Opinion **Dynamics**

AMEREN MISSOURI - PROGRAM YEAR 2023 ANNUAL EM&V REPORT

VOLUME 3: BUSINESS PORTFOLIO

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I.   EXECUTIVE SUMMARY

This volume presents the evaluation results of the Ameren Missouri PY2023 portfolio of business energy efficiency programs as described in Ameren Missouri's 2019–2021 Missouri Energy Efficiency Investment Act (MEEIA) Energy Efficiency Plan, the subsequent *Unanimous Stipulation and Agreement Regarding the Implementation of Certain MEEIA Programs Through Plan Year 2022* (Stipulation PY2022), and the *Non-Unanimous Stipulation and Agreement Regarding the Implementation Certain MEEIA Programs Through Plan Year 2023 and Motion For Expedited Treatment* (Stipulation PY2023). Results for the Residential Portfolio and the Demand Response Portfolio are provided in separate volumes.

The following programs comprise the Business Portfolio:

- Standard Incentive Program
- Custom Incentive Program
- Small Business Direct Install (SBDI) Program
- Retro-Commissioning (RCx) Program

In addition to these four programs, this volume also includes the Business Social Services (BSS) Program.[1] The five programs are collectively referred to as the "business programs" or the "BizSavers® Programs."[2]

The following sections present overarching key evaluation findings for the business programs. Per Stipulation PY2023, this evaluation focused on the assessment of gross impacts, with no process or net-to-gross (NTG) work. The remainder of this volume is organized as follows:

- Chapter 2 presents the general evaluation approach for the business programs, including overarching evaluation objectives and an overview of the PY2023 evaluation activities and methodologies.
- Chapters 3–7 present evaluation results for the five BizSavers Programs.

The Appendix to Volume 3 contains additional detail on the methodology and results of the Hours of Use (HOU) and In-Service Rate (ISR) analyses for Standard Lighting projects as well as project-level summaries of our Custom Program desk reviews and onsite visits.

1.1   PORTFOLIO IMPACT RESULTS

The PY2023 Business Portfolio (not including the BSS Program) achieved 77,924 MWh of ex post net energy savings and 26.23 MW of ex post net demand savings, achieving 75% and 78%, respectively, of its net goals (as outlined in the Stipulation PY2023. The savings-weighted portfolio-level gross realization rates (RRs) were 89.0% for energy savings and 92.7% for demand savings.

Table 1 summarizes annual net savings for the Business Portfolio in PY2023.

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[1] While considered part of Ameren Missouri's low-income portfolio, the BSS Program is included in this volume because of implementation and evaluation similarities with the other business programs: (1) it is implemented by the same implementation contractor using similar program processes, and (2) it was evaluated using similar evaluation methods. As such, much of the overarching content in this volume is applicable to the BSS Program.

[2] All product or company names that may be mentioned in this publication are tradenames, trademarks, or registered trademarks of their respective owners.

Table 1. PY2023 Business Portfolio Savings Summary

	Ex Ante Gross	Realization Rate	Ex Post Gross	NTGR [A]	Ex Post Net	Goal/Target Net	% of Goal
Energy Savings (MWh)	106,147	89.0%	94,453	82.5%	77,924	104,286	75%
Demand Savings (MW)	34.30	92.7%	31.79	82.5%	26.23	33.50	78%

[A] In accordance with Stipulation PY2023, PY2023 net-to-gross ratios (NTGRs) are deemed at 82.5% for the Business portfolio.

The Standard and Custom programs were the largest programs in Ameren Missouri's PY2023 Business Portfolio, contributing, respectively, 49% and 44% of ex post net energy savings and 44% and 49% of ex post net demand savings. Despite relatively strong gross realization rates, all programs fell just short of net energy and demand savings goals. Portfolio-wide, the primary driver of low program-specific performance relative to gross savings goals was lack of participation: For all programs, other than Custom and Standard (demand savings only), even gross ex ante savings are below net goals (in some cases significantly).

Table 2 summarizes annual gross and net savings for all programs in the PY2023 Business Portfolio.

Table 2. PY2023 Business Portfolio First Year Savings Summary by Program

Program	Ex Ante Gross	Realization Rate	Ex Post Gross	NTGR	Ex Post Net	Goal/Target Net	% of Goal
Energy Savings (MWh)							
Standard	50,743	90.9%	46,149	82.5%	38,073	51,715	74%
Custom	48,082	85.5%	41,109	82.5%	33,915	37,075	91%
SBDI	4,174	97.8%	4,085	82.5%	3,370	10,781	31%
RCx	3,148	98.8%	3,110	82.5%	2,566	4,715	54%
Total Business	106,147	89.0%	94,453	82.5%	77,924	104,286	75%
Demand Savings (MW)							
Standard	14.29	98.6%	14.09	82.5%	11.63	12.85	90%
Custom	17.95	87.3%	15.67	82.5%	12.93	16.55	78%
SBDI	0.80	101.0%	0.81	82.5%	0.67	2.14	31%
RCx	1.26	96.7%	1.22	82.5%	1.00	1.96	51%
Total Business	34.30	92.7%	31.79	82.5%	26.23	33.50	78%

As noted above, this volume also includes the results of the BSS Program evaluation. Despite significant gains compared to PY2021 and PY2022 and realization rates above 100%, the BSS Program fell short of its PY2023 goal, achieving 75% and 76%, respectively, of its net energy and demand savings goals.

Table 3 summarizes annual gross savings for the BSS Program in PY2023.

Table 3. PY2023 BSS Program Savings Summary

	Ex Ante Gross	Realization Rate	Ex Post Gross	NTGR [A]	Ex Post Net	Goal/Target Net	% of Goal
Energy Savings (MWh)	3,738	101.0%	3,775	100.0%	3,775	5,012	75%
Demand Savings (MW)	0.73	102.0%	0.75	100.0%	0.75	0.98	76%

[A] Per industry standard practice, we assume an NTGR of 100% for the BSS Program.

1.2 CSR PROCESS EVALUATION REQUIREMENTS

The PY2023 evaluation did not include an assessment of BizSavers Program processes. However, findings from the following research activities and data sources can help inform the process evaluation requirements for Ameren Missouri's BizSavers Program:[3]

- PY2023 interview with BizSavers Program staff; and
- The PY2023 program-tracking database.

Table 4 summarizes responses to the five CSR process evaluation questions.

Table 4. PY2023 CSR Process Questions

CSR Required Process Evaluations Questions	Findings
What are the primary market imperfections that are common to the target market segment?	▪ Based on PY2019 research, the primary market barriers to the adoption of energy-efficient equipment in the business sector are a lack of awareness of energy-saving opportunities and programs, the high cost of energy efficiency equipment, access to financing or capital, and uncertainty about expected bill savings. ▪ In PY2021, business customers experienced different barriers due to the COVID-19 pandemic, including material shortages and difficulty hiring or maintaining staff; however, the impacts of these barriers on planned capital projects appear limited. In PY2022, the vast majority (92%) of surveyed Standard and Custom participants indicated that material shortages had not caused capital project delays or cancellations during 2022.
Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	▪ Ameren Missouri's BizSavers portfolio serves businesses of varying sizes and sectors. The SBDI Program recognizes the unique challenges of small businesses, although small businesses can still participate in the Standard or Custom programs if the offerings are a better match to customer needs. The current target audience for the SBDI Program is commercial electric customers classified as Small General Service Rate 2(M). This covers a wide range of market segments. The SBDI Program is generally serving the majority of the market segments existing in the General Service Rate 2(M), although participation has been concentrated in a few segments (56% of PY2023 projects were completed in the office and retail segments, compared to 55% in PY2022 and 58% in PY2021). Savings realized through this program decreased over the PY2019–PY2021 program cycle, rebounded in PY2022 but then fell sharply in PY2023. ▪ The PY2023 SBDI Program appears to have been more successful in serving renters, a frequently underserved market segment, than in the two prior program years. According to program-tracking data, renters accounted for 39% of PY2023 SBDI Program participants, compared to 21% in PY2022 and 25% in PY2021; however, this is still below the 54% achieved in PY2020. According to market research supporting Ameren Missouri's 2019 potential study, 36% of Ameren Missouri's business customer population are renters. ▪ The BSS Program, introduced in 2019, serves nonprofit organizations that provide services to the low-income public. The program is relatively small in scope, having completed an average of 50 projects annually during the 2029-2023 program cycle. Notably, the PY2023 BSS Program supported almost as many projects (123) as the prior four years combined (133). The program also

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[3] The Missouri Code of State Regulations (20 CSR 4240-22.070(8), formerly 4 CSR 240-22.070(8)), requires that demand-side programs, operating as part of a utility's preferred resource plan, are subject to ongoing process and impact evaluations that meet certain criteria, including the process evaluation questions presented in this section.

CSR Required Process Evaluations Questions	Findings
	increased ex ante savings by 38% over PY2022, which dramatically increased over the first three years of implementation. PY2023 also saw the expansion of the BSS Program to serve eligible municipal and government buildings (where eligibility is based on the municipality's residents meeting the filed *Eligibility Guidelines for All Residential Low-Income Programs*).
Does the mix of enduse measures included in the program appropriately reflect the diversity of enduse energy service needs and existing enduse technologies within the target market segment?	▪ PY2019 evaluation research found that participants were relatively dissatisfied with the breadth of measure offerings. In some cases, participants and market partners were dissatisfied with the list of eligible measures; in other cases, they indicated that low incentives rendered an officially eligible measure effectively ineligible. The most common suggestion was to add outdoor lighting to the list of available measures, which the program did for the Standard and SBDI Programs during PY2020 but then discontinued again starting in PY2021. ▪ In PY2019, the SBDI Program only provided incentives for lighting measures. For PY2020, the program added HVAC measures, increased incentive caps, and developed a simplified, stand-alone HVAC application form. Despite these changes, the uptake of non-lighting measures in PY2020 was limited to 15 smart thermostats, accounting for 0.2% of program savings. There was no uptake of non-lighting measures in PY2021, only a single non-lighting measure was incented in PY2022, and minimal non-lighting incentives were provided in PY2023 (<1% of ex post energy savings). ▪ While the BSS Program offers a range of measures across different technologies, the program focused almost exclusively on lighting measures during the current program cycle. The PY2019 evaluation found that incentive levels for non-lighting equipment were insufficient to induce adoption in this market segment. While the program added a few new measures in PY2020—including occupancy sensors, VFDs, and kitchen ventilation controls—incentive levels remained largely unchanged over the first three years of program cycle. Then, in September 2022, the Business portfolio increased incentives portfolio-wide, and in PY2023 the program increased incentives for both HVAC measures to align with the Multifamily Income Eligible Program. While these changes have coincided with an increase in non-lighting measures incented through the program, they remain a small proportion of overall saves (<2% of ex post energy savings combined in PY2023).
Are the communication channels and delivery mechanisms appropriate for the target market segment?	▪ According to market research in support of Ameren Missouri's 2019 potential study, awareness of Ameren Missouri BizSavers Programs is relatively low among the target market. Just over one-third of customers (36%) are aware of the programs offered. Medium and large businesses are much more likely to be aware of Ameren Missouri BizSavers Programs than small businesses (60% compared to 33%). These results suggest that additional communication or delivery of messages through alternative channels is needed for small businesses. ▪ Trade Allies remain a key communication channel for the BizSavers Program, and much of the program's outreach efforts are focused on them. Trade Allies/contractors are still the primary source of information for program participants (reported by 62% of Standard and 57% of Custom PY2022 survey respondents), which is similar to the prior two years, although somewhat lower than in PY2019 (77% Standard and 83% Custom). Notably, over one-third (38%) of Standard and Custom participants prefer e-mail outreach or electronic newsletters as an information channel for energy efficiency opportunities. By program, Custom Program participants show a strong preference for outreach via Ameren Missouri or BizSavers representatives (29% of survey respondents) compared to Standard Program participants (13% of respondents). During PY2022, the BizSavers team shifted back to in-person instead of virtual events. Participant survey results reflect this, with 7% of Standard/Custom Program participants reporting that they heard of the program through an in-person event compared to only 1% who heard about it through a virtual event. ▪ During PY2021, the Ameren Missouri and the BizSavers Program revised BSS Program processes to allow Trade Allies to bring in their own leads. PY2022 was the first full year where this policy was in effect. In addition, the team created a BSS website to inform customers of the program and help Trade Allies generate leads. While these new communication strategies appear to be appropriate additions, their impact is difficult to isolate, given other program changes (most notably the increased budget).
What can be done to more effectively overcome the identified market imperfections and to increase the rate of	The PY2023 evaluation did not include process research designed to answer this question. The PY2019 evaluation provided the following recommendations, some of which were adapted in subsequent program years: ▪ Continue to expand the slate of program-eligible measures. Outdoor lighting is the only one that arose as a specific recommendation, but others likely offer potential.

