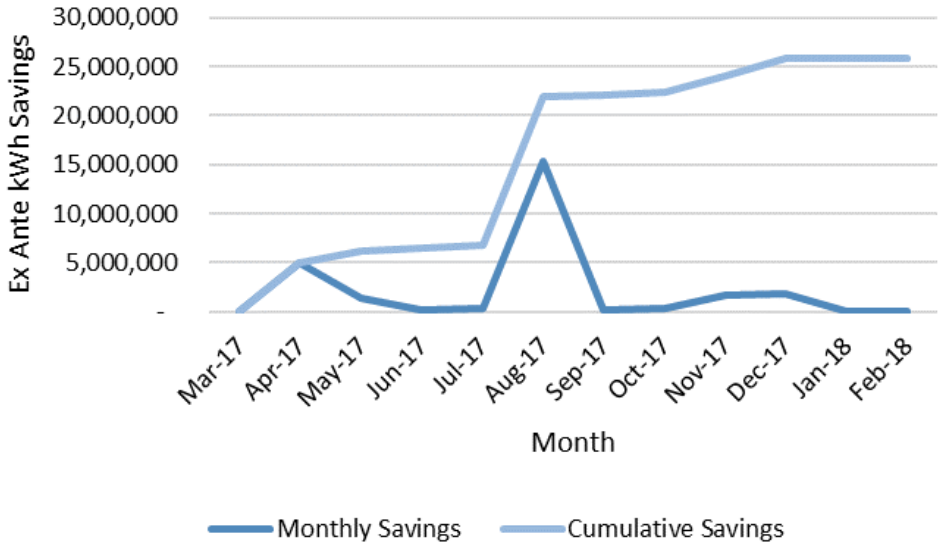


Figure 2-4 Retro-Commissioning Ex Ante kWh Savings by Project Completion Month

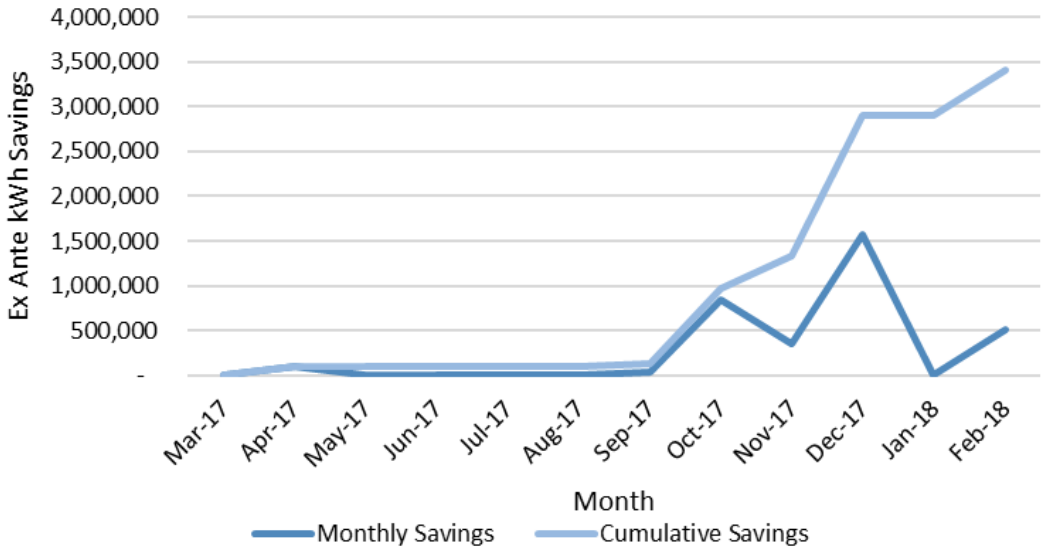


Figure 2-5 plots the Small Business Direct Install ex ante savings by project completion month and cumulative ex ante energy savings through the program year.

Figure 2-5 Small Business Direct Install Ex Ante kWh Savings by Project Completion Month

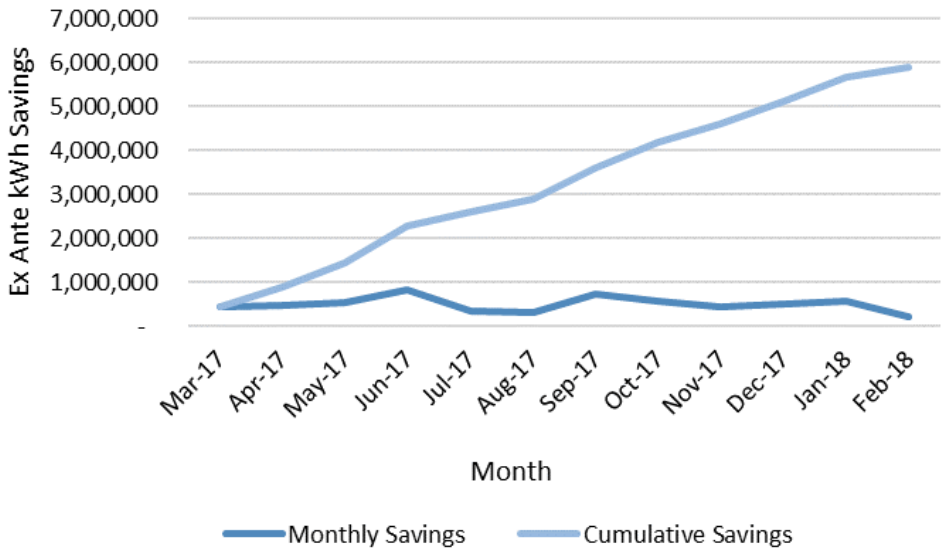
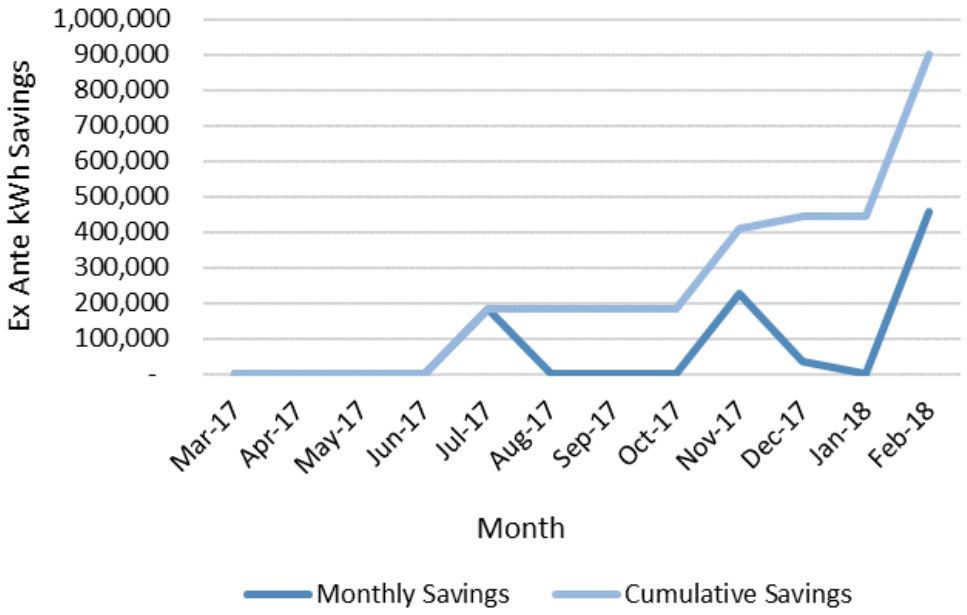


Figure 2-6 charts the Energy Management System ex ante energy savings by project completion month and cumulative ex ante energy savings through the program year. The increase in completed projects was primarily from school building types that installed or upgraded EMS control systems during the summer break period.

Figure 2-6 Energy Management System Ex Ante kWh Savings by Project Completion Month



2.3 Organization of Report

This report is divided into two volumes providing information on the impact, process, and cost effectiveness evaluation of the BizSavers portfolio of programs for the period March 2017 through February 2018. Volume I is organized as follows:

- Chapter 3 presents and discusses the methods used for and the results obtained from estimating ex post gross savings.
- Chapter 4 contains the ex post net savings methodology and results.
- Chapter 5 presents and discusses the methods used for and results obtained from the process evaluation.
- Chapter 6 presents and discusses the methods used for and results obtained from the cost effectiveness evaluation.
- Chapter 7 presents evaluation conclusions and recommendations.

See report Volume II for appendices presenting detailed information regarding evaluation methodologies, data collection instruments, and evaluation results.

3. Estimation of Ex Post Gross Savings

This chapter explains the estimation of ex post gross kWh savings and ex post gross peak kW savings associated with BizSavers measures installed during program year 2017 (PY2017), which occurred during March 2017 - February 2018. ADM performed impact analyses in accordance with evaluation requirement in Missouri 4 CSR 240-20.093 Demand-Side Programs Investment Mechanism and 4 CSR 240-20.094 Demand-Side Programs. Section 3.1 describes the methodology used for estimating ex post gross energy and demand impacts. Section 3.2 presents the results of the effort to estimate savings for BizSavers program M&V samples. Volume II of this report presents the specific, applied methodologies used to estimate ex post gross savings and the savings estimation results for each sampled measure.

3.1 Methodology for Estimating Gross Savings

The program gross kWh and kW savings are determined by evaluating a sample of individually completed projects receiving incentives that is statistically significant. The population for sampling includes both projects aggregated by ex ante kWh savings and high impact measures aggregated by ex ante kWh savings. High impact measures are those that produce at least 50% of the program ex ante savings in aggregate. Project measures and complete projects without high impact measures will be referred to as non-HIM measures in the following tables.

3.1.1 Sampling Plan

Program tracking data was continually reviewed during PY2017 for project sampling selection. During PY2017, there were 943 projects with Custom Program measures for an ex ante savings of 66,166,976 kWh. Within the Custom Program, the EMS Pilot Program completed an additional 7 EMS projects with ex ante savings of 901,141 kWh. There were 2,813 Standard Program projects associated with ex ante energy savings of 96,866,043 kWh. The New Construction Program completed 28 projects with ex ante savings of 25,911,761 kWh savings, the Retro-Commissioning Program completed 9 projects with ex ante savings of 3,413,154 kWh, and the SBDI Program completed 520 projects associated with ex ante savings of 5,891,046 kWh. The evaluation team used stratified statistical sampling for the Custom Program, Standard Program, New Construction Program, Retro-Commissioning Program, and the Small Business Direct Install Program. Additionally, a census of the EMS Pilot Program projects was selected.

The basis for the estimation of savings for the programs is a ratio estimation procedure that allows the measured and verified (M&V) sample to, with a specific statistical precision, explain the annual ex post gross savings for all completed projects. The sampling statistical precision for each program is shown in Table 3-1. The Custom

Program sample facilitated estimation of energy savings with statistical precision of 6.3%, while the precision of the Standard Program sample is 6.5%. The sampling precision of the New Construction Program sample is 10.1% and the precision of the Small Business Direct Install Program sample is 4.7%. There was an M&V census performed for the EMS Program.

Table 3-1 Sample Statistical Precision by Program

Program	*Statistical Precision*
Custom	6.3%
EMS	N/A (Census)
Standard	6.5%
New Construction	10.1%
Retro-Commissioning	9.0%
SBDI	4.7%

The sample selection is from the population of projects with completion dates during PY2017, from March 1, 2017 through February 28, 2018. The evaluation team developed periodic samples to allow for analysis of projects throughout the program year. Table 3-2 is a summary of the sampling statistics. Additional data pertaining to the sampling plans is presented in Volume II of this report. The sampling groups include projects and the high impact measure groups within the project. The total ex ante kWh savings of the sampled projects is 64,162,199 kWh from the population of 199,150,121 kWh, for 32% of the BizSavers' savings.

Table 3-2 Population and Sample Statistics

Program -Sample	*Population size*	*Sample*	*Strata*	*Total Ex Ante kWh Savings*	*Sample Ex Ante kWh Savings*	*Percent Ex Ante Savings in Sample*
Custom	943	103	5	66,166,976	18,662,618	28%
Standard - Non HIM	1,799	183	5	41,011,972	5,917,765	14%
Standard - HIM 3025	1,165	117	3	38,430,754	9,046,662	24%
Standard - HIM 3026	1,186	109	3	17,423,317	3,037,847	17%
New Construction	28	11	4	25,911,761	22,420,367	87%
RetroCommissioning	9	5	4	3,413,154	2,708,066	79%
SBDI - Non HIM	290	60	3	2,476,281	428,846	17%
SBDI - HIM 3007	180	46	3	812,973	317,145	39%
SBDI - HIM 3026	290	60	4	1,686,326	517,969	31%
SBDI - HIM 3084	168	38	3	915,466	203,773	22%
EMS	7	7	Census	901,141	901,141	100%
Total				199,150,121	64,162,199	32%

3.1.2 Review of Documentation

After the sample selection, ADM obtained project documentation from the tracking database maintained by Ameren Missouri's program implementation contractor. ADM analysts then reviewed this documentation and other program materials that were relevant to the evaluation effort.

The available documentation (e.g., audit reports, savings calculation work papers, invoices, etc.) for each incentivized measure was reviewed, with attention given to the calculation procedures and documentation for ex ante energy saving estimates. The reviewed documentation for all selected projects included program forms, databases, invoices, product spec sheets, reports, billing system data, weather data, and any other potentially useful data. Examination of each application to determine whether the following types of information is included:

- Documentation for the equipment changed, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information
- Documentation for the new equipment installed, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information
- Information about the savings calculation methodology, including (1) what methodology was used, (2) specifications of assumptions and sources for these specifications, and (3) correctness of calculations

If there was uncertainty regarding a project or incomplete project documentation, then ADM staff contacted the implementation contractor to seek further information to ensure the development of an appropriate project-specific M&V plan.

3.1.3 On-Site Data Collection Procedures

Field technicians made on-site visits to sampled facilities in order to collect data used in calculating ex post energy and peak demand impacts for the implemented measures. During the site visits of the sampled projects, field technicians collected primary data on the participants' facilities and the implemented energy efficiency measures.

ADM provided Ameren Missouri energy efficiency staff with a list of projects for which ADM planned to schedule M&V activities. This list included the company name, the project ID, the site address or other premise identification, and the customer representatives' contact information with whom ADM intended to schedule an appointment.

During an on-site visit, the field staff accomplished three major tasks:

- First, they verified the implementation status of all measures for which customers received incentives. They verified the installation of energy efficiency

measures, that the installation was complete, and that the measures still functioned properly.

- Second, they collected the data needed to analyze the ex post energy and peak demand impacts associated with the measures that were implemented. Data were collected in accordance with the site-specific M&V plans developed through detailed documentation review for each sampled facility.
- Third, they interviewed the facilities' representatives to obtain additional information that may support the calculation of ex post energy savings. These interviews covered various topics depending on the nature of the specific project. Potential areas for discussion include facility operating schedules, details of process driven upgrades.

Volume II of this report presents information regarding site-specific M&V data collection activities.

3.1.4 Procedures for Estimating kWh Savings from Measures Installed through the Program

The method ADM employs to determine ex post gross impacts depends on the types of measures implemented. Categories of measures include the following:

- Lighting;
- HVAC;
- VFDs;
- Refrigeration; and
- Compressed Air.

Table 3-3 summarizes the general methods used by ADM to determine gross savings for the BizSavers measures. Volume II of this report presents the specific, applied methodologies used to estimate ex post gross savings for each sampled measure.

Table 3-3 Typical Methods to Determine Savings for Custom Measures

Type of Measure	*Method to Determine Savings*
Lighting	Reference to data on wattages of newly-installed measures, hours-of-use data obtained from field monitoring, with baseline data informed by applicable standards or pre-existing equipment characteristics.
HVAC (including packaged units, chillers, cooling towers, controls/EMS)	eQUEST model using DOE-2 as its analytical engine for estimating HVAC loads and calibrated with site-level billing data to establish a benchmark.
VFDs	eQUEST model using DOE-2 as its analytical engine for estimating HVAC loads and calibrated with site-level billing data to establish a benchmark.
Refrigeration	Engineering analysis referencing Energy Star equations and variables.
Compressed Air Systems	Engineering analysis, with monitored data of power and schedule of operation.

The activities specified in Table 3-3 were used to estimate gross savings for each sample unit (project or measure). Energy savings gross realization rates were calculated for each site for which on-site data collection and engineering analysis/building simulations were conducted. The gross realization rates represent the ratio of ex post gross savings to ex ante gross savings. Estimates of program-level gross savings were then aggregated by applying a ratio estimation procedure in which achieved savings levels estimated for the sample units are statistically extrapolated to the program-level ex ante savings.

ADM also conducted an analysis of sites with relatively high or low gross realization rates to determine the reasons for the discrepancy between ex ante and ex post energy savings. Volume II of this report presents information on the results of this analysis at the site-level, and the program- and portfolio-level analysis results are presented in section 3.2 of this document.

The following discussion describes the basic procedures used for estimating savings from various measure types.

3.1.4.1. Method for Analyzing Savings from Lighting Measures

Lighting measures examined include retrofits of existing fixtures, lamps and/or ballasts with energy efficient fixtures, lamps or LED lamps/drivers. These types of measures reduce demand, while not affecting operating hours. Participants often complete retrofit projects in combination with the installation of lighting control measures, such as motion sensors or daylight controls. Controls reduce the operating hours and/or current passing thorough the connected fixture or group of fixtures.

Analyzing the savings from such lighting measures requires data for retrofitted fixtures on (1) baseline wattages and post-retrofit wattages and (2) hours of operation before and

after the retrofit. Hours of operation are typically determined based on metered data collected after measure installation for a sample of fixtures.

Data collected determines the average operating hours for retrofitted fixtures by using light intensity loggers where lighting efficiency measures have been installed. Usage areas are areas within a facility with comparable average operating hours. For industrial customers, expected usage areas include production, warehouse, and office areas. Usage areas are assigned to lighting logger data for analysis.

Annual energy savings for each sampled fixture/lamp is determined by the following formula:

$$Annual\ Energy\ Savings = kWh_{baseline} - kWh_{after}$$

The input values for this formula are determined through the following steps:

- Results from the monitored sample calculate the average operating hours of the metered lights in each period for every unique building type/usage area.
- Applying this average operating hours to the baseline and post-installation average demand for each usage area to calculate the respective energy usage and peak period demand for each usage area.
- The annual baseline energy usage is the sum of the baseline kWh for each costing period for all the usage areas. Similarly, the post-retrofit energy usage is calculated. The calculated energy savings are the difference between baseline and post-installation energy usage.
- For conditioned spaces, region-specific, building type-specific heating interaction factors (HIF) and cooling interaction factors (CIF) account for the energy impacts of implemented lighting measures on HVAC operation. The applied factors, presented in report Volume II, were developed based on energy simulation of DEER eQUEST prototypical buildings, referencing Ameren Missouri service territory weather data. The kWh heating and cooling interaction factor (HCIF) is calculated as 1 + *HIF* + *CIF*.
- Energy savings for lighting are determined by one of two methods. With sufficient monitoring data, applying an algorithm to time series monitoring data to estimate the lighting operating hours prior to implementation of lighting controls. For each monitored hour during which there was any lighting use, survey data is applied to determine the behavior with the absence of lighting controls. This survey asks questions by usage area for the manual lighting control behavior both within the workday, and at the end of the workday.

3.1.4.2. Method for Analyzing Savings from HVAC Measures

Savings estimates of HVAC measures were determined using DOE-2 energy simulations and/or engineering calculations. Each approach is supplemented with data collected through on-site visits. Typical HVAC measures which were evaluated using the following methods are:

- Installation of VFDs on pump and fan motors;
- Retrofit/upgrade of distribution system controls (i.e. supply air reset, economizers, etc.);
- Retrofit/upgrade of central plant controls (i.e. chiller sequencing, chilled and condensing water reset, etc.) ; and
- Replacement of HVAC or central plant (i.e. chillers) equipment with more efficient models.

When tractable, building simulation software is our preferred approach, as it allows calculation of secondary energy impacts which quantify a measure's impacts on other building systems. Building simulation software also enables us to more accurately account for the interactive effects that multiple measures have on one another when installed in the same facility. Each simulation produces estimates of HVAC energy and demand usage under different assumptions about equipment and/or construction conditions.

In cases in which DOE-2 simulation was inappropriate because data were not available to properly calibrate a simulation model and engineering analysis provided more accurate M&V results, engineering spreadsheet models were developed referencing a secondary literature source and primary data collected on-site. A measure for which engineering spreadsheet modeling was developed included retrofit/upgrade of a single chiller.

3.1.4.3. Method for Analyzing Savings for VFDs

Estimates of energy savings for VFDs were determined using DOE-2 energy simulations as described in section 3.1.4.2.

3.1.4.4. Method for Analyzing Savings from Refrigeration Measures

Energy savings were determined by referencing data collected on-site and using engineering equations from a secondary literature source (i.e. Energy Star).

3.1.4.5. Method for Analyzing Savings from Compressed Air Measures

Energy savings of compressed air leak repairs were calculated through engineering analysis of compressor performance curves, supported by data collected through short-

term baseline metering. Current data was used to calculate power, using the following algorithm:

$$P = \frac{\sqrt{3} \times V \times A \times pf}{1{,}000}$$

Where:

P	*= Power (kW)*
V	*= Voltage (460)*
A	*= Amperage*
pf	*= Power factor (0.9 assumed)*

The load (cfm) at each monitoring point was determined using the performance curve (%Power vs %Flow) for the applicable control type (inlet modulation without blowdown) from the Uniform Methods Project.

The effect of the measure was then imposed on the established load profile by subtracting the total leaks repaired from each data point. This "new" load profile represented the decreased demand because of repaired leaks. The compressor performance curve was then once again used to determine power requirements at each data point.

Energy savings were calculated by taking the difference in energy requirements of baseline and post-RCx compressed air systems, at each monitoring point, summing over the monitoring period, and scaling to an annual basis.

3.1.5 Procedures for Estimating Peak kW Savings from Measures Installed through the Program

The system peak net demand (kW) savings for PY2017 measures is determined by factoring the first year annual energy savings by end use-specific energy-to-demand ratios. Table 3-4 shows the applicable business energy to peak demand factors, which are presented in Appendix E to the *Non-Unanimous Stipulation and Agreement* in File No. EO-2015-0055[6]. The *Non-Unanimous Stipulation and Agreement* in File No. EO-2015-0055 states: "Only measures that are expected to deliver energy savings in 2023 and beyond are counted towards the demand goal in the EO included in Appendix A." ADM referenced the Ameren Missouri TRM for secondary data on measure EUL in order

[6] https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935982981

to assess whether or not measures are sufficiently long-lived to apply the stipulated energy-to-demand ratio to determine 2023-persistent kW savings.

Table 3-4 End-Use Category Energy to Peak Demand Factors

End Use	*Factor*
Air Comp	0.0001379439
Building Shell	0.0004439830
Cooking	0.0001998949
Cooling	0.0009106840
Exterior Lighting	0.0000056160
Heating	0.0000000000
HVAC	0.0004439830
Lighting	0.0001899635
Miscellaneous	0.0001379439
Motors	0.0001379439
Process	0.0001379439
Refrigeration	0.0001357383
Water Heating	0.0001811545

3.2 Results of Ex Post Gross Savings Estimation

To estimate ex post gross kWh savings and ex post gross peak kW reductions for the BizSavers programs, data were collected and analyzed for the samples identified in section 3.1.1. ADM analyzed the sample measure data using the methods described in section 3.1 to estimate project energy savings, peak kW reductions, and determine gross realization rates. In this section are the results of that analysis results. Note that detailed, site-level analysis methods and results are presented in Volume II of this report, along with summary information regarding measure-level and site-level energy savings of sampled measures.

3.2.1 Ex Post Gross kWh Savings

3.2.1.1. Custom Program Ex Post Gross kWh Savings

The ex ante and ex post gross kWh savings of the PY2017 Custom Program sample projects are summarized by sampling stratum in Table 3-5. Overall, ex post gross energy savings of 18,130,823 kWh are equal to 97% of the ex ante savings.

Table 3-5 Ex Ante and Ex Post Annual kWh Savings for Custom Program by Sample Stratum

Stratum	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
1	4,479,545	4,154,348	93%
2	973,543	973,543	100%
3	6,995,575	6,538,810	93%
4	5,123,344	5,477,975	107%
5	1,090,611	986,147	90%
Total	18,662,618	18,130,823	97%

Table 3-6 presents information on ex ante and ex post kWh energy savings of sampled Custom Program measures by end use.

Table 3-6 Ex Ante and Ex Post Annual kWh Savings for Custom Program Sample Measures by End Use

End Use	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
Air Comp	468,068	38,792	8%
Cooling	853,172	691,932	81%
Ext Lighting	819,417	794,922	97%
HVAC	277,205	287,777	104%
Lighting	9,940,191	10,191,076	103%
Miscellaneous	4,607,452	3,813,494	83%
Process	271,664	271,040	100%
Refrigeration	1,425,449	2,041,790	143%
Total	18,662,618	18,130,823	97%

3.2.1.2. EMS Pilot Program Ex Post Gross kWh Savings

For the EMS Pilot Program, M&V was performed for a census of the seven projects completed during PY2017. The EMS Pilot Program realized 93% of the ex ante kWh savings of 901,141 kWh, with ex post gross savings of 838,270 kWh. Table 3-7 presents

information on ex ante and ex post kWh energy savings of the EMS Pilot Program measures by end use.

Table 3-7 Ex Ante and Ex Post Annual kWh Savings for EMS Pilot Program Measures by End Use

End Use	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
Cooling	421,659	372,662	88%
Heating	244,450	250,197	102%
HVAC	235,032	215,411	92%
Total	901,141	838,270	93%

3.2.1.3. Standard Program Ex Post Gross kWh Savings

The gross kWh savings of the PY2017 Standard Program sample projects are summarized by sampling stratum in Table 3-8. The ex post gross kWh savings for the Standard Program non-HIM sample of 5,386,186 kWh are equal to 91% of the ex ante kWh savings. For Standard Program HIMs:

- The gross kWh savings of Standard HIM 3025 sample projects (LED linear lamp replacing T8 fluorescent lamp) of 8,696,457 kWh are equal to 96% of the ex ante kWh savings.
- Standard HIM 3026 sample projects (LED linear lamp replacing T12 fluorescent lamps) had ex post gross kWh savings of 2,630,173 kWh are equal to 87% of the ex ante kWh savings.

In the aggregate, the gross realization rate of the Standard Program is 93%.

Table 3-8 Ex Ante and Ex Post Gross Annual kWh Savings for the Standard Program by Sample Stratum

Standard Program	*Stratum*	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
Non Him	1	564,533	462,029	82%
	2	1,168,933	943,998	81%
	3	1,618,324	1,391,156	86%
	4	2,487,365	2,512,298	101%
	5	78,610	76,705	98%
HIM 3025	1	3,973,369	3,778,446	95%
	2	3,967,917	3,814,720	96%
	3	1,105,376	1,103,291	100%
HIM 3026	1	604,012	569,744	94%
	2	1,642,120	1,301,384	79%
	3	791,715	759,045	96%
Total		18,002,274	16,712,816	93%

Table 3-9 presents information on ex ante and ex post kWh energy savings of sampled Standard Program measures by end use.

Table 3-9 Ex Ante and Ex Post Annual kWh Savings for Standard Program Sample Measures by End Use

End Use	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
Lighting	17,630,141	16,375,713	93%
Miscellaneous	350,977	330,879	94%
Water Heating	21,156	6,224	29%
Total	18,002,274	16,712,816	93%

3.2.1.4. New Construction Program Ex Post Gross kWh Savings

The gross kWh savings of the PY2017 New Construction Program sample projects are summarized by sampling stratum in Table 3-10.

Overall, ex post gross kWh savings of 22,139,809 kWh are equal to 99% of the ex ante kWh savings.

Table 3-10 Ex Ante and Ex Post Gross Annual kWh Savings for New Construction Program by Sample Stratum

Stratum	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
1	15,256,422	14,987,668	98%
2	5,970,449	5,831,009	98%
3	1,111,463	1,241,485	112%
4	82,033	79,648	97%
Total	22,420,367	22,139,809	99%

New Construction measures by End Use are shown in Table 3-11. The project with zero ex post gross kWh cooling savings installed HVAC equipment with an efficiency equal to the minimum building code requirement.

Table 3-11 Ex Ante and Ex Post Annual kWh Savings for New Construction Program Sample Measures by End Use

End Use	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
Air Comp	1,810,948	1,617,680	89%
Cooling	32,419	0	0%
Lighting	10,204,458	10,646,916	104%
Motors	10,185,525	9,783,187	96%
Refrigeration	187,017	92,026	49%
Total	22,420,367	22,139,809	99%

3.2.1.5. Retro-Commissioning Program Ex Post Gross kWh Savings

The ex post gross kWh savings of the PY2017 Retro-Commissioning Program sample projects are presented in Table 3-12. The ex post kWh savings of 2,804,809 kWh are equal to 104% of the ex ante kWh savings.

Table 3-12 Ex Ante and Ex Post Gross Annual kWh Savings for Retro-Commissioning Program

Stratum	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
1	1,575,980	1,715,132	109%
2	507,414	465,686	92%
3	357,664	347,421	97%
4	267,008	276,570	104%
	2,708,066	2,804,809	104%

The Retro-Commissioning Program sample, shown in Table 3-13, included air compressor optimization and leak repair along with whole building retro-commissioning.

Table 3-13 Ex Ante and Ex Post Annual kWh Savings for Retro-Commissioning Program Sample Measures by End Use

End Use	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
Air Comp	774,422	742,256	96%
Cooling	1,185,826	1,258,342	106%
HVAC	747,818	804,211	108%
Total	2,708,066	2,804,809	104%

3.2.1.6. SBDI Program Ex Post Gross kWh Savings

The gross kWh savings of the PY2017 Small Business Direct Install Program sample projects are summarized by sampling stratum in Table 3-14. Overall, for SBDI non-HIMs, ex post gross kWh savings of 444,674 kWh are equal to 104% of the ex ante kWh savings. For SBDI HIMs:

- The gross kWh realization rates of the high impact measure groups are similar.
- HIM 3026 for LED lamps replacing T12 lamps realized 105% of the ex ante savings
- The HIM 3084 for delamping T12 or T8 fixtures realized 109% of the ex ante savings.
- The HIM 3007 for LED screw in BR/R lamps realized 102% of the ex ante savings.

Table 3-14 Ex Ante and Ex Post Gross Annual kWh Savings for the SBDI Program by Sample Stratum

SBDI Program	*Stratum*	*Ex Ante kWh Savings*	*Ex Post Gross kWh Savings*	*Gross kWh Savings Realization Rate*
Non-HIM	1	107,881	103,609	96%
	2	123,053	123,836	101%
	3	197,912	217,229	110%
HIM 3026	1	86,381	89,677	104%
	2	289,288	307,131	106%
	3	89,566	94,494	106%
	4	52,734	54,200	103%
HIM 3084	1	89,034	99,544	112%
	2	74,938	73,519	98%
	3	39,801	48,728	122%
HIM 3007	1	234,901	249,830	106%
	2	64,315	59,074	92%
	3	17,929	14,959	83%
Total		1,467,733	1,535,830	105%

All PY2017 SBDI energy savings is associated with the lighting end use.