CSR Required Process Evaluations Questions	Findings
customer acceptance and implementation for select enduses / measure groups included in the Program?	▪ The program added exterior lighting (offered in combination with interior lighting projects) in the summer of 2020 but discontinued the measure in PY2021. ▪ Other measures introduced in PY2020 included occupancy sensors, VFDs for certain applications, kitchen ventilation controls, compressed air measures, and high-volume, low-speed fans. ▪ In PY2022, the program introduced HVAC Chip technologies to the Custom Program. ▪ Revisit incentive levels to improve the uptake of non-lighting measures. 　▪ In the spring of 2021, the program offered a temporary Trade Ally incentive to increase the uptake of HVAC measures. 　▪ While the program offered a 15% bonus incentive for HVAC measures (compared to 10% for lighting measures) in PY2020, the only bonus incentive in PY2021 was for select Standard lighting measures. 　▪ Notably, the Standard Program saw a substantial increase in non-lighting projects and savings over the program cycle. Non-lighting measures collectively increased from 2.5% of Standard Program ex ante gross energy savings in PY2019 to 16% in PY2023. 　▪ In PY2022, the BizSavers team increased incentives for most measures across all programs. 　▪ In PY2023, the BizSavers team increased incentives for select Standard and Custom HVAC measures. ▪ Continue to expand the network of Trade Allies and Service Providers, focusing on increasing the diversity of services offered and market segments targeted. 　▪ In light of the COVID-19 pandemic, the program undertook considerable effort in re-engaging and supporting its trade ally network. However, any expansion of the network during the current program cycle was limited.

1.3   COST-EFFECTIVENESS RESULTS

Cost-effectiveness analysis compares the benefits of an energy efficiency or demand response program with the cost of delivering it, expressed as the ratio of the net present value (NPV) of lifetime benefits to the costs. A cost-effectiveness ratio of greater than 1.0 means that the benefits generated by the program exceeded its costs. Cost-effectiveness can be assessed from several different "perspectives," using different tests, with each test including a slightly different set of benefits and costs.

The evaluation team assessed the cost-effectiveness of each of the five BizSavers programs, using all five costs-effectiveness tests recommended by the California Standard Practice Manual and used in prior evaluations:[4]

- **Total Resource Cost (TRC) Test:** Perspective of all utility customers (participants and nonparticipants) in the utility service territory

- **Utility Cost Test (UCT):** Perspective of utility, government agency, or third-party program implementer

- **Ratepayer Impact Measure (RIM) Test:** Impact of efficiency measure on nonparticipating ratepayers overall

- **Participant Cost Test (PCT):** Perspective of the customers installing the measures

- **Societal Cost Test (SCT):** Perspective of all utility customers (participants and nonparticipants) in the utility service territory[5]

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[4] *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*. October 2001.
[5] Although we developed SCT results as a part of our evaluation, this section does not show the results because they are equivalent to TRC results due to two factors: (1) Ameren Missouri does not include non-energy impacts in cost-effectiveness testing, and (2) Ameren Missouri uses the same planning assumptions for both tests, including the discount rate.

Table 5 summarizes the cost-effectiveness results for the five BizSavers programs. All five programs were cost-effective in PY2023 based on the TRC, UC, and PCT tests. The RIM test for all five programs resulted in cost-effectiveness ratios of less than 1.0.

Table 5. Summary of BizSavers Cost-Effectiveness Results

Program	TRC	UCT	RIM	PCT
Standard	3.20	3.88	0.58	7.98
Custom	1.68	3.82	0.69	2.78
RCx	3.65	4.26	0.80	7.26
SBDI	3.20	2.44	0.45	11.47
BSS	3.61	1.82	0.42	9.91

Cost-effectiveness results for the overall Business Portfolio—including the Business Demand Response Program but excluding the BSS Program—are presented in Volume 1.

2. EVALUATION APPROACH

While the evaluation team conducted separate evaluations of each of the five BizSavers Programs, many research objectives and evaluation activities were common across all the programs. To reduce repetition throughout the report, this chapter discusses overarching research objectives and presents an overview of the evaluation approach and activities conducted to address the research objectives. Additional program-specific details, where needed, are presented in the individual program chapters.

2.1 RESEARCH OBJECTIVES

The PY2023 Business Portfolio evaluation was designed to address numerous gross impact, net impact, and cost-effectiveness objectives. A fourth category of objectives is focused on responding to the five process-related research questions stipulated in 20 CSR 4240-22.070(8). This evaluation did not include any other process-related research objectives.

The PY2023 Business Portfolio evaluations address the following research objectives:

GROSS IMPACT OBJECTIVES

- Verify program-tracking data.
- Verify measure installation (not applicable to all programs).
- Estimate the first year ex post gross energy (kWh) and demand (kW) savings.

ATTRIBUTION/NET IMPACT OBJECTIVES

- Estimate the first year ex post net energy (kWh) and demand (kW) savings using a deemed NTG value of 82.5% (except for the BSS Program, which uses a deemed NTG value of 100%).

COST-EFFECTIVENESS

- Assess the cost-effectiveness of each business program and the Business Portfolio as a whole using industry-standard cost-effectiveness tests.
- Ensure alignment of cost-effectiveness testing assumptions and parameters with the PY2023 business evaluation results, Ameren Missouri's TRM,[6] and industry best practices.
- Provide total program benefits, costs, net benefits, and cost-effectiveness testing results.

CSR MANDATED RESEARCH OBJECTIVES (20 CSR 4240-22.070(8))

- What are the primary market imperfections that are common to the target market segment?
- Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?

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[6] Our ex post evaluation relied on the PY2023 planning TRM. Ameren Missouri revised the approved 2019–2021 MEEIA Cycle Appendix F (Deemed Savings Table) and Appendix H and I (TRM Volumes 2 and 3) in October 2022 (referred to as "Ameren Missouri TRM"). The referenced TRM versions, updated in October 2022, include Appendix H, Version 4.0 and Appendix F, Version 6.0.

- Does the mix of enduse measures included in the program appropriately reflect the diversity of enduse energy service needs and existing enduse technologies within the target market segment?

- Are the communication channels and delivery mechanisms appropriate for the target market segment?

- What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation for select enduses / measure groups included in the program?

2.2   EVALUATION ACTIVITIES AND METHODOLOGIES

This section provides an overview of the evaluation activities undertaken as part of the PY2023 evaluation, including a high-level description of common methodologies. The combination of evaluation activities for each program was based on the evaluation scope and budget specified by the Stipulation PY2023 as well as factors such as levels of program participation and the type, size, and complexity of energy efficiency projects.

Table 6. PY2023 Evaluation Activities by Program

Evaluation Activity	Standard	Custom	SBDI	RCx	BSS
Program Manager and Implementer Interviews	✓	✓	✓	✓	✓
Program Material Review	✓	✓	✓	✓	✓
Gross Impact Analysis					
Database Review	✓	✓	✓	✓	✓
Engineering Analysis	✓	✓	✓	✓	✓
Desk Reviews	✓	✓	-	-	-
Onsite Verification	-	✓	-	-	-
Net Impact Analysis					
Application of deemed NTGR	✓	✓	✓	✓	-

The following subsections provide a general description of each evaluation activity. Program-specific details are included in each program chapter, where relevant.

PROGRAM MANAGER AND IMPLEMENTER INTERVIEWS

We conducted two interviews with program and implementation staff to support the PY2023 evaluation of the BizSavers Program:

- The first interview was conducted in January 2023 as part of the PY2022 year-end interview. During this interview, we explored any planned changes to program design and implementation in PY2023 that might affect our evaluation approaches or priorities.

- The second interview was conducted following the end of the program year on January 26, 2024. The objectives of this second interview were to understand the program team's perspective on program performance during PY2023, assess program accomplishments and challenges, clarify any outstanding questions about program design and implementation, and understand planned changes for PY2024.

PROGRAM MATERIAL REVIEW

We reviewed available program materials, including program guidelines, marketing plans and activity summaries, application forms, and incentive brochures. This review familiarized the evaluation team with program design and implementation details and changes made relative to the PY2022 programs.

GROSS IMPACT ANALYSIS

The primary objective of the gross impact analysis was to develop first year ex post gross energy and demand savings and gross energy and demand realization rates. The methods varied by program and included desk reviews (Standard and Custom), onsite visits (Custom), and lighting measure engineering analysis (Standard, SBDI, and BSS). To optimize evaluation budgets, we applied gross realization rates from prior evaluations for enduses that account for smaller shares of savings and/or were comprehensively studied in recent years (as outlined in Table 7 below). We also passed through, at 100%, ex ante savings for Standard Refrigeration, Compressed Air, Cooking, and Water Heating measures (which collectively account for <2% of Standard Program ex ante gross savings) and for SBDI and BSS non-lighting measures (which account for less than 1% of ex ante gross program savings each).

Table 7 summarizes the PY2023 gross impact approaches used for the various BizSavers programs and enduse categories.

Table 7. PY2023 Gross Impact Approaches by Program

Gross Impact Approach	Program / Enduse
Desk Review	▪ Standard (Lighting) ▪ Custom (HVAC, Indoor Ag)
Onsite Visit	▪ Custom (HVAC)
Engineering Analysis	▪ Standard (Lighting) ▪ SBDI (Lighting) ▪ BSS (Lighting)
PY2022 RR	▪ Standard (HVAC, Motors) ▪ Custom (Lighting) ▪ RCx
PY2021 RR	▪ Custom (Compressed Air)
PY2020 RR	▪ Custom (Motors, Other) [A]
Pass Through 100%	▪ Standard (Other) [B] ▪ SBDI (Non-lighting) [C] ▪ BSS (Non-lighting) [C]

[A] For the Custom Program, the enduse category is based on the enduse assigned in the tracking data and the measure description. The Custom "Other" enduse includes the following enduse categories: Process, Refrigeration, and Building Shell.

[B] Collectively less than 2% of ex ante gross program savings.

[C] Less than 1% of ex ante gross program savings.

The following should be noted:

- For lighting measures, ex post energy savings reflect a heating penalty for applicable lighting measures installed in electrically heated spaces.

- We applied deemed enduse-specific coincidence factors (CFs) from Ameren Missouri's TRM to ex post energy savings to calculate ex post demand savings. For lighting measures, CFs are applied to ex post gross savings net of any heating penalty. As such, program-level ex post demand savings may not equal the product of ex post gross savings and the CF.

DATABASE REVIEW

We reviewed the program-tracking database to check that project data were recorded fully and correctly and that the database contained all needed deemed measure information to (1) verify the estimation of ex ante savings and (2) inform savings inputs for the ex post analysis. We also used the program-tracking database to develop desk review and onsite samples for the Standard and Custom Programs.

ENGINEERING ANALYSIS

We conducted an engineering analysis to estimate PY2023 ex post gross savings for lighting measures in the Standard, SBDI, and BSS Programs. We leveraged project-specific information reported in the program-tracking database with Ameren Missouri TRM algorithms and assumptions and results of Standard lighting desk reviews to estimate ex post gross savings. As a part of this analysis, we applied a new baseline for applicable measures installed on or after August 1, 2023 to align with the Energy Independence and Security Act (EISA) policy of a 45 lumens/watt efficiency.

ENGINEERING DESK REVIEWS

We conducted engineering desk reviews for a sample of Standard lighting and Custom HVAC projects as well as the sole Custom Indoor Agriculture project completed in PY2023.

For Custom projects, we verified information in the program-tracking database, including baseline and installed equipment types, efficiencies, quantities, hours of operation, and other information needed to validate ex ante savings estimates and determine ex post gross savings. We reviewed all available project documentation for the sampled projects, including project application materials, project planning documentation (e.g., project narratives, electrical and mechanical drawings, and equipment schedules), invoices, and equipment specification sheets. In some cases, we contacted project representatives to collect or clarify additional information, such as ex ante calculation workbooks, building simulation model files and assumptions, current occupancy or operating schedules, and baseline assumptions.

For Standard lighting projects, desk reviews were targeted and designed to collect the necessary inputs to calculate updated values for the hours of use (HOU) adjustment factor and the in-service rate (ISR) to be applied in the Standard lighting engineering analysis. We reviewed supporting project documentation to ensure that HOU data were correctly entered from the application and other documentation. We also verified measure installation and collected HOU data through participant interviews to inform the estimation of ex post ISRs and the HOU adjustment factor.

Our sampling approach for Custom HVAC and Standard lighting projects was based on the number, type, and size of projects completed in PY2023, targeting 10% relative precision at the 90% confidence level, where possible. We used a stratified random sampling approach, stratifying by enduse and project size.

ONSITE VERIFICATION

Onsite verification involved in-person visits to the site of measure installation, conducted for a subset of the Custom projects that received an engineering desk review. Onsite visits provided additional rigor to the verification process through visual inspections of the installed equipment and operating characteristics, collection of trend and other performance data, and deeper engagement with project or facility personnel to confirm that baseline conditions, equipment characteristics, and building characteristics are consistent with project documents and program implementer assumptions.

We tailored the scope of each onsite visit to the specific project and the measure(s) installed at the site based on the in-depth engineering desk review of the site's project files. The engineer performed the following actions during the onsite visits:

- Verified that the incented measures were installed and functioning and that the quantity and equipment specifications (e.g., model number, capacity, and efficiency) were consistent with the information in the project application form, the program-tracking database, and the basis for ex ante savings.

- Collected additional physical data to further analyze and determine the energy savings from the incented measure(s). Such onsite data included identification of facility HVAC systems, collection of equipment nameplate information, verification of controls equipment and programming, direct measurement of floor areas, and historical operational data from site monitoring systems.

- Conducted interviews with facility staff to verify current and typical equipment operating schedules and other baseline building and equipment conditions.

PROGRAM-LEVEL GROSS IMPACTS

For each program/enduse, we developed realization rates for first year energy and demand savings. Where we used a sample-based approach, we developed realization rates by aggregating the project-level results from the desk reviews and/or onsite visits, applying weights that reflect (1) the relative size of each project within the sample and (2) the probability of each project to be sampled. The program/enduse-level realization rates were then applied to the population of that program/enduse.

ATTRIBUTION/NET IMPACT ANALYSIS

Per Stipulation PY2023, "[t]he throughput disincentive for the PY2023 year will utilize an 82.5% NTG factor with no true-up." As such, this evaluation did not include NTG research for application in PY2023. Net savings for the Standard, Custom, RCx, and SBDI Programs are calculated using the following formula:

Ex post net savings = Ex post gross savings × 0.825

As described in the PY2023 Evaluation Plan, we assume that customers served by the BSS Program would not make energy-efficient improvements on their own due to the cost. Therefore, we assume an NTG value of 1.0 when estimating net savings for this program. As such, the deemed net-to-gross ratio (NTGR) of 0.825 specified in the PY2023 stipulation agreement does not apply to the BSS Program.

3. STANDARD INCENTIVE PROGRAM

This chapter summarizes the PY2023 evaluation methodology and results for the Standard Incentive Program (Standard Program). The PY2023 evaluation of the Standard Program included an engineering analysis of lighting measures and desk reviews for a sample of Standard Lighting projects to calculate updated HOU and ISR adjustment factors to be applied in the ex post lighting analysis. We present additional details on the evaluation methodology in Chapter 2 and Appendix A.

The Standard Program is the largest program in Ameren Missouri's PY2023 business portfolio based on ex post net energy savings (49%) and the second largest based on ex post net demand savings (44%).

The Standard Program promotes energy awareness and installation of energy-efficient technologies or services by providing incentives to offset the higher cost associated with completing these projects. The program encourages customer participation through simple and streamlined participation processes. It focuses on lighting, motors, controls, HVAC, and refrigeration technologies. In PY2023, the only participation channel for the Standard Program was application-based and supported by a network of registered Trade Allies and other non-registered Market Partners (including contractors, distributors, wholesale retailers, and local economic development and professional associations, where applicable). The target market for the Standard Program includes commercial, industrial, and institutional customers and excludes multifamily and low-income customers who are served by the residential programs.

The PY2023 Standard Program is an ongoing program from the previous MEEIA cycle, and implementation has remained largely unchanged from previous years. Notable changes compared to PY2022 include the following:

- Removal of general service lamps from the program as of September 15, 2023.
- Increased incentives for select HVAC and lighting measures as of August 16, 2023

3.1 PARTICIPATION SUMMARY

During PY2023, Ameren Missouri business customers implemented 1,330 projects through the Standard Program, resulting in 50,743 MWh of ex ante gross energy savings. This represents a decrease in both participation and savings compared to previous years (Figure 1).

Figure 1. PY2023 Standard Project Completions and Ex Ante Gross Savings
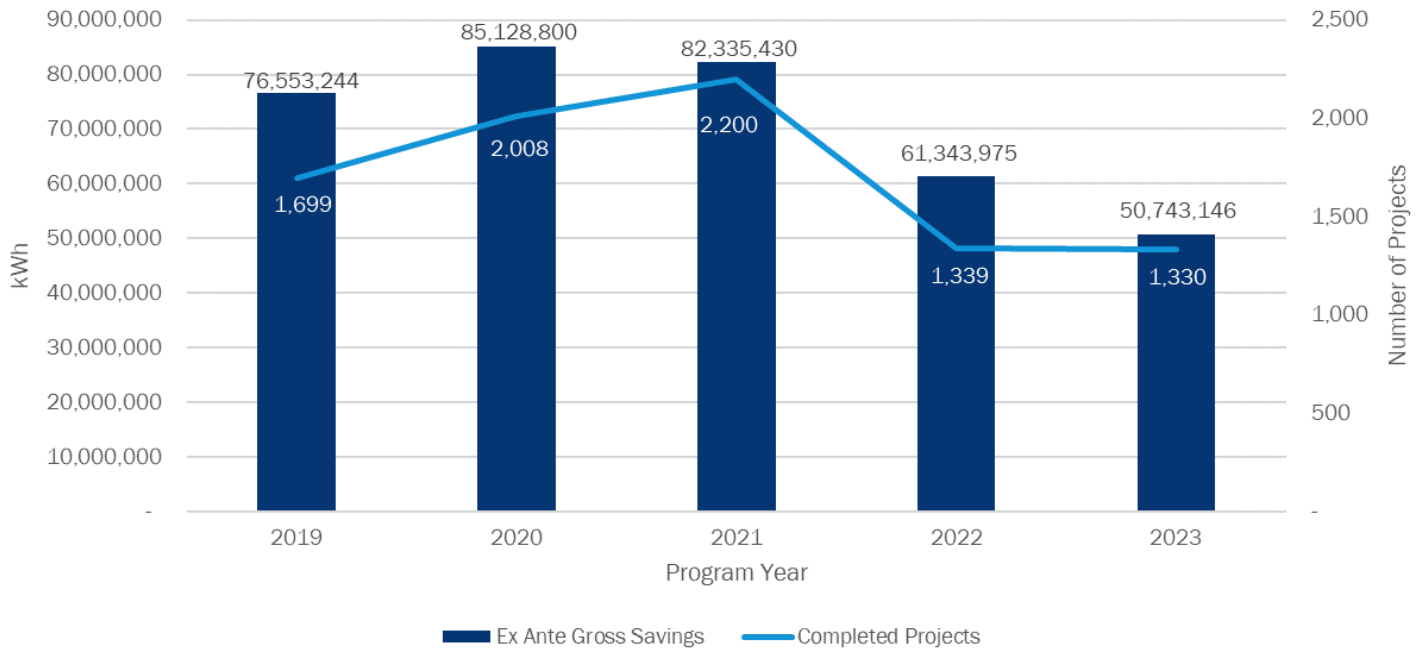
The Standard Program again was heavily focused on lighting (84% of ex ante gross energy savings); however, this represents the lowest percentage of annual Standard Program savings derived from lighting this cycle.

Table 8 summarizes PY2023 participation in the Standard Program, including the number of projects and ex ante gross savings, by enduse.

Table 8. PY2023 Standard Program Participation Summary by Enduse

Enduse	Projects [A]		Ex Ante Gross Savings	
	Number	%	MWh	%
Lighting	1,047	79%	42,605	84%
HVAC	220	17%	5,565	11%
Motors	46	3%	1,844	4%
Refrigeration	33	2%	395	1%
Compressed Air	8	1%	219	<1%
Cooking	12	1%	94	<1%
Water Heating	1	<1%	21	<1%
Total	1,330	100%	50,743	100%

[A] Individual enduse values sum to more than the totals shown due to some projects containing more than one enduse.

Standard Program project starts were relatively steady over the program year (Figure 2), averaging 100 projects started per month, with a spike in April. Ten percent of Standard Program projects completed in PY2023 started in 2020, 2021, or 2022. Project completions also remained steady over the first nine months of the program year before they increased for the final quarter of the year, especially in December.

Figure 2. PY2023 Standard Program Monthly Project Starts and Completions
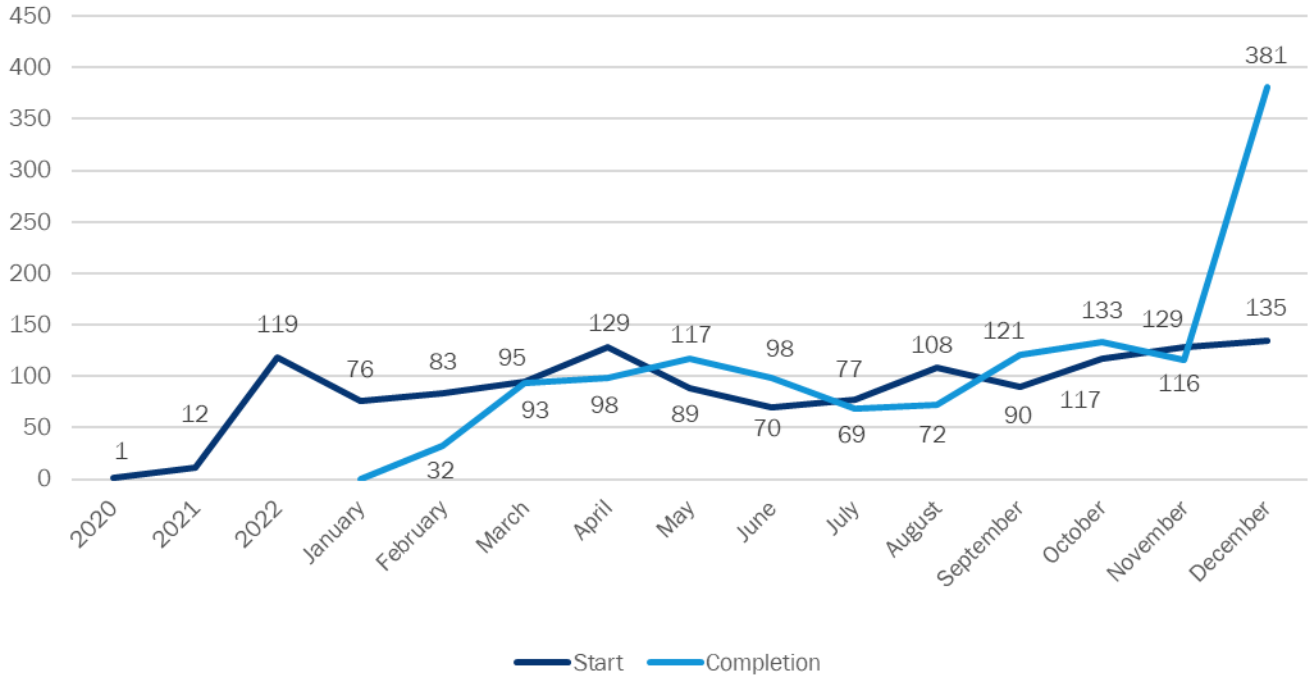
3.2 EVALUATION METHODOLOGY

Table 9 provides an overview of the PY2023 evaluation activities for the Standard Program. Most of these activities are similar across the various business programs and described in Chapter 2. The sections following the table highlight program-specific aspects of key evaluation activities.

Table 9. PY2023 Evaluation Activities for the Standard Incentive Program

Evaluation Activity	Description
Program Manager and Implementer Interviews	▪ Conducted interviews in January 2023 to inform evaluation planning and in January 2024 to understand program staff's perspective on program performance.
Program Material Review	▪ Reviewed program materials to understand program changes relative to PY2022.
Engineering Desk Reviews	▪ Reviewed supporting project documentation for a sample of projects to ensure that original data were correctly entered from invoices and other documentation. ▪ Verified measure installation and collected HOU data from participants ▪ Developed revised HOU and ISR adjustment factors for the sample and the population.
Engineering Analysis (Lighting Measures)	▪ Verified that ex ante savings use correct TRM algorithms and project-specific values or TRM assumptions. ▪ Developed ex post savings using TRM algorithms and site-specific parameters, TRM assumptions, and newly developed HOU and ISR adjustment factors.
Net Impact Analysis	▪ Estimated PY2023 net impacts, applying a deemed NTGR of 0.825.

3.2.1 LIGHTING MEASURES

ENGINEERING DESK REVIEWS

We conducted engineering desk reviews for a stratified random sample of 54 Standard Program lighting projects to review and verify project documentation and savings assumptions. The main purpose of the desk reviews was to update program-specific HOU adjustments and ISRs. We reviewed supporting project documentation in the desk reviews to ensure that HOU data were correctly entered from the application and other documentation. We also verified measure installation and collected HOU data through participant interviews to inform the estimation of ex post ISRs and a HOU adjustment. In most cases, the evaluation team updated ex ante HOU estimates based on participant feedback and confirmed that installed quantities matched program tracking data. Further details on the Standard Lighting desk reviews can be found in Appendix A.

Table 10 summarizes the final sample for the desk reviews for the PY2023 Standard Program.

Table 10. Standard Program Gross Impact Sampling Summary

Enduse & Size Stratum	Number of Projects [A]	
	Population	Desk Reviews
Stratum 3 (Large)	19	13
Stratum 2 (Medium)	93	17
Stratum 1 (Small)	935	24
Total	1,047	54

[A] For sampling purposes, projects are defined by project numeral and enduse.

ENGINEERING ANALYSIS

We conducted an engineering analysis of all Standard Incentive Program lighting measures to estimate ex post gross program savings. We first reviewed program-tracking data to verify that ex ante savings calculations used correct TRM algorithms and savings assumptions. We then calculated ex post savings using Ameren Missouri TRM algorithms and site-specific parameters from the program-tracking database, TRM assumptions, and the new HOU and ISR adjustment factors developed from our engineering desk reviews.

3.2.2 NON-LIGHTING MEASURES

For non-lighting enduses, we applied gross realization rates based on PY2022 evaluation results or passed through savings at a 100% realization rate, depending on the enduse, to optimize evaluation budgets. Specifically, we applied PY2022 gross realization rates for Standard HVAC and motors projects. Given the small contribution of other measures to Standard Program savings (collectively <2%), we passed through savings for Standard Program refrigeration, compressed air, cooking, and water-heating measures at a 100% realization rate.