3.2.2 Ex Post Gross Peak kW Savings

Table 3-15 contains the ex post gross peak kW reductions of the Custom, EMS Pilot, Standard, New Construction, Retro-Commissioning, and Small Business Direct Install Programs during PY2017.

Table 3-15 Ex Ante and Ex Post Gross Peak kW Savings for BizSavers Programs

Program	*Ex Ante Peak kW Savings*	*Ex Post Gross Peak kW Savings*	*Gross kW Savings Realization Rate*
Custom	17,537.0	17,173.3	98%
EMS	488.3	435.0	89%
Standard	18,281.7	17,076.8	93%
New Construction	4,601.1	4,552.3	99%
Retro-Commissioning	1,858.7	1,936.3	104%
SBDI	1,118.5	1,168.3	104%
Total	43,885.5	42,342.1	96%

Table 3-16 aggregates the same ex post gross kW in the above table, but by measure sampling groups.

Table 3-16 Ex Ante and Ex Post Gross Peak kW Savings for BizSavers Programs and Measure Sampling Group

Program	*Measure Sampling Group*	*Ex Ante Peak kW Savings*	*Ex Post Gross Peak kW Savings*	*Gross kW Savings Realization Rate*
Custom	Non HIM	17,537.0	17,173.3	98%
Standard	Non HIM	7,700.3	7,062.2	92%
Standard	Standard3025	7,275.8	7,069.5	97%
Standard	Standard3026	3,305.6	2,945.1	89%
New Construction	Non HIM	4,601.1	4,552.3	99%
Retro-Commissioning	Non HIM	1,858.7	1,936.3	104%
SBDI	Non HIM	469.8	489.4	104%
SBDI	SBDI3007	154.4	152.7	99%
SBDI	SBDI3026	320.3	336.8	105%
SBDI	SBDI3084	173.9	189.4	109%
EMS	Non HIM	488.3	435.0	89%
Total		43,885.5	42,342.1	96%

The 2023-persistent gross kW savings by end-use category and equipment EUL are shown below for each program. Table 3-17 presents the portfolio-level 2023-presistent kW savings by end-use category and equipment EUL.

Table 3-17 Custom Program End-Use Category and 2023-Persistent kW Savings

End Use	*EUL*	*Ex Post Gross kWh Savings*	*End-Use Category Energy to Coincident Peak Demand Factor*	*2023-Persistent Gross kW Savings*
Custom				
Air Comp	10	800,399	0.0001379439	110.4
Air Comp	15	2,103,626	0.0001379439	290.2
Cooling	10	238,262	0.0009106840	217.0
Cooling	15	4,770,512	0.0009106840	4,344.4
Cooling	20	3,170,122	0.0009106840	2,887.0
Ext Lighting	12	10,772	0.0000056160	0.1
Ext Lighting	15	8,348,990	0.0000056160	46.9
HVAC	10	811,811	0.0004439830	360.4
HVAC	15	4,152,193	0.0004439830	1,843.5
Lighting	10	995,523	0.0001899635	189.1
Lighting	12	546,253	0.0001899635	103.8
Lighting	15	27,821,268	0.0001899635	5,285.0
Miscellaneous	15	4,753,404	0.0001379439	655.7
Motors	15	1,340,338	0.0001379439	184.9
Process	10	299,563	0.0001379439	41.3

End Use	*EUL*	*Ex Post Gross kWh Savings*	*End-Use Category Energy to Coincident Peak Demand Factor*	*2023-Persistent Gross kW Savings*
Process	15	1,273,311	0.0001379439	175.6
Process	20	722,569	0.0001379439	99.7
Refrigeration	12	247,297	0.0001357383	33.6
Refrigeration	15	2,245,043	0.0001357383	304.7
Custom Total		64,651,256		17,173.3
EMS				
Cooling	15	372,662	0.0009106840	339.4
Heating	15	250,197	0.0000000000	0
HVAC	15	215,411	0.0004439830	95.6
EMS Total		838,270		435.0
Custom with EMS		65,489,526		17,608.3

Table 3-18 Standard Program End-Use Category and 2023-Persistent kW Savings

End Use	*EUL*	*Ex Post Gross kWh Savings*	*End-Use Category Energy to Coincident Peak Demand Factor*	*2023-Persistent Gross kW Savings*
Ext Lighting	9	21,330	0.0000056160	0.1
Lighting	8	184,126	0.0001899635	35.0
Lighting	9	10,904,108	0.0001899635	2,071.4
Lighting	10	306,849	0.0001899635	58.3
Lighting	11	379,020	0.0001899635	72.0
Lighting	12	11,664,106	0.0001899635	2,215.8
Lighting	15	9,634,976	0.0001899635	1,830.3
Lighting	16	233,612	0.0001899635	44.4
Lighting	17	55,005,037	0.0001899635	10,448.9
Miscellaneous	9	150,876	0.0001379439	20.8
Miscellaneous	12	1,237,707	0.0001379439	170.7
Miscellaneous	15	7,767	0.0001379439	1.1
Miscellaneous	17	639,200	0.0001379439	88.2
Motors	15	2,450	0.0001379439	0.3
Refrigeration	12	78,366	0.0001357383	10.6
Water Heating	15	48,960	0.0001811545	8.9
		90,498,491		17,076.8

Table 3-19 New Construction Program End-Use Category and 2023-Persistent kW Savings

End Use	*EUL*	*Ex Post Gross kWh Savings*	*End-Use Category Energy to Coincident Peak Demand Factor*	*2023-Persistent Gross kW Savings*
Air Comp	10	1,376,480	0.0001379439	189.9
Air Comp	15	250,424	0.0001379439	34.5
Building Shell	15	94,985	0.0004439830	42.2
Building Shell	20	46,354	0.0004439830	20.6
Cooling	15	7,285	0.0009106840	6.6
Cooling	20	256,910	0.0009106840	234.0
HVAC	10	118,142	0.0004439830	52.5
HVAC	15	128,114	0.0004439830	56.9
Lighting	8	3,183	0.0001899635	0.6
Lighting	10	635,359	0.0001899635	120.7
Lighting	11	9,550	0.0001899635	1.8
Lighting	15	12,813,082	0.0001899635	2,434.0
Motors	15	5,213,142	0.0001379439	719.1
Refrigeration	15	4,707,336	0.0001357383	639.0
		25,660,346		4,552.3

Table 3-20 Retro-Commissioning Program End-Use Category and 2023-Persistent kW Savings

End Use	*EUL*	*Ex Post Gross kWh Savings*	*End-Use Category Energy to Coincident Peak Demand Factor*	*2023-Persistent Gross kW Savings*
Air Comp	10	1,075,713	0.0001379439	148.4
Cooling	10	271,732	0.0009106840	247.5
Cooling	15	267,376	0.0009106840	243.5
Cooling	20	990,966	0.0009106840	902.5
HVAC	10	742,144	0.0004439830	329.5
HVAC	15	146,356	0.0004439830	65.0
		3,494,286		1,936.3

Table 3-21 SBDI Program End-Use Category and 2023-Persistent kW Savings

End Use	*EUL*	*Ex Post Gross kWh Savings*	*End-Use Category Energy to Coincident Peak Demand Factor*	*2023-Persistent Gross kW Savings*
Ext Lighting	9	1,895	0.0000056160	0.01
Lighting	8	28,050	0.0001899635	5.3
Lighting	9	2,034,667	0.0001899635	386.5
Lighting	10	329	0.0001899635	0.1
Lighting	11	10,954	0.0001899635	2.1
Lighting	12	368,610	0.0001899635	70.0
Lighting	15	997,198	0.0001899635	189.4
Lighting	16	48,032	0.0001899635	9.1
Lighting	17	2,654,384	0.0001899635	504.2
Miscellaneous	12	11,077	0.0001379439	1.5
		6,155,195		1,168

Table 3-22 Portfolio End-Use Category and 2023-Persistent kW Savings

End Use	*EUL*	*Ex Post Gross kWh Savings*	*End-Use Category Energy to Coincident Peak Demand Factor*	*2023-Persistent Gross kW Savings*
Air Comp	10	3,252,592	0.0001379439	448.7
Air Comp	15	2,354,050	0.0001379439	324.7
Building Shell	15	94,985	0.0004439830	42.2
Building Shell	20	46,354	0.0004439830	20.6
Cooling	10	509,993	0.0009106840	464.4
Cooling	15	5,417,835	0.0009106840	4,933.9
Cooling	20	4,417,998	0.0009106840	4,023.4
Ext Lighting	9	23,225	0.0000056160	0.1
Ext Lighting	12	10,772	0.0000056160	0.1
Ext Lighting	15	8,348,990	0.0000056160	46.9
Heating	15	250,197	0.0000000000	0.0
HVAC	10	1,672,097	0.0004439830	742.4
HVAC	15	4,642,074	0.0004439830	2,061.0
Lighting	8	215,358	0.0001899635	40.9
Lighting	9	12,938,775	0.0001899635	2,457.9
Lighting	10	1,938,061	0.0001899635	368.2
Lighting	11	399,525	0.0001899635	75.9
Lighting	12	12,578,969	0.0001899635	2,389.5
Lighting	15	51,266,523	0.0001899635	9,738.8
Lighting	16	281,644	0.0001899635	53.5
Lighting	17	57,659,421	0.0001899635	10,953.2

End Use	*EUL*	*Ex Post Gross kWh Savings*	*End-Use Category Energy to Coincident Peak Demand Factor*	*2023-Persistent Gross kW Savings*
Miscellaneous	9	150,876	0.0001379439	20.8
Miscellaneous	12	1,248,784	0.0001379439	172.3
Miscellaneous	15	4,761,171	0.0001379439	656.8
Miscellaneous	17	639,200	0.0001379439	88.2
Motors	15	6,555,929	0.0001379439	904.4
Process	10	299,563	0.0001379439	41.3
Process	15	1,273,311	0.0001379439	175.6
Process	20	722,569	0.0001379439	99.7
Refrigeration	12	325,663	0.0001357383	44.2
Refrigeration	15	6,952,379	0.0001357383	943.7
Water Heating	15	48,960	0.0001811545	8.9
		191,297,845		42,342.1

4. Estimation of Ex Post Net Savings

This chapter reports the results from estimating the net impacts of the program during program year 2017 (PY2017), where net ex post savings represent the portion of ex post gross savings by program participants that can be directly attributed to the effects of the program. Net savings estimated in this report equal gross savings, *minus* free ridership, *plus* participant spillovers, and non-participant spillovers.

4.1 Procedures Used to Estimate Net Savings

The same procedures were used to estimate net savings for all of the BizSavers programs. The following sub-sections describe the methodology used to estimate free ridership, participant spillover, and non-participant spillover.

4.1.1 Procedures Used to Estimate Free Ridership

Free riders are those program participants that would have installed the same energy efficiency measures without the program incentives. Net savings may be less than gross savings because of free ridership impacts, which arise to the extent that participants in a program would have adopted energy efficiency measures and achieved the observed energy changes even in the absence of the program. Conversely, net savings may be greater than gross savings due to energy savings spillovers or market transformation impacts attributable to the program. Participants or non-participants may implement energy efficiency measures due to the influence of the program, without receiving program incentives for implemented measures.

Survey response data collected from a sample of program participants was used to support the net-to-gross analysis. A copy of the survey instrument is presented in Volume II of this report. Based on review of this information, the preponderance of evidence regarding free ridership inclinations was used to attribute a customer's savings to free ridership.

Several criteria determine which portion of a participant's savings should be attributed to free ridership. The first criterion comes from the response to the following two questions:

- "Would you have been financially able to install the equipment or measures without the financial incentive from the BizSavers Program?"
- "To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?"

Respondents answering “No” to the first question and “Yes” to the second question were considered to require program financial assistance to undertake the project and were not deemed to be free riders.

For decision makers who did not indicate lack of financial ability to undertake energy efficiency projects without financial assistance from the program, three additional factors determined what percentage of savings is attributable to free ridership. The three factors are:

- Plans and intentions of the firm to install a measure even without support from the program;
- Influence that the program had on the decision to install a measure; and
- A firm’s previous experience with a measure installed under the program.

For each of these factors, rules were applied to decision-maker survey responses to develop binary variables indicating whether a participant showed free ridership behavior.

The first step was to determine if a participant stated that his or her intention was to install an energy efficiency measure without the help of the program incentive. Two binary variables were constructed to account for customer plans and intentions: one, based on a more restrictive set of criteria that may describe a high likelihood of free ridership, and a second, based on a less restrictive set of criteria that may describe a relatively lower likelihood of free ridership.

The first, more restrictive criteria (Definition 1) indicating customer plans and intentions that likely signify free ridership are as follows:

- The respondent answered “yes” to the following two questions: “Did you have plans to install the measure before participating in the program?” and “Would you have completed the [Equipment/Measure] project even if you had not participated in the BizSavers Program?”
- The respondent answered, “definitely would have installed” to the following question: “If the financial incentive from the BizSavers Program had not been available, how likely is it that you would have installed [Equipment/Measure] anyway?”
- The respondent answered, “did not affect timing of purchase and installation” to the following question: “How did the availability of information and financial incentives through the BizSavers Program affect the timing of your purchase and installation of [Equipment/Measure]?”
- The respondent answered “no, the program did not affect level of efficiency that we chose for equipment” in response to the following question: “How did the availability of information and financial incentives through the BizSavers

Program affect the level of energy efficiency you chose for [Equipment/Measure]?

The second, less restrictive criteria (Definition 2) indicating customer plans and intentions that likely signify free ridership are as follows:

- The respondent answered “yes” to the following two questions: “Did you have plans to install the measure before participating in the program?” and ““Would you have completed the [Equipment/Measure] project even if you had not participated in the BizSavers Program?”
- Either the respondent answered, “definitely would have installed” or “probably would have installed” to the following question: “If the financial incentive from the BizSavers Program had not been available, how likely is it that you would have installed [Equipment/Measure] anyway?”
- Either the respondent answered “did not affect timing of purchase and installation” to the following question: “How did the availability of information and financial incentives through the BizSavers Program affect the timing of your purchase and installation of [Equipment/Measure]?” or the respondent indicated that while program information and financial incentives did affect the timing of equipment purchase and installation, in the absence of the program they would have purchased and installed the equipment within the next two years.
- The respondent answered “no, the program did not affect level of efficiency that we chose for equipment” in response to the following question: “How did the availability of information and financial incentives through the BizSavers Program affect the level of energy efficiency you chose for [Equipment/Measure]?

The second factor was determining if a customer reported that a recommendation from a program representative or past experience with the program was influential in the decision to install a particular piece of equipment or measure.

This criterion indicates that the program’s influence may lower the likelihood of free ridership when either of the following conditions are true:

- The respondent answered “very important” to the following question: “How important was previous experience with the BizSavers Program in making your decision to install [Equipment/Measure]?
- The respondent answered “yes” to the following question: “Did a representative of the BizSavers Program recommend that you install [Equipment/Measure]?”

The third factor was determining if a participant in the program indicated that he or she had previously installed an energy efficiency measure similar to one that they installed under the program without an energy efficiency program incentive during the last three

years. A participant indicating that he or she had installed a similar measure is considered to have a higher likelihood of free ridership.

The criteria indicating that previous experience may signify a higher likelihood of free ridership are as follows:

- The respondent answered “yes” to the following question: “Before participating in the BizSavers Program, had you installed any equipment or measure similar to [Incentivized Equipment/Measure] at your facility?”
- The respondent answered “yes, purchased energy efficient equipment but did not apply for financial incentive.” to the following question: “Has your organization purchased any energy efficient equipment in the last three years for which you did not apply for a financial incentive through the BizSavers Program?”

The four sets of rules just described were used to construct four different indicator variables that address free ridership behavior. For each customer, a free ridership value was assigned based on the combination of variables. With the four indicator variables, there were 12 applicable combinations for assigning free ridership scores for each respondent, depending on the combination of answers to the questions creating the indicator variables. Table 4-1 shows these values. A free ridership score of 100% indicates total free ridership, and a free ridership score of 0% indicates no free ridership.

ADM recognizes that there are potential survey respondent biases, including social desirability bias, which may impact self-report data. The free ridership assessment methodology employed by ADM is constructed with the intention of mitigating those impacts by asking a *series* of questions in assessing the likelihood of free ridership. Additionally, decision maker responses and project documentation were reviewed to assess the reasonableness of free ridership estimates developed using the methodology described above, and to ensure that reported free ridership estimates account for available data regarding the decision-making process.

Table 4-1 Free Ridership Scores for Combinations of Indicator Variable Responses

Indicator Variables				*Free Ridership Score*
Had Plans and Intentions to Install Measure without BizSavers Program? (Definition 1)	*Had Plans and Intentions to Install Measure without BizSavers Program? (Definition 2)*	*BizSavers Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	
Y	N/A	Y	Y	100%
Y	N/A	N	N	100%
Y	N/A	N	Y	100%
Y	N/A	Y	N	67%
N	Y	N	Y	67%
N	Y	Y	Y	33%
N	N	N	Y	33%
N	Y	N	N	33%
N	Y	Y	N	0%
N	N	N	N	0%
N	N	Y	N	0%
N	N	Y	Y	0%

4.1.2 Procedures Used to Estimate Participant Spillover

ADM used two data sources for calculation of program participant spillover; Lockheed Martin measure-level spillover report and participant survey data. The measure-level spillover report includes all measures that were flagged as an “Installed Spillover Measure.” Generally, the non-incented measures were small components of a broader project comprised of incentivized measures. The spillover ex ante savings estimates were reviewed by ADM and determined to be reasonable and aligned with ex ante savings estimates for incentivized measures. The savings were calculated as equal to the ex ante savings of the non-incented measure, factored by 1) the project-specific gross realization and 2) the project-specific non-free ridership rate [(Ex Post Gross kWh - Free Ridership Ex Post kWh) / Ex Post Gross kWh].

The second source of participant spillover was additional measures installed without incentives identified by decision makers that completed the online participant survey. Survey respondents provided information on the installation of additional equipment implemented without a program incentive, including information on the program’s influence on the decision to the install the additional equipment, and information on the measure specifications used to estimate the energy saving impacts of the equipment.

Specifically, respondents were asked:

- Since participating in the BizSavers Program has your organization installed any ADDITIONAL energy efficiency measures at this facility or at your other facilities

within Ameren Missouri's service territory that did NOT receive incentives through Ameren Missouri's BizSavers Program?

Customers who indicated "yes" were identified as potential spillover candidates. Potential spillover candidates were also asked to identify the type of additional equipment installed and provide information about the equipment for use in estimating energy savings. For each type of equipment that respondents reported installing, respondents were asked the following two questions to assess if any savings resulting from the additional equipment installed were attributable to the program:

- [SP1] How important was your experience with the BizSavers Program in your decision to install this [EQUIPMENT TYPE], using a scale of 0 to 10, where 0 is not at all important and 10 is extremely important?"
- [SP2] If you had not participated in the BizSavers Program, how likely is it that your organization would still have installed this [EQUIPMENT TYPE], using a 0 to 10 scale, where 0 means you definitely WOULD NOT have installed this equipment and 10 means you definitely WOULD have installed this equipment?

A spillover score was developed based on these responses as follows:

Spillover Score = Average(SP1, 10-SP2)

The energy savings of equipment installations associated with a spillover score of greater than five were attributed to the program.

The energy savings of the spillover measures were estimated using the deemed values from the Ameren Missouri TRM.

In total, spillover impacts were calculated for nine survey respondents. Survey respondent net savings were adjusted based on the reported spillover savings. To extrapolate spillover savings to non-survey respondents, a spillover ratio was calculated as follows:

Spillover Ratio = Sum of Sample Reported Spillover/ Sum of Sample Ex Post Gross Savings

4.1.3 Procedures Used to Estimate Non-Participant Spillover

The evaluation team assessed PY2017 non-participant spillover energy savings through data collected via trade ally surveys.

A detailed description of the methodology used for the analysis is presented in Volume II of this report. The evaluation team's objective was to take a conservative approach to estimate non-participant spillover energy savings that occurred outside of the program but were influenced through upstream program partners, program trade allies. The evaluation team deemed it appropriate to focus only on lighting measure groups for which kWh energy savings could be reliably estimated.

4.2 Results of Net Savings Estimation

The procedures described in the preceding section were used to estimate net-to-gross ratios for the BizSavers Program for program year 2017 (PY2017). The following subsections detail the results of the free ridership and spillover analyses.

4.2.1 Results of Estimation of Free Ridership

The data used to assign free ridership scores were collected through a customer survey of 545 customer decision makers for projects completed during PY2017. Individual free ridership rates were estimated for all five programs in the table below.

For purposes of adjusting gross savings to account for free ridership, the gross savings of projects associated with decision makers that were surveyed by ADM were adjusted by that decision makers specific free-ridership *score (Gross Savings * (1 – Free Ridership Score))*. Gross savings of projects associated with decision makers that were *not* surveyed by ADM were adjusted by the program-level free ridership score. For the programs for which free ridership research was conducted, Table 4-2 below provides a summary of the program-level free ridership scores stated above.

Table 4-2 Percent of net ex post kWh Savings Associated with Free-Ridership

Program Component	*Percent of kWh Savings Associated with Free Ridership*
Custom EMS	7.7% 0.0%
Standard	5.0%
New Construction	0.0%
Retro-Commissioning	0.0%
SBDI	0.3%
Total	5.0%

4.2.2 Results of Estimation of Spillover Energy Savings

PY2017 spillover energy impacts were assessed from program participants and non-participants. Table 4-3 summarizes the results. Custom, EMS, New Construction and RetroCommissioning all have zero Non-Participant Spillover, as the identified installed lighting spillover products were attributed to similar measures within the Standard and SBDI programs.

Table 4-3 Summary of Spillover kWh Energy Savings

Program Component	*Spillover Total*	*Participant Spillover (Tracked)*	*Participant Spillover (Survey)*	*Non-Participant Spillover*
Custom	3,287,131	170,789	3,116,342	0
EMS	0	0	0	0
Standard	2,316,778	0	1,758,850	557,928
New Construction	611,804	610,782	1,022	0
Retro-Commissioning	0	0	0	0
SBDI	108,810	0	17,350	91,460
Total	6,324,522	781,571	4,893,564	649,388

4.3 Ex Post Net kWh Savings

Table 4-4 summarizes the program-level ex post net kWh savings along with associated net-to-gross ratios.

Table 4-4 Summary of Free Ridership, Spillover, and Net kWh Savings by Program

Program	*Estimated Free Ridership*	*Spillover*	*Ex Post Gross kWh Savings*	*Ex Post Net kWh Savings*	*Net-to-Gross Ratio*
Custom	4,882,313	3,287,131	64,651,256	63,056,074	98%
EMS Pilot	0	0	838,270	838,270	100%
Standard	4,446,377	2,316,778	90,498,491	88,368,892	98%
New Construction	0	611,804	25,660,346	26,272,150	102%
Retro-Commissioning	0	0	3,494,286	3,494,286	100%
SBDI	19,185	108,810	6,155,195	6,244,820	101%
Total	9,347,875	6,324,522	191,297,845	188,274,492	98%

Table 4-5 below provides the free-ridership and spillover values as a percent of ex post net kWh savings. At the portfolio level, kWh savings associated with free ridership represents 5% of total ex post net kWh savings. Additionally, at the portfolio level, spillover kWh savings represents 3.4% of total BizSavers ex post net kWh savings.

Table 4-5 Summary of Free Ridership and Spillover as Percent of Ex Post Gross kWh

Program Component	*Ex Post Net kWh Savings*	*Estimated Free Ridership*	*FR as a % of Ex Post Net kWh*	*Spillovers*	*SO as a % of Ex Post Net kWh*
Custom	63,056,074	4,882,313	7.7%	3,287,131	5.2%
EMS	838,270	-	0.0%	-	0.0%
Standard	88,368,892	4,446,377	5.0%	2,316,778	2.6%
New Construction	26,272,150	-	0.0%	611,804	2.3%
Retro-Commissioning	3,494,286	-	0.0%	-	0.0%
SBDI	6,244,820	19,185	0.3%	108,810	1.7%
Total	188,274,492	9,347,875	5.0%	6,324,522	3.4%

4.3.1 Program Level Net Energy Savings by End Use

The following tables provide program-*level net kWh energy savings summarized by end use category. Program-level net kWh savings are presented in Table 4-6 through Table 4-10.*

Table 4-6 Custom Program and EMS Pilot Program Net kWh Savings by End Use Category

Custom End Use Category	*Ex Post Net kWh Savings*	*Percent of Total Ex Post Net kWh Savings*
Custom		
Air Comp	2,767,019	4%
Cooling	7,957,049	12%
Ext Lighting	8,705,598	14%
Heating	803	0%
HVAC	4,832,863	8%
Lighting	28,006,710	44%
Miscellaneous	4,597,060	7%
Motors	1,340,771	2%
Process	2,289,886	4%
Refrigeration	2,558,316	4%
EMS		
Cooling	372,662	<1%
Heating	250,197	<1%

Custom End Use Category	*Ex Post Net kWh Savings*	*Percent of Total Ex Post Net kWh Savings*
HVAC	215,411	<1%
Custom with EMS Total	63,894,344	100%

Table 4-7 Standard Program Net kWh Savings by End Use Category

End Use Category	*Ex Post Net kWh Savings*	*Percent of Total Ex Post Net kWh Savings*
Ext Lighting	21,084	<1%
Lighting	86,282,610	98%
Miscellaneous	1,947,411	2%
Motors	2,370	<1%
Refrigeration	75,806	<1%
Water Heating	39,611	<1%
Total	88,368,892	100%

Table 4-8 New Construction Program Net kWh Savings by End Use Category

End Use Category	*Ex Post Net kWh Savings*	*Percent of Total Ex Post Net kWh Savings*
Air Comp	1,626,967	6%
Building Shell	142,180	1%
Cooling	264,206	1%
Heating	9,494	<1%
HVAC	248,554	1%
Lighting	13,461,725	51%
Motors	9,834,093	37%
Refrigeration	684,933	3%
Total	26,272,150	100%

Table 4-9 Retro-Commissioning Program Net kWh Savings by End Use Category

End Use Category	*Ex Post Net kWh Savings*	*Percent of Total Ex Post Net kWh Savings*
Air Comp	1,075,713	31%
Building Shell	1,530,074	44%
Cooling	888,500	25%
Total	3,494,286	100%

Table 4-10 SBDI Program Net kWh Savings by End Use Category

End Use Category	*Ex Post Net kWh Savings*	*Percent of Total Ex Post Net kWh Savings*
Lighting	6,233,751	100%
Miscellaneous	11,069	<1%
Total	6,244,820	100%

4.4 Ex Post Net Peak kW Savings

The PY2017 ex post net peak kW savings are summarized by program in Table 4-11.

Table 4-11 Summary of Free Ridership, Spillovers, and Net Peak kW Impacts by Program

Program	*Estimated Free Ridership kW*	*Spillovers kW Savings*	*Ex Post Gross Peak kW Savings*	*Ex Post Net Peak kW Savings*
Custom	1,256.2	708.0	17,173.3	16,625.1
EMS	0.0	0.0	435.0	435.0
Standard	837.4	437.7	17,076.8	16,677.1
New Construction	0.0	82.8	4,552.3	4,635.1
Retro-Commissioning	0.0	0.0	1,936.3	1,936.3
SBDI	3.6	20.7	1,168.3	1,185.3
Total	2,097.2	1,249.1	42,342.1	41,494.0

Below, Table 4-12 through Table 4-16 present, for each program, the 2023-presistent net kW savings by end-use category and equipment EUL. Then Table 4-17 presents the portfolio-level 2023-presistent kW savings by end-use category and equipment EUL.

Table 4-12 Custom Program and EMS Pilot Program End-Use Category and 2023-Persistent Net kW Savings

End Use Category	*End-Use Category Energy to Coincident Peak Demand Factor*	*Ex Post Net kWh Savings*	*2023-Persistent Net kW Savings*
Custom			
Air Comp	0.0001379439	2,767,019	381.7
Cooling	0.0009106840	7,957,049	7,246.4
Ext Lighting	0.0000056160	8,705,598	48.9
Heating	0.0000000000	803	0.0
HVAC	0.0004439830	4,832,863	2,145.7
Lighting	0.0001899635	28,006,710	5,320.3
Miscellaneous	0.0001379439	4,597,060	634.1
Motors	0.0001379439	1,340,771	185.0
Process	0.0001379439	2,289,886	315.9
Refrigeration	0.0001357383	2,558,316	347.3
Custom Total		63,056,074	16,625.1
EMS Pilot			
Cooling	0.0009106840	372,662	339.4
Heating	0.0000000000	250,197	0.0
HVAC	0.0004439830	215,411	95.6
EMS Total		838,270	435.0
Custom with EMS Total		63,894,344	17,060.1

Table 4-13 Standard Program End-Use Category and 2023-Persistent Net kW Savings

End Use Category	*End-Use Category Energy to Coincident Peak Demand Factor*	*Ex Post Net kWh Savings*	*2023-Persistent Net kW Savings*
Ext Lighting	0.0000056160	21,084	0.1
Lighting	0.0001899635	86,282,610	16,390.5
Miscellaneous	0.0001379439	1,947,411	268.6
Motors	0.0001379439	2,370	0.3
Refrigeration	0.0001357383	75,806	10.3
Water Heating	0.0001811545	39,611	7.2
		88,368,892	16,677.1

Table 4-14 New Construction Program End-Use Category and 2023-Persistent Net kW Savings

End Use Category	*End-Use Category Energy to Coincident Peak Demand Factor*	*Ex Post Net kWh Savings*	*2023-Persistent Net kW Savings*
Air Comp	0.0001379439	1,626,967	224.4
Building Shell	0.0004439830	142,180	63.1
Cooling	0.0009106840	264,206	240.6
Heating	0.0000000000	9,494	0.0
HVAC	0.0004439830	248,554	110.4
Lighting	0.0001899635	13,461,725	2,557.2
Motors	0.0001379439	5,218,605	719.9
Refrigeration	0.0001357383	5,300,421	719.5
		26,272,150	4,635.1

Table 4-15 Retro-Commissioning Program End-Use Category and 2023-Persistent kW Savings

End Use Category	*End-Use Category Energy to Coincident Peak Demand Factor*	*Ex Post Net kWh Savings*	*2023-Persistent Net kW Savings*
Air Comp	0.0001379439	1,075,713	148.4
Cooling	0.0009106840	1,530,074	1,393.4
HVAC	0.0004439830	888,500	394.5
Total		3,494,286	1,936.3

Table 4-16 SBDI Program End-Use Category and 2023-Persistent Net kW Savings

End Use Category	*End-Use Category Energy to Coincident Peak Demand Factor*	*Ex Post Net kWh Savings*	*2023-Persistent Net kW Savings*
Ext Lighting	0.0000056160	1,974	<1
Lighting	0.0001899635	6,231,777	1,183.8
Miscellaneous	0.0001379439	11,069	1.5
		6,244,820	1,185.3

Table 4-17 Portfolio End-Use Category and 2023-Persistent Net kW Savings

End Use Category	*End-Use Category Energy to Coincident Peak Demand Factor*	*Ex Post Net kWh Savings*	*2023-Persistent Net kW Savings*
Air Comp	0.0001379439	5,469,698	754.5
Building Shell	0.0004439830	142,180	63.1
Cooling	0.0009106840	10,123,990	9,219.8
Ext Lighting	0.0000056160	8,728,655	49.0
Heating	0.0000000000	260,494	0.0
HVAC	0.0004439830	6,185,328	2,746.2
Lighting	0.0001899635	133,982,822	25,451.8
Miscellaneous	0.0001379439	6,555,540	904.3
Motors	0.0001379439	6,561,746	905.2
Process	0.0001379439	2,289,886	315.9
Refrigeration	0.0001357383	7,934,543	1,077.0
Water Heating	0.0001811545	39,611	7.2
		188,274,492	41,494.0

5. Process Evaluation

This chapter presents the results of the program year 2017 (PY2017) process evaluation of the Ameren Missouri BizSavers Programs. The purposes of this process evaluation are to assess the effectiveness of Ameren Missouri's PY2017 BizSavers Programs in delivering appropriate energy efficiency technologies to the business sector served by Ameren Missouri and to identify ways to improve the BizSavers Programs and inform future program design. The evaluation has been guided by five regulatory research questions specified in 4 CSR 240-22.070(8): to identify the primary market imperfections; to investigate whether the target market segment is appropriately defined, program measures reflect the target market's needs and available technologies, and communication and delivery channels and mechanisms are appropriate; and to investigate whether there are better ways to address market imperfections to increase adoption of program measures.