3.3 EVALUATION RESULTS

This section summarizes impact results for the PY2023 Standard Incentive Program. As noted above, we estimate ex post gross savings by enduse, relying on a combination of population-level engineering analysis and sample-based desk reviews for lighting measures and deemed realization rates for non-lighting enduses. Table 11 compares ex ante and ex post gross savings at the program level. As shown, gross realization rates are 90.9% for energy savings and 98.6% for demand savings. Applying the deemed NTGR of 82.5%, the program achieved ex post net energy and demand savings

of 38,073 MWh and 11.63 MW, respectively, representing 74% of the program net energy savings goal and 90% of the program net demand savings goal.

Table 11. PY2023 Standard Program Savings Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTRG [A]	Ex Post Net	Goal/Target Net	% of Target
Energy Savings (MWh)	50,743	90.9%	46,149	82.5%	38,073	51,715	74%
Demand Savings (MW)	14.29	98.6%	14.09	82.5%	11.63	12.85	90%

[A] In accordance with Stipulation PY2023, PY2023 NTGRs are deemed at 82.5% for the Business portfolio.

The majority of PY2023 ex post gross energy savings for the Standard Program (83.5%) came from lighting, including LED linear tube retrofits, non-linear LEDs, and LED lighting redesign. The remaining 16% of program ex post gross energy savings are from non-lighting measures, mostly from HVAC projects (10.5%) and motors (4.5%). Refrigeration, compressed air, cooking, and water-heating equipment collectively account for the remainder (1.6% combined).

Table 12 summarizes gross savings and realization rates by enduse.

Table 12. PY2023 Standard Program Gross Savings by Enduse

Enduse	Energy Savings (MWh)			Demand Savings (MW)		
	Ex Ante	Gross RR	Ex Post	Ex Ante	Gross RR	Ex Post
Lighting	42,605	90.4%	38,517	8.09	94.3%	7.63
Other Linear LED	22,486	90.2%	20,272	4.27	94.7%	4.04
LED Replacing T12	8,673	89.1%	7,723	1.65	94.0%	1.55
Other Non-Linear LED	6,318	91.4%	5,773	1.20	93.3%	1.12
Lighting Redesign	4,011	91.6%	3,673	0.76	94.0%	0.72
Lighting Controls	641	94.8%	608	0.12	94.8%	0.12
LED Replacing Incandescent A-Lamp	325	101.3%	330	0.06	103.5%	0.06
LED Exit Sign	151	91.5%	138	0.03	99.7%	0.03
HVAC	5,565	86.9%	4,835	4.92	97.0%	4.78
Motors	1,844	112.1%	2,067	1.16	135.3%	1.57
Other	730	100.0%	730	0.11	100.0%	0.11
Total	50,743	90.9%	46,149	14.29	98.6%	14.09

LIGHTING IMPACTS – DESK REVIEWS

The overall HOU adjustment rate for the Standard Program is 92.3%, with rates for individual sampled projects ranging from 10% to 256%. We conducted a granular analysis of the HOU for each project by interviewing the building facilities manager to characterize the operations schedule for installed fixtures throughout the year. This analysis also considered the occupancy sensors at the facility: if present but not accounted for in the interview, we applied an energy savings factor for occupancy sensors. For 22 projects, we confirmed existing HOU inputs were correct; for 19, we reduced HOU, and for 11, we increased HOU on a savings-weighted basis. Two projects were dropped from the analysis because ex post HOU could not be determined.

The overall ISR for the Standard Program is 100.3%, with rates for individual sampled projects ranging from 80% to 126%. For the sampled projects, we developed ISRs by reviewing project documents provided by the program team to verify the number of installed lamps/fixtures based on invoices and lamp/fixture wattages based on specification sheets for the reported model numbers. In cases where the information in project documents was insufficient, we

asked for extra information during the HOU interviews to resolve discrepancies. For 43 projects, we confirmed that the total installed wattages (including both lamp/fixture counts and wattages) were correct; for six, we increased the total installed wattage; and for five, we decreased the total installed wattage.

LIGHTING IMPACTS – ENGINEERING ANALYSIS

Based on the engineering analysis for lighting projects, we made the following adjustments to ex ante savings:

- **Waste Heat Factor (WHF) and Heating Penalty Interactive Factor (IF).** To capture the heating and cooling interactive impacts when calculating ex ante savings for interior lighting measures, the program implementer applies an average Heating and Cooling Interaction Factor (HCIF) of 1.07 for measures installed in air-conditioned spaces. The HCIF encompasses WHF and IF. Notably, the implementer applies the HCIF to energy savings and demand savings, even though heating penalties are not relevant for demand savings. In contrast, the evaluation team used building-specific assumptions based on information reported in the program-tracking database and in accordance with the Ameren Missouri TRM:

  - For energy savings, the evaluation team applied building type-specific WHFs and building and HVAC type-specific Ifs based on the Ameren Missouri TRM tables, resulting in a weighted average WHF/IF factor of 1.04 and lower ex post energy savings compared to ex ante.

  - For demand savings, the evaluation team applied building type-specific WHFs, resulting in a weighted average WHF of 1.09 and higher ex post demand savings than ex ante.

- **Application of ISR and HOU Adjustment.** We applied the updated parameters for the Standard Program of 100.3% ISR and 92.3% HOU adjustment for a combined adjustment of 92.6%. These parameters were estimated based on 54 desk reviews conducted as a part of this evaluation and are discussed further above. As a result, ex post energy and demand savings were lower than ex ante.

- **Adjustment of baseline wattage for applicable measures to comply with EISA guidelines.** The program incented 1,919 measures (corresponding to 53 records) that were installed on or after August 1, 2023 and are subject to EISA guidelines. For these measures, we applied measure-specific 45-lumen equivalent baseline wattages while the ex ante analysis used a deemed adjustment factor of 34% for halogen baselines and 24% for incandescent baselines. This increased the savings for some measures but reduced savings for others with an overall minimal impact on the program's realization rate.

- **Application of Incorrect Coincidence Factor.** For 193 measures (LED exit signs replacing a CFL exit sign), ex ante calculations use the coincidence factor for 24/7 exterior/garage lighting (0.0001379439) instead of the TRM-prescribed value for these measures (0.0001899635). As a result, ex post demand savings for these measures are higher than ex ante savings.

3.4   CONCLUSIONS AND RECOMMENDATIONS

The Standard Incentive Program performed strongly during PY2023. Similar to previous years, the Standard Program carried the BizSavers portfolio and was the largest contributor to portfolio ex post net energy savings and a close second to ex post net demand savings.

Based on the results of this evaluation, the evaluation team offers the following conclusions and recommendations for the Standard Program:

- **Conclusion #1:** Lighting measures continued to dominate the PY2023 Standard Program, but non-lighting measures have increased in importance every year of this MEEIA cycle (non-lighting measures collectively

increased from 2.5% of Standard Program ex ante gross energy savings in PY2019 to 16% in PY2023). The BizSavers Program has been successful in promoting non-lighting measures.

- **Recommendation:** Continue to harvest energy savings from lighting measures while available while at the same time increasing promotion of other enduses among Trade Allies and customers to facilitate the transition from lighting as the LED market matures.

- **Conclusion #2:** The program implementer uses an average HCIF of 1.07 to estimate ex ante energy and demand savings for interior lighting measures, regardless of building or HVAC system type. In contrast, the evaluation team applied building and HVAC type-specific WHFs and Ifs based on the tracked building and system types for each project and specifications in the Ameren Missouri TRM, Appendix H. Across all Standard Program projects, the average combined ex post energy savings adjustment (WHF plus IF) was 1.04, and the average ex post demand savings adjustment (WHF only) was 1.09.

  - **Recommendation:** To improve the accuracy of ex ante savings, we recommend that the implementer either (1) apply building type-specific WHF and IF values (as stipulated in the TRM and done in the ex post analysis); or (2) apply the TRM HCIF of 1.056 to calculate energy savings and the IF_{kW} factor of 1.032 to calculate demand savings.[7]

- **Conclusion #3:** The desk reviews and customer interviews overall resulted in a 92.3% HOU adjustment rate between ex ante value and ex post values, but the range in values was large (10%–256%). While the ultimate source of this variation is uncertain, the more granular treatment of HOU by space/fixture type combined with the consideration of holidays is likely a driving factor.

  - **Recommendation:** To collect more accurate HOU inputs from participants and improve ex ante savings estimates, the BizSavers team should consider collecting HOU assumptions at a fixture level whenever possible and encourage applicants to consider holidays and account for the presence of occupancy sensors when estimating total HOU per year. Treatment of holidays could also be integrated into the Excel-based application to assist participants with estimating HOU more accurately.

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[7] IF_{kW} is a second electric heat interaction factor designed to remove the heating penalty from demand savings. This factor is necessary when ΔkW is calculated as $kW = \Delta kWh \; x \; CF$ and ΔkWh includes the heating penalty; it is necessary because demand savings should not include the heating penalty. The IF_{kW} of 1.032 was developed based on PY2021 ex post energy and demand lighting savings.

4.   CUSTOM INCENTIVE PROGRAM

This chapter summarizes the PY2023 evaluation methodology and results for the Custom Incentive Program (Custom Program). The PY2023 evaluation of the Custom Program included desk reviews and onsite visits for a sample of projects within the HVAC enduse category and the single indoor agriculture new construction project completed in PY2023.[8] To optimize evaluation budgets, we applied historical gross realization rates for the lighting, compressed air, motors, and "other" enduse categories.[9] Additional details on the evaluation methodology are presented in Chapter 2. Detailed desk review and onsite visit findings for the sampled HVAC and indoor agriculture projects are presented in Appendix B.

The Custom Program is the second largest program in Ameren Missouri's PY2023 business portfolio based on ex post net energy savings (44%) and the largest based on ex post net demand savings (49%).

The Custom Program is designed to promote energy awareness and installation of energy-efficient technologies or services by providing incentives to offset the higher cost associated with completing these projects. The Custom Program applies to processes, technologies, and energy efficiency measures that do not fall within the other pre-defined programs. These projects are sometimes complex and always unique, requiring customer-specific incentive applications and calculations of estimated energy savings. Incentive levels for the Custom Program are calculated based on energy savings estimates for each proposed measure, except for interior lighting measures that rely on a code baseline, in which case incentives are calculated based on the watts reduced. Onsite visits are required for projects with incentives exceeding $15,000 to verify baseline data, energy savings estimates, and post-installation measuring capabilities. In PY2023, the only participation channel for the Custom Program was application-based and supported by a network of registered Trade Allies and non-registered Market Partners (including contractors, distributors, wholesale retailers, and, where applicable, local economic development and professional associations).

The target market for the Custom Program includes commercial, industrial, and institutional customers and excludes multifamily and low-income customers, who are served by the residential programs. Beginning in PY2022, the Custom Program also serves new construction projects, including new construction indoor agriculture projects, which were previously served under a stand-alone New Construction Program.

The PY2023 Custom Program is ongoing from the previous MEEIA cycle, and implementation has remained largely unchanged from previous years. Notable changes compared to PY2022 include:

- Adding a line item to the Custom Program incentive list and associated incentive rate for indoor agriculture grow conditioning.
- Increasing the incentives for select cooling, HVAC, and Lighting measures as of August 16, 2023.

4.1   PARTICIPATION SUMMARY

During PY2023, Ameren Missouri business customers implemented 280 projects through the Custom Program, resulting in 48,082 MWh of ex ante gross energy savings. This represents an increase in participation but a significant decrease in ex ante gross savings compared to PY2022 (259 projects; 68,396 MWh in ex ante gross savings). The decrease in program savings and the smaller per project savings are, in part, driven by a drop in new construction

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[8] The BizSavers portfolio served only a single new construction indoor agriculture project with high-efficiency heating, ventilation, air conditioning, and dehumidification (HVACD) equipment for the grow rooms, which was evaluated. The portfolio also served a second new construction indoor agriculture project consisting of only lighting. This project was not evaluated and categorized under the general Custom lighting enduse.
[9] The "other" enduse category includes process, refrigeration, and building shell measures.

indoor agriculture, which accounted for a substantial share of Custom Program savings in PY2022 (27% of ex ante gross energy savings, compared to 2% in PY2023).

The PY2023 Custom Program focused heavily on HVAC and lighting (collectively accounting for 79% of ex ante gross energy savings). Table 13 summarizes PY2023 participation in the Custom Program, including the number of projects and ex ante gross savings, by enduse.

Table 13. PY2023 Custom Program Participation Summary

Enduse	Projects [A]		Ex Ante Gross Savings	
	Number	%	MWh	%
HVAC	78	28%	22,034	46%
Lighting	192	69%	16,058	33%
Motors	11	4%	5,010	10%
Compressed Air	12	4%	2,530	5%
Indoor Ag	1	<1%	1,146	2%
Other	18	6%	1,303	3%
Total	280	100%	48,082	100%

[A] Individual enduse values sum to more than the totals shown due to some projects containing more than one enduse.

Custom Program project starts were relatively steady over the program year (Figure 3), averaging 15 projects started per month, with a spike in March and October. Over one-third (34%) of Custom Program projects completed in PY2023 started prior to 2023. Project completions grew from January through May and dropped to a relatively constant level through November, before peaking in December.