This evaluation addressed topics of importance to the BizSavers programs in general, such as program communication, customer decision making, and trade allies' and customers' program experience. In addition to addressing cross-cutting topics and the Standard and Custom Programs (which produce the majority of energy savings); this year's evaluation investigated special topics related to the Energy Management System Pilot Program.

The remainder of this chapter is organized into nine main sections. Section 5.1 presents a summary of evaluation data sources and methods, with details of data collection methods for the participant, nonparticipant, and trade ally surveys. Section 5.2 presents high-level summaries of process findings. Section 5.3 describes cross-cutting findings from program staff interviews and analyses of the customer and program databases. The remaining sections address program-specific findings: Section 5.4 relates to the Standard and Custom Programs; Section 5.5, to the Small Business Direct Install (SBDI) Program; Section 5.6, to the New Construction Program; Section 5.7, to the Retro-commissioning Program; and Section 5.8, to the Energy Management System (EMS) Pilot.

5.1 Summary of Evaluation Sources and Methods

The evaluation team collected and analyzed both qualitative and quantitative data to understand program process and outcomes. As summarized in Table 5-1 the team interviewed or surveyed five staff members of Ameren Missouri's implementation contractor, Lockheed Martin; more than 550 program participants; more than 100 trade allies, including 12 SBDI Service Providers, 11 architects, and 5 Retro-Commissioning Service Providers; and 769 nonparticipant customers. The team also reviewed program documentation to gain a full understanding of plans (e.g., marketing plan) and

processes and analyzed the program database to characterize the population of program participants and review data quality.

Table 5-1 Evaluation Data Collection Activities

*Data Source**	*Method*	*Dates*	*Key Research Topics*	*Analysis Type*
Program implementer staff (5)	Telephone in-depth interview	August to December 2017	Program management; communication; current and new offerings; goals and progress; trade ally relations; marketing and outreach; tracking and reporting; quality assurance	Qualitative
Participants, all programs (545)	Online survey	August 2017 to March 2018	Program awareness, decision-making, equipment preferences; experience and satisfaction	Quantitative
Participants, Retro-commissioning Program (6)	Telephone interview	November 2017 to January 2018	Program experiences; installed equipment; satisfaction with program	Qualitative
Trade allies, all programs (101)	Online survey	March 2018	Awareness and effect of program changes; customer awareness of BizSavers; awareness of and interest in new programs.	Quantitative and Qualitative
Architects, New Construction program (11)	Telephone interview	November 2017 to February 2018	Program awareness; role in equipment decisions; program effect on decision making and efficiency; experience with program processes.	Qualitative
Retro-commissioning Service Providers (5)	Telephone interview	December 2017 to January 2018	Customer recruitment and awareness of retro-commissioning; identification of upgrades and installations; comparison with other retro-commissioning programs; training	Qualitative
Nonparticipant customers (667)	Online and Telephone survey	January to February 2018	Program awareness, interest, and barriers to participating; equipment decisions	Quantitative and Qualitative
Program documentation	Document review	July 2017 to April 2018	Program function; tracking and reporting; quality control	Qualitative
Database analysis	Database review	January to April 2018	Number of projects; project type and details; data quality	Quantitative

Following are details of the data collection methods and descriptions of the respondents for the participant, nonparticipant, and trade ally surveys, which constituted the large bulk of primary data collection. The large sample sizes for all three of those surveys provide high levels of precision (greater than 5% precision at greater than 95% confidence for the participant and nonparticipant surveys; greater than 7% precision at 90% confidence for the trade ally survey).

When examining differences between subgroups of survey respondents, the evaluation team tested the statistical significance of the difference (typically using Pearson Chi-square, Mann-Whitney U, or Kruskal-Wallis for differences in proportions and *t*-test for differences in means). Only differences that were statistically significant ($p \leq .05$) are reported.

5.1.1 Participant Online Survey Method and Response

The evaluation team sent all program participants an invitation to take an online survey about their program experiences. A total of 2,436 invitations were sent in August, September, and October of 2017 and in March of 2018.

A total of 545 program participants completed the online participant survey, representing a 22% response rate. Of those, 378 had completed a Standard project, 154 had completed a Custom project, 87 completed an SBDI project, seven completed a New Construction project, and five completed a project in the EMS pilot program. Eighty-two survey respondents had completed projects in two or more programs (mostly Standard and Custom).

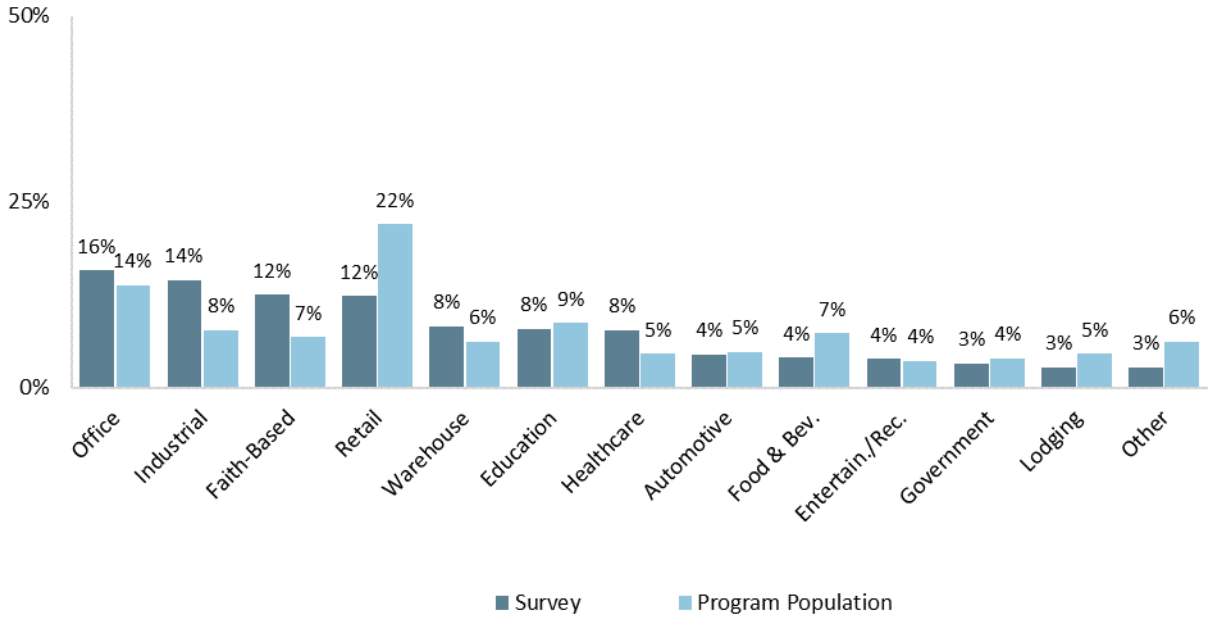
Respondents were the project contact identified in the program records. About two-thirds were the company owner, a top officer or director, or someone with facility management or maintenance responsibilities. Most others reported some management or administrative title.

Of possible significance for program marketing and outreach plans, responses revealed that respondents for automotive, entertainment, retail, and office-based businesses and small businesses in general (those occupying less than 10,000 square feet or having just one location) were the most likely to be a company owner or executive.

Respondents represented a variety of building end-uses (Figure 5-1). The survey sample generally reflected the distribution of building uses in the participant population.

About three-quarters (77%) of respondents reported owning their buildings, most of whom (70% of the sample) also occupy it while the others lease it out; one-sixth (17%) lease their space; the remaining respondents did not describe their building ownership.

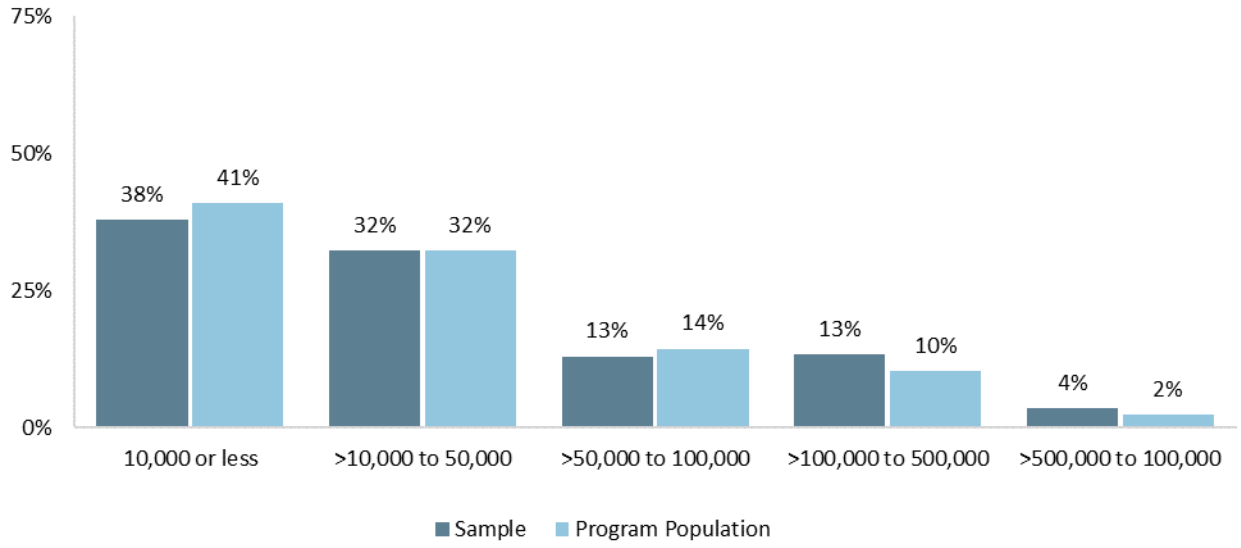
Figure 5-1 Type of Building – Sample Compared to Program Population



The distribution of the survey sample across facility sizes adheres closely to the distribution within the participant population – in both cases, the distribution is skewed toward smaller buildings (Figure- 5-2).[7]

[7] About three-quarters of project records do not include building size. However, all project records had total annual kWh consumption. For 13 of 16 business types, accounting for 96% of project records, annual kWh consumption correlated with building size at moderate to high levels (*r* ranging from .40 to .93). Therefore, the evaluation team was able to interpolate missing building size by using separate regression formulas for each of those 13 business types. For the other three types, the evaluation team replaced the missing building size with the mean for that business type.

Figure- 5-2 Building Size- Sample Compared to Program Population



The number of business locations was similarly skewed, with about two-fifths (38%) reporting a single location. Nearly one-quarter of respondents – disproportionately representing office building types – did not report the number of locations making it difficult to gauge the skew of the distribution. However, the number who reported two to five locations was somewhat more than twice the number who reported more locations.

The number of reported locations varied by building end-use. Respondents representing both Grocery and the Food and Beverage business types were about twice as likely to report only one business location, relative to other respondents, while government, entertainment, and education organizations were the most likely to report six or more work locations.

5.1.2 Nonparticipant Online and Telephone Survey Method and Response

The evaluation team carried out a primarily online survey of program non-participants, with some additional telephone calls. From the Ameren Missouri customer database, the team identified 72,900 unique customers (based on business name) that had not participated in the BizSavers program. Unique email addresses were available for 25,093 of these customers; the team sent up to three email invitations to each of the nonparticipant customers with email addresses.

The team planned to conduct a phone survey with about 30 customers for whom email addresses were not available to check their comparability with online survey respondents. The team drew a sample of 1,500 customers and used a third-party provider to append contacts with titles indicating responsibility for equipment decisions (e.g., owner, officer, facilities manager) and phone numbers. The provider was able to

identify such contacts for 253 of the customers, which formed the frame for the phone survey.

The web survey produced 741 valid responses (Table 5-2), 3% of the invitations sent to valid emails. Another 281 customers started the survey but were screened out because they were not involved in energy-using equipment decisions; 283 passed the screener questions but completed only the next one to three questions; 27 were deemed ineligible after completing the survey because they reported their property was not a business.[8] After calling all 253 numbers to exhaustion, the team was able to start the survey with 35 additional customers, seven of whom did not pass the screeners.

Table 5-2 Disposition Summary

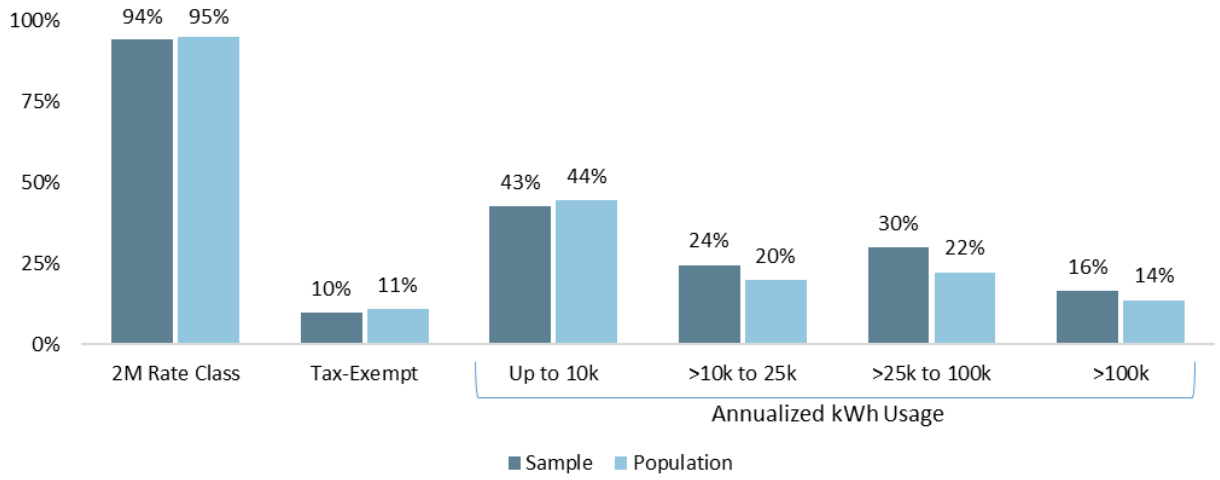
Disposition	*Count*	*Percent of Valid Email/Phone Number*
Web Survey		
Nonparticipants sent email	25,093	n/a
Email was undeliverable	1,974	n/a
Valid email	23,119	100%
Responses	1,332	5%
Screened-out or ineligible	591	2%
Valid responses	741	3%
Phone Survey		
Attempted	223	n/a
Bad phone number	5	n/a
Valid phone number	218	100%
Refused	22	10%
Did not pass screening	7	3%
Valid responses	28	15%
Total valid responses (online + phone)	769	n/a

The nonparticipant survey sample provided a good representation of the overall nonparticipant population in terms of rate class (2M, representing small-to-medium-sized businesses, versus other rate classes), tax-exempt status, and annualized electricity usage (Figure 5-3).[9]

[8] These customers generally reported their "business" account was for a specialized purpose but was on a residential property.

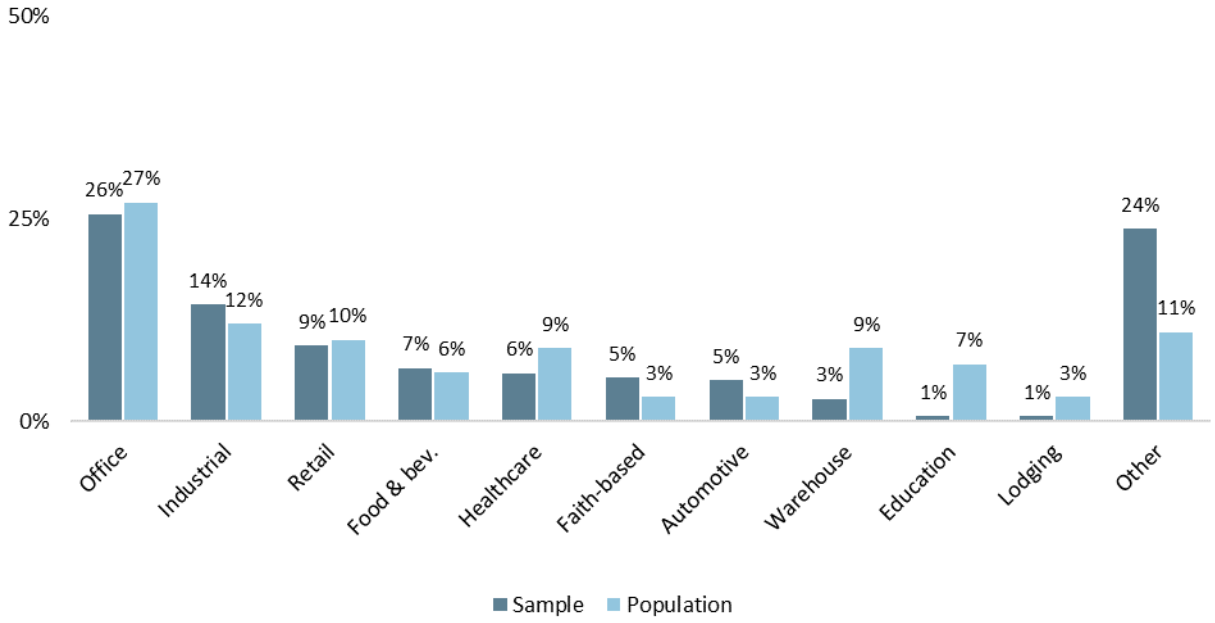
[9] "Annualized kWh usage" means average monthly usage times 12. (Some customers did not have usage over the full year.)

Figure 5-3 Sample Compared to Nonparticipant Population: Rate Class, Tax-Exempt Status, and Annualized kWh Usage



Survey respondents also generally represented the distribution of business types across the population at large (Figure 5-4), although the sample somewhat underrepresented warehouse, industrial, and education business types, while over-representing "other" business types.

Figure 5-4 Distribution of Business Types, Population vs. Sample



Note: "Other" includes transportation, construction, agriculture, information technology, and other miscellaneous categories.

The majority of survey respondents reported having a leadership role at their company. Nearly three-quarters (72%) of those identifying their title were the company owner, a

top officer or director, or someone with facility management or maintenance responsibilities. Most others reported some management or administrative title. Just more than half (55%) of survey respondents reported owning their work facility, most of whom also reported occupying that facility; 29% reported leasing their work space.

Work facilities ranged in size, but the reported sizes were skewed toward smaller buildings (Table 5-3). The large majority of nonparticipants (82%) reported having no more than one work location within Ameren Missouri territory, and very few (3%) reported more than five locations.[10]

Table 5-3 Total Square Footage of Workplace Locations (n = 769)

Range	*Percent*	*Percent reporting*
Up to 1,000	10%	14%
>1,000 to 5,000	34%	46%
>5,000 to 25,000	19%	26%
>25,000 to 50,000	5%	7%
>50,000	5%	7%
Don't know, no response	27%	n/a

Almost all nonparticipants (99%) reported their company or organization was responsible for maintenance or replacement decisions of at least one type of equipment (Table 5-4). Respondents of the large-business rate classes were significantly more likely to report responsibility for heating, cooling, and motors than 2M respondents.

[10] About 40% of respondents reported no work locations in Ameren Missouri territory. This was clearly not possible, as these were Ameren Missouri commercial customers. The evaluation team assumed these customers had one work location.

Table 5-4 Equipment Responsibilities Among Nonparticipants (n = 769)

Equipment Type	*Percent*
Any equipment responsibility	99%
Lighting	86%
Any non-lighting	8%
Heating	77%
Cooling	77%
Computer	71%
Refrigeration	52%
Motors	31%
Other	5%
Both lighting and non-lighting	83%

5.1.3 Trade Ally Online Survey

The evaluation team conducted an online survey of trade allies who were active in Ameren Missouri's service territory. The team sent up to three email invitations to take the survey to a total of 447 individual trade allies, representing 276 companies, who had completed at least one BizSavers project during program year 2017. The email offered a $50 gift card for completing the survey.

A total of 101 trade allies, representing 81 companies, completed the survey. Those 101 survey respondents were responsible for 35% of the BizSavers projects and 33% of the ex ante savings in PY2017.

The 101 surveyed trade allies represented a range of business types that were representative of the Ameren Missouri Trade Ally Network: 55 reported being contractors, including 43 who install equipment and 12 who provide energy efficiency services such as design, energy consulting, and air compression audits; 39 said they were vendors who sell equipment to contractors and business; and seven did not specify they type of services their company provides.

Surveyed trade allies reported working with a range of equipment types (Table 5-5). A large majority had experience with lighting equipment and somewhat fewer than half (44%) had non-lighting experience, with about one-third (30%) reporting experience with both.

Table 5-5 Types of Equipment Installed or Sold by Surveyed Trade Allies (n=101; Multiple Responses Allowed)

Equipment Type	*Count*	*Percent*
Lighting	86	85%
Energy or Building management systems (EMS or BMS)	21	21%
Motors	20	20%
HVAC (Cooling / Heating)	19	19%
Air compression / Refrigeration	18	18%
Water heating	12	12%
Building shell	9	9%
Industrial process	8	8%
Other	15	15%

5.2 High-Level Summary of Process Evaluation Findings

5.2.1 Program Progress

Overall, the BizSavers program is doing well – total ex post energy savings are 129% of goal – but some specific programs fared better than others. The Standard and New Construction Programs far exceeded their goals, driving the overall success. Overall, the representation of business types, sizes, and geographic areas in the program is consistent with their representation in the customer population.

On the other hand, the Custom Program (together with the EMS pilot) achieved somewhat less than three-quarters of goal and the SBDI and Retro-Commissioning programs both attained about half of their goals.

Reasons for low activity in the SBDI Program are not entirely clear. Surveyed Service Providers reported success at scheduling walk-through assessments and in converting those to projects, cited few barriers to doing more projects, and said that no business was too small to approach. One concern for the SBDI Program is that it continues to rely on a few highly active Service Providers, with five providers accounting for three-quarters of savings and one responsible for about half of savings.

5.2.2 Awareness

Awareness of the BizSavers Program is moderate among nonparticipants, with larger customers reporting the highest levels of awareness. BizSavers awareness varies by customer type, with faith-based organizations and construction-related trades reporting the highest levels of program awareness and entertainment and restaurant businesses reporting the lowest levels of awareness. Awareness specifically related to the increase in Custom cooling incentives is low, especially among Custom Program participants.

About half of lighting trade allies who are not already SBDI Service Providers are aware of the program, and a similar proportion of trade allies who work with energy or building management systems are familiar with the EMS pilot program. Interviewed design professionals indicate limited awareness of New Construction program incentives, among themselves and their customers.

Three-quarters of program participants learned about the program from a contractor or vendor, while about one in seven nonparticipants reported that source of awareness. When the estimated percentage of overall program participation is taken into consideration, this means that as much as one-third of customers who learn about BizSavers incentives from a contractor or vendor become participants, compared to about 3% of those who learn about the program from other means.

5.2.3 Decision Making

Vendors and contractors are highly influential in customer equipment upgrade decisions. SBDI service providers have the greatest influence on participants' decisions about lighting equipment. Program participants of larger organizations are most likely to report interactions with a BizSavers program representative or with a designer or architect and are more likely than others to rate those interactions as influential on their decisions to participate. The relative influence levels of some trade groups vary somewhat among nonparticipant customer types, with distributors relatively more influential among tax-exempt and large customers than non-exempts and smaller customers.

5.2.4 Program Interest

Nonparticipants are moderately interested in using BizSavers incentives, with just over one-third reporting high likelihood of using them in the next two years. Interest was higher for large than small-to-medium customers and higher for tax-exempt than for non-tax-exempt customers. Many participants of the SBDI program are not aware of, but are interested in, using BizSavers incentives for other types of energy efficient equipment.

Despite the low achievement of the SBDI Program this year, several factors point to opportunities for expansion. Many small customers have little LED lighting installed and are motivated to replace lighting to reduce their electricity bill, and surveyed nonparticipants indicated moderate-to-high likelihood of agreeing to schedule a walk-through assessment if approached by an SBDI Service Provider. While most small customer types are about equally good targets for SBDI than others, Food and Beverage customers may provide the best return on recruitment effort, as a high percentage of such customers are responsible for lighting purchases and are motivated to change lighting to reduce their energy bills.

Although awareness of the SBDI was moderate among lighting trade allies, more than one-third said they would be interested in becoming a Service Provider. Thus, the program still has the opportunity to increase program participation through recruitment of new Service Providers as well as by driving greater participation among those already in the program.

Interest was lower for the EMS pilot program, with about one-quarter of tax-exempt nonparticipants (one-third of those with higher-than-median usage) indicating an interest in learning more about the incentives.

5.2.5 Participant Program Experience

Program participants view their experience with the BizSavers program positively, with particularly high satisfaction with the Custom, Standard, and SBDI programs. Participants also report that incentive amounts generally align with their expectations. Although participants largely rate the application instructions as being clear, custom incentive applications often require resubmittal with additional documentation or revised savings calculations. Additionally, participants report not being clear on the rules governing Fast Track applications. Participants, however, generally know how to get application assistance, which promotes satisfaction with the process.

The program delivered the incentive within the contractually mandated 45 days for nearly all projects.

5.3 Cross-Cutting Feedback: Program Staff, Database Analysis, Trade Allies

The evaluation provided cross-cutting information on program processes and progress from three sources: in-depth interviews with program staff; analysis of the project tracking data; and the trade ally survey. These are each discussed in turn in the following subsections.

5.3.1 Cross-Cutting Program Staff Feedback

In August and September of 2017, evaluation staff interviewed the Lockheed Martin BizSavers program manager, operations lead, senior marketing manager, and marketing manager. Evaluation staff later interviewed the business development lead in December of 2017. Key findings are summarized below.

5.3.1.1. Program Staffing

Lockheed has had some staff changes in the current program year:

- Lockheed hired an associate program manager to lead operations and engineering team, taking over some of the responsibilities of the operations lead. That person had been a program engineer for BizSavers during the first program cycle (MEEIA 1). The operations lead now has responsibility for “overall program

performance and direction," with subject matter expertise on project tracking system, including process improvements, forecasting, and data requests.

- At the time of the staff interviews, the former specialty programs lead had left Lockheed. Lockheed promoted an implementation specialist to that position. In addition, the former data analyst had moved to a different program and has since been replaced through a new hire.
- Lockheed hired a 30-year veteran with a major HVAC firm as a business development (BD) representative to "bridge the gap" between business development and engineering with complex projects and provide an increased level of program engagement as the programs mature. This new staff member reportedly developed incentive calculations that customers' engineers can use to calculate incentives.
- The program manager reported that other Lockheed offices can provide staff to help out the BizSavers staff as needed during peak times. Lockheed promoted two implementation specialists into the BD role and has hired a previous program manager from Laclede Gas Company (now Spire) into the BD staff. According to the BD lead, these staff have done a "great job" and been "effective from the start."

5.3.1.2. Program Progress

Program progress reportedly is going well. Key findings were:

- Through program marketing and outreach, the program was having a "good year" in spreading across the Ameren Missouri territory, which is consistent with the evaluation team's database analysis (see section 5.3.2.4).
- Savings and pipelines were ahead of forecasts for Custom, Standard, and New Construction program.
- Retro-commissioning and New Construction savings reportedly constitute an acceptable proportion of overall program savings, given the higher cost per kWh saved. Still, Retro-commissioning had slowed some, possibly partly because of opt-outs, and the BD lead is engaging with Retro-commissioning Service Providers (RSPs) to find out other reasons and attempt to increase participation.
- The program was reportedly doing well at explaining the incorporation of a kW factor in program incentives.

5.3.1.3. Program Marketing and Outreach

The evaluation team followed up on the report, in the previous year's evaluation, that Lockheed Martin had redesigned program collateral to provide a new look and ensure that previous years' collateral does not get mistaken for current. Staff reported that

Ameren Missouri was pleased with the new designs and had asked Lockheed to work with the implementer for the residential programs to draft new brand identity guidelines and develop new collateral for the residential programs.

Lockheed staff also reported they are trying to get Ameren Missouri to allow freer use of social media. Currently, the use of social media is controlled to a large extent by Ameren Missouri corporate.

In addition to the above, staff clarified a previous misunderstanding about the distribution of program collateral to trade allies. Based on a misinterpretation of previous staff feedback, the evaluation team incorrectly reported in the previous year-end report that Lockheed had shifted from a practice of distributing hard copies of program collateral to trade allies, to allowing trade allies to download the collateral from the program website. Staff clarified that it had never been the practice to provide trade allies with hard copies of collateral in bulk, and that the only distribution of hard copies has been at outreach events or by BD representatives at customer sites.

The BD group now takes a major role in development New Construction projects. In previous years, New Construction was done separately from Standard, Custom, and Retro-Commissioning, but Lockheed found that the New Construction process was “pretty adaptable” to the business development process Lockheed was already doing for the other programs. At the heart of this is the view that New Construction incentives are one of the many ways that customers can get money for upgrades. While program developers think in terms of “programs” – and, therefore, the BD staff do so as well – customers think in terms of “what can I get money for?” Therefore, when interacting with customers, BD staff do not talk about how a particular program works but instead figure out how to get them the incentive they need.

Section 5.6 addresses evaluation findings specific to the New Construction Program, including staff comments specific to that program.

5.3.1.4. Trade Ally Relations

Lockheed is continuing to work at moving away from basing trade ally network (TAN) tiers on cumulative project completions, to basing it on ongoing participation.

Only a “handful” of the approved SBDI Service Providers (SPs) have actively pursued projects, and the SBDI program has led to expanded participation for these Service Providers in other BizSavers programs. (Examination of project tracking data reveal a

large increase between 2015 and 2017 in the number of non-SBDI projects for one SP and a moderate increase for another.)[11]

Lockheed has increased outreach to the American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE) and the International Facility Management Association (IFMA) to familiarize members with the incentive calculations.

5.3.1.5. Program Website

The evaluation team followed up on changes to the program website that Lockheed Martin staff reported in the previous evaluation. When asked about metrics used to assess the website's usability, staff reported that the website belongs to Ameren Missouri, which may not track metrics in detail. Lockheed staff rely on customer feedback via its implementation specialists, who ask customers about the application process. Through that feedback, Lockheed has learned of some customer "pain points," such as web links in bold, green letters rather than in the common format (blue, underlined font). Because of the unusual format, customers do not recognize the links as such, and implementation specialists often have to identify the links to them.

5.3.1.6. Program Processes

Staff reported an initiative to provide additional training to trade allies on application requirements. In the previous year-end report, trade allies and participants had provided feedback suggesting the application process was challenging, particularly for custom projects.

In addition, Lockheed Martin has begun a corporate initiative (i.e., not one carried out by BizSavers implementation staff) to develop a "journey map" of customers' program experience, starting with the Ameren Missouri programs. Ameren Missouri has given approval to Lockheed Martin corporate staff to interview BizSavers customers and map their experience.

5.3.1.7. Equipment and Incentives

The program has made the following equipment and incentive changes:

- In March 2017, the program reinstated incentives for external lighting, to drive more lighting projects. The incentives were lower than previously, however, which reportedly has disappointed some trade allies.
- In March 2017, the program increased standard and SBDI incentives for linear fluorescent-to-LED change-outs.

[11] The evaluation team left the shortened 2016 program year out of this analysis.

- In May 2017, the SBDI program added incentives to T5s.

One interviewed program staff provided additional details on the program's effectiveness in promoting lighting controls, pointing out that the evolution of sophisticated lighting control software that can be integrated with other building systems can provide good savings.

5.3.1.8. Communication

Staff reported continued good communication between Lockheed Martin and Ameren Missouri and within Lockheed Martin.

5.3.1.9. Tracking, Reporting, and Quality Assurance

All staff were pleased with project tracking and reporting.

The evaluation team followed up with program staff about evaluation findings that some lighting for which customers had applied for (and received) incentives had not yet been installed. Staff reported Lockheed had identified a specific lighting vendor that had worked with customers to complete the incentive application at the point of purchase, before equipment installation. That vendor neither performed installation nor followed up with customers to confirm installation. Staff reported that Lockheed contacted the vendor to let them know the program terms and conditions require that the equipment must be installed before the application is completed. Staff also indicated that Lockheed may randomly sample applications submitted by that vendor in the future for checking.

5.3.2 Cross-Cutting Database Analysis

As of the end of the program year, the majority of completed projects continued to be in the Standard and Custom Programs. The evaluation team carried out an analysis of the program database to identify characteristics of participants, the projects they have done, and the service providers associated with them.

The following subsections provide an overall analysis of projects and participants; show analyses of program participation by building end-use type, business size (rate class), and geographic area; and shows information on contractor participation.

Key findings are:

- One-quarter of participants had multiple projects, but they accounted for half of projects and two-thirds of energy savings.
- Standard incentives were about four times as common as custom or SBDI incentives.
- The distribution of participant building end-uses matches relatively well with the distribution in the general population, with some exceptions noted below.

- Customer “towers,” or aggregates of accounts with a common decision maker, complete more projects than non-tower customers.
- The use of incentive types varied across building end-uses, with building end-uses falling into four general patterns of incentive use.
- The distribution of customers across geographic areas is consistent with the distribution of energy savings.
- The share of total program savings in the 2M rate class is consistent with total electric reportable usage in that class.
- The program delivered the incentive within the contractually mandated 45 days for 97% of projects.
- Members of the BizSavers Trade Ally Network accounted for 94% of savings.

5.3.2.1. Overall Analysis of Projects and Participants

The analysis identified 2,334 unique participants with completed BizSavers projects, who collectively had completed 4,095 projects across 3,207 buildings.[12] While those who did multiple projects were a small minority of all participants, they accounted for more than half of projects and two-thirds of savings (Table 5-6).

Table 5-6 Participants with Single and Multiple Projects

Number of Projects	*Participants (n = 2,334)*	*Buildings (n = 3,207)*	*Projects (n = 4,095)*	*Savings*
One project	75%	54%	42%	33%
Multiple projects	25%	46%	58%	67%
Total	100%	100%	100%	100%

Standard incentives were by far the most common types, with custom and SBDI incentives both about one-quarter as common as standard (Table 5-7). However, custom incentives account for about two-thirds as much savings as do standard. SBDI incentives account for a small fraction of the savings of either standard or custom.

[12] Based on the Parent Company field in *LM Captures*.

*Table 5-7 Incentive Types of Participants, Buildings, and Completed Projects**

Incentive Type	*Percentage of…*			
	Participants (n = 2,334)	*Buildings (n = 3,207)*	*Projects (n = 4,095)*	*Percent of Savings*[13]
Standard (with or without custom) (n = 2,814)	72%	71%	69%	54%
Custom (with or without standard) (n = 692)	22%	20%	17%	36%
Standard only (n = 2,592)	64%	64%	63%	42%
Custom only (n = 470)	13%	13%	11%	23%
Custom and standard (n = 222)	8%	7%	5%	13%
SBDI (n = 520)	18%	15%	13%	3%
NC (n = 28)	1%	1%	1%	13%
RCX (n = 9)	0%	0%	0%	2%
EMS (n = 7)	0%	0%	0%	0%

5.3.2.2. Customer Towers

Of the 2,334 participants, 311 (13%), were part of a "tower," or an aggregate of accounts with a common decision maker. Those customers completed more than twice as many projects, on average, than other customers (Table 5-8).

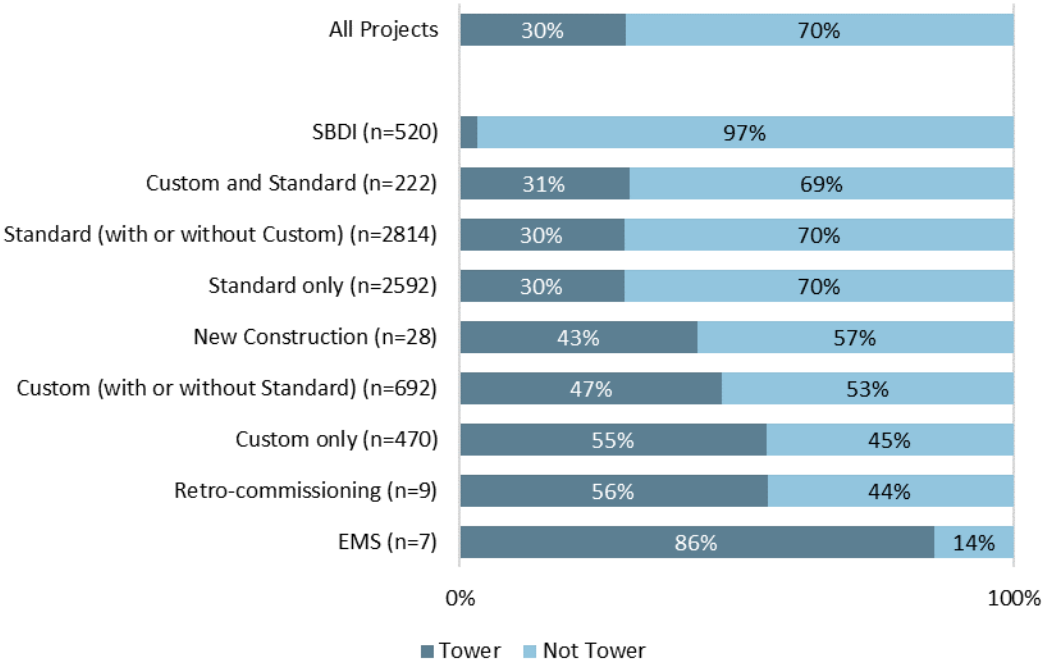
Table 5-8 Participation and Projects in Tower and Non-Tower Groups

Account type	*Number of Participants*	*Number of Projects*	*% of projects*	*Mean Number of Projects per Participant*
Tower	311	1,229	30%	4.0
Not Tower	2,023	2,867	70%	1.4
Total	2,334	4,096	100%	1.8

Tower customers made up a disproportionately large share of EMS, custom, retro-commissioning, and new construction projects and a disproportionately small share of SBDI projects (Figure 5-5).

[13] A project may be counted in more than one row, so percentages may sum to greater than 100%.

Figure 5-5 Comparison of Tower and Non-Tower Projects by Application Type



5.3.2.3. Building End-Use Type

At the participant, building, and project levels, the most common building end uses were retail, office, and industrial (Table 5-9). Together, those three end-use types made up 42% of all projects and a slightly higher percentage of buildings and participants. Note, however, that while industrial customers made up just 8% of projects and 10% of participants, they accounted for 24% of the savings.

Table 5-9 Building End-Use Types

Building End -Use Type	*Percentage of…*			
	Participants (n = 2,334)	*Buildings (n = 3,207)*	*Projects (n = 4,095)*	*Total Savings*
Retail	22%	22%	19%	14%
Office	17%	14%	15%	11%
Industrial	10%	8%	8%	24%
Food & Beverage Service	8%	8%	7%	5%
Faith-Based	7%	7%	8%	4%
Warehouse	8%	6%	6%	6%
Automotive Services	6%	5%	4%	4%
Healthcare	5%	4%	6%	7%
Lodging	5%	5%	6%	5%
Education	5%	8%	9%	8%
Other*	12%	15%	14%	12%

*Other = Government, Entertainment and Recreation, Grocery and Convenience, Gas Station, IT/Data Center, and Parking Garage, all of which make up less than 5% of participants, buildings, projects, and savings.

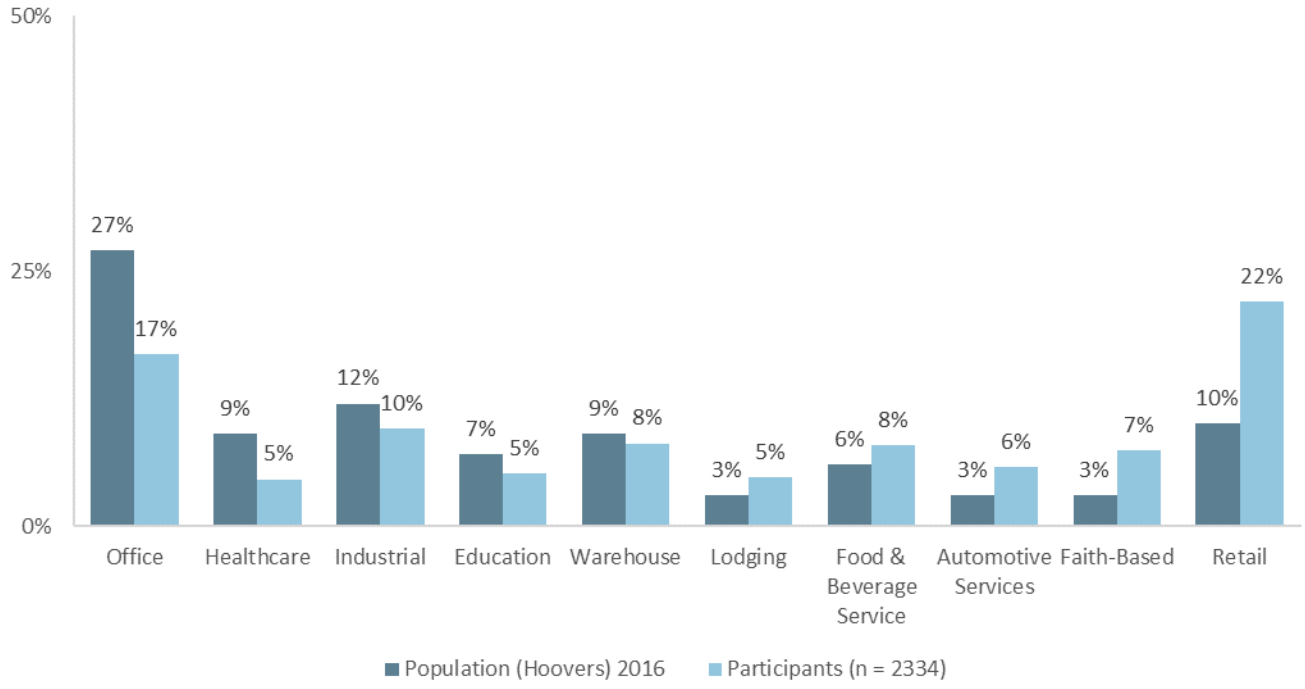
The evaluation team compared the distribution of BizSavers customers across building end-use types to the estimated distribution of nonresidential buildings in the broader population.

Figure 5-6 shows that, for most building end uses, the distribution of program participants matches relatively well with the distribution of buildings in the population. The office segment appears to be somewhat underrepresented in the program population, while the retail, faith-based, and automotive services segments appear to be somewhat overrepresented.

The appearance of over- or under-representation conceivably could be at least partly a function of the method used to estimate the population proportions.[14] The evaluation team will continue to seek general population data that can be compared to the program data.

[14] For the general population data, the evaluation team used data from the Hoover's database on entities doing business in the zip codes that make up the Ameren Missouri service territory (www.hoovers.com).

*Figure 5-6 Distribution of Participants by Building End-Use Types, Compared to Population Data**



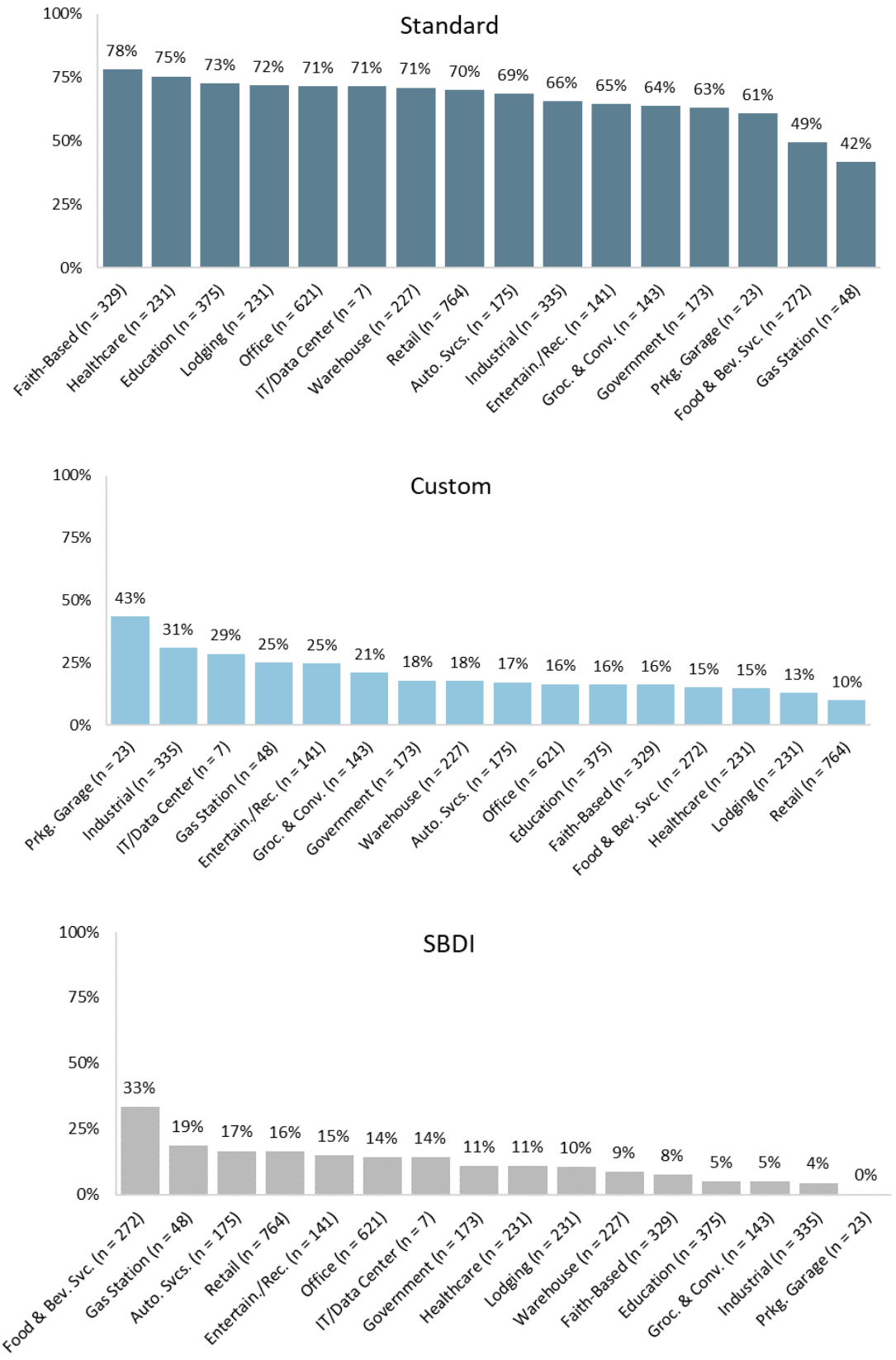
*The population data are from the Hoover's database of commercial businesses.[15]

The relative use of standard, custom, and SBDI incentive types continued to vary across building end-uses (Figure 5-7). The most obvious patterns are:

- Food and beverage service customers use SBDI incentives much more, and standard and custom incentives less, than do other customer types.
- Parking garage, Industrial, and IT/data center customers use custom incentives much more, and standard incentives less, than most other customer types. They also use SBDI incentive relatively infrequently.
- Retail and office customers make relatively high use of SBDI and standard incentives, but low use of custom incentives.
- Most other customer types make much greater use of standard than custom or SBDI incentives. Faith-based customers are the most extreme example of this pattern.

[15] A detailed explanation of the method, and the reason for using the Hoover's database rather than data from the Commercial Buildings Energy Consumption Survey (CBECS), as done previously, is found in the 2016 EOY report.

Figure 5-7 Participation by Incentive Type and Building End-Use



5.3.2.4. Geographic Area

As of the end of the program year, distribution of participation across geographic areas was consistent with that reported in the 2016 year-end report. Specifically, the distribution of participation by geographic area was more closely aligned with the distribution of Ameren Missouri customers' energy usage than it was with the distribution of the customer counts (Table 5-10).

Table 5-10 Geographical Distribution of Participants, Buildings, and Projects

*Area**	*BizSavers Program Participation*				*Ameren Missouri Customers***	
	Participants (n = 2,334)	*Buildings (n = 3,207)*	*Projects (n = 4,095)*	*Savings*	*Customer Counts*	*Usage*
St. Louis metro	40%	39%	43%	36%	33%	43%
Outer suburbs	36%	32%	30%	25%	32%	38%
All other areas	24%	29%	27%	38%	35%	20%
Total	100%	100%	100%	100%	100%	100%

* St. Louis metro encompasses zip codes 63101 through 63147 as well as about half of the zip codes in the range 63150 to 63199. Outer suburbs encompass zip codes 63001 through 63091 and 63301 through 63390. Other areas are all other Ameren Missouri service area zip codes.

**A given customer may have multiple locations, with some having locations in more than one geographic area, and so the percentages sum to more than 100%. The usage data are for 2016. The evaluation team will update this information for subsequent analyses.

The above findings summarize the geographical distribution of participants for all of PY2017, but during the program year, the geographical distribution of participants shifted. In Q1, participation in St. Louis metro was disproportionately low relative to the distribution of usage. Over time, however, participation in St. Louis metro increased faster than in other areas. This is possibly because St. Louis metro has a higher concentration of tower customers, compared to other areas (Table 5-11), and so the increase in repeat participation among tower customers likely led to the increased participation in the St. Louis area, as the evaluation team conjectured at Q1.

Table 5-11 Geographic Distribution of Tower and Non-Tower Customers

Area	*Tower*	*Not Tower*	*Total*
St. Louis metro	36%	64%	100%
Outer suburbs	21%	79%	100%
All other areas	31%	69%	100%

5.3.2.5. Business Size

On average, customers in the 3M, 4M, and 11M rate classes produce higher savings per participant, building, and project than do 2M customers as well as more projects per building and per participant (Table 5-12).

Table 5-12 Total and Average kWh Savings by Rate Class

Rate Class	Total kWh Savings	Mean kWh Savings per…			Est. Mean # Projects per Participant	Est. Mean # Projects per Building
		Participants (n = 2,334)	Buildings (n = 3,207)	Projects (n = 4,095)		
2M	38,985,779	25,904	20,316	18,338	1.41	1.11
3M	104,513,559	142,002	90,020	61,587	2.31	1.46
4M/11M	55,628,869	1,354,226	1,125,485	433,092	2.95	2.15
Total	199,128,207	85,316	62,092	48,627	1.75	1.28

The share of total program savings for participants in the 2M rate class is roughly proportional to their share of total electric reportable usage, even though the share of participants, buildings, and projects in the 2M rate class is disproportionately low relative to the share of customer accounts (Table 5-13).[16]

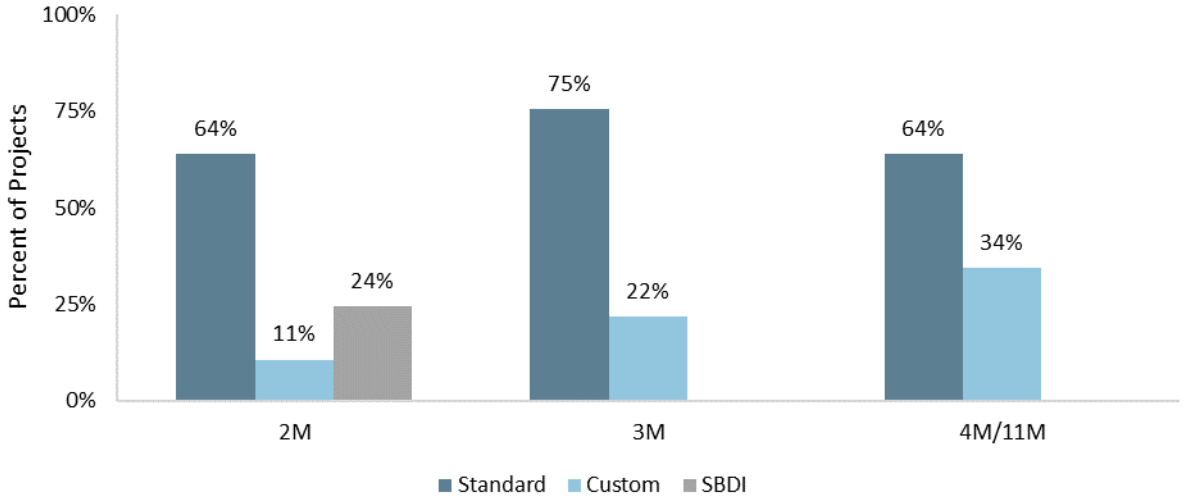
Table 5-13 Participation, Savings, and Population by Rate Class

Rate class	Savings Compared to Usage		Participants, Buildings, Projects Compared to Accounts			
	Total Savings	Electric Reportable Usage	Participants	Buildings	Projects	Accounts
			(n = 1,725)	(n = 2,350)	(n = 2,883)	(n ≅ 159k)
2M	20%	17%	64%	60%	52%	93%
3M	52%	42%	32%	36%	41%	7%
4M/11M	28%	41%	4%	4%	7%	<1%
Total	100%	100%	100%	100%	100%	100%

While high percentages of all rate classes use standard incentives, the use of custom incentives is relatively greater in the larger rate classes (Figure 5-8).

[16] The percentage of accounts and electric reportable usage are for the period from October 2016 through September 2017, the latest 12-month interval for which data were available to the evaluation team.

Figure 5-8 Incentive Type by Rate Class



Customers in the outer areas of the Ameren Missouri service territory appear to be using the SBDI program to a disproportionally great degree. As Table 5-14 shows, customers in those outer areas account for 20% of all energy usage and 25% of the usage in the 2M rate class, but they account for 34% of SBDI savings.

*Table 5-14 Geographical Distribution of Completed Energy Usage and SBDI Projects**

Area	*Total Energy Usage*	*Energy Usage in 2M Rate Class*	*SBDI Savings*
St. Louis metro	43%	35%	34%
Outer suburbs	38%	40%	31%
All other areas	20%	25%	34%
Total	100%	100%	100%
*Results were comparable when the distribution of customers instead of usage was examined.			

5.3.2.6. Interval between Project Completion and Incentive Delivery

The program delivered the incentive within the contractually mandated 45 days for 97% of projects. The rate of achievement was highest for Fast Track projects, but pre-approval projects showed only a slightly lower rate. Achievement of the 45-day standard was much lower for new construction and retro-commissioning projects (Table 5-15).

Table 5-15 Time from Project Installation to Incentive Delivery

Time Interval	*Fast Track (n = 3,028)*	*Pre-Approval (n = 1,001)*	*New Construction (n = 28)*	*Retro-Commissioning (n = 9)*	*All Projects (n = 4,066)*
> 45 days	2%	6%	29%	22%	3%
Within 45 days	98%	94%	71%	78%	97%
Within 30 days	91%	77%	21%	33%	87%
Within 15 days	49%	26%	4%	11%	43%

5.3.2.7. Analysis of Contractors

Members of the BizSavers Trade Ally Network (TAN) comprised just under half of contractor firms in the project tracking database, but the majority (80%) of those with projects in the current program year and a large majority (94%) of savings (Table 5-16). Platinum-level trade allies generated 50% of all program savings.

Table 5-16 Trade Ally Network Membership and Energy Savings

Trade Ally Network (TAN) Member-ship	*Percent of Total Savings*	*By Company Name (All Company Locations)*			
		Count - All	*with PY2017 Projects*		
			Count	*Percent of Total*	*Mean Savings*
Members	94%	242	112	80%	1,436
Platinum	50%	20	17	12%	5,060
Gold	20%	22	18	13%	1,884
Silver	17%	76	52	37%	558
General	7%	124	25	18%	476
Non-members	6%	324	28	20%	388
TOTAL	100%	566	140	100%	1,227

5.3.3 Cross-Cutting Trade Ally Feedback

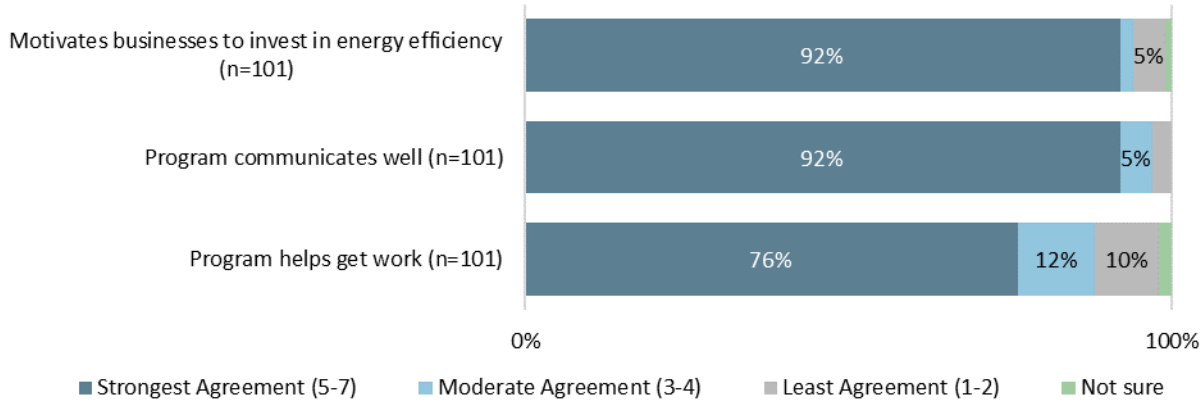
The 101 surveyed trade allies provided both program-specific and cross-cutting information. Program-specific information is presented in the program-specific sections of this chapter. This section discusses three topics that cut across programs: overall program effectiveness, the effects of changes to the incentive structure, and suggestions for program improvements.

5.3.3.1. Program Effectiveness

Trade allies report that Ameren Missouri's BizSavers program is effective in motivating businesses to invest in energy efficiency and that communication between the program and trade allies is acceptable. Nearly all trade allies reported strong agreement that the

BizSavers program both helps in motivating business to invest in energy efficiency and that the program communicates well with them, and three-quarters indicated that the program helps them to get work (Figure 5-9).

*Figure 5-9 Trade Ally Agreement with Aspects of the Ameren Missouri BizSavers Program**



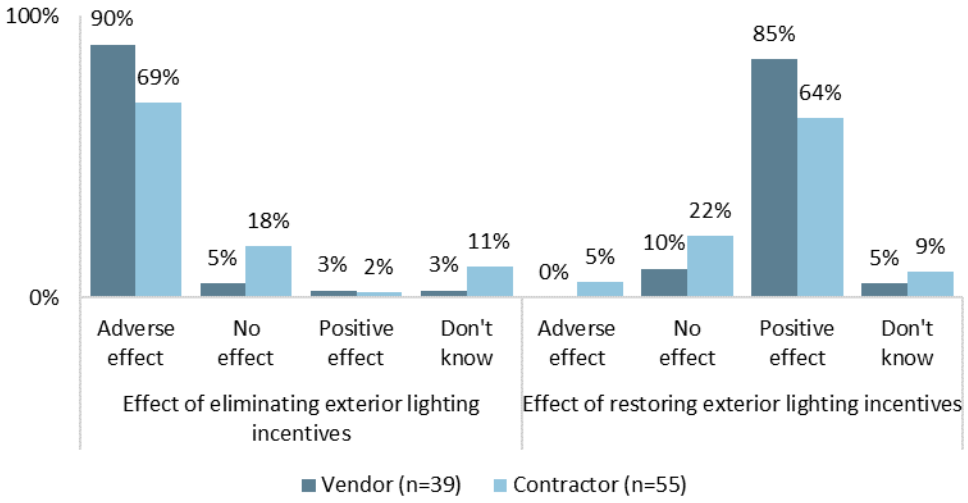
*The team asked respondents to provide their level of agreement with each statement using a scale from 1 (strongly disagree) to 7 (strongly agree).

5.3.3.2. Effect of Changes to Incentives

The elimination of exterior lighting incentives in 2016 had a negative effect on business for trade allies involved in lighting sales and installations. The reinstatement of exterior lighting incentives in 2017 produced a positive change in their business. The elimination of exterior lighting incentives had a greater impact on vendors than contractors (Figure 5-10).[17]

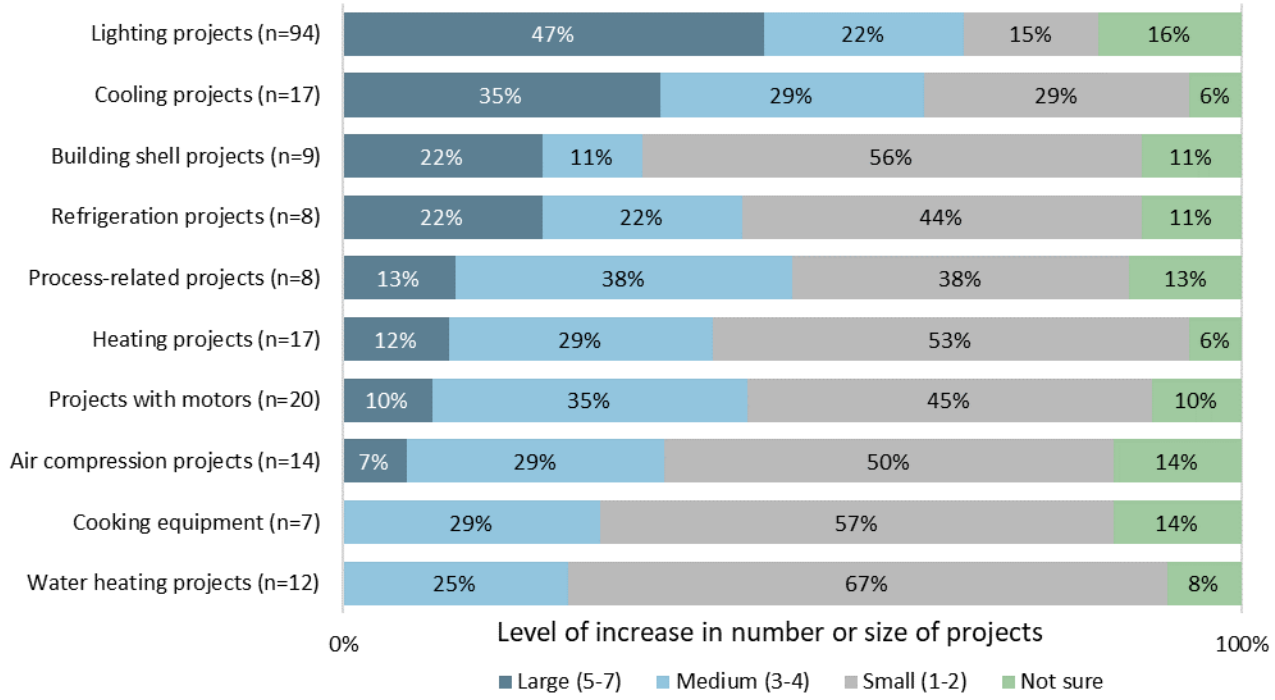
[17] Two trade allies reported the elimination of exterior lighting incentives had a positive effect on their business, of whom one elaborated that the change eliminated sales of fluorescent tubes, which allowed for the sales of LED tubes.