Figure 3. PY2023 Custom Program Monthly Project Starts and Completions
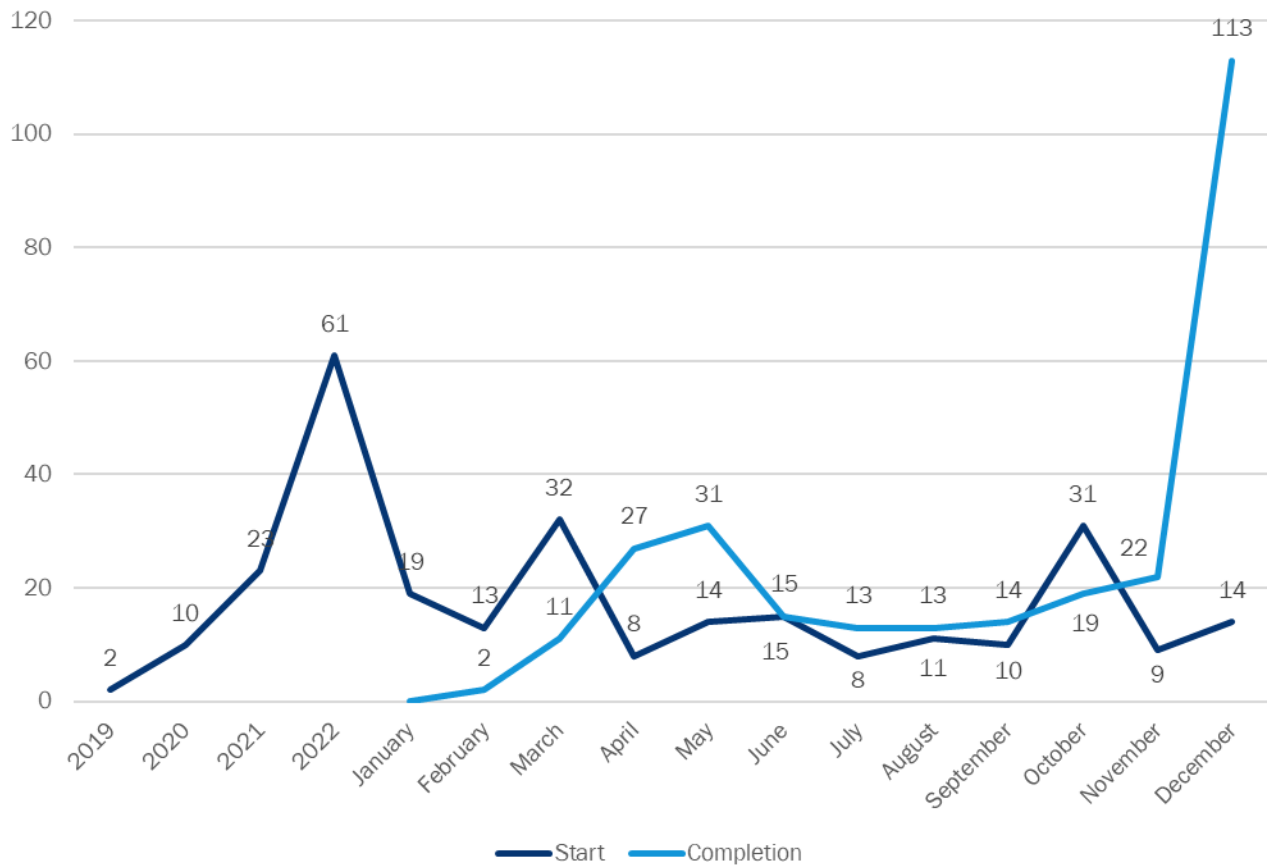
4.2   EVALUATION METHODOLOGY

Table 14 provides an overview of the PY2023 evaluation activities for the Custom Program. Most of these activities are similar across the various business programs and were described in Chapter 2 The sections following the table highlight program-specific aspects of key evaluation activities.

Table 14. PY2023 Evaluation Activities for the Custom Incentive Program

Evaluation Activity	Description
Program Manager and Implementer Interviews	▪ Conducted interviews in January 2023 to inform evaluation planning and in January 2024 to understand program staff perspectives on program performance.
Program Material Review	▪ Reviewed program materials to understand program changes relative to PY2022.
Engineering Desk Reviews (HVAC & Indoor Agriculture) & Onsite Verification (HVAC)	▪ Reviewed supporting project documentation for a sample of projects to ensure that original data were correctly entered from invoices and other documentation. ▪ Performed onsite verification visits for a sample of projects to confirm quantity and continued operation of incented measures, collect additional data to develop energy savings, and verify other parameters through staff interviews. ▪ Collected additional data and confirmed key analysis parameters through direct outreach to participants.

Evaluation Activity	Description
	▪ Collected pre/post facility consumption data, when possible, to validate the overall savings impact. ▪ Developed ex post savings for the sample and the population.
Net Impact Analysis	▪ Estimated PY2023 net impacts, applying a deemed NTGR of 0.825.

We conducted engineering desk reviews for a sample of 25 Custom Program projects to review and verify project documentation and savings assumptions. The main purpose of the desk reviews was to confirm that the program-tracking database correctly reflected the installed measure(s), including equipment types, efficiencies, quantities, hours of operation, and other information needed to verify project installation and estimate gross energy and demand savings. We confirmed or updated key analysis inputs through direct outreach to participants where possible. Wherever needed and possible, we leveraged phone and e-mail communication with site contacts to verify measure installation and operation, including the timing of the installation and key parameters affecting savings for installed equipment (e.g., occupancy schedules, system setpoints, HOU, baseline conditions, and operating strategies). To support the desk review data collection, site contacts provided photographs of installed equipment (e.g., equipment nameplates), screenshots from the building automation systems, and trend data showing historical performance.

In most cases, the evaluation team updated ex ante savings estimates based on project documentation, review of facility consumption data, publicly available information (e.g., building size), review of additional project details collected during the evaluation, or other post-installation information. For some projects, the evaluation team developed project-specific calculations or analyzed pre- and post-installation billing data as a more accurate method of quantifying ex post energy savings.

We conducted onsite visits for a subset of nine of the 25 Custom Program projects, where key project details or parameters could not be verified through the desk reviews and customer outreach. Onsite visits provided additional rigor to the verification process by confirming through visual inspection and conversations with site contacts that the incented measures were still installed and operational and that the baseline conditions, equipment characteristics, and building characteristics were consistent with project documents and program implementer assumptions.

Table 15 summarizes the final desk review and onsite visit sample for the PY2023 Custom Program.

Table 15. Custom Program Gross Impact Sampling Summary

Enduse & Size Stratum	Number of Projects [A]		
	Population	Desk Reviews	Onsite Visits
HVAC	79	25	9
Stratum 3 (Large)	2	2	2
Stratum 2 (Medium)	11	8	6
Stratum 1 (Small)	66	15	1
Indoor Ag	1	1	0

[A] For sampling purposes, projects are defined by project numeral and enduse.

For enduses not covered by the desk reviews/onsite visits, we applied gross realization rates based on prior evaluation results, depending on the enduse, to optimize evaluation budgets. Specifically, we applied PY2022 gross realization rates for Custom lighting projects, PY2021 gross realization rates for Custom compressed air projects, and PY2020 gross realization results for Custom motors and other enduse projects. Most of these enduses represent a small share of Custom Program savings (5% or less of ex ante gross savings) except for motors, which account for 10% of PY2023 ex ante gross savings.

4.3   EVALUATION RESULTS

This section summarizes impact results for the PY2023 Custom Incentive Program. As described above, we estimate ex post gross savings by enduse, relying on a combination of new sample-based and historical realization rates. Table 16 compares ex ante and ex post gross savings at the program level. As shown, gross realization rates are 85.5% for energy savings and 87.3% for demand savings. Applying the deemed NTGR of 82.5%, the program achieved ex post net energy savings and demand savings of 33,915 MWh and 12.93 MW, respectively, representing 91% of the program net energy savings goal and 78% of the program net demand savings goal.

Table 16. PY2023 Custom Program Savings Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTRG [A]	Ex Post Net	Goal/Target Net	% of Target
Energy Savings (MWh)	48,082	85.5%	41,109	82.5%	33,915	37,075	91%
Demand Savings (MW)	17.95	87.3%	15.67	82.5%	12.93	16.55	78%

[A] In accordance with Stipulation PY2023, PY2023 NTGRs are deemed at 82.5% for the Business portfolio.

The majority of PY2023 ex post gross energy savings for the Custom Program came from HVAC (42%) and lighting (35%) measures. The remaining 23% of program ex post gross energy savings came from motors measures (12%), compressed air measures (6%), indoor agriculture projects (2%), and process, refrigeration, and building shell measures (collectively 3%).

Table 17 summarizes gross savings and realization rates by enduse.

Table 17. PY2023 Custom Program Gross Savings by Enduse

Enduse	Energy Savings (MWh)			Demand Savings (MW)		
	Ex Ante	Gross RR	Ex Post	Ex Ante	Gross RR	Ex Post
HVAC	22,034	78.3%	17,261	13.27	85.6%	11.36
Lighting	16,058	90.5%	14,535	3.04	90.5%	2.76
Motors	5,010	97.6%	4,890	0.92	98.6%	0.91
Compressed Air	2,530	100.0%	2,530	0.35	100.0%	0.35
Indoor Ag	1,146	71.2%	816	0.16	71.2%	0.11
Other	1,303	82.6%	1,077	0.21	87.2%	0.19
Total	48,082	85.5%	41,109	17.95	87.3%	15.67

Below, we provide additional detail on these results, organized by the enduses analyzed in this evaluation. Additional details on the onsite findings, ex post analysis methods, and reasons for discrepancies are available in the individual site reports in Appendix B.

HVAC IMPACTS

HVAC is the largest enduse within the Custom Program, and—due to cooling season operation—provides a significant amount of demand savings. The overall gross energy and demand realization rates for Custom HVAC measures are 78.3% and 85.6%, respectively. The energy and demand realization rates for individual sampled Custom HVAC projects ranged from 0% to 205%, indicating a wide range of evaluation results at the project level.

- For most projects, the measures were installed and are operating as expected. A variety of discrepancies were identified in the desk reviews, however, leading to over half of sampled Custom HVAC projects (14 of 25) having

gross kWh realization rates of less than 90% and one project having a gross kWh realization rate of 0%. These discrepancies included:

- Inappropriate system types chosen for the baseline equipment;

- Ex ante baseline efficiencies or control requirements for New Construction or Replace on Fail measures differing from minimum code or standard requirements;

- Discrepancies in key parameters such as cooling efficiency; and

- In one new construction project, the evaluation team found that none of the incentivized equipment was installed; instead, the equipment identified as the baseline equipment was installed.

- In some cases, ex ante calculations did not document the source of primary input assumptions. In these cases, the evaluation team contacted the implementation team or participants directly for the missing information or attempted to obtain it through an onsite verification visit. If the information could not be obtained, the evaluation team relied on engineering judgment using the best available information.

- Two projects had adjustments that led to gross kWh realization rates of over 110%. The same Trade Ally completed the two projects and used the same spreadsheet-based bin calculators. In both projects, the ex ante calculations underestimated the baseline fan energy by treating the air-handler fans as cycling on and off during unoccupied periods when the calculator input indicated no cycling.

- Per Ameren Missouri's TRM, demand (kW) savings are calculated by multiplying each measure's energy savings (kWh) by an enduse-specific deemed CF. For each sampled project, the evaluation team reviewed the ex ante CFs by measure to ensure the correct enduse was applied and made adjustments as needed in the ex post analysis. Three projects were found to have incorrect enduse assignments in one or more measures, including (1) efficient dehumidification, (2) variable-primary chilled water pumping, and (3) exhaust air heat recovery. Each of these measures was assigned the HVAC enduse in the ex ante calculation but was changed to the Cooling enduse in the ex post calculation. The Cooling CF is approximately twice the HVAC CF, so these changes increased the estimated demand savings and associated kW gross realization rates.

INDOOR AGRICULTURE IMPACTS

The gross realization rate for the single completed and evaluated Custom indoor agriculture project[10] is 71% for both energy and demand savings, with demand savings based on the CF for the process enduse. Evaluation findings include the following:

- The ex ante analysis incorrectly used IECC 2015 minimum efficiency values for air-cooled units instead of water-cooled units. This is the primary driver of differences between ex ante and ex post savings.

- The ex ante CF for this project correctly used a process enduse.

4.4   CONCLUSIONS AND RECOMMENDATIONS

The Custom Program fell short of goals and achieved gross energy realization rates of 78.3% (HVAC) and 71.2% (Indoor Agriculture) for the enduses evaluated in PY2023. Based on the results of this evaluation, the evaluation team offers the following conclusions and recommendations for the Custom Program.

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[10] Classified as indoor agriculture due to the installation of specialized high-efficiency heating, ventilation, air conditioning, and dehumidification (HVACD) equipment for grow rooms.

- **Conclusion #1:** Compared to PY2022, the PY2023 Custom Program saw an increase in participation (280 projects up from 259) but a significant decrease in ex ante gross savings (48,082 MWh down from 68,396 MWh). In part, this decrease can be attributed to a drop-off in indoor agriculture projects completed in PY2023: The program served just one indoor agriculture project in PY2023 (accounting for 1,145 MWh of ex ante gross savings) compared to four projects (accounting for 18,290 MWh) in PY2022.