Figure 5-10 Effect of Changes to Exterior Lighting Incentives by Trade Ally Type



Half (52%) of trade allies reported that they were aware of changes to Custom Program incentive levels in 2016, which provided higher incentive levels for cooling, HVAC, building shell, lighting, and water heating, and lower incentives for refrigeration equipment. The effect of those changes on the number or size of projects varied by equipment type (Figure 5-11). While two-thirds or more reported medium-to-large increases in their lighting and cooling projects, about one-third to one-half of trade allies reported that magnitude of increase for most other equipment types. The incentive changes had the least reported impact in projects involving cooking equipment and water heating.

*Figure 5-11 Impact of Increases in Incentive Levels, by Measure Type**



*The team asked respondent to provide the level of increase for each equipment type using a scale from 1 (not at all) to 7 (to a great degree). The team asked respondents about each equipment type only if they reported installing that type of equipment.

5.3.3.3. Suggestions for Improvements

About half of the surveyed trade allies provided one or more suggestions for improving Ameren Missouri's BizSavers incentives program (Table 5-17). Trade allies most commonly suggested adding measures to the Standard incentive program and decreasing the application processing time. No other suggestion was made by more than 7% of the surveyed trade allies.

Table 5-17 Trade Ally Suggestions for Program Improvements (n=99; Multiple Responses Allowed)

Suggestion	*Count*
Adding measures to the Standard incentive program	11
Decreasing application processing time	11
Additional outreach / Changes to marketing	7
Changes to application	5
Increase incentive amounts	5
Additional tools / Improvements to program processes	4
Improve communication with program staff	3
Other	5

5.4 Custom and Standard Programs

Feedback on the Custom and Standard Programs came from the nonparticipant survey, from the 468 Custom and Standard Program participants who completed the online participant survey, and from the trade ally survey. Together, these sources provided information on program awareness, customer decision-making, experiences with the Custom and Standard Programs, and nonparticipant interest in participation.

5.4.1 Program Awareness

The evaluation team obtained information about the level and sources of program awareness from program nonparticipants and participants as well as from surveyed trade allies. These nonparticipant and trade ally findings converge to suggest that about half of Ameren Missouri commercial customers who have not yet participated in the BizSavers program are aware of it.

Both participants and nonparticipants learn about the BizSavers programs in a variety of ways, but participants learning about the program via contractors and equipment vendors is strongly associated with program participation. Among nonparticipants, level of awareness and source of awareness also are associated with organizational characteristics, such as building size and energy usage.

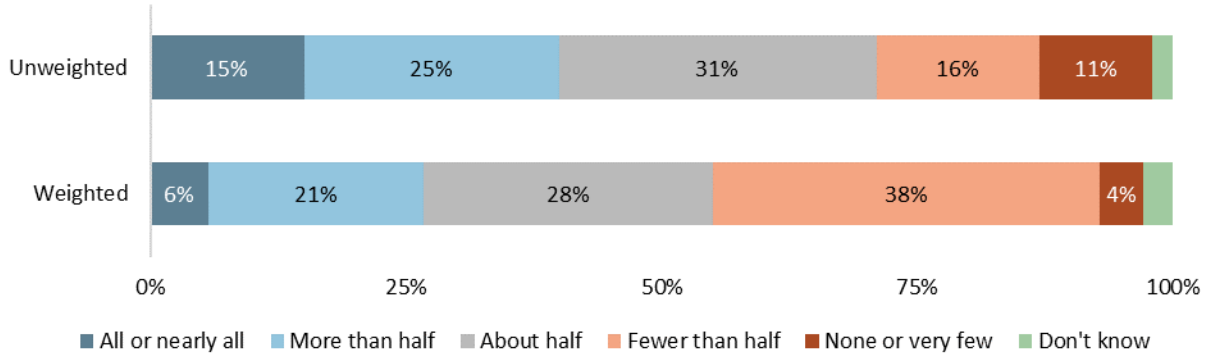
Awareness of the BizSavers program is moderate among nonparticipants. About half (47%) reported awareness of Ameren Missouri's cash incentives for energy efficient equipment purchases. Large customers (rate classes 3M, 4M, and 11M) were more aware of Ameren Missouri incentives (65%) than small-to-medium customers (those in the 2M rate class; 46%).

Awareness varied by customer type, with more than 60% of respondents from religious organizations and construction-related trades reporting program awareness and one-third or fewer respondents from entertainment and restaurant businesses reporting awareness. All other customer types varied from about 40% to about 50% awareness.

Not surprisingly, respondents reporting buildings larger than 500,000 square feet, representing the Government and Education sectors, or reporting their title as energy manager were significantly more likely to report face-to-face outreach (through an Ameren Missouri or BizSavers representative) as an awareness source.

Feedback on customer awareness from surveyed trade allies was consistent with the nonparticipant self-reports. When asked what proportion of their customers already knew about Ameren Missouri's BizSavers incentives before they mentioned the program, trade ally responses were skewed slightly in the direction of more than half. However, when responses are weighted to account for the fact that respondents who reported lower prior customer awareness did more projects than those who reported greater customer awareness, the results suggest that the overall awareness is somewhat less than half (Figure 5-12).

Figure 5-12 Proportion of Customers Aware of Ameren Missouri BizSavers Incentives Prior to Trade Ally Mentioning Them: Trade Ally Survey (n=101)



Vendors (distributors and retailers) reported higher customer awareness than did contractors (82% vs. 60% reporting at least half of customers are aware, respectively). Trade allies working with building shells reported the lowest levels of customer awareness and those involved in industrial processes reported the highest levels of customer awareness (3 of 9 and 7 of 8 reporting half or more customers being aware, respectively).

Trade-ally-driven awareness is associated with program participation. Participants and nonparticipants both reported various sources of program awareness, but participants most commonly became aware of the program via a contractor or vendor,

while nonparticipants most commonly reported Ameren Missouri outreach or marketing as the source of awareness (Table 5-18).[18]

Table 5-18 Sources of Program Awareness (multiple responses allowed)

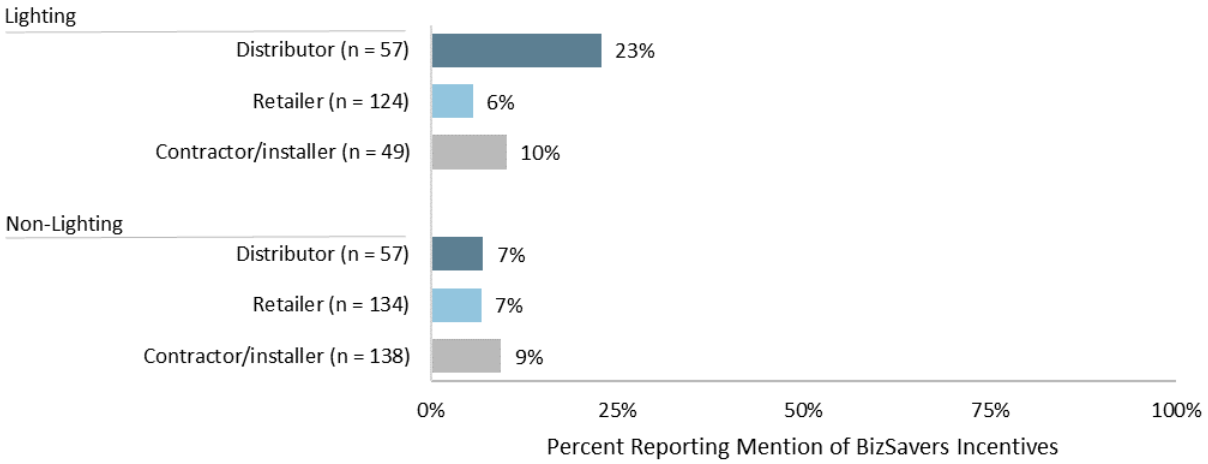
Source	*All Survey Respondents*		*All Those Responding to This Question*	
	Non-participants	*Participants*	*Non-participants*	*Participants*
	(n = 360)	*(n = 545)*	*(n = 228)*	*(n = 545)*
Ameren Missouri or BizSavers*	36%	9%	62%	14%
Direct outreach	2%	8%	3%	12%
Mass or direct marketing	22%	2%	39%	2%
Contractor or vendor	8%	48%	14%	73%
Web search	13%	7%	23%	10%
Word of mouth	4%	9%	8%	14%
Other	1%	5%	1%	7%
No source reported	43%	33%	n/a	n/a

*Includes Ameren Missouri or program representative, direct mail, email, or mass media.

Consistent with the above, most nonparticipants who reported recent purchase or upgrade of equipment or building features said that the vendor or contractor they dealt with did not mention BizSavers incentives (Figure 5-13). Lighting distributors were most often reported as mentioning the incentives. None of the 112 very small customers (less than 4,000 kWh annualized usage) who bought equipment reported that their vendor or contractor mentioned BizSavers incentives.

[18] Many respondents to the nonparticipant survey reported their source only as “Ameren,” without further specifying the medium.

Figure 5-13 Mention of BizSavers Incentives by Equipment Vendors and Contractors – Non-Participant Customers with Annualized Usage At Least 4,000 kWh (n = 364)



It is possible to estimate the relative impact of trade allies as a source of awareness on program participation by taking into consideration the percentage of Ameren Missouri customers who are program participants. In preparing the nonparticipant survey frame, the evaluation team identified 9% of Ameren Missouri business customers as program participants. Thus, using the survey respondent sources or program awareness from Table 5-18, 6% (9% x 73%) of all business customers are estimated to be program participants who learned about the program from a trade ally. Similarly, 2% (9% x 27%) are program participants who did not learn about the program from a trade ally. Finally, 13% (91% x 14%) are nonparticipants who learned about the program from a trade ally and 79% (91% x 86%) are non-participants who did not learn about the program from a trade ally.

The above means that 19% (6% + 13%) of all customers learned about the program from a trade ally, and 33% of them (6% / 19%) became participants. By contrast, 81% (2% + 79%) of all customers did not learn about the program from a trade ally, and only 3% of them (2% / 81%) became participants. This analysis puts into perspective the important role that trade allies have in driving program participation.

Awareness of Ameren Missouri's Custom incentive offerings is moderate among Standard-only Program participants. Of the 308 respondents with projects that included only Standard incentives, a little more than one-quarter (29%) reported awareness of the Custom incentives. As might be expected, awareness of Custom incentives was particularly high among those with technical responsibilities (e.g., facilities or maintenance; 40%) and among those with large buildings (>100,000 square feet) than those with smaller buildings (59%).

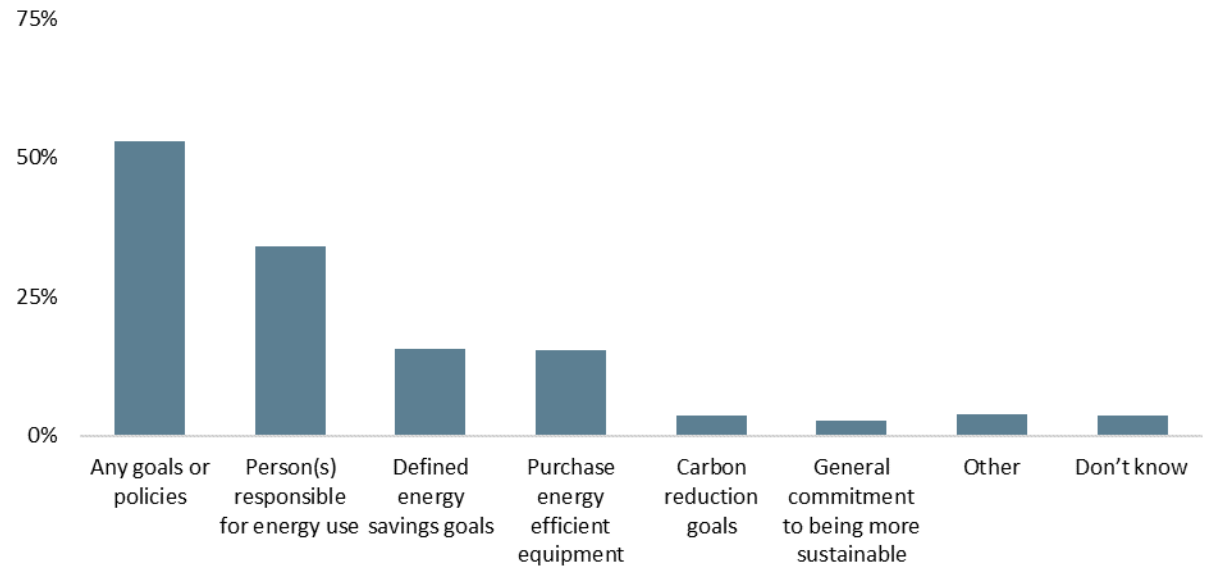
Awareness of the increase in Custom cooling incentives is low, *especially* among Custom Program participants. Of the 243 respondents who completed Custom

projects or were otherwise familiar with the Custom incentives, about one-fifth (21%) reported awareness that the cooling equipment incentives increased from $0.07/kWh to $0.15/kWh in 2016. Interestingly, awareness was *higher* among the 89 respondents who knew about Custom incentives *but had not done a Custom project* (34%) than among the 154 who had done a Custom project (13%). It is not clear why this might be the case; it may possibly merit further investigation.

5.4.2 Customer Decision-Making

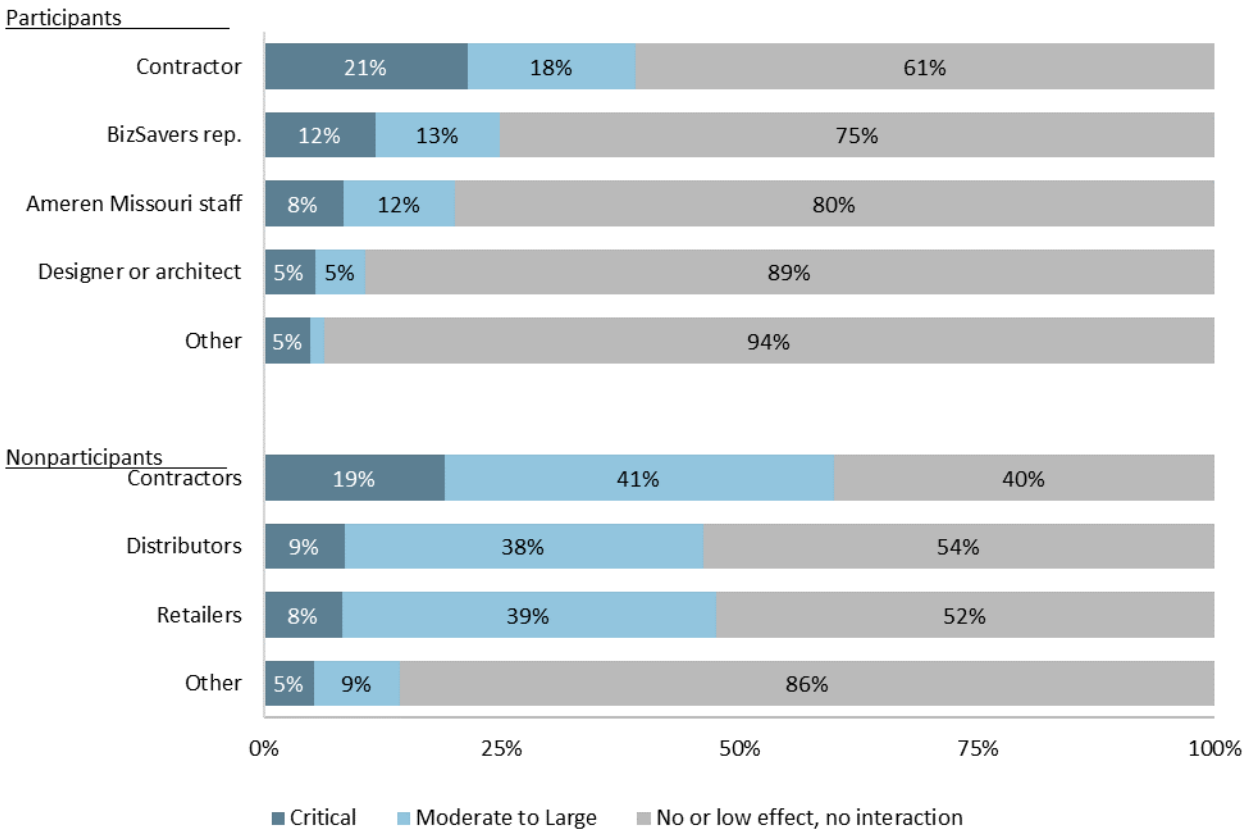
Program participants are moderately proactive in saving energy. Just over half of respondents reported that their company had one or more policies related to energy management, the most common of which was having an employee or employees responsible for energy monitoring or management. About one-fifth reported having defined energy-saving goals or an energy efficient equipment purchase policy (Figure 5-14).

Figure 5-14 Participants' Energy-Related Policies (n = 468; multiple responses allowed)



Vendors and contractors have the most influence on customers' equipment decisions. While participants were more likely to identify vendors than contractors, designers, or architects as influencers, when those other trade professionals provided input, it had nearly as great an influence on the equipment decisions as did that from vendors (Figure 5-15). By contrast, for nonparticipants, contractors were not only more commonly identified as influencers than were vendors (distributors and retailers), but they were more influential when they had input.

Figure 5-15 Influencers on Participants' (n=468) and Nonparticipants' (n =364) Decisions to Install Efficient Equipment



As might be expected, program participant contacts for larger organizations (those with six or more locations) were most likely to report interactions with a BizSavers program representative or with a designer or architect, and they were more likely than others to rate those interactions as moderately to critically influential on their decisions.

The relative influence levels of some trade groups varied somewhat among nonparticipant customer types, with distributors relatively more influential among tax-exempt and large customers than non-exempts and smaller customers. There were no broader differences.

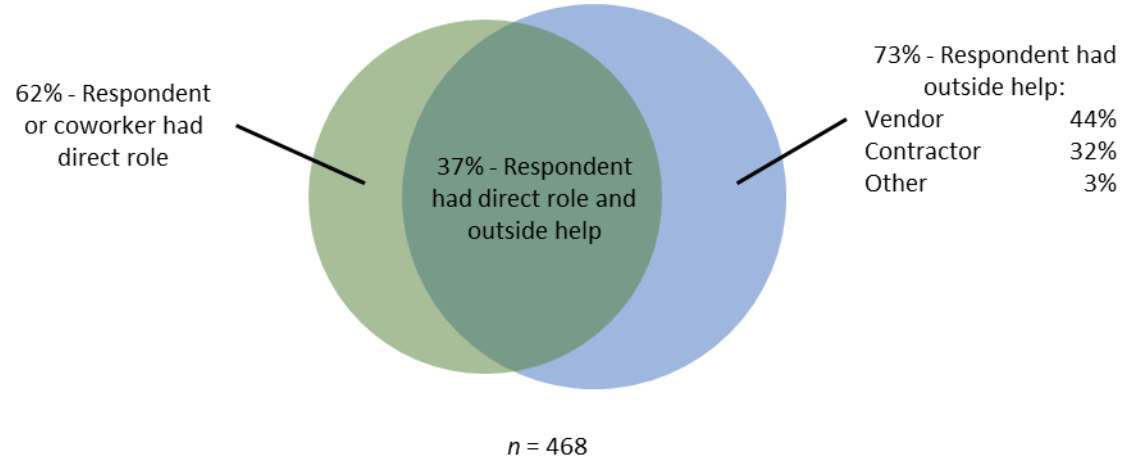
5.4.3 Participant Program Experience

Program participants reported generally positive experiences with the program processes. They largely rated the application instructions as clear and, with some exceptions, reported knowing where to get help with it when needed. They indicated high satisfaction with all program elements and reported that the incentive met or exceeded expectations. However, about half of participants were not clear on the rules governing Fast Track applications and one-quarter reported an understanding of the

rules that could result in project disqualification. In addition, as before, about one-quarter of Custom Program participants need to resubmit applications with additional documentation or revised calculations.

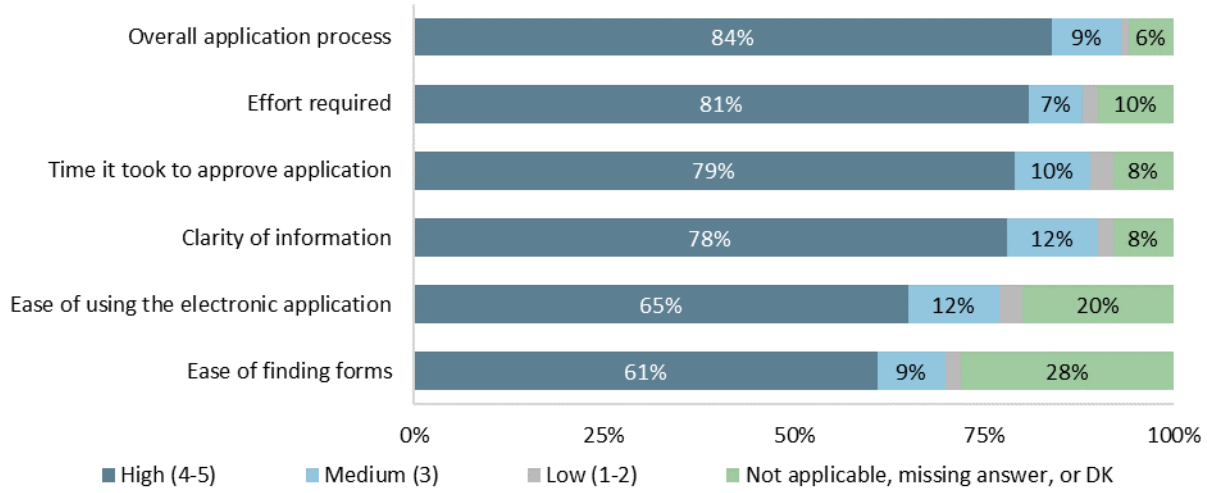
Participants perceive Ameren Missouri's application instructions as clear and the process as acceptable. Nearly two-thirds of respondents reported that they or a co-worker had a direct role in completing their application for incentives, and three-quarters said they had received outside help, most commonly from a vendor or contractor (Figure-5-16).

Figure-5-16 Who Had a Role in the Application?



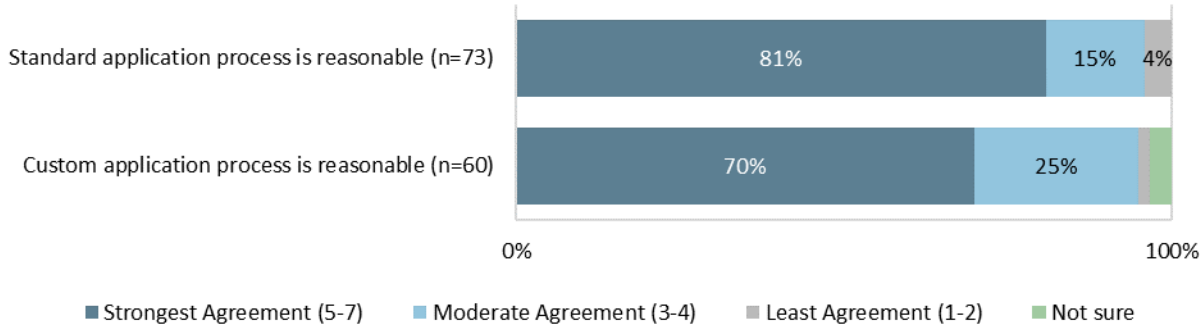
Survey respondents who personally had a role in completing the application (*n* = 260) gave high ratings to several aspects of their application experience, including the clarity of application instructions (Figure 5-17). Initially, it may appear that ease of using the electronic application was less acceptable than other items, but nearly one-fifth of respondents provided a "don't know" response, suggesting they had not used the electronic application. When those respondents are excluded, the acceptability rating is on a par with that of other aspects of the application.

Figure 5-17 Program Participants' Rated Clarity of Information and Acceptability of Application Process (n=260)



Surveyed trade allies agreed that the application process for the Standard and Custom Programs is reasonable (Figure 5-18).

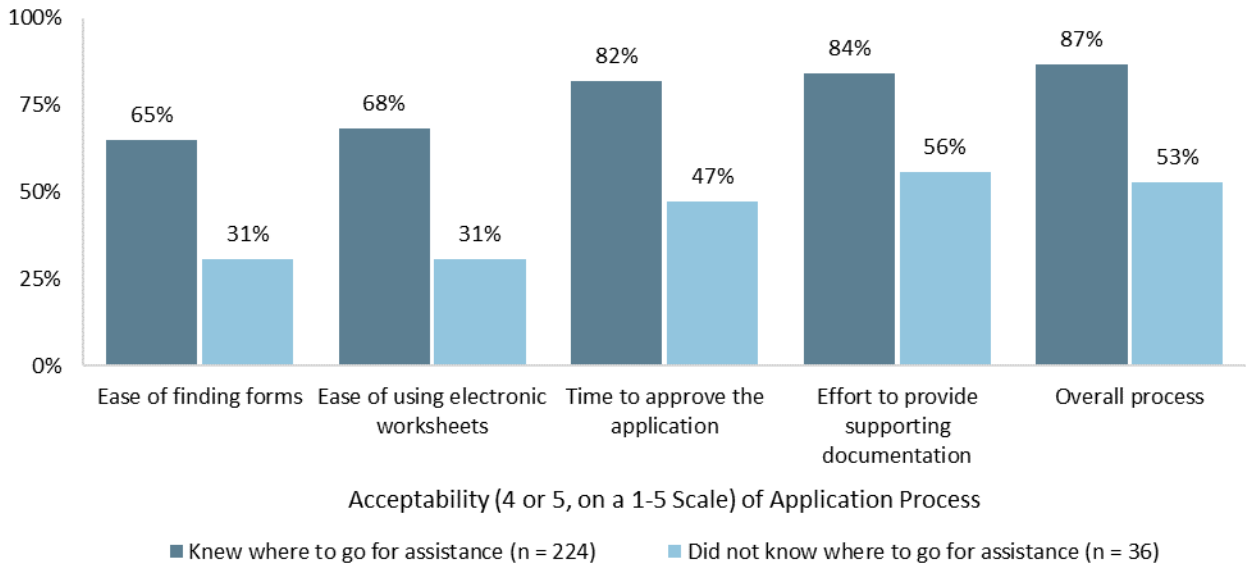
Figure 5-18 Trade Allies' Rating of Reasonableness of Application Process (n=101)



Participants generally know how to get application assistance, which promotes satisfaction with the process. Of the 468 Custom and Standard program participants, 370 (79%) reported they knew who to go to for assistance with the application process. The respondents who reported a role in completing the application themselves (with or without outside assistance) were more likely to report knowing where to go to for help than were those whose applications were done entirely by someone outside the organization (86% vs. 71%). This has at least two possible interpretations: 1) customers may get outside assistance because they do not know where to go for help; and 2) customers who rely on outside help with applications (at least in part because of the complexity of the projects), do not feel the need to learn where to get help with the application because they do not need it. Both of these interpretations may be correct to some degree.

Of the 260 respondents who reported a role in completing the application themselves, 224 (86%) knew where to go for help. Those 224 respondents reported the application process as more acceptable than did 36 respondents who had a role in the application but did not report knowing where to go for assistance (Figure 5-19). Thus, as in previous years, there is a small group of participants who found the process challenging and did not know where to get help with it.

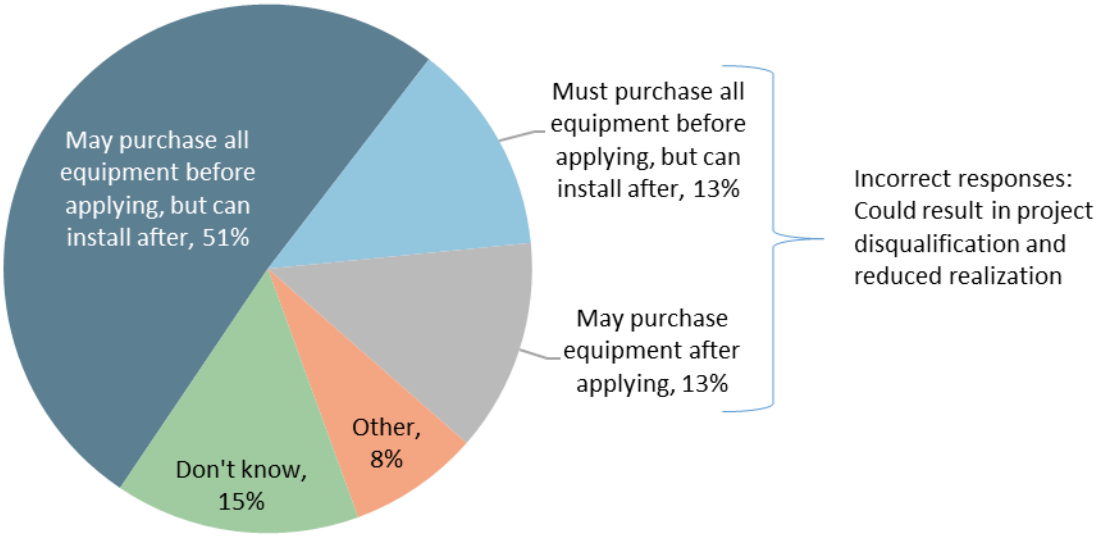
Figure 5-19 Clarity of Application Instructions and Acceptability of Application Process



Custom incentive applications often require resubmittal with additional documentation or revised savings calculations. One-quarter (25%) of the 154 participants who received Custom incentives reported having to resubmit or provide additional documentation before their application was approved. For just over half of those participants, the issue was a need for additional supporting documents, such as invoices, and one-quarter reported an issue relating to how their energy savings were calculated.