- **Conclusion #2:** Quality control issues continued to be prevalent in the sample of reviewed Custom projects. For example key documents (including project narratives, equipment submittals, and mechanical drawings) were often missing, there were frequently undocumented or unsupported baseline assumptions, some measures had unrealistically large ex ante savings, there were large discrepancies between modeled systems and as-built systems, and two projects were found to have unsupported changes to ex ante savings (for example, converting therm savings to electric with no explanation and changing the Trade Ally's ex ante savings derating factor). In one new construction project, we found that none of the incentivized equipment was installed even though the project had received a post-inspection.

  - **Recommendation:** We recommend that the implementation team review its quality control processes for third-party engineering calculations and internally-produced calculations submitted with Custom Program applications. As a general practice, we recommend that the implementer document their project reviews in a standard workbook template, including project description, baseline descriptions, savings summary, verification of correct energy code version (as applicable), clearly labeled and referenced input assumptions, and recreated/modified calculations. The BizSavers team should review and implement the project documentation memo and checklist created by the evaluation team in PY2022 to ensure that all final documentation (project narratives, specification sheets, drawings, energy modeling files, etc.) is captured and loaded to TRC Captures for all sampled projects. Providing a comprehensive project narrative, as is done in the evaluation site reports, is critical. A quality control process such as this will help ensure Ameren Missouri and its ratepayers receive the most value from their investments in energy efficiency and help reduce evaluation risk by minimizing the number and extent of evaluation adjustments to project savings.

- **Conclusion #3:** Twelve Custom HVAC and Indoor Ag projects that were evaluated this year, including some of the largest in terms of ex ante savings, employed energy modeling to produce the ex ante savings claims. While we generally support using energy modeling for Custom Program projects, the baseline model, proposed model, and energy efficiency measures must be thoroughly described and documented to reduce evaluation risk. In some of the projects we reviewed, the only description of the baseline assumptions was a single entry on the Custom Program incentive application. Although modeling reports were saved with all the projects we reviewed, model input files were only saved with three of the twelve projects. The modeling reports alone were not sufficient to understand the basis of the savings claims or, in some cases, even discern the energy efficiency measures. Furthermore, given the size and complexity of these projects there is considerable uncertainty that any model results will align with actual metered impacts.

  - **Recommendation:** For projects that use building energy modeling tools, the workbook should document the modeling tool name and version, baseline model assumptions, including specific energy code references as applicable, energy efficiency measures, and the sources of key inputs and outputs. Model input files should be routinely collected and reviewed by the implementation team as part of their engineering review process to ensure that the savings results align with the reports provided and to understand the basis of the energy savings claims.

  - **Recommendation:** We recommend conducting a post-occupancy evaluation of the large HVAC and new construction indoor agriculture projects that rely on energy models to validate the building simulation modeled annual energy use against actual consumption. This would have to be conducted as a special study or under evaluation for future years since a period of 100% operational energy use would be needed. Results from this analysis could also be used as a benchmark for future projects.

- **Conclusion #4**: We reviewed two Custom projects that used proprietary energy modeling tools to develop ex ante savings in which the underlying calculations and assumptions were not accessible. There was no explicit documentation in the project files that indicated the implementation team thoroughly reviewed the savings before approving the Custom Program incentive.

  - **Recommendation:** We recommend that Ameren Missouri develop criteria for approving the use of proprietary energy modeling tools for Custom Program applications. Tools that are frequently used could be placed on an approved list after a thorough review by the implementation and evaluation teams. Tools that are not frequently used should be evaluated on a project-by-project basis, with the implementation team reviewing the energy savings estimates and documenting the review in an Excel workbook as described under Conclusion #2. For more complex projects that use building simulation tools, Ameren Missouri should consider developing a list of approved, widely accepted tools such as TRACE3D, eQUEST, or Energy Plus so that both the implementation and evaluation teams can rerun the models and verify the modeling assumptions.

- **Conclusion #5:** For several of the Custom projects evaluated, the baseline calculations assumed a different HVAC or HVACD system type then was installed. For example, one Custom HVAC new construction project was submitted with a baseline of all air-cooled direct expansion (DX) systems, but the as-built systems used hydronic cooling with a water-cooled centrifugal chiller plant. The single new construction indoor agriculture project evaluated used an atypical and unique water-cooled HVACD system for the grow areas, but a conventional air-cooled HVACD system was used for the ex ante baseline analysis.

  - **Recommendation:** The baseline HVAC or HVACD system type should be the same as the installed system unless sufficient evidence exists to support an alternative assumption. The efficient configuration of a system would then be one that uses high-efficiency equipment with integrated design features to reflect a change in performance instead of a change in HVAC or HVACD system type. If applicable, using the correct configuration in the TRACE3D model will provide more accurate savings estimates. An alternative system type baseline should only be used when supported by the total building performance or performance rating methods in the applicable version of ASHRAE 90.1 or IECC (applies to new construction or gut renovation projects only), the customer received a bid for an alternative system type, or other similar evidence exists in a project file to support this assumption.

  - **Recommendation:** The issue of establishing baseline assumptions for Custom new construction projects warrants stakeholder discussions to ensure consistent baseline assumptions are applied going forward. Broadly speaking, newly constructed buildings can achieve compliance with either IECC or ASHRAE 90.1 under a prescriptive-based approach or a performance-based approach. The latter involves the use of energy modeling to compare the energy use of the as-designed building to a hypothetical baseline design. In one project, the trade ally referred to the use of baseline assumptions from ASHRAE 90.1 Appendix G, which is intended for use in rating the energy efficiency of building designs rather than determining performance-based compliance. The evaluation team accepted the use of Appendix G for this project in the absence of specific rules on baseline model assumptions for new construction projects but recommends future discussions to clarify the appropriate use of prescriptive and performance-based approaches in IECC and ASHRAE 90.1.

- **Conclusion #6:** The new construction indoor agriculture project was the product of splitting one project between program years. The PY2022 project included the lighting savings and the PY2023 project we evaluated included the HVACD savings and included interactive effect HVAC savings from the PY2022 lighting measures. This aspect of the project was not mentioned in the project documentation but was readily observable from the TRACE3D model results.

  - **Recommendation:** For all facilities where split-projects are implemented, a summary of all the split projects should be provided in the project narrative, an ex ante savings calculation workbook, or the project applications. This information is essential for understanding all of the measures implemented at a facility and being able to look for underlying explanations, such as the interactive HVAC impacts for this project.

5. SMALL BUSINESS DIRECT INSTALL PROGRAM

This chapter summarizes the PY2023 evaluation methodology and results for the SBDI Program. The PY2023 evaluation of the SBDI Program included an engineering analysis of lighting measures. The SBDI Program is designed to promote the installation of energy-efficient technologies in small businesses by removing barriers such as high upfront cost, lack of knowledge, and lack of time and resources to investigate energy efficiency opportunities. The target market includes small non-residential customers with a Small General Service Rate 2(M), including commercial and institutional customers but excluding multifamily customers. The SBDI Program encourages small business customer participation through a simple, immediate, and streamlined program process. A group of SBDI Program Service Providers delivers energy-efficient measures at low cost to small business customers. These Service Providers supply, install, and finalize paperwork for eligible participants and are tasked with identifying additional energy efficiency opportunities not covered under the SBDI Program.

The SBDI Program is an ongoing program from MEEIA Cycle II. In PY2019, program-eligible measures were limited to LED lighting and smart thermostats. In PY2020, the program introduced additional HVAC measures (air-cooled chillers, advanced rooftop unit controls, and demand-controlled ventilation), occupancy sensors, and exterior lighting (in combination with interior lighting projects). The program also increased the incentive cap in PY2020 from $3,500 to $5,000 (per Ameren Missouri customer per cycle); developed a simplified, stand-alone HVAC application form; and extended the application due date from 30 to 90 days of the invoice date. In September 2022, the program increased incentives for all measures by approximately 25%, which remained in effect in PY2023.There were no changes to measure offerings or incentives in PY2023.

5.1 PARTICIPATION SUMMARY

During PY2023, the SBDI Program provided incentives to 258 unique small businesses for a total of 298 projects,[11] resulting in 4,174 MWh of ex ante gross energy savings—the lowest level of participation and realized ex ante gross savings in the last five years. (Figure 4).

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[11] Unique businesses are defined at the company level, rather than the location level (i.e., a company that participated at more than one location is only counted once).

Figure 4. PY2023 SBDI Project Completions and Ex Ante Gross Savings
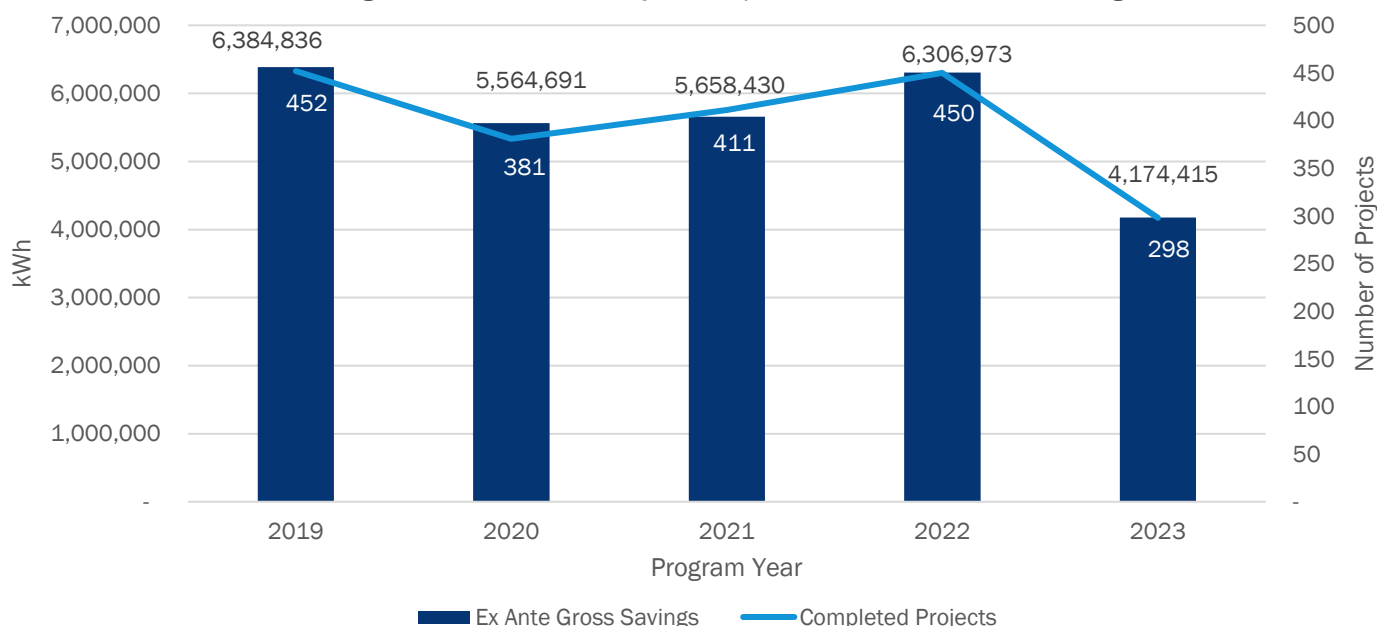
In PY2019 and PY2021, all incentives provided through the SBDI Program were for lighting measures. PY2020 and PY2022 program activity was still dominated by lighting (accounting for 99.8% and 99.997%, respectively, of ex ante gross savings). In PY2023, program activity was again dominated by lighting, but the program also incented two HVAC projects: one involved two smart thermostats and a new package DX air conditioner, and the other involved six smart thermostats.

In PY2023, 39% of SBDI projects were implemented at tenant-occupied buildings, a traditionally hard-to-reach population. This was a strong increase from PY2022 (21%) and PY2021 (25%) but still a significant decrease from 54% in PY2020. Overall, 24 Service Providers completed SBDI projects in PY2023 (up from 23 in PY2020 and 20 in PY2021, but down from 28 in PY2022), with the single most active provider accounting for 30% of all projects.

5.2   EVALUATION METHODOLOGY

Table 18 provides an overview of the PY2023 evaluation activities for the SBDI Program. Most of these activities are similar across the various business programs and described in Chapter 2.

Table 18. PY2023 Evaluation Activities for the SBDI Program

Evaluation Activity	Description
Program Manager and Implementer Interviews	▪ Conducted interviews in January 2023 to inform evaluation planning and in January 2024 to understand program staff's perspective on program performance.
Program Material Review	▪ Reviewed program materials to understand program changes relative to PY2022.
Engineering Analysis (Lighting Measures)	▪ Verified that ex ante savings use correct TRM algorithms and project-specific values or TRM assumptions. ▪ Developed ex post savings using TRM algorithms, site-specific parameters, and deemed savings assumptions.
Net Impact Analysis	▪ Estimated PY2023 net impacts, applying a deemed NTGR of 0.825.

We conducted an engineering analysis of all SBDI Program lighting measures to estimate ex post gross program savings. We first reviewed program-tracking data to verify that ex ante savings calculations used correct TRM algorithms and savings assumptions. We then calculated ex post savings using Ameren Missouri TRM algorithms, site-specific parameters from the program-tracking database, and deemed savings assumptions (including the application of HOU and ISR adjustment factors).