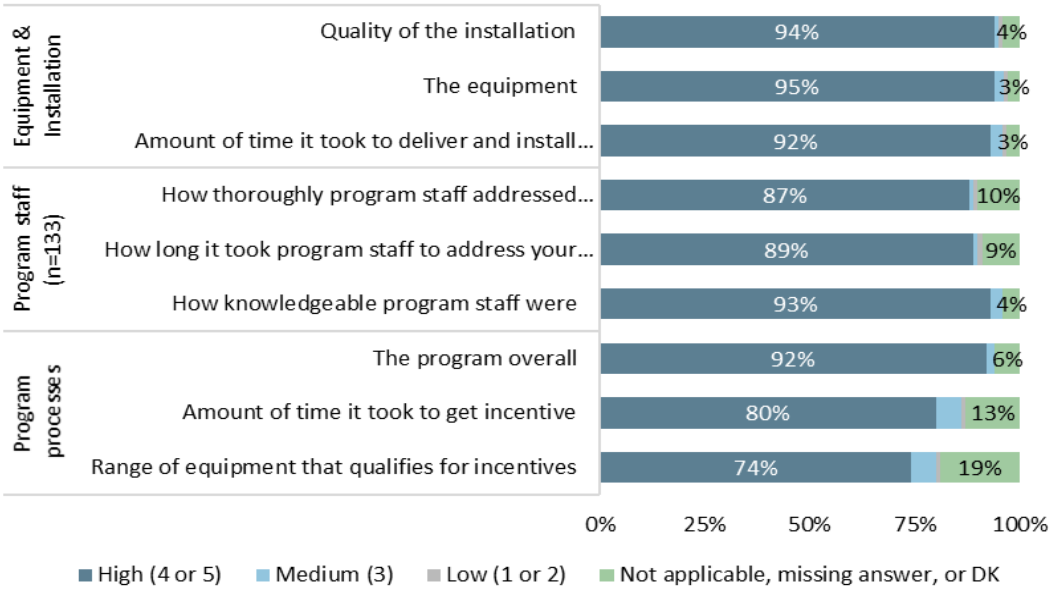
Many participants misunderstand the Fast Track application procedure. About two-thirds of the surveyed participants (*n* = 305) used the Fast Track process, which does not require pre-approval for purchase and installation of the equipment upgrades. The process does require that customers purchase and install all of the equipment before applying for incentives. However, when asked to indicate their understanding of the rules, only half the respondents responded correctly (Figure 5-20). One quarter of the respondents indicated the rules allowed purchasing and/or installing equipment *after* applying for incentives – practices which, if identified during M&V, would result in project disqualification and a reduction in the program's gross realization rate.

Figure 5-20 Participant Perceptions of Fast Track Application Procedure (n = 305)



The Custom and Standard Programs have high customer satisfaction. Respondents gave high satisfaction ratings to all aspects of participation (Figure 5-21). Satisfaction was lowest regarding the range of incented equipment and time it took to get the incentive; however, when the respondents who said they were "not sure" about their satisfaction with these items (and, thus, may not have been directly involved in those aspects), or respondents who did not provide an answer are excluded, the satisfaction levels were nearly on a par with those for other program elements.

Figure 5-21 Satisfaction with Program Elements (n = 468)

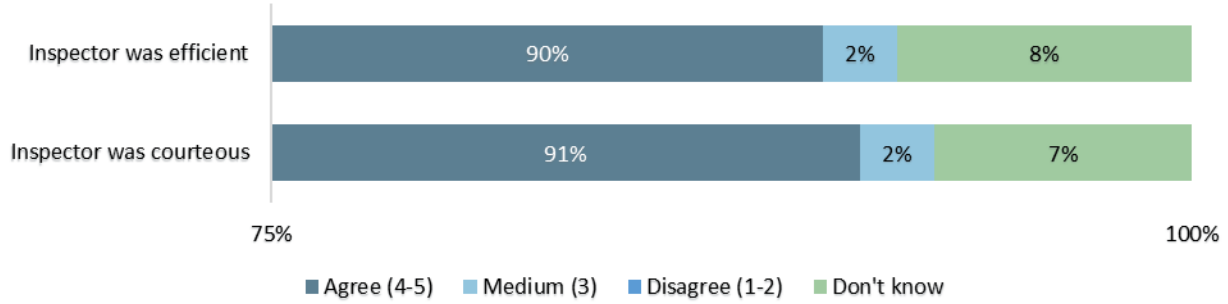


Note: The sample for the program staff items is the subset of respondents who reported interacting with program staff.

Verbatim comments by the 38 respondents who indicated low or medium satisfaction with program elements did not shed additional light on the reason for the ratings. Seven of those 38 elaborated that they were in fact satisfied with their experience despite having given a lower rating to a specific aspect.

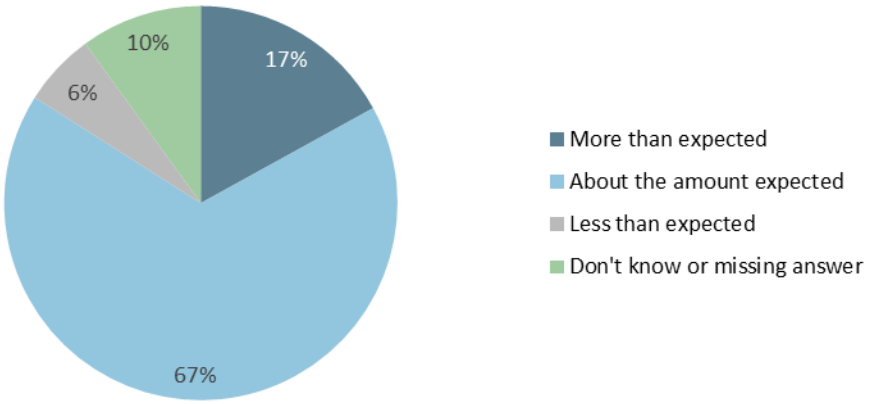
Of respondents who reported that a program representative had inspected the completed project (40% of the total), nearly all indicated high agreement (a 4 or 5 on a 5-point scale) that the inspector had been courteous and efficient (Figure 5-22).

Figure 5-22 Satisfaction with Project Inspection (n = 186)



When asked how their incentive amount compared to what they had expected to receive, a large majority (67%) of respondents reported that the incentive was at least as much as they had expected (Figure 5-23).

Figure 5-23 How Incentive Compared with Expectations (n = 468)

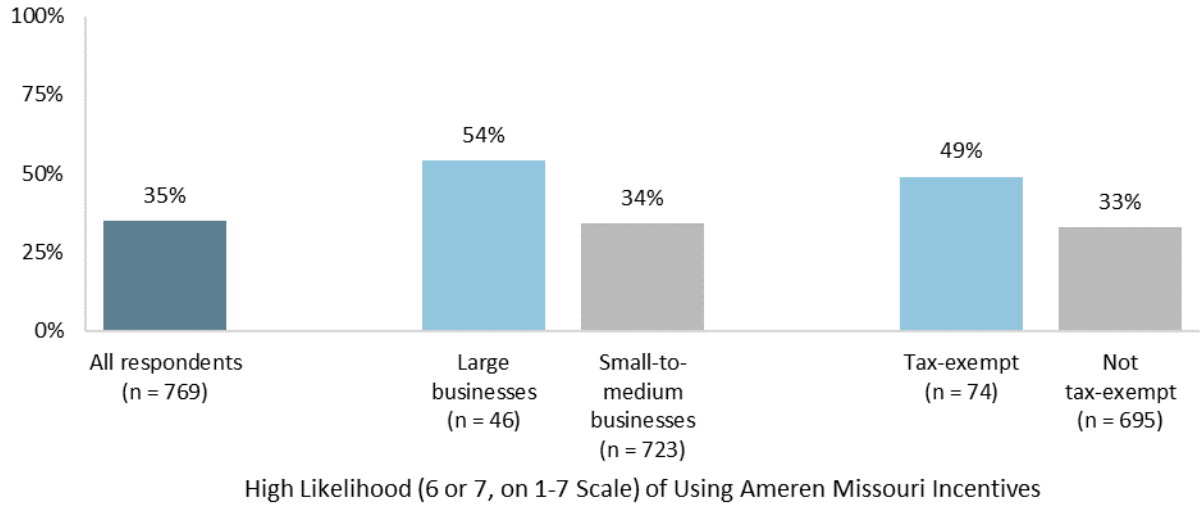


5.4.4 Nonparticipant Program Interest

Nonparticipants are moderately interested in using Ameren Missouri incentives to increase the energy efficiency level of equipment replacements in the next two years. Overall, just over one-third of nonparticipants reported high likelihood of using Ameren Missouri incentives to increase the energy efficiency level of their equipment upgrades in the next two years. Interest in Ameren Missouri incentives was higher for large than

small-to-medium customers and higher for tax-exempt than for non-tax-exempt customers (Figure-5-24).

Figure-5-24 Likelihood of Using Ameren Missouri Incentives



Note: Large business = rate class 3M, 4M, or 11M. Small-medium business = rate class 2M.

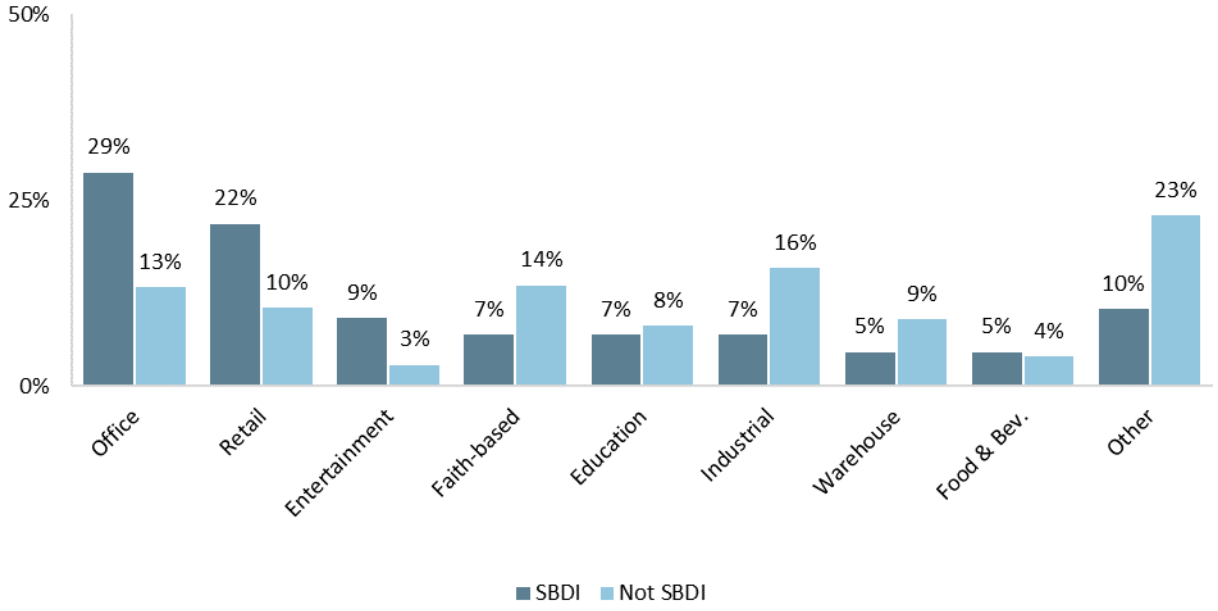
5.5 Small Business Direct Install (SBDI) Program

Feedback on the Small Business Direct Install (SBDI) program came from three main sources. The 87 SBDI participants who took the online participant survey and the 585 surveyed nonparticipants from the 2M rate class who reported their business was responsible for buying lighting equipment provided information on program awareness and potential for expanded savings. The participants also gave feedback on their participation experiences and satisfaction with the program. The 94 surveyed lighting trade allies, including 12 SBDI Service Providers, provided feedback from their perspective on program awareness and processes.

5.5.1 Description of Surveyed SBDI Participants

The 87 SBDI participants represented a variety of business types, though they were more likely to be office or retail organizations than were non-SBDI participants (Figure 5-25).

Figure 5-25 Distribution of SBDI Participants Across Customer Types, Compared to Distribution of Non-SBDI Participants



More than half (57%) of respondents reported an upper management position, with most of the rest reporting facility, maintenance, other management responsibilities. Similarly, more than half (57%) reported a single work location and two-thirds (67%) reported they occupied buildings smaller than 10,000 square feet. By contrast, 7% reported six or more locations and 5% reported buildings larger than 50,000 square feet. Two-thirds own their building, with most of those also occupying their building, and just under one-third lease their work space.

A description of all participant survey respondents, along with a description of the nonparticipant and trade ally samples, can be found in Section 5.1.

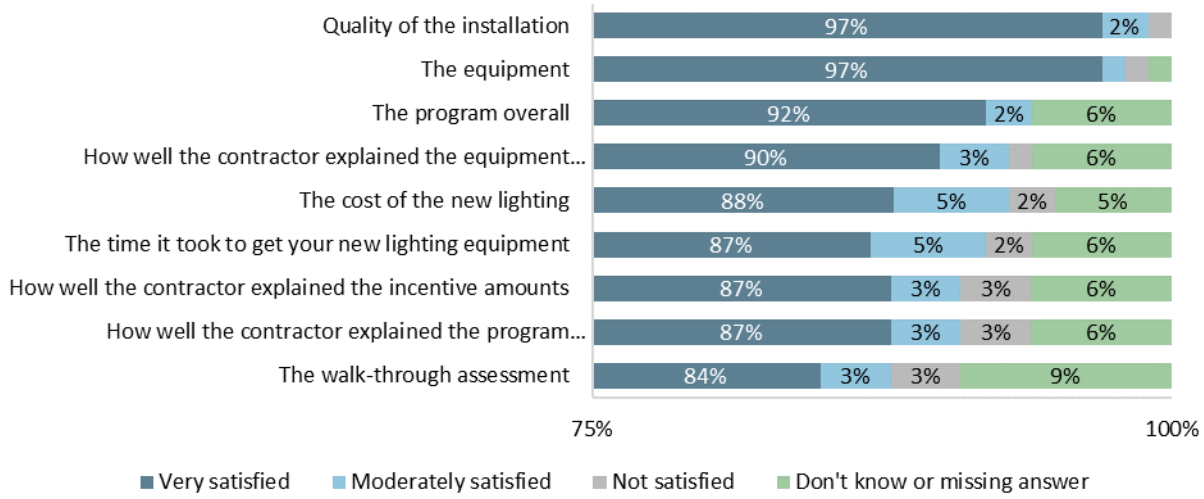
5.5.2 Customer Program Awareness and Interest

Consistent with the program delivery approach, SBDI Participants become aware of Ameren Missouri's incentives through contractors, vendors, or energy consultants. About two-thirds (66%) reported hearing about the program from a contractor or equipment vendor, 17% reported friends or colleagues, and 9% reported an Ameren Missouri or BizSavers representative. Very few (3%) reported hearing about the SBDI program through a direct marketing channel, such as an informational brochure or other form of advertising.

5.5.3 Program Processes

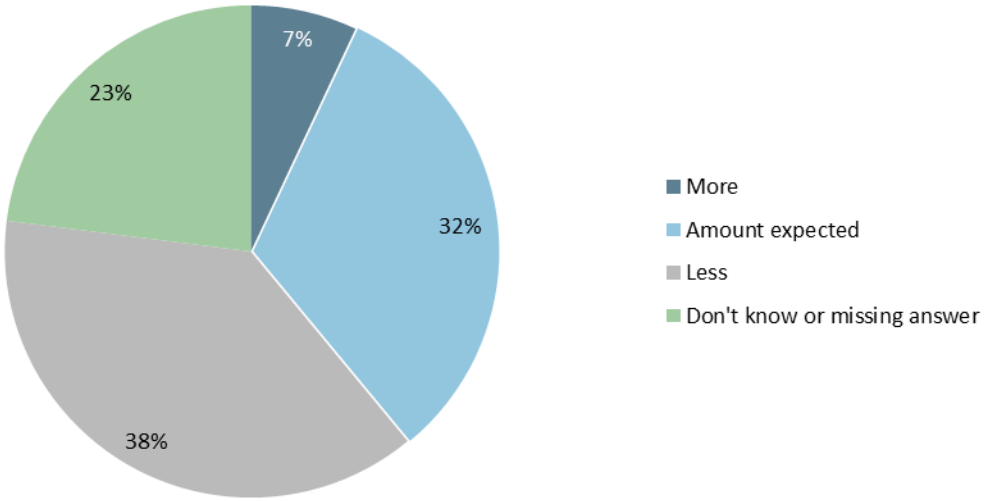
Participants in the SBDI program are highly satisfied with the overall program; particularly with the lighting equipment installed and the lower-than-anticipated project costs. Almost all participants reported high satisfaction with the lighting equipment and the program overall (Figure 5-26). When the respondents who were not able to provide a rating are excluded, satisfaction with contractor recommendations is on a par with that for the equipment and the program overall, and satisfaction with all other program elements is only slightly lower.

Figure 5-26 SBDI Participant Satisfaction with Program Participation (n = 87)



Two-thirds of participants – and more than 90% of those who could provide a response – reported the project cost of their lighting upgrades was roughly the same as or less than their expectations (Figure 5-27).

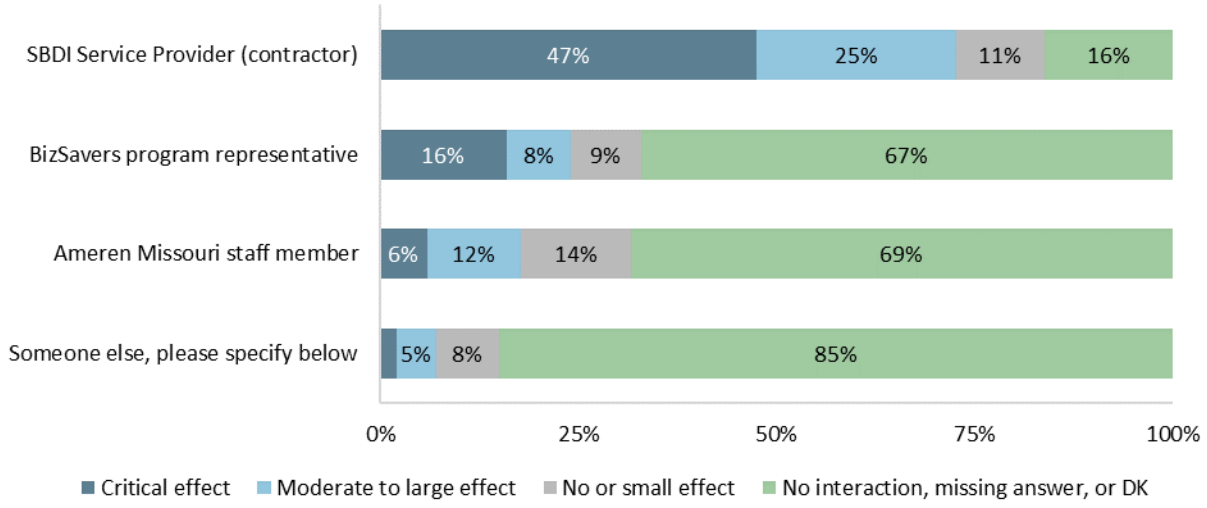
Figure 5-27 How Project Cost Compared with Expectations (n = 87)



SBDI participants were highly satisfied with the project inspection they received after the lighting was installed. Of the 38 respondents who reported their project received inspection from an Ameren Missouri program representative (44% of the sample), most (87%) rated the inspector as courteous and efficient. The remaining 13% did not express dissatisfaction, but said they were unsure.

SBDI service providers influence participants' decisions about lighting equipment. Almost three-quarters (72%) of respondents reported service providers had at least a moderate effect on their decision-making, with most reporting a critical influence (Figure 5-28). The SBDI participants reported interacting with Ameren Missouri staff members and BizSavers program representatives infrequently.

Figure 5-28 Influence of Contractor and Utility Staff on SBDI Participants' Decision to Install Efficient Equipment (n = 87)

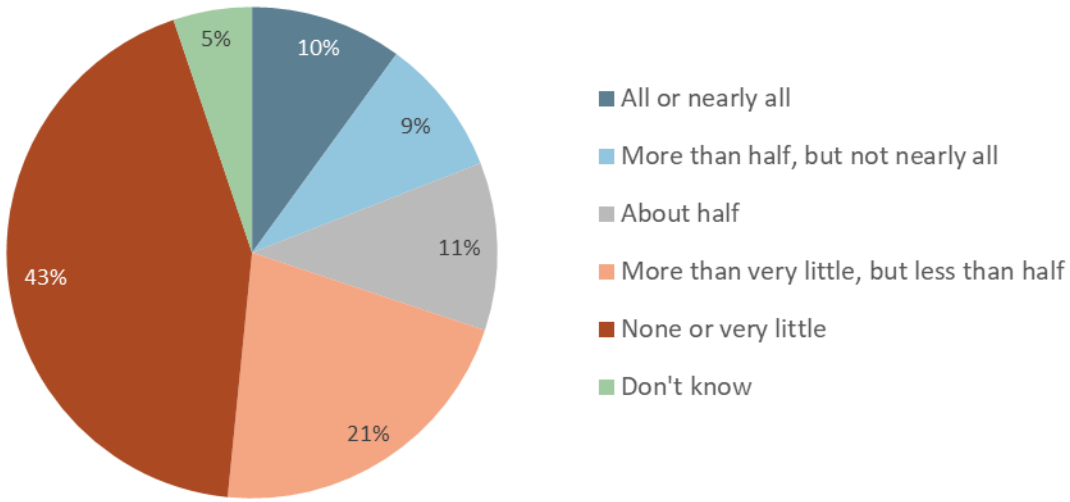


5.5.4 Program Potential for Expansion

Many small customers do not have LED lighting installed and are motivated to replace lighting to reduce their electricity bill. The nonparticipant survey included questions to assess potential SBDI program participation among eligible customers. Of the 723 survey respondents in the 2M rate class, 585 (81%) reported responsibility for buying the lighting at their work location. These formed the overall sample of interest.

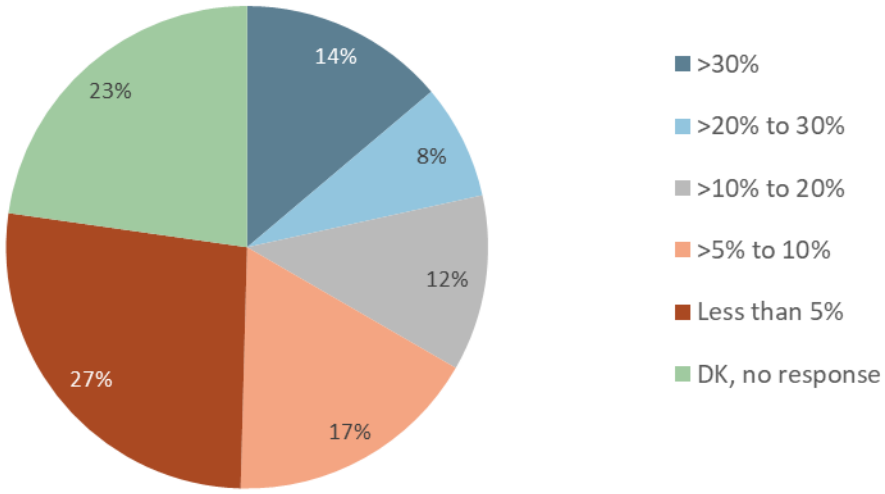
About two-thirds of the SBDI-eligible nonparticipants reported that LEDs make up less than half the lighting at their work location, with most of these reporting it constitutes "none or very little" of the lighting (Figure 5-29).

Figure 5-29 Proportion of LED Lighting at Work Location (n=585)



While nearly one-third of respondents indicated their monthly electricity bill makes up a small part of their monthly operating costs, about one-quarter of respondents reported it constitutes more than 20% of their costs (Figure 5-30).

Figure 5-30 Electricity Bill as a Percentage of Monthly Operating Costs (n=585)



One-quarter (24%) of SBDI-eligible nonparticipants reported they would replace their lighting if they could reduce their monthly electric bills by 10 to 20%, and another 58% said “maybe” they would. At the prospect of saving more than 20% on their electricity bill, the percentage saying they would replace their lighting increased to 43%, and the percentage saying “maybe” decreased to 45%.

Most small customer types are about equally good targets for SBDI than others; Food & Beverage customers may provide the best return on recruitment effort, and Healthcare customers may not be well served by the SBDI programs. While Food & Beverage businesses make up a relatively small share of the Ameren Missouri business customer population, they were among the customer types with the highest percentages of responsibility for lighting purchase (95%) and had highest willingness to replace lighting to save up to 20% on electricity bills (57%). Thus, they may provide a good return on invested SBDI recruitment effort.

Healthcare customers also make up a relatively small share of the business customer base. But while they show a high need for lighting replacements (61% reported “none or very little” LEDs), they had the lowest percentage of businesses responsible for buying lighting (68%; for all other customer types, the percentage ranged from 82% up), the lowest percentage reporting that lighting makes up more than 20% of operating expenses (9%), and the lowest percentage reporting they would replace lighting to save 10% to 20% on bill (17%). This pattern of findings suggests that the SBDI Program may

not be the best vehicle to meet what may be a clear need for lighting replacement for this customer type.

Nonparticipants are interested in the SBDI Program. Two-thirds (65%) of eligible nonparticipants reported at least some likelihood (a rating of 3 or higher on a 1-7 scale) they would schedule a free walk-through energy assessment with an SBDI service provider. The most prominent barrier reported by respondents who did not report likelihood of scheduling a free walk-through was lack of time to schedule an energy assessment.

Many participants of the SBDI program are not aware of, but are interested in, using Ameren Missouri incentives for other types of energy efficient equipment. Of 48 respondents who reported they were financially responsible for equipment repairs or replacements at their workplace and had *not* participated in other BizSavers programs, two-thirds (67%) were unaware they could qualify for other energy efficient equipment incentives. Of those 48 participants, 43 (90%) reported they would be “very interested” in using Ameren Missouri’s incentives to upgrade to new, energy efficient equipment. Three respondents reported they were not interested or only moderately interested and two were not sure.

5.5.5 Trade Ally Feedback on the SBDI Program

Awareness of the SBDI Program is moderate among lighting trade allies. Of the 80 lighting trade allies who were not SBDI Service Providers, 41 (51%) reported being aware of the SBDI program. After being provided with a brief description of the program, the 80 lighting trade allies were split among 31 (39%) who indicated interest in becoming an SBDI Service Provider, 23 (29%) who were unsure about participating, and 26 (32%) who were not interested.

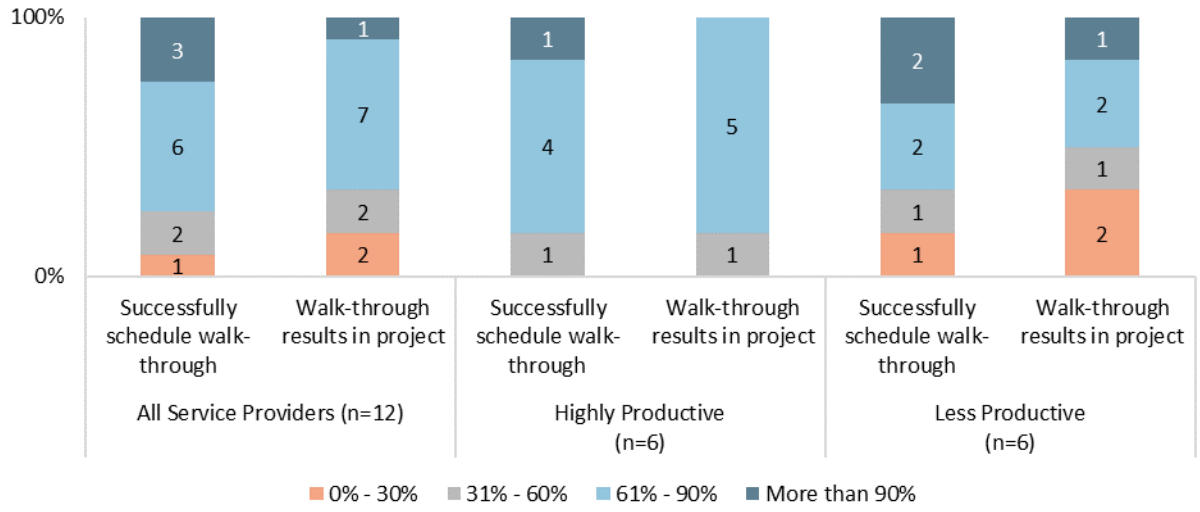
Of the 26 who said they were not being interested in being an SBDI Service Provider, 21 reported a variety of reasons:

- Four said they sell but do not install lighting.
- Three said they do limited work in Ameren Missouri territory or they use an installation subcontractor in the service territory.
- Five said they are not interested in small projects or gave answers suggesting the incentives were too low.
- One simply cited unfamiliarity with the program.
- One cited the fact that a coworker was already doing the program.
- Five said the program was not a good fit for them but did not provide additional details.

The SBDI Program accounts for varying amounts of the Service Providers' lighting work. The proportion of lighting sales coming from SBDI projects varied among the 12 surveyed SBDI Service Providers, with six reporting that the program accounts for less than 30% of lighting-related sales, four reporting 31% to 60%, and two reporting more than 60%.

Service Providers are successful at scheduling walk-through assessments and converting those to projects. Three-quarters of the surveyed SBDI Service Providers reported being able to schedule walk-through assessments with more than 60% of prospective customers, and two-thirds reported the ability to convert more than 60% of walk-throughs to projects (Figure 5-31). The more productive service providers (those with 15 or more SBDI projects) reported more success than those less productive service providers (those with fewer than 15 SBDI projects).

*Figure 5-31 Proportion of Trade Ally Projects Resulting in Walk-Through Assessments and Walk-Through Assessments Resulting in SBDI Projects**



*The team defined productivity based on number of completed projects. The team considered those SBDI service providers with fifteen or more SBDI project as "highly productive" and those with fewer than 15 projects as "less productive."

Small customer size is not a limit to Service Provider sales efforts, but other barriers may exist. Ten of the 12 SBDI Service Providers reported that there is no business too small to try and schedule a walk-through assessment. Of the other two, one indicated the question of a minimum business size depended on other factors but did not specify those factors, and the other did not give a response.

Two Service Providers reported time-related issues that prevent them from completing SBDI projects, with one elaborating that waiting for payment from Ameren Missouri can cause cash flow issues. A third respondent cited inadequate staffing. For a fourth respondent, the limiting issue appeared to be the complexity of customer needs, as that

respondent being interested in SBDI projects only if they are simple, “screw-in replacements.”

Three Service Providers suggested that the program should provide additional marketing and outreach to small businesses to help increase SBDI sales.

Two of the surveyed Service Providers identified issues that may be important concerns for the program. One said that SBDI authorized suppliers are selling products to unauthorized SBDI installers and suggested that the program implementer should investigate this practice. It must be noted that suppliers, registered as program Service Providers, can partner with installers and work together on SBDI projects. The installers are not required to undergo training, however the installer must be listed on the initial Service Provider application and they must provide a certificate of insurance (COI), for their installers. The SBDI program implementer may wish to follow-up with SPs on this concern and to ensure they understand how the program works.

5.6 New Construction Program

Sources for the evaluation of the New Construction Program were 154 surveyed nonparticipants, 7 surveyed participants who reported planning new construction projects, and interviews with 11 staff of architect and design firms that completed BizSavers New Construction projects. These sources provided information on program awareness, processes, and potential for expansion.

The 11 interviewed design professionals provided useful information on awareness of the program and its rules and on project decision-making, including how the program can better drive energy efficiency in new construction project designs. The interviews with those individuals investigated their engagement – and desired engagement – with the program and their perceptions of what other actors are engaged. Program staff had suggested that architects are not highly engaged in the New Construction program: they are interested in bringing value to their customers, but the energy efficiency incentives are not a “deal maker” compared to the overall budget. Staff also indicated that general contractors are not highly engaged, as dealing with the incentive program is “just another cost.” The best target, according to staff, is the owners’ representatives and mechanical engineering firms.