Given the small contribution of non-lighting measures to SBDI Program savings (<0.5%), we applied a default realization rate of 100% for non-lighting measures.

5.3   EVALUATION RESULTS

This section summarizes impact results for the PY2023 SBDI Program. Table 19 compares ex ante and ex post savings at the program level. As shown, gross realization rates are 97.8% for energy savings and 101.0% for demand savings. Applying the deemed NTGR of 82.5%, the program achieved ex post net energy and demand savings of 3,370 MWh and 0.67 MW, respectively, representing 31% of the program's net energy and demand savings goals.

Table 19. PY2023 SBDI Program Savings Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTRG [A]	Ex Post Net	Goal/Target Net	% of Target
Energy Savings (MWh)	4,174	97.8%	4,085	82.5%	3,370	10,781	31%
Demand Savings (MW)	0.80	101.0%	0.81	82.5%	0.67	2.14	31%

[A] In accordance with Stipulation PY2023, PY2023 NTGRs are deemed at 82.5% for the Business portfolio.

Based on the engineering analysis for lighting measures, we made the following adjustments to ex ante savings assumptions:

- **WHF and IF.** To capture the heating and cooling interactive impacts when calculating ex ante savings for interior lighting measures, the program implementer applies an average HCIF of 1.07 for measures installed in air-conditioned spaces. The HCIF encompasses both WHF and IF. Notably, the implementer applies the HCIF to both energy and demand savings, even though heating penalties are not relevant for demand savings. In contrast, the evaluation team used building-specific assumptions based on information reported in the program-tracking database and in accordance with the Ameren Missouri TRM:
    - For energy savings, the evaluation team applied building type-specific WHFs and building- and HVAC type-specific IFs based on the Ameren Missouri TRM tables, resulting in a weighted average WHF/IF factor of 1.06 and higher ex post energy savings compared to ex ante.
    - For demand savings, the evaluation team applied building type-specific WHFs, resulting in a weighted average WHF of 1.09 and higher ex post demand savings compared to ex ante.
- **Application of ISR and HOU Adjustment.** We applied the TRM-prescribed parameters for the SBDI Program of 99.2% ISR and 100.7% HOU adjustment for a combined adjustment of 99.9%. This had minimal impact on ex post savings.
- **Adjustment of baseline wattage for applicable measures to comply with EISA guidelines.** The program incented 1,051 measures (corresponding to 46 records) that were installed on or after August 1, 2023 and are subject to EISA guidelines. For these measures, we applied measure-specific 45-lumen equivalent baseline wattages while the ex ante analysis used a deemed adjustment factor of 34% for halogen baselines and 24% for incandescent baselines. This increased the savings for some measures but reduced savings for others with an overall minimal impact on the program's realization rate.

- **Coincidence Factor for LED Exit Signs Replacing CFL Exit Signs.** The PY2023 SBDI Program provided incentives for ten LED exit signs that replaced CFL exit signs. Ex ante demand savings use the coincidence factor (CF) for 24/7 exterior/garage lighting (0.0001379439) instead of the TRM-prescribed value for this measure (0.0001899635). As a result, ex post demand savings for these measures are higher than ex ante savings.

Table 20 presents first year ex post gross energy and demand savings by measure type. As shown, over two-thirds (70%) of both energy and demand savings came from linear LEDs replacing T12s.

Table 20. PY2023 SBDI Ex Post Gross Savings by Measure Category

Measure Category	Energy Savings		Demand Savings	
	MWh	%	MW	%
Lighting	4,070	100%	0.80	98%
LED Replacing T12	*2,870*	*70%*	*0.56*	*70%*
Other Linear LED	*690*	*17%*	*0.14*	*17%*
Other Non-Linear LED	*448*	*11%*	*0.09*	*11%*
LED Replacing Incandescent A-Lamp	*45*	*1%*	*0.01*	*1%*
Lighting Controls	*0*	*<1%*	*<0.01*	*<1%*
LED Exit Sign	*18*	*<1%*	*<0.01*	*<1%*
HVAC	14.2	<1%	0.01	2%
Total	4,085	100%	0.81	100%

5.4   CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this evaluation, the evaluation team offers the following conclusions and recommendations for the SBDI Program:

- **Conclusion #1:** In PY2023, the SBDI served fewer projects and achieved lower ex ante gross savings than in any other year in this MEEIA Cycle, but the program did serve a higher proportion of renters, a traditionally hard-to-reach population, than in the prior two years (39% of projects compared to 21% in PY2022 and 25% in PY2021).

- **Conclusion #2:** Lighting measures continued to dominate the SBDI Program, with virtually no uptake of non-lighting measures.

  - **Recommendation:** Continue to harvest energy savings from lighting measures while available but work with Service Providers to increase the promotion of other enduses to facilitate the transition away from lighting as the LED market matures. Ensure that the network of approved Service Providers includes a sufficient number of providers that offer non-lighting services throughout Ameren Missouri's service territory.

- **Conclusion #3:** The program implementer uses an average HCIF of 1.07 to estimate ex ante energy and demand savings for lighting measures installed in air-conditioned spaces, regardless of building type or heating system fuel. In contrast, the evaluation team applied building- and HVAC type-specific WHFs and Ifs based on the tracked building and system types for each project and specifications in the Ameren Missouri TRM Appendix H. Across all projects, the average combined ex post energy savings adjustment (WHF plus IF) was 1.06, and the average ex post demand savings adjustment (WHF only) was 1.09.

  - **Recommendation:** To improve the accuracy of ex ante savings, we recommend that the implementer either (1) apply building- and HVAC type-specific WHF and IF values (as stipulated in the TRM and done in the ex post

analysis); or (2) apply the TRM HCIF of 1.056 to calculate energy savings and the IF$_{kW}$ factor of 1.032 to calculate demand savings.[12]

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[12] IFkW is a second electric heat interaction factor designed to remove the heating penalty from demand savings. This factor is necessary when ΔkW is calculated as $kW = \Delta kWh \; x \; CF$ and ΔkWh includes the heating penalty; it is necessary because demand savings should not include the heating penalty. The IF$_{kW}$ of 1.032 was developed based on PY2021 ex post energy and demand lighting savings.

6.   RETRO-COMMISSIONING PROGRAM

This section summarizes the PY2023 evaluation methodology and results for the RCx Program. The PY2023 evaluation of the RCx Program included the application of PY2022 realization rates to estimate ex post energy and demand savings. It did not include an assessment of the new Smart Meter Commissioning program subcomponent, which, although planned, was ultimately not implemented in PY2023. Additional details on the evaluation methodology are presented in Chapter 2.

The RCx Program is designed to help customers retro-commission existing facilities. Program activities include conducting a retro-commissioning study, benchmarking existing building system performance levels, identifying operating system performance optimization improvements, and, where applicable, providing financial incentives to support the implementation of program recommendations. The most common optimization measures involve compressed air, refrigeration, and building systems. The program relies on program-approved contractors (Retro-Commissioning Service Providers, or RSPs) to deliver measurable energy savings. These RSPs complete a facility energy study on equipment optimization and educate customers about maintaining equipment efficiency. In PY2022 the BizSavers team developed a Smart Meter Commissioning channel within the RCx Program. The Smart Meter Commissioning channel will analyze advanced metering infrastructure (AMI) data to identify cost-efficient energy efficiency opportunities and engage with customers to implement recommendations. Initially planned for PY2023, roll out of the channel was delayed and is now planned for PY2024.

The PY2023 RCx Program is an ongoing program from MEEIA Cycle II. Incentive levels and program design remained largely consistent with PY2022.

6.1   PARTICIPATION SUMMARY

The PY2023 RCx Program completed ten projects, accounting for 3,148 MWh of ex ante gross energy savings. Table 21 presents PY2023 participation and gross energy savings by enduse.

Table 21. PY2023 RCx Program Participation Summary

Enduse/Channel	Projects		Ex Ante Savings	
	Number	%	MWh	%
Compressed Air	7	70%	1,566	50%
HVAC	3	30%	1,582	50%
Total	10	100%	3,148	100%

Compared to PY2022, the RCx Program completed slightly more projects (ten projects in PY2023 compared to nine projects in PY2022) and generated 50% more ex ante savings (3,148 MWh in PY2023 compared to 2,066 MWh in PY2022; see Figure 5). Nevertheless, program activity remained low relative to PY2020 and PY2021.

Figure 5. PY2023 RCx Project Completions and Ex Ante Gross Savings
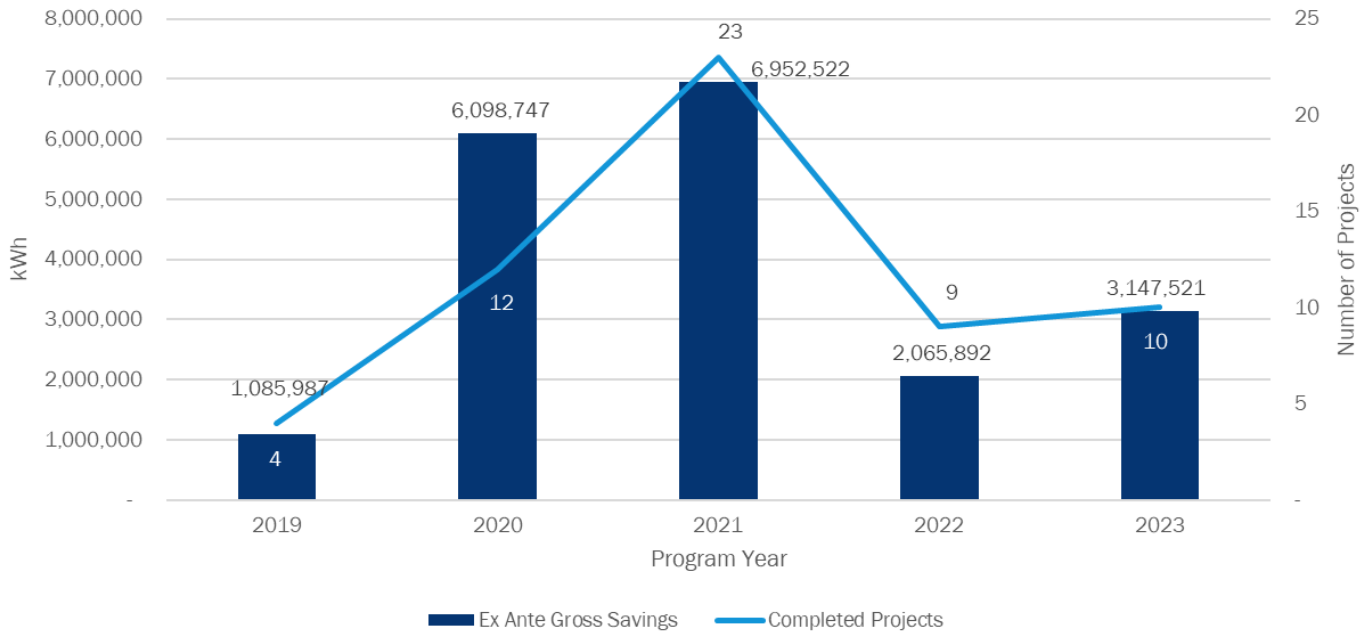
6.2   EVALUATION METHODOLOGY

Table 22 provides an overview of the RCx Program evaluation activities. Given the small contribution of the RCx Program to portfolio savings (<3% of ex ante gross energy savings) and to optimize evaluation budgets, we applied a historical realization rate to the RCx Program to calculate ex post gross savings.

Table 22. PY2023 Evaluation Activities for the RCx Program

Evaluation Activity	Description
Program Manager and Implementer Interviews	▪ Conducted interviews in January 2023 to inform evaluation planning and in January 2024 to understand program staff's perspective on program performance.
Program Material Review	▪ Reviewed program materials to understand program changes relative to PY2022.
Gross Impact Analysis	▪ Developed ex post gross savings for the population using PY2022 realization rates.
Net Impact Analysis	▪ Estimated PY2023 net impacts, applying a deemed NTGR of 0.825.

6.3   EVALUATION RESULTS

This section summarizes impact results for the PY2023 RCx Program. Ex post gross savings are based on the application of PY2022 gross realization rates of 98.8% for energy savings and 96.7% for demand savings. Applying the deemed NTGR of 82.5%, the program achieved first year ex post net energy and demand savings of 2,566 MWh and 1.00 MW, respectively, representing 54% of the program net energy savings goal and 51% of the program net demand savings goal (see Table 23).

Table 23. PY2023 RCx Program Gross Impact Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTRG [A]	Ex Post Net	Goal/Target Net	% of Target
Energy Savings (MWh)	3,148	98.8%	3,110	82.5%	2,566	4,715	54%
Demand Savings (MW)	1.26	96.7%	1.22	82.5%	1.00	1.96	51%

[A] In accordance with Stipulation PY2023, PY2023 NTGRs are deemed at 82.5% for the Business portfolio.

6.4   CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this evaluation, the evaluation team offers the following conclusions and recommendations for the RCx Program:

- **Conclusion #1:** The RCx Program achieved significantly lower ex ante gross energy savings compared to PY2020 and PY2021 and fell short of PY2023 energy and demand goals (54% and 51%, respectively). Historically, the RCx Program has generated higher gross energy savings by serving more HVAC projects. In addition, the delay in implementing Smart Meter Commissioning hindered program performance.