5.6.1 Customer Feedback

Two-thirds of the surveyed nonparticipants and all participants reported being an owner or executive or having facilities responsibilities at their workplace. The respondents represented a range of business types, with half of them representing the Office, Industrial, Retail or Food & Beverage types. Of those who reported building size, just over half reported they occupy a building less than 10,000 square feet and most of the rest reported buildings less than 100,000 square feet. Of those reporting the number of

work locations, half reported a single location and most of the rest reported no more than five.

5.6.1.1. Customer Awareness of the Program and Its Rules

New Construction participants learn about the availability of Ameren Missouri's New Construction incentives relatively early in their project. Two respondents learned of New Construction incentives prior to any project discussion and three reported they became aware of incentives after they had started discussing their project, but before selecting major energy-using equipment. The other two respondents reported learning of Ameren Missouri New Construction incentives once they had started designing their project.

New Construction participants became aware of the program via a contractor or vendor (four mentions), a program representative (two mentions), or online via the website or search engine (two mentions). The source of awareness was unrelated to how early in the planning process they became aware.

Some New Construction participants are unsure of the guidelines for receiving incentives. Respondents reported whether they understood a key program requirement at the time they applied for New Construction incentives - specifically, that they could not receive incentives for equipment that already was part of their project design before they spoke with a program representative. Three of the seven surveyed participants reported they did not understand that requirement or were unsure.

Design professions are influential on new construction equipment descriptions, but they infrequently mention BizSavers New Construction incentives. A total of 154 surveyed nonparticipants reported any plans for undertaking new construction projects. Of those, 64 (42%) had begun discussing the project design with architects, engineers, or contractors. Those 64 nonparticipants indicated that design professionals were at least moderately influential on their decisions about new equipment and building features: 26 (41%) reported moderate influence (a rating of 3 to 5 on a 7-point scales), and the same number reported strong influence (a rating of 6 or 7).

Although design professionals are influential, they apparently do not frequently use that influence to recommend BizSavers New Construction incentives: 11 of the nonparticipants who had begun discussions of a new construction project (17%) reported that someone during those discussions had brought up the possibility of using Ameren Missouri incentives.

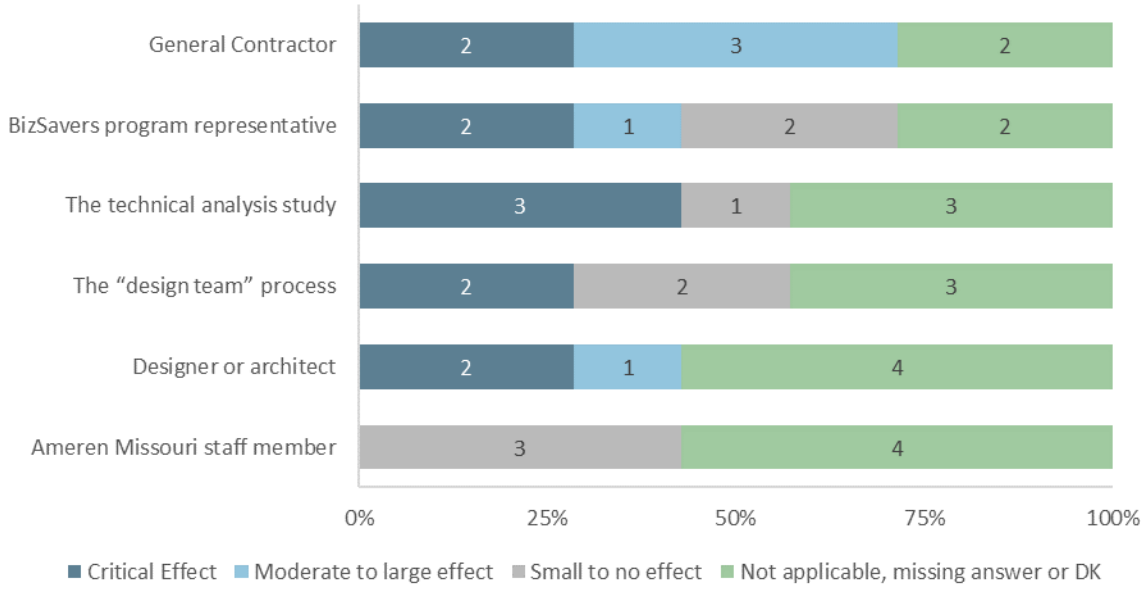
5.6.1.2. Participant Perspectives on Program Processes

The New Construction program's range of incentive options fits participants' needs. Six out of seven participants reported a "4" or "5" on a 5-point scale when asked how well the program's range of incentives fit their needs. One respondent reported they were unsure. Furthermore, the majority (71%) of respondents reported they felt the

incentive payment was about the amount they expected to receive, while the remaining two respondents (29%) reported it was less.

Participants perceive the elements of the New Construction program as moderately influential on their decisions to install energy efficient equipment. Although many participants reported they did not interact with many of the people or processes involved in the program, they rated the technical analysis study as the most influential factor in their equipment selection process: three out of seven respondents reported the study as having a critical effect on their decision (Figure 5-32). Two-fifths of participants reported Ameren Missouri staff members have little to no effect on their decisions.

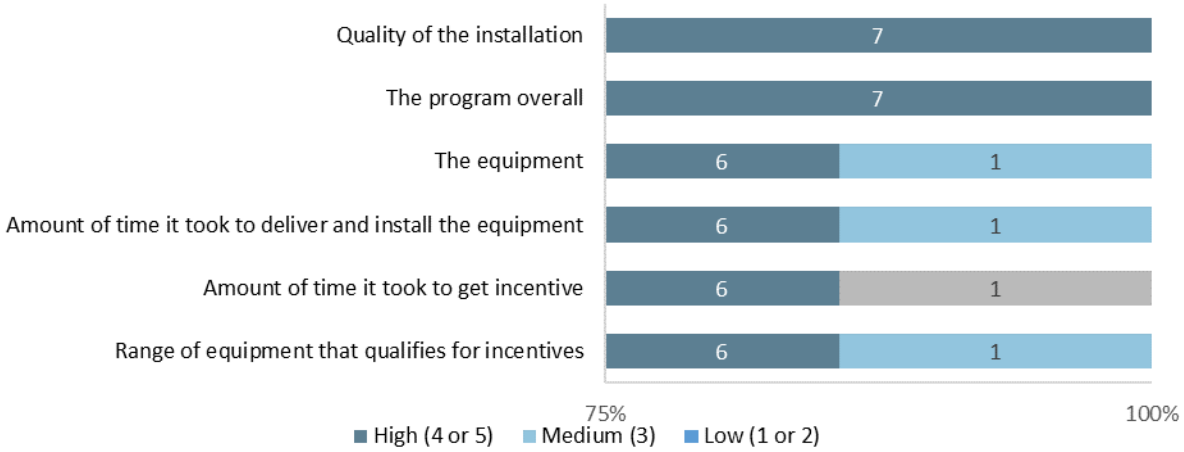
Figure 5-32 Influence of New Construction Program Staff & Processes on Participants (n = 7)



Most New Construction projects are inspected by program representatives, who are rated as courteous and efficient by participants. Five out of six participants who received project inspections reported the inspector as both courteous and efficient. The remaining participant was unsure about the inspector's courtesy and rated their efficiency as moderate.

Participants are highly satisfied with all elements of the New Construction program (Figure-5-33). Most notably, 100% of participants reported they were highly satisfied with the quality of the installation and the program overall. One respondent was dissatisfied with the amount of time it took to get the incentive.

Figure-5-33 New Construction Participants' Satisfaction with Program Participation (n=7)



5.6.2 Design Professional Feedback

New construction projects may span program years. Therefore, the evaluation team identified all architect/design companies associated with applications started since the beginning of the current program cycle, March 1, 2016. Of 59 such companies, most (51) were associated with one or two projects. The evaluation team excluded 19 companies whose projects had not yet reached the "committed" phase. Of the remaining 40 companies, the team prioritized contacting those with completed projects.

The 11 interviewed design professionals reported a range of titles: project manager (4), project architect or designer (4), or principal, director, and mechanical engineer (1 each). Seven reported active roles in BizSavers projects, including general project management (2), project design and equipment selection (3), facilitating meetings with various design engineers (1), and completing the application (2). Four respondents reported having no or a minimal role in BizSavers projects.

Respondents reported being in business in Ameren Missouri service territory for between five and forty-eight years or about twenty-one years on average and primarily specialized in the healthcare, commercial, and industrial sectors (Table 5-19).

Table 5-19: Characteristics of Interviewed Design Professionals

ID	*Years in Business*	*Number of Projects**	*Hospitality*	*General Commercial*	*Health Care*	*Grocery*	*Education*	*Industrial*
NC01	5	4			✓			
NC02	30	3		✓			✓	
NC03	18	3						✓
NC04	10	2				✓		
NC05	20	2	✓	✓	✓			
NC06	12	1	✓					
NC07	48	1				✓		
NC08	23	1		✓				
NC09	30	1			✓		✓	✓
NC10	10	1		✓				
NC11	27	5			✓			✓

* Includes completed, committed, and discontinued Ameren Missouri new construction projects.

5.6.2.1. Awareness of the Program and Program Rules

There is limited awareness of Ameren Missouri's New Construction incentive program among architects and designers. Four respondents reported awareness of New Construction incentives, of whom three reported knowing about the program for five or fewer years and one, for more than ten years. Respondents reported learning about the program previously through a variety of sources including their MEP engineers, clients, emails from Ameren Missouri, and previous projects. Five of the 11 respondents reported not being aware of the New Construction Program before starting working on the project(s), one of whom reported not even knowing the project they were involved with received Ameren Missouri New Construction incentives.

Four respondents reported having received information from Ameren Missouri about the New Construction incentive program (emails or a newsletter), of whom, two said the information covered the Whole Building Performance incentive. All four said the information was useful.

All six respondents who had not received any information from Ameren Missouri said that it would be helpful to receive information about New Construction incentives. Respondents mentioned that receiving information highlighting the program processes would be helpful (three mentions), in addition to how the program could benefit their clients (two mentions), eligibility requirements, required coordination, and required documentation (one mention each; multiple responses allowed).

Design professionals note lack of program awareness in the market. Four of the 11 respondents indicated that their clients and their clients' contractors often do not know about the New Construction Program and suggested additional marketing and outreach to help attract more clients. One suggested providing more outreach to project managers and engineers, saying "it always helps if who we're working with is at least aware that the program exists – and that certain steps are needed to happen. If you are talking with project managers on the client end, and electrical and civil engineers – they should have an awareness of the program." Another respondent echoed this: "As long as the design pros are aware of it they can advise their clients."

There is low awareness of the requirement to complete projects within a program cycle. Of the 11 respondents, four knew that a New Construction project must be completed within a given program cycle (currently, three years) to receive incentives. Of those four, two said that their clients also understand this requirement. One respondent reported the understanding that projects may bridge into the next cycle by a short period of time.

Two of the four respondents said the three-year program cycle did not prevent their clients from applying for incentives. Of the other two, one elaborated on the challenge the rule creates: "If it's the end of the calendar year, electricians are trying to order as many fixtures as they can since fixture prices go up in January. But if we are starting in December, they can either buy at a reduced cost or wait until January and maybe save through the program."

Respondents reported having limited involvement in completing the New Construction incentive application. Four respondents reported involvement in the application process, two saying they fully managed the application process while two reported minimal involvement, mainly providing information as needed. The other seven reported no involvement in completing the incentive application. The four respondents involved in the application process all reported being generally satisfied with the process, although two commented that the process was somewhat time consuming. All four reported that the application instructions were generally clear, although three reported having to reach out to program staff for additional clarification.

5.6.2.2. Project Decision Making

Respondents report limited involvement in the decisions to apply for New Construction incentives. Eight respondents reported that they were actively involved in the discussions about applying for incentives (four respondent) and/or were aware of who was involved in those discussions. The most commonly mentioned parties involved in such discussions included the building owner, MEP engineers, and a general or design-build contractor (five mentions each). Less commonly mentioned were members

of the facilities team, the project manager, and a structural engineer (one to three mentions each).

Discussion about New Construction incentives often occur late in the project. While three respondents said the discussion of the program occurred at the beginning of the design phase, five said that the discussion of the program did not occur until the end of or shortly after the initial design phase of the project. For one of those five, the discussion came after the design phase but before equipment specification, three said it was during or shortly after the production of the construction documentation, and one said the discussions started after construction had started. Three did not know when the discussions occurred.

Design professionals say they can play an important role in informing clients about the New Construction Program if the discussions about applying for incentives occur early in the design process, which requires program outreach and support. Four of the respondents said that architects and designers can be instrumental in informing clients about the program. One respondent mentioned “The more [architects and designers] can get involved upfront in the design of those initial systems is when they’re most successful.” Another respondent echoed this, saying “I think that if involved early in schematic design it will impact our building layout and entire project, so I think it’s an opportunity to consider incentives in our initial work.” That respondent expanded on the role of architects, as to “lead the process forward and to be that expertise, and part of that is making sure you’re building something successfully within the client’s budget.”

One respondent noted that, since contractors and engineers have a better relationship with utilities, they “seem to have a better handle on what’s available.” Thus, some respondents said that general or MEP engineers may be more effective in informing clients about available incentives than architects and designers.

Five respondents suggested that the program staff could help design professionals more effectively promote the program by increasing program outreach and awareness, including by providing a contact person available to answer questions about the program and by providing details of program processes, specifically the required steps and timeline. One respondent also suggested that Ameren Missouri make marketing materials more graphic, simple, and clear to make it easier and less time consuming for architects and designers to explain the program to clients.

Drivers of energy efficiency investment include return on investment, the desire for building certifications, and non-energy benefits. Respondents reported a variety of factors influence the selection of energy efficient equipment into their designs, such as payback or return on investment (five mentions), operational energy savings (four mentions), certifications such as LEED certification, reduction of maintenance costs, increased performance (two mentions each), comfort, and relationship with suppliers (one mention each; multiple mentions allowed).

The program has moderate influence on project design, largely because of lack of early involvement. The program does affect the design of some new construction projects. Four respondents reported making changes to the design of their projects due to the incentive, such as additional controls, integrating LEDs, integrating systems, including fewer lighting fixtures, and including a Variable Refrigerant Flow (VRF) Heat Pump (one to two mentions each). Respondents identified no program-recommended energy efficiency equipment or construction practices they decided to not include in their project designs. However, seven respondents reported that the New Construction incentives did not have a significant impact on design.

Few respondents report having contact with program staff about how to build energy efficiency into their designs. Of the 11 respondents, two reported contacting program staff about the project design. One respondent commented that they "Spoke with [program staff] after we decided to go for it - close to ground breaking. The discussions secured the energy efficiency project we were looking at." The other respondent reported program staff were helpful, however, they mentioned the discussion "seemed like a very prescribed process." The respondent went on to say, "There might have been some help offers there, but mostly dotting the I's. [The design] was affected to some degree but as the building process goes along you have less time to make those modifications (regardless of incentives). There were time conflicts that didn't work out for us. The whole receiving the bid before you can order stuff is tough."

One respondent commented on the importance of getting program staff involved earlier in the design process: "There are prototypical design standards, if it deviates from that, then there are a lot of decision makers and stakeholders involved in those decisions. At that level I don't think those decisions are made quickly enough for them to get incorporated into a project for incentive savings… Generally, once [the design] is implemented at the project, those decisions have been made and they're not going to deviate."

5.7 Retro-Commissioning Program

To shed light on the Retro-Commissioning Program processes and progress, the evaluation team interviewed five Retro-Commissioning Program participants and five Retro-commissioning Service Providers (RSPs).

5.7.1 Retro-Commissioning Participants and Near-Participant

The evaluation team interviewed five retro-commissioning participants and one near-participant. The interviews covered how the respondents learned about the retro-commissioning program, how they decided to do a retro-commissioning project and what they included in the project, their experience with and satisfaction with the project

processes and their service provider, and their awareness of and interest in other BizSavers incentives.

Interviews showed that having past program experience is influential in completing retro-commissioning projects. RSPs play a minimal role in initial recruitment for retro-commissioning participants but do play a substantial role throughout the project. The key suggestions for improving the program was to provide additional marketing materials, simplify the application process, and streamline the program to make it easier to apply for additional incentives.

5.7.1.1. Selection of Interviewees

Retro-commissioning projects may span program years. Therefore, the evaluation team identified all customers with projects started since the beginning of the current program cycle, March 1, 2017. Of 21 customers with projects started, the team selected the 14 that had gotten to at least the “offered” phase and prioritized them for contact, starting with those whose projects were most advanced (completed) to least advanced (offered). Of the five interviewed participants, one had a completed project, two had projects in the payment pending phase, and two had committed projects. The team also selected and interviewed the one participant with a discontinued project to learn about the reasons for discontinuation in addition to the other objectives.

5.7.1.2. Respondent Characteristics and Project Types

The program provides retro-commissioning incentives for optimizing buildings, compressed air systems, and refrigeration. Of the six respondents, four represented industrial facilities, one represented a school, and one worked for a museum. This distribution well represented the distribution of all retro-commissioning projects (Table 5-20). Respondents completed three compressed air and three building optimization projects. In all cases, the respondent represented the building owner. Additionally, respondents reported having between one and thirty-four buildings in Ameren Missouri service territory. Among the five who reported having multiple buildings, four indicated at least some of those buildings would be candidates for retro-commissioning work.

Table 5-20 Respondent Summary

Participant	*Building Type*	*Business Type*	*RCx Project Type*	*Square Footage*	*Properties in Ameren Missouri Territory*
RCP3	Manufacturing	Industrial	Compressed air	DK	2
RCP4	Manufacturing	Industrial	Compressed air	100,000	6
RCP5	K-12 School	School Dist.	Bldg. optimization	317,000	34
RCP8	Manufacturing	Industrial	Compressed air	110,000	1
RCP12	Office	Industrial	Bldg. optimization	900,000	2
RCP14	Museum	Non-profit	Bldg. optimization	200,000	2

The three compressed air projects all involved air leak assessments, with one also incorporating power load and ventilation adjustments. The three building optimization projects involved supply air pressure and temperature resets, economizer optimization, energy recovery wheels (“heat wheels”), outside air reduction, and elimination of unneeded equipment.

5.7.1.3. Factors Driving Program Participation

Prior experience or knowledge of the BizSavers retro-commissioning program was instrumental in current participation for four of the six respondents (Table 5-21). Two had participated in the program previously. A third reported having known about BizSavers incentives since first doing facility management. The fourth did not personally have long-standing prior knowledge of the program but learned about it from a coworker who had known about it. Of the remaining two participants, one reported searching for business incentives and came across the Ameren Missouri website and one reported initially learning about the program through their lighting vendor and then being approached by the RSP. This respondent went on to mention that they thought their firm had a retro-commissioning study completed prior to them joining the company.

Table 5-21 Source of Awareness of Retro-commissioning Program

Respondent	*Past participation*	*Prior knowledge*	*Colleague*	*Ameren Missouri Website*	*RCx Provider / Vendor*
RCP3				✓	
RCP4					✓
RCP5	✓				
RCP8		✓			
RCP12			✓		
RCP14	✓				

Five of the six respondents indicated that the initial impetus for doing retro-commissioning or related work was internal, and five either said they were explicitly considering completing a retro-commissioning project prior to talking to their RSP (three mentions) or that they were looking for ways to tune up their systems to save energy, though not specifically considering a retro-commissioning project (two mentions). The remaining respondent reported that a recommendation from a senior executive in the company, who previously had done work with the RSP, led to contacting the RSP.

Of the five respondents who completed projects, all reported their RSP as having a significant role in completing their retro-commissioning project. One respondent reported having an existing contract with the RSP for maintaining their air compressors. As part of the contract the RSP provided the respondent with an air leak assessment report which they were then able to provide to management to get sign-off on the project. A second respondent reported that their RSP developed a comprehensive “action plan” and helped coordinate the application submittal process and engage with staff to make changes. A third respondent echoed this in saying that their RSP acted a “project manager” and assisted with drafting and refining proposals in a collaborative manor. A fourth respondent reported that the RSP provided them with “a variety of energy conservation measures” that were covered under the retro-commissioning program as well as additional custom measures. The final respondent reported their RSP identified measure that would fit into their operations budget and helped them develop a “phased approach” for measures that were outside of their budget.

5.7.1.4. Participation Experience

Respondents who completed a project reported being generally satisfied with all aspects of their retro-commissioning project, including the audit, the quality of worked performed, and the on-site inspection (for those who reported having one). Respondents provided high satisfaction ratings with their overall program experience. One respondent who had completed additional custom incentive measures identified during the audit suggested that it would be helpful to streamline the program to not

require a separate application for the custom measures. This respondent went on to mention that they would be able to do additional retro-commissioning work on buildings they owned if program requirements allowed buildings under 100,000 square feet.

Respondents reported a limited role in filling out the incentive application but mentioned the portions of the application they did complete were relatively straightforward. Of the five respondents who commented, two reported that they would have been able to complete the entire application without the assistance from their RSP or program staff. Two additional respondents mentioned they could have completed certain parts of the application but not sections involving energy calculations. They went on to say that "if Ameren Missouri were to put something out that allowed customers to do their own modeling or run with some standard equations, then [the RCP] could potentially [complete the application]." The remaining respondent reported they likely could have completed the application, but it would have taken longer. All respondents reported having no questions about any program requirements other than how to complete the application.

Of the five respondents who completed a retro-commissioning project, two reported all equipment types or optimization measures recommended by their RSP were qualified by the program. Two additional respondents reported some recommendations were not covered by the retro-commissioning program (HVAC and ECMs) but were covered by custom incentives. The remaining respondent did not recall if there was any recommended energy saving equipment that was disqualified by the program. Of the five respondents who completed a project, all but one reported that they completed everything recommended by their RSP. The remaining respondent reported they were only able to partially complete recommendations because of budgetary constraints but would be continuing to complete projects throughout 2018.

Respondents who completed a retro-commissioning project reported being satisfied with the audit provided by their RSP. Four reported general satisfaction of which one respondent elaborated, "there were areas where we were surprised that we were not doing as well as I thought, like energy conservation and our heat wheel. That was an eye opener. It was a good experience for me." The remaining respondent reported being generally satisfied with the audit but did mention finding the process to be time consuming. Of the three respondents who had completed or had a project with payment pending status, all reported no issues with the onsite inspection and all reported general satisfaction with the quality of their RSP's work.

The four respondents who completed a project reported receiving some type of information or training on how to keep their equipment and systems operating efficiently. Of the four, two mentioned receiving documentation of the measures installed with the optimal settings which they primarily used to ensure operations didn't deviate from those settings. Another respondent reported receiving in-person training on how to set

up their air compressors and how to use their sequencing controller. The remaining respondent reported not receiving any specific documentation or training but did mentioned the RSP recommended doing occasional audits for air leaks – something that was included in the project cost.

5.7.1.5. Awareness and Interest in Other BizSavers Incentives

All but one respondent reported being aware of other Ameren Missouri BizSavers programs, all of which mentioned knowing about lighting incentives. Three of the five also reported being aware of incentives for mechanical equipment upgrades. Of the five that reported being aware of other Ameren Missouri BizSavers incentives, four indicated that they would consider applying for incentives in the future. Among the four, three reported being interested in additional lighting upgrades, two reported being interested in having additional retro-commissioning work completed, and one reported being interested in energy management systems (multiple mentions allowed).

5.7.2 Feedback from Retro-Commissioning Service Providers (RSPs)

The evaluation team completed interviews with five retro-commissioning service providers (RSPs) to complement the information from the retro-commissioning participants. The team identified five RSPs that had started retro-commissioning projects in the current cycle that had at least reached the “offered” phase. Of those, one had nine projects at that stage and the others each had one or two projects.

The interviews covered RSPs target customers for retro-commissioning, challenges encountered in finding qualifying customers, the types of equipment or upgrades identified in the process of conducting a retro-commissioning project, the types of follow-up and training they provided to customers to help realize the potential savings from the retro-commissioning, how the BizSavers retro-commissioning program may differ from any others they are familiar with, and the training or preparation they received about the program from the program implementer.

The team found that RSPs face three primary challenges in completing retro-commissioning projects 1) finding customers with large enough buildings who did not opt-out of Ameren Missouri’s incentive programs, 2) customer financial constraints, and 3) some structural issues with the program. RSPs suggested that Ameren Missouri could alleviate some of these challenges by adopting some aspects of other utility retro-commissioning programs. Finally, RSPs reported being generally satisfied with the retro-commissioning program but did offer some suggestions for improvement.

5.7.2.1. Retro-Commissioning Service Provider (RSP) Characteristics

Respondent firms varied in the range of services they offered their clients. Four of the five firms reported provided building commissioning services and one reported providing

compressed air and air leak assessments (Table 5-22). All four building optimization firms reported their firm provides energy audits, analytics and modeling. One building optimization firm reported they do not sell any products other than energy analytics software to their clients. Respondents reported providing retro-commissioning services for between seven (two mentions) and ten years (two mentions). One respondent reported not knowing exactly when the firm started providing retro-commissioning services but mentioned it had been a number of years prior to when they started working for the company.

Table 5-22 Services Provided by Retro-commissioning Respondents

RSP	*Building Optimization*	*Compressed Air*	*Energy audits, analytics, and modeling*	*Controls and programing*	*Mechanical system services*
RSP1	✓		✓	✓	
RSP2	✓		✓		
RSP3		✓			
RSP4	✓		✓	✓	✓
RSP5	✓		✓	✓	✓

5.7.2.2. Targeting Retro-commissioning Projects

Respondents typically target specific types of customers. Four of the five providers target building owners, and one reported working with tenants who lease space and commercial property management firms. All respondents reported they target customers with buildings over 100,000 square feet with one mentioning working on buildings over one million square feet. Respondents reported targeting a variety of building types for retro-commissioning projects with building optimizations RSPs reporting mainly working in the healthcare and education sectors.

- RSP1 and RSP5 reported primarily targeting hospitals, school districts, and universities but have also completed some smaller commercial projects.
- RSP2 reported their customers are mainly in the healthcare sector, but they also complete projects at education and commercial facilities.
- RSP3, an air compressor optimization specialist, reported they target both manufacturing and food processing facilities for their optimization projects.
- RSP4 reported that they do not specialize in any one sector, but the bulk of their customers are in healthcare and education. Within the healthcare sector they focus on hospitals and firms that specialize in biopharmaceutical labs.

5.7.2.3. Explaining Retro-Commissioning Projects and Customer Acquisition

A common approach used by RSPs to explain retro-commissioning to their customers is describing the process as a “tune-up” to their building(s) or equipment. Two building optimization RSPs and the one air compressor optimization RSP reported referring to retro-commissioning as a tune-up to their customers. Another RSP reported they explain to their customers that the retro-commissioning process involves adjusting building operations to meet current operational conditions. The remaining RSP did not mention specifics on how they explain the program to their customers by reported that sharing results from prior retro-commissioning projects is effective in securing retro-commissioning projects – a sales approached mentioned by one other RSP. Additional customer acquisition approaches mentioned by RSPs included providing savings and payback estimates (three mentions), providing free analysis of utility bills (one mention), and informing potential customers that they are paying into the Ameren Missouri incentive programs and should take advantage of them. The one air compressor optimization specialist reported that letting maintenance staff know they will be going through the facility to identify and repair air leaks is a key sales tactic used.

5.7.2.4. Challenges to Project Implementation

Finding customers who both qualify for the retro-commissioning program in terms of building size and who have not opted-out of Ameren Missouri’s incentive programs is another challenge mentioned by three of the five RSPs. One building optimization RSP reported that about half of their retro-commissioning projects do not qualify for the retro-commissioning program because the customer opted-out of Ameren Missouri’s incentive programs. The RSP mentioned that those who opt-out are generally hospitals, universities, and large commercials customers. Another building optimization RSP also reported that many of their “campus-sized” customers have opted out of the Ameren Missouri’s incentive programs. The air compressor optimization RSP reported encountering similar situations where they have started a project only to find out later that the customer had opted-out of Ameren Missouri’s incentive programs. This RSP went onto suggest that having a listing of customers who have opted out of the program would be helpful in tailoring their messaging.

Respondents reported financial constraints as a challenge to implementing retro-commissioning projects. Four of the five RSPs mentioned that the initial cost of the project or getting the project budgeted can prevent participation. The one air compressor optimization RSP mentioned because the program no longer funds studies to identify savings opportunities, much of the risk is on either the RSP or their customers. The RSP mentioned that they have been successful in getting their customers to pay some of the upfront costs, but it does discourage some from participating. The current incentive amount does at least partially address these

financials challenges. One RSP reported that the initial outlay of money does prevent some from participating, but went on to say, “usually once [a customer] goes through the process and sees the incentive amount they will move forward.” Another RSP echoed this saying that “[retro-commissioning projects] cost money, so incentives are important.” As discussed below, three of the five RSPs reported that other unity programs they work with incentivize the initial audit which results in increased participation. This may suggest some value in at least partially covering the initial audit to alleviate this financial barrier to participation.

Two RSPs mentioned specific issues with the retro-commissioning program structure as barriers to both customer and RSP participation. One building optimization RSP reported their customers mention that the program involves too many steps before work can be completed. The RSP suggested the program could allow “some simple fixes” such as adjusting setpoints that would instantly qualify for incentives and be completed during the initial evaluation. The RSP went on to say that these “prescriptive measures” would be attractive to customers because they could start seeing savings immediately. The air compressor optimization RSP also mentioned challenges related to the program structure. The RSP reported additional burden on both the RSP and customers when estimated savings does not match final savings – especially if it falls under the 500,000-kW threshold. The RSP mentioned that “we fix all these leaks and things and say we are going to save 600,000 kW and if we do not save that much, Ameren Missouri does not pay… we have all that risk that if something happens and Ameren Missouri does not have any. Some [RSPs do not] want to take that risk, I do because I am confident in what we do.”

5.7.2.5. Identification of Equipment Replacement or Upgrades

Four of the five RSPs reported identifying capital upgrades outside of the retro-commissioning program during their initial audit. RSPs reported identifying a variety of capital upgrades including boilers (two mentions), chillers (two mentions), heat exchangers, air compressors, and air compressor dryers (one mention each; multiple mentions allowed). Two of the four RSPs also mentioned that they have recommended lighting upgrades to their customers. The RSP who did not specifically mention identifying capital upgrades reported that if they did identify capital upgrades they would involve an outside contractor.

All RSPs who reported identifying capital upgrades during the initial audit reported recommending that their customers apply for additional Ameren Missouri BizSavers incentives. The air compressor optimization specialist went on to say that they “do not do the other BizSavers things, but they always work closely with [program staff]. They come in with me and explain the other opportunities (lighting, VFDs, controls, etc.). We just let them piggyback on us. We do not put that information in our study, but we want [the program] to be successful.”