  - **Recommendation #1:** The BizSavers team should focus on serving more HVAC projects in future years and roll out Smart Meter Commissioning as early as possible in 2024 to bolster PY2024 program performance.

7. BUSINESS SOCIAL SERVICES PROGRAM

This chapter summarizes the PY2023 evaluation methodology and results for the BSS Program. While the BSS Program is part of Ameren Missouri's portfolio of low-income programs, the evaluation results are presented in this volume because of implementation and evaluation similarities with the other business programs: (1) it is implemented by the same implementation contractor using similar program processes, and (2) we evaluate it using similar evaluation methods. The PY2023 evaluation of the BSS Program included an engineering analysis of lighting measures.

The BSS Program was a new program for Ameren Missouri in PY2019. The program is designed to promote the installation of energy-efficient technologies in social service organizations by removing barriers such as high upfront cost, lack of financing, lack of knowledge, and lack of time and resources to investigate energy efficiency opportunities. The target market consists of commercial, nonprofit, and tax-exempt business customers that provide social services to the low-income public in federally designated opportunity zones, including family services, healthcare facilities, homeless shelters, employment services, worker training organizations, job banks, and childcare facilities. The BSS Program provides lighting and other measures at low- or no-cost to social services business customers with qualifying facilities. Program-approved Service Providers supply and install measures, finalize the paperwork for eligible participants, and identify additional energy efficiency opportunities not covered under the BSS Program. The BSS Program offers the highest incentive levels for deemed measures among all BizSavers programs, including incentives that cover 100% of eligible costs for select interior lighting measures. In PY2022, the primary responsibility of outreach for the BSS Program shifted from Ameren Missouri's Corporate Contributions and Community Initiatives Group to the implementation contractor in response to higher program goals and budgets. In addition, incentive levels for all available BSS measures increased in September 2022.

In PY2023, the BizSavers Team increased the HVAC incentive to $0.80/kWh to align with the Income Eligible Multifamily program and focused on expanding participation among municipalities and other governmental facilities, including public schools within those municipalities.[13]

7.1 PARTICIPATION SUMMARY

In PY2023, the BSS Program served 73 unique customers that implemented 123 energy efficiency projects accounting for 3,738 MWh of ex ante gross energy savings, a significant increase compared to program participation and savings in prior years of this program cycle (see Figure 6). According to implementation staff, the increase in BSS-realized savings in PY2023 was driven, in part, by the increased participation of governments and municipalities. In PY2023, just over one-third (25 of 73) of the organizations the program served were government, but they accounted for more than one-half of completed projects (64 of 123) and almost two-thirds of ex ante energy savings (2,375 MWh of 3,738 MWh). This is driven by the relatively larger size of government facilities compared to other facilities served by the Program in PY2023. The Program completed 34 projects at 3M facilities,[14] 25 of which were at government facilities.

Similar to prior program years, PY2023 program activity was dominated by LED lighting upgrades; only seven of the 123 projects installed non-lighting measures (six installed smart thermostats and one installed an ENERGY STAR® commercial refrigerator).

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[13] Municipal and government facilities qualify under BSS if that municipality's residents qualify under the filed Eligibility Guidelines for All Residential Low-Income Programs.

[14] In addition to meeting other program eligibility requirements, only facilities served under a 2M and 3M rate class are eligible for BSS. The 2M rate class is for small general service customers (<100 kW per month) where 3M services large general service customers (>100 kW per month).

Figure 6. PY2023 BSS Project Completions and Ex Ante Gross Savings
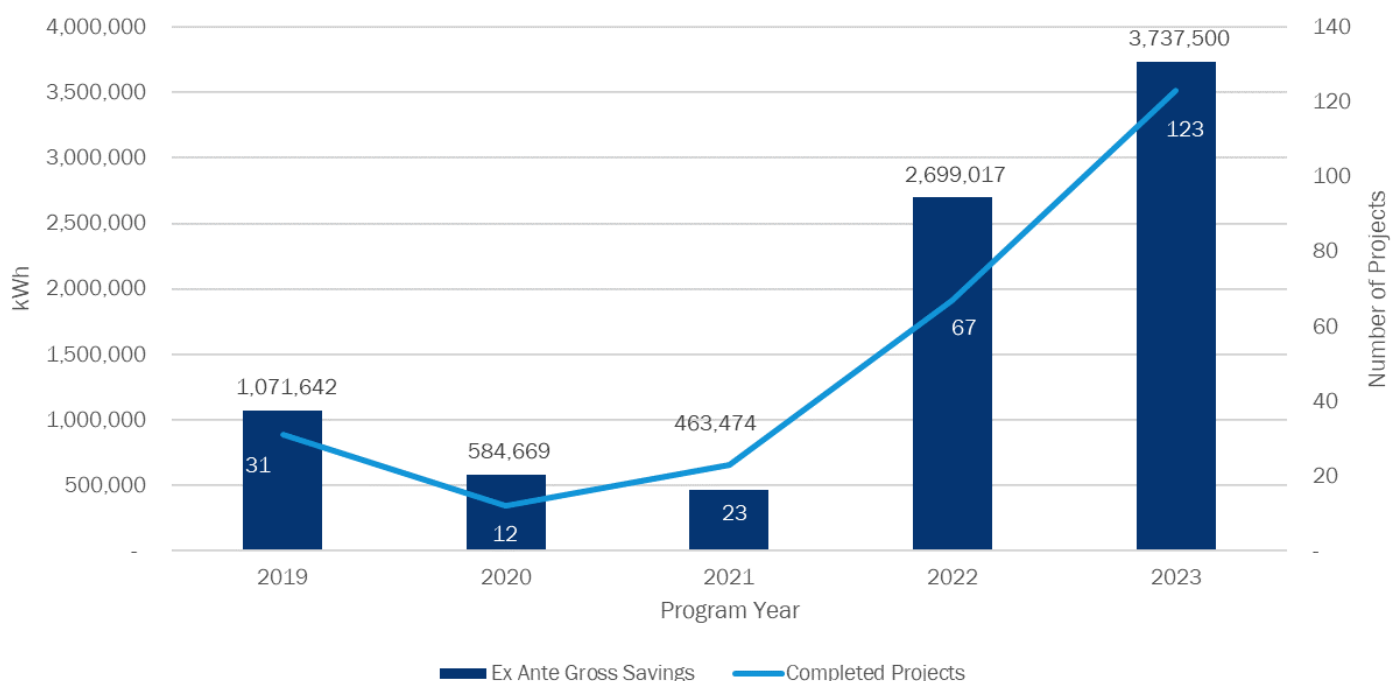
7.2 EVALUATION METHODOLOGY

Table 24 provides an overview of the PY2023 evaluation activities for the BSS Program. Most of these activities are similar across the various business programs and described in Chapter 2.

Table 24. PY2023 Evaluation Activities for the BSS Program

Evaluation Activity	Description
Program Manager and Implementer Interviews	▪ Conducted interviews in January 2023 to inform evaluation planning and in January 2024 to understand program staff's perspective on program performance.
Program Material Review	▪ Reviewed program materials to understand program changes relative to PY2022.
Engineering Analysis (Lighting Measures)	▪ Verified that ex ante savings use correct TRM algorithms and project-specific values or TRM assumptions. ▪ Developed ex post savings using TRM algorithms, site-specific parameters, and deemed savings assumptions.
Net Impact Analysis	▪ Estimated PY2023 net impacts, applying a deemed NTGR of 1.0.

We conducted an engineering analysis of all BSS Program lighting measures to estimate ex post gross program savings. We first reviewed program-tracking data to verify that ex ante savings calculations used correct TRM algorithms and savings assumptions. We then calculated ex post savings using Ameren Missouri TRM algorithms, site-specific parameters from the program-tracking database, and deemed savings assumptions (including the application of HOU and ISR adjustment factors).

Given the small contribution of non-lighting measures to BSS Program savings (<1%), we applied a default realization rate of 100% for non-lighting measures.

7.3   EVALUATION RESULTS

This section summarizes impact results for the PY2032 BSS Program. Table 25 compares ex ante and ex post savings at the program level. As shown, gross realization rates are 101.0% for energy savings and 102.0% for demand savings. Applying an industry-standard NTGR of 100%, the program achieved ex post net energy and demand savings of 3,775 MWh and 0.75 MW, respectively, representing 75% of the program gross energy savings goal and 76% of the program net demand savings goal.

Table 25. PY2023 BSS Program Savings Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTRG [A]	Ex Post Net	Goal/Target Net	% of Target
Energy Savings (MWh)	3,738	101.0%	3,775	100.0%	3,775	5,012	75%
Demand Savings (MW)	0.73	102.0%	0.75	100.0%	0.75	0.98	76%

[A] Per industry standard practice, we assume an NTGR of 100% for the Income Eligible portfolio.

Based on the engineering analysis for lighting measures, we made the following adjustments to ex ante savings assumptions:

- **WHF and IF.** To capture the heating and cooling interactive impacts when calculating ex ante savings for interior lighting measures, the program implementer applied an average HCIF of 1.07 for measures installed in air-conditioned spaces. The HCIF encompasses both WHF and IF. Notably, the implementer applies the HCIF to both energy and demand savings, even though heating penalties are not relevant for demand savings. In contrast, the evaluation team used building-specific assumptions based on information reported in the program-tracking database and in accordance with the Ameren Missouri TRM:

    - For energy savings, the evaluation team applied building type-specific WHFs and building- and HVAC type-specific IFs based on the Ameren Missouri TRM tables, resulting in a weighted average WHF/IF factor of 1.08 and higher ex post energy savings compared to ex ante.

    - For demand savings, the evaluation team applied building type-specific WHFs, resulting in a weighted average WHF of 1.09 and higher ex post demand savings compared to ex ante.

- **Application of ISR and HOU Adjustment.** We applied the TRM-prescribed parameters for the BSS Program of 100.1% ISR and 100% HOU adjustments, for a combined adjustment of 100.1%. This had minimal impact on ex post savings.

- **Adjustment of baseline wattage for applicable measures to comply with EISA guidelines.** The program incented 1,262 measures (corresponding to 83 records) that were installed on or after August 1, 2023 and are subject to EISA guidelines. For these measures, we applied measure-specific 45-lumen equivalent baseline wattages while the ex ante analysis used a deemed adjustment factor of 34% for halogen baselines and 24% for incandescent baselines. This increased the savings for some measures but reduced savings for others with an overall minimal impact on the program's realization rate.

- **Coincidence Factor for LED Exit Signs Replacing CFL Exit Signs.** The PY2023 BSS Program provided incentives for six LED exit signs that replaced CFL exit signs. Ex ante demand savings use the coincidence factor (CF) for 24/7 exterior/garage lighting (0.0001379439) instead of the TRM-prescribed value for this measure (0.0001899635). As a result, ex post demand savings for these measures are higher than ex ante savings.

Table 26 presents first year ex post gross energy and demand savings by measure type. As shown, over 40% of both energy and demand savings came from linear LEDs replacing T12s.

Table 26. PY2023 BSS Ex Post Gross Savings by Measure Category

Measure Category	Energy Savings		Demand Savings	
	MWh	%	MW	%
Lighting	3,741	99%	0.72	96%
LED Replacing T12	_1,626_	_43%_	_0.31_	_42%_
Other Linear LED	_1,280_	_34%_	_0.24_	_33%_
Other Non-Linear LED	_708_	_19%_	_0.14_	_18%_
LED Replacing Incandescent A-Lamp	_126_	_3%_	_0.02_	_3%_
LED Exit Sign	_2_	_<1%_	_<0.01_	_<1%_
HVAC	31	1%	0.03	4%
Refrigeration	3	<1%	<0.01	<1%
Total	3,775	100%	0.75	100%

7.4   CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this evaluation, the evaluation team offers the following conclusions and recommendations for the BSS Program:

- **Conclusion #1:** In PY2023, the BSS Program supported more projects (123) and achieved higher ex ante energy savings (3,738 MWh) than any of the prior four years of the MEEIA Cycle; however, the program's gross energy and demand savings goals both increased dramatically over the last two years. Consequently, the program only achieved 75% and 76% of its energy and demand savings goals, respectively.

- **Conclusion #2:** The program achieved strong first year energy and demand realization rates (101.0 and 102.0%, respectively).

- **Conclusion #3:** The program implementer used an average HCIF of 1.07 to estimate ex ante energy and demand savings for lighting measures installed in air-conditioned spaces, regardless of building type or heating system fuel. In contrast, the evaluation team applied building- and HVAC type-specific WHFs and IFs based on the tracked building and system types for each project and specifications in the Ameren Missouri TRM Appendix H. Across all projects, the average combined ex post energy savings adjustment (WHF plus IF) was 1.08, and the average ex post demand savings adjustment (WHF only) was 1.09.

  - **Recommendation:** To improve the accuracy of ex ante savings, we recommend that the implementer either (1) apply building- and HVAC type-specific WHF and IF values (as stipulated in the TRM and done in the ex post analysis); or (2) apply the TRM HCIF of 1.056 to calculate energy savings and the IF$_{kW}$ factor of 1.032 to calculate demand savings.[15]

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[15] IFkW is a second electric heat interaction factor designed to remove the heating penalty from demand savings. This factor is necessary when ΔkW is calculated as $kW = \Delta kWh \ x \ CF$ and ΔkWh includes the heating penalty; it is necessary because demand savings should not include the heating penalty. The