5.7.2.6. Follow-up and Training

Two of the five RSPs reported they try to build follow-up and monitoring into their retro-commissioning projects to ensure that associated savings persist. One RSP reported, however, that not all customers are interested in paying for the additional follow-up and suggested that Ameren Missouri consider providing incentives for monitoring-based commissioning. That RSP suggested modeling incentives based on ComEd's monitoring-based commissioning program, which they have found to be effective. The air compressor optimization RSP did not report following up with their Ameren Missouri customers, but mentioned providing biennial follow up to their Ameren Illinois customers because the follow up air leak identification surveys are paid for by Ameren Illinois.[19]

Four of the five RSPs reported providing some information or training to their customers after the retro-commissioning work has been completed. Two RSPs reported providing training to their customers for an additional fee and one RSP mentioned providing general training that is included in the cost of the project. One RSP reported providing walkthroughs to show staff the work the RSP completed and to show "how things are supposed to be operated." The RSP who reported not providing any training mentioned that they would be willing to provide training to their customers if requested.

5.7.2.7. RSP Preparation or Training

Four of the five RSPs reported attending training and seminars hosted by program staff and found the information provided during these events to be useful. The one air compressor optimization RSP elaborated that they also presented at several of the seminars hosted by Ameren Missouri and mentioned that it is often difficult getting customers to attend the seminars. The one RSP who reported not attending any specific trainings or seminars reported they receive periodic updates directly from program staff. When asked whether any additional information or training was needed, no RSPs suggested such a need. However, when later asked about barriers to participation, one RSP commented that "the biggest barrier is making a salesman out of an engineer." This may suggest some value in including sales training in the program training and seminars.

5.7.2.8. Comparison to Other Retro-Commissioning Programs

RSPs reported that other utility retro-commissioning programs can offer certain benefits but often result in less savings and follow-through. Three of the five RSPs mentioned that programs in Illinois are often more effective at gaining initial customer interest

[19] The evaluation team reviewed the website for the Ameren Illinois Retro-commissioning program but could not confirm that this is part of that program.

because the cost of the initial audit is at least partially covered.[20] Two of the three RSPs went on to say that customers in other programs, however, are less likely to follow through with project implementation and have less savings associated with the retro-commissioning projects. The third RSP, the air compressor optimization specialist, did not specifically mention issues with customer follow through or savings, but did report finding the Illinois program better suited for air optimization because it covers biennial leak surveys. Of the remaining two RSPs one reported monitoring-based commissioning is offered through other utility programs and that "the whole industry is moving that way." The RSP went on to mention that they typically include the analytics in their projects, but it would be beneficial to have an incentive because "energy savings degrade overtime without monitoring-based commissioning." The final RSP reported not having experience with utility programs outside of Ameren Missouri's territory.

5.7.2.9. Effect of Program Interruption

The program interruption in early 2016 affected RSPs retro-commissioning projects. Four of the five RSPs mentioned that the program interruption did affect their business in some way. The air compressor optimization RSP reported the program interruption was "very powerful" and resulted in a loss of "a lot of money." The RSP went on to say that they also observed an impact on program staff, noting that the program lost a lot of staff during the interruption. One RSP noted that the interruption led them to "steer away" from the program as it was not their "focus area." They reported providing their customers with estimates including program incentives and recommended holding off on completing retro-commissioning projects until the program restarted. Another RSP did not mention specifics about how the interruption affected their business, saying only that "it didn't help." That RSP, however, indicated understanding the reasoning behind the interruption and appreciated that the new incentive structure is now more closely aligned with Ameren Illinois programs. Another RSP mentioned that it was difficult to market their retro-commissioning services and slowed down their business. The one RSP who did not mention the program interruption affecting their business reported that their retro-commissioning projects were in "limbo as far as incentives" but they try to sell projects based on the associated payback rather than the incentive.

5.7.2.10. Overall Program Satisfaction and Suggestions for Improvement

RSPs reported being generally satisfied with the retro-commissioning program. One RSP noted that the three-year program cycle is helpful in completing retro-

[20] Ameren Missouri also pays up to 100% of the study cost but the incentive payment is based on energy savings achieved, as opposed to an incentive that covers all or a portion of the study cost independent of energy savings achieved.

commissioning projects. Two other RSPs mentioned that the incentive structure is effective in offsetting project costs and reducing payback time.

RSPs also provided suggestions for improving the retro-commissioning program. One RSP suggested creating standardized format for calculations to expedite the application review process. The RSP mentioned “we do work in Xcel Energy’s territory and they have created a standard format for a lot of calculations… and [program staff] can review it very quickly instead of having various spreadsheets that are used by different companies. [Ameren Missouri program staff] have to decipher each one and that makes the review process more difficult.” Another RSP suggested shortening the approval time for projects to between two and three weeks would improve customer acquisition. The RSP elaborated saying that not being able to book a project until there is an incentive offer may discourage other RSPs from applying because “they want to get paid and book a job.” Another RSP echoed this suggestion saying that “the biggest drawback is the time delay that can occur in the processes itself.” Finally, one RSP mentioned experiencing some difficulties with working with program staff and suggested providing better communication.

5.8 Energy Management System (EMS) Pilot

Feedback on the Energy Management System (EMS) pilot came from three main sources. The five EMS participants who took the online participant survey provided information on program awareness and interest. The participants gave feedback on their participation experiences and satisfaction with the program. The 21 surveyed trade allies who reported experience with EMS or Building Management Systems (BMS), provided feedback on their awareness of the program and on the awareness of the distinction between EMS and BMS in the market.

Awareness and understanding of Energy Management Systems is low. Most (97%) tax-exempt nonparticipants reported they do not have an EMS installed at their work location, and nearly three-quarters (72%) reported knowing little or nothing about EMS. One-fifth or respondents reported knowing at least a moderate amount (one in ten did not report their level of knowledge).

The two respondents reporting having an EMS in place were large businesses with high annualized energy usage, but generally, other higher-energy usage respondents did not report any greater familiarity with EMS than organizations that use less energy.

Feedback from the 21 surveyed trade allies with EMS/BMS experience confirms a low level of familiarity with these types of systems. In particular, a potential challenge in program uptake may come from lack of clarity in the distinction between an energy management system (EMS) and a building management system (BMS). Many sources distinguish the two, with the primary distinction being that a BMS automates the control of mechanical and electrical equipment, while EMS monitors and provides feedback on

the energy use of equipment systems but does not directly control systems.[21] EMS may be built into a BMS, but it also may operate as a stand-alone system. Those sources that distinguish the two, however, indicate that many facility professionals treat them as the same.

The potential concern relating to the BizSavers EMS Pilot is that the Ameren Missouri website that describes the pilot states that an EMS can "manage functions such as heating, ventilation and air conditioning (HVAC), lighting, fire alarm systems, security, maintenance and energy management, acting as a central control hub to maximize service while minimizing energy consumption."[22] The use of the terms "manage" and "control" appear to suggest that the pilot program incentives either may or must apply to a BMS and not only to EMS.

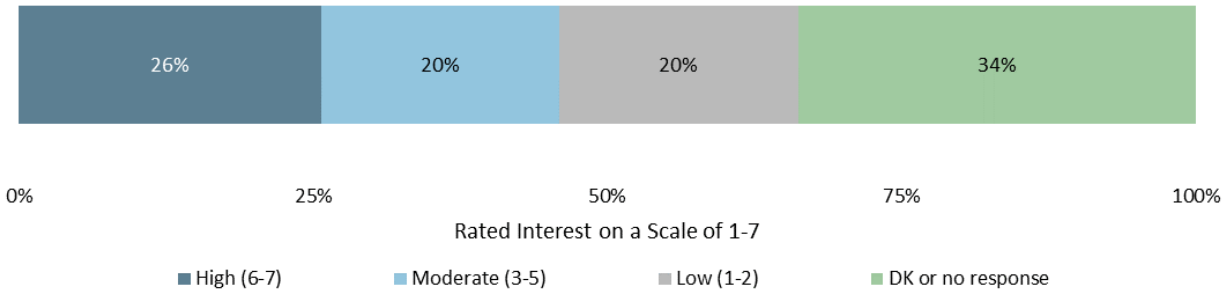
Feedback from the 21 EMS/BMS trade allies confirms that the distinction often is not clear to their clients, which can lead to challenges in explaining the measures to customers. Of those twenty-one trade allies, thirteen (62%) reported that the distinction between the two systems is "not at all clear" or "not very clear" to their customers, and only three reported the distinction was "mostly clear" for their customers. Similarly, thirteen (62%) reported that explaining the difference between BMS and EMS to customers was at least somewhat challenging to do (providing a rating of 3 or higher on a 7-point scale from "not challenging at all" to "a great challenge").

Tax-exempt customers are interested in EMS. Overall, one-quarter (26%) of tax-exempt respondents reported being very interested in learning more about Ameren's EMS incentives (Figure 5-34). However, among customers with at least 50,000 kWh annualized usage, that percentage was 33%. The primary reason noted for low interest in EMS incentives was lack of financial resources to cover the upfront costs of the project.

[21] See, for example, https://www.qagraphics.com/understanding-the-difference-between-ems-and-bms/ and https://facilityexecutive.com/2015/12/ems-bms-or-both/.

[22] https://www.ameren.com/missouri/energy-efficiency/business/energy-management-system.

Figure 5-34 Interest in Learning More About Ameren Missouri EMS Incentives (n = 74)



Awareness of the EMS Pilot is low among trade allies, but knowledgeable ones drive project participation. Of the 21 trade allies involved in energy or building management systems, about half reported knowing about the EMS pilot incentives.

All five EMS participants said that a contractor and/or vendor had a high influence (4 or 5 rating on a 1-5 scale) on their decision to install the EMS. All participants had help from a contractor or equipment vendor in completing the incentive application.

Participants are largely satisfied with the program. The one participant who was personally involved in the application process indicated satisfaction (a 4 rating on the 1-5 scale) with all aspects of the process. All five participants were highly satisfied (a 5 rating) with the incentive turnaround time. Four of the five were satisfied (4 or 5 rating) with the range of equipment covered and the equipment that was installed (the other participant did not rate satisfaction on those items). When it came to the time it took to install the equipment, three gave top ratings, but two indicated moderate satisfaction (a 3 rating on the 1-5 scale). Two respondents said they were required to resubmit their application with additional documentation or revised calculations.

6. Cost Effectiveness Evaluation

This chapter summarizes the results of the cost effectiveness evaluation of the Ameren Missouri BizSavers Program.

For each program, the following cost effectiveness tests were performed: Total Resource Cost (TRC) test, Utility Cost test (UCT), Ratepayer Impact Measure test (RIM), Societal test and Participant test, as defined by the California Standard Practice Manual.

Cost effectiveness analysis was completed by Ameren Missouri using DSMore software. Developed and licensed by Integral Analytics based in Cincinnati Ohio, the DSMore cost-effectiveness modeling tool takes hourly prices and hourly energy savings from the specific measures/technologies being used in the Ameren Missouri program, and correlates both price and savings to weather. The software references over 30 years of historic weather variability to appropriately model weather variances. In turn, this allows the model to account for low probability, high impact weather events and apply appropriate value to them. Thus, a more accurate view of the value of the efficiency measure can be captured in comparison to other alternative supply options. Volume II of this report provides additional information on the data sources test formulas, inputs, and methodology.

Table 6-1 shows the resulting cost benefit scores for each program and for the overall portfolio. Any score above 1.0 signifies cost effectiveness. The following table also summarizes the net present values of the UCT lifetime benefits. All programs pass the UCT, TRC, PTC and SCT cost effectiveness tests. The RIM test score was less than 1.0 for all programs.

Table 6-1 Results of Cost Effectiveness Evaluation

Variable	*Portfolio*	*Custom*	*Standard*	*New Construction*	*Retro-Commissioning*	*SBDI*	*EMS*
UCT	4.95	5.23	4.72	6.14	3.89	3.24	2.88
TRC	1.91	1.78	2.30	1.36	3.34	2.28	1.75
RIM	0.62	0.71	0.56	0.63	0.91	0.53	0.93
PCT	3.42	2.73	4.76	2.28	5.41	4.80	2.03
SCT	2.46	2.28	2.95	1.73	4.35	2.85	2.25
NPV of UCT Lifetime Benefits (2016 Dollars)	$121,025,955	$44,477,760	$52,574,160	$16,992,849	$2,740,284	$3,478,011	$762,890

7. Conclusions and Recommendations

The following section summarizes conclusions and recommendations that resulted from the evaluation activities. They are organized to present impact and process findings separately.

7.1 Impact Conclusions

Below is a summary of conclusions from the impact evaluation.

- Ex ante energy savings estimates were, on average, relatively accurate, with program-level gross realization rates ranging between 93% and 104%. The ex ante project review procedures appear to effectively mitigate the risk of divergent gross realization rates.
- While Custom Program ex post net kWh savings fell short of the goal energy savings goal, the program's ex post net peak kW exceeded the goal. Part of the Custom Program shortfall in net kWh savings relative to goal can be explained by changes in program offerings throughout the 2016 to 2017 program years that increased the number of lighting measures with available standard incentives. The program performed better at meeting the kW goal as compared to the kWh goal because a large share of Custom Program kWh savings were associated with cooling and HVAC projects. The coincident factor for these end uses is higher than for other end uses such as lighting. HVAC and Cooling measures accounted for 21% of the program kWh savings and 51% of the kW savings.
- As noted in the PY2016 EM&V report, there is a negative correlation between the number of application rows of measure data and the variability in the gross realization rate of measures within projects. Applicant provision of more rows of data for a single project measure is associated with lower variability in measure-level, project-level gross realization rates. Applicant provision of multiple rows of application data for a single measure typically is associated with differences in the application data fields for one or more of the energy savings calculation algorithm input variables. The most significant variables impacting variation in gross realization rates of lighting measures are the existing lighting wattage and the annual lighting hours of operation.
- During ADM's review of ex ante energy savings for non-lighting projects that require energy use modeling, it was discovered that additional guidelines or requirements regarding model inputs and development procedures may be appropriate to more accurately reflect energy impacts for submitted projects. While ex ante energy savings calculations developed through bin analysis were

generally accurate, they could be further improved through increased reliance upon primary data.

- The New Construction Program requires applicants to perform building energy modeling to receive incentives for efficient equipment. For smaller buildings or smaller projects, applicants may be unable to recover all the costs for designing the model. Two project site contacts stated that the modeling costs were high relative to the incentive amount.

7.2 Impact Recommendations

The evaluation team offers the following impact recommendations for consideration.

- For projects that require energy use modeling, consider developing additional guidelines, including requiring that applicants provide model files in their native format and that assumptions associated with baseline models be clearly identified.
- Consider expanding Standard incentives to include additional HVAC equipment.
- The Custom and Standard Incentive Application form should be revised to further direct applicants to provide unique lighting operating hours, where applicable. ADM recommends that the application form prompt applicants to disaggregate single measures, where appropriate, such that quantities of measures are associated with the applicable annual hours of operation.
- Update the Ameren Missouri TRM to account for impact evaluation results presented in Table 7-1.

Table 7-1 Ex Post kWh Savings of Select Ameren Missouri TRM Measures

Ameren Missouri TRM Measures	*Program Measure IDs*	*Ex Post kWh Savings*	*Total Monitoring Days*[23]	*Lamp Quantity*	*Ex Post kWh/ Lamp Savings*	*Ameren Missouri TRM kWh/Lamp Savings*
3024 LED Linear Lamp replacing T8 4' Lamp 28W	305402 100104	392,686	2,610	5,829	67.4	42.5
3025 LED Linear Lamp replacing T8 4' Lamp 32W	305402 100104 200102	8,779,360	17,890	95,279	92.1	54.7
3026 LED Linear Lamp replacing T12 4' Lamp	305401 100101	2,927,154	19,119	31,655	92.5	54.7

[23] The monitoring days of a single lighting logger is the total number of days during which it was deployed and collecting data used to support calculation of ex post kWh savings. Total monitoring days is the sum of the monitoring days of all loggers deployed and collecting data used to support calculation of ex post kWh savings.

Ameren Missouri TRM Measures	*Program Measure IDs*	*Ex Post kWh Savings*	*Total Monitoring Days*[23]	*Lamp Quantity*	*Ex Post kWh/ Lamp Savings*	*Ameren Missouri TRM kWh/Lamp Savings*
3007 LED BR/R EISA Compliant	200909	540,653	6,422	2,682	201.6	181.3
3008 LED PAR	201010	812,482	6,418	3,485	233.1	209.5
3009 LED 12-20 W A-Lamp	201212 301132	1,240,912	10,932	11,212	110.7	148.8
3011 LED 5-11 W A-Lamp	201111	452,991	5,711	5,612	80.7	85
3012 LED MR16 12W	200808	56,137	1,676	356	157.7	173.1

Information regarding the disposition of previous year recommendations is presented in section 7.4.

7.3 Regulator Research Questions – Process Findings and Recommendations

The results of the process evaluation research are largely positive. Program participant satisfaction was high across all program facets. This report provides an overview of program operations and suggests recommendations for consideration as the program evolves.

Below, conclusions and recommendations are organized according to the five regulatory research questions specified in 4 CSR 240-22.070(8). The conclusions address the first four questions; the fifth question speaks to recommendations.

Research Question 1: What are the primary market imperfections common to target market segment?

Findings from previous evaluations have pointed to four factors that may affect the ability of Ameren Missouri customers to take advantage of the BizSavers programs to undertake energy efficiency upgrades: cost, lack of program awareness, business size, and geography. High up-front costs continue to be commonly cited barriers to efficiency upgrades, and the continued high net-to-gross ratios for the BizSavers Program, together with feedback from participants about the value of the incentives, again emphasize the importance of incentives in driving the efficiency upgrades.

Analyses of program participation data as it compares to customer population data indicate that various business sizes and geographic areas are well represented in the program.

Consistent with most of the evaluations in the past several years (excluding PY2016), this year's evaluation found that about half of nonparticipants were aware of the BizSavers program. This is more than twice the level of nonparticipant program awareness reported in the PY2016 evaluation. In the PY2016 report, the evaluation team conjectured that the low awareness may have been related to the program's three-month suspension in early 2016. Previously, awareness was assessed in the

middle of the program cycle, and the assessment for the current evaluation came after nearly two years of continuous program operation. This suggests that maintaining program awareness may depend on continuous program operation, with its associated marketing, outreach, and trade ally engagement.

Research Question 2: Is target market segment appropriately defined, or does it need further subdivision or merging with other segments?

In general, the BizSavers Program does a good job of reaching all parts of the nonresidential market: for most building end uses, the distribution of program participants matches relatively well with the distribution of businesses in the population.

Evaluation findings continue to support the establishment of the SBDI Program to serve small businesses. Many small customers have little LED lighting installed and are motivated to replace lighting to reduce their electricity bill, and surveyed nonparticipants indicated moderate-to-high likelihood of agreeing to schedule a walk-through assessment if approached by an SBDI Service Provider. While most small customer types are about equally good targets for SBDI than others, Food and Beverage customers may provide the best return on recruitment effort, as a high percentage of such customers are responsible for lighting purchases and are motivated to change lighting to reduce their energy bills.

By contrast, while healthcare customers show a high need for lighting replacements (nearly two-thirds had “none or very little” LEDs), they are the customer type that is least likely to be responsible for buying lighting and is least motivated to replace lighting to reduce electricity costs. Thus, the SBDI Program may not be the best vehicle to meet what may be a clear need for lighting replacement for this customer type. More broadly, the program may be challenged in serving businesses that lease their space and are not responsible for lighting purchases. A recent evaluation of a small business program for the State of Connecticut[24] found that a key success factor was to bring the landlord and tenant together to present savings opportunities.

While the SBDI Program in general serves small businesses, it achieved only about half of its savings goals. The program continues to rely on a few highly active Service Providers, with five providers accounting for three-quarters of savings and one responsible for about half of savings. Reasons for low activity are not entirely clear. Surveyed Service Providers, who well represented the population of all Service

[24] Connecticut EEB SBEA Process Evaluation. Final Report – Project C1639. Prepared by Energy & Resource Solutions (ERS) and Research Into Action, Inc. for Connecticut Energy Efficiency Board (EEB). June 30, 2017. https://www.energizect.com/sites/default/files/C1639_SBEA%20Process%20Evaluation%20Report__Final_6.30.17.pdf

Providers, reported good success at scheduling walk-through assessments and in converting those to projects. They also cited few barriers to doing more projects and generally said that no business was too small to approach. The most common suggestion they made for helping them accomplish more projects was to increase program marketing.

More than one-third of lighting trade allies said they would be interested in becoming a Service Provider, but about half of them reported being aware of the program. Thus, the program still has the opportunity to increase program participation through recruitment of new Service Providers as well as by driving greater participation among those already in the program.

The EMS pilot has achieved limited participation. Like SBDI, it also achieved about half of its savings goals. About half of interviewed trade allies who reported doing relevant work were aware of its existence. One-quarter of tax-exempt respondents (and one-third of those with at least 50,000 kWh annual usage) reported being very interested in learning more about Ameren's EMS incentives.

Research Question 3: Do program measures reflect the diversity of end-use needs and available technologies for target segment?

Participant surveys and interviews showed satisfaction with the range of program-eligible equipment, delivery time for ordered equipment, and the quality of the equipment and the installation.

In the PY2016 evaluation, the primary measures-related concern was the elimination of incentives for exterior lighting, which reportedly had a largely adverse impact on trade allies. The current evaluation confirmed that the elimination of exterior lighting incentives in 2016 had a negative effect on business for trade allies involved in lighting sales and installations, particularly among lighting vendors (that is, those who largely sell lighting to installers or directly to customers who self-install). The evaluation found that reinstatement of exterior lighting incentives in 2017 produced a positive change in their business.

Research Question 4: Are communication and delivery channels/mechanisms appropriate for the target market segment?

The program implementer reported using a wide range of marketing outreach channels and methods to reach end-use customers and service providers (e.g., contractors, vendors, and distributors), including targeted outreach to decision makers representing customer account aggregates or "towers."

While general program marketing may play an important role in generating overall program awareness and targeted outreach may be important in acquiring large projects, the importance of the program trade allies in generating savings cannot be

underestimated. Using participant and non-participant reports on the source of program awareness, together with the estimated percentage of participation among customers, the evaluation team was able to calculate that trade allies are about ten times as effective at generating projects as are other means: specifically, as much as one-third of customers who learn about BizSavers incentives from a contractor or vendor become participants, compared to about 3% of those who learn about the program from other means.

Given the above, the program's outreach efforts to trade allies are valuable. In this light, it is important feedback that half of equipment-appropriate trade allies are not aware of the SBDI Program or EMS pilot. Similarly, interviewed design professionals indicate limited awareness of New Construction program incentives, among themselves and their customers.

The potential for lost opportunities for savings in new construction projects (as it often will be more expensive to carry out deep-savings retrofits than to build the savings into the construction design) merits some attention to the New Construction Program. While the program exceeded its goals and achieved savings comparable to those achieved in several other large jurisdictions, program staff reported that the savings achieved are "expensive," relative to those achieved through the Standard and Custom programs. Activities that help achieve deeper savings in each project may improve the cost-effectiveness of the program.

One such activity may be to engage more effectively with design firms. Interviewed design professionals reported low-to-moderate program engagement and said they would like greater engagement. While New Construction participants learn about the availability of Ameren Missouri's New Construction incentives relatively early in their project, they do so primarily from a source other than their architecture or design firm. Possibly related to this, New Construction participants continue to be unsure about the requirement to apply for incentives before incorporating equipment into a project's plan, and thus they and the program may lose out on energy-saving opportunities.

The evaluation team identified two other factors that may point to the need for continuing and possibly increased program efforts at communicating program rules. First, about half of participants were not aware that the rules for Fast Track applications required customers to purchase and install all equipment *before* applying for incentives; lack of proper understanding of the program rules could result in project disqualification and loss of savings. Second, as before, the evaluation found that about one-quarter of Custom Program participants need to resubmit applications with additional documentation or revised calculations, suggesting a continued need to clarify and communicate the application requirements to customers and trade allies.

Research Question 5: Are there better ways to address market imperfections to increase adoption of each program measure?

The evaluation team repeats the recommendation to continue to attempt to recruit more SBDI Service Providers and work with existing service providers to increase the number of projects they deliver to decrease the risk of relying on a single provider to deliver most program savings. One way to achieve the latter may be to work with Service Providers to help them penetrate businesses that are not responsible for buying or maintaining their lighting equipment. Small healthcare customers (such as medical and dental offices) may be special, but not exclusive, targets for such an effort. One way in which the program may help Service Providers is in facilitating efforts to bring landlords and tenants together to present savings opportunities.

Although the New Construction program is exceeding goals, the program implementer should consider increasing engagement with architects and design firms to increase their awareness of the program and its rules and help ensure that the most possible savings are achieved with each project. In addition, the evaluators repeat last year's recommendation to increase awareness of the New Construction program and its rules among all contractors and vendors, such as by providing special recognition to contractors who attend specific training on, and demonstrate knowledge of, New Construction Program rules and processes.

The implementer should augment efforts to improve awareness of the rules governing Fast Track applications to avoid loss of savings from disqualified applications. Working with lighting distributors to ensure that they fully explain the requirement to customers may be valuable.

7.4 Update to PY2016 EM&V Recommendations

Throughout program year 2017 (PY2017), the evaluation team followed up with program staff and monitored the program tracking system, LM Captures, to monitor how the program responded to past EM&V recommendations. The following section provides an update regarding the program's response.

EM&V Recommendation: To allow for more accurate estimation of energy savings of lighting implemented in lodging facilities, ADM recommends that the program application allow applicants to distinguish between guest rooms and lodging common areas.

- Program Response: The program now distinguishes between the two areas of use by identifying the open text field "Location Detail" for each given measure and then applying a specific operating hour estimate per measure line item. There are no additional actions planed at this time.

EM&V Recommendation: ADM recommends that the program implementer review the use of the EISA adjustment factor and ensure that the adjustment factor is not erroneously applied to EISA-exempt incandescent reflector lamps. These lamps are

both EISA 2007 exempt and also DOE 2009 exempt: (ER/BR 30/40 50W or less; BR 30/40 65W and R20 45W or less).

- Program Response: This recommendation was implemented during the 2016 program year. There are no additional actions planned at this time.

EM&V Recommendation: ADM recommends that ex ante savings estimation for projects with multiple HVAC measures rely upon calibrated energy simulation. Calibrated energy simulation accounts for actual building conditions and HVAC interactive effects. For such projects, uncalibrated energy simulation and bin analyses that do not rely upon actual metered/trended data will tend to generate relatively inaccurate energy savings estimates.

- Program Response: The implementation contractor agrees with ADM's assessment and continues to balance the cost/benefit associated with project-specific energy modeling approaches. The implementation contractor reiterated they make every effort to obtain the most reliable data possible, without increasing customers' costs and increasing barriers to participation.

EM&V Recommendation: For small projects with a single HVAC measure and/or one or more non-HVAC, non-lighting measure, ADM recommends that ex ante energy savings estimation rely upon algorithms in secondary literature, with energy savings equation variable values determined by facility-specific and equipment-specific information, where appropriate. The utilization of such algorithms may provide more accurate energy savings estimates compared with those provided by deemed estimates such as those found in the Ameren Missouri TRM or those provided by building energy simulation premised upon assumed values rather than facility-specific and project-specific data.

- Program Response: The implementation contractor reiterated they make every effort to obtain the most reliable data possible, without increasing customers costs and increasing barriers to participation.

EM&V Recommendation: The Custom and Standard Incentive Application form should be revised to further direct applicants to provide unique lighting operating hours, where applicable. Currently, the application form prompts entry of annual lighting hours of operation, and provides a tool referred to as the "Facility Operating Hours Calculator," which presents narrative stating: "Each measure could have unique operating hours depending on the technology and use. Use this calculator to record the specific operating hours for each measure as required." In fact, a single measure may be installed in multiple areas with unique lighting hours of operation. ADM recommends that the application form prompt applicants to disaggregate single measures, where appropriate, such that quantities of measures are associated with the applicable annual hours of operation.

- Program Response: The program has incorporated these points into trade ally training and will continue to incorporate into future training and program communication.

EM&V Recommendation: Additionally, during the program year, ADM recommended the removal of the space conditioning type option of "N/A" from the program application. A number of applicants were selecting the "N/A" option, rather than identifying the space conditioning type or absence of space conditioning, resulting in unavailability of data with which lighting heating and cooling interactive effects could be estimated. Prior to the conclusion of the program year, the program application was revised to remove the "N/A" option.

- Program Response: Resolved in 2016.

EM&V Recommendation: The program implementer should work to increase awareness of the new construction program rules among contractors and vendors. In particular, increasing the awareness of the importance of involving the program staff early in the design phase is important for maximizing savings. One thing to consider may be to include providing some form of recognition to contractors who attend specific training on, and demonstrate knowledge of, new construction program rules and processes—for example, identifying such contractors as "new construction program specialists" on the trade ally website and providing special new construction program co-branding.

- Program Response: The implementation contractor does not disagree with opportunities to educate the market on New Construction, the New Construction Program has run well ahead of expectations and there is concern that further market awareness/education would increase participation, applying risk toward goal achievement. Currently, there are no plans for further action.

EM&V Recommendation: The program implementer should more strongly emphasize the requirement to provide supporting documentation, including invoices, with applications. The evaluation team recommends placing a statement about that requirement on the "Welcome" tab of the standard/custom incentive application, together with a reference to the section of the application that spells out the details of the requirement. This may also help draw attention to the availability of standard incentives.

- Program Response: The "Submit Application" lists the required and recommended documentation to submit with the application. Fast Track applications do have required fields, while custom applications do not. The program implementation contractor is open to adding something to the Welcome page, however there are no plans for further action at this time.

EM&V Recommendation: If it does not already do so, the program implementer should track applications that have errors in calculating incentive amounts and record the errors made in the initial application. Then the implementer, or perhaps the evaluation

team, can review the calculation errors to identify patterns, allowing the implementer to provide more detailed instructions to prevent such errors.

- Program Response: Issues with project submission are currently tracked within LM Captures to include calculation and modeling errors or omissions. Currently, there are no plans for further action.

EM&V Recommendation: The program implementer should consider increasing the size of the trade ally network and re-introduce distribution of printed collateral to trade allies for use in marketing the program to customers. As part of that effort, the implementer should emphasize the availability of both standard and custom incentives

- Program Response: The implementation contractor does not disagree with opportunities to provide additional collateral. However, the BizSavers Program has run well ahead of expectations and there is concern that further market awareness/education would increase participation, applying risk toward goal achievement.

EM&V Recommendation: The program implementer should continue to monitor the project delivery of all SBDI service providers and, if necessary, attempt to recruit more SBDI service providers capable of delivering reasonably large numbers of projects and/or work with existing service providers to increase the number of projects they deliver to decrease the risk of relying on a single provider to deliver most program savings.

- Program Response: Adding and removing service providers from the SBDI program has been ongoing. In January 2018, the performance of all SBDI Service Providers was evaluated by the TA coordinator. SPs who had little or no participation were sent a notice of removal or request for feedback. By removing SPs who were not using the program, we are able to add other companies who have the potential to be more active and drive projects and savings.

EM&V Recommendation: Ameren Missouri should consider adding customer type information to its customer database to make it easier for programs to identify any under-served segments and improve reach into those segments and improve assessments of program reach to various business and building types.

- Program Response: Ameren Missouri provides LM with account information and details. This data includes monthly account usage data, NAICS codes, account rate class and location. In addition, LM collects more accurate data during project submittal such as building type, square footage, # of floors, building conditioning and water heating types. EM&V currently compares participation building types with Hoover's territory building type estimates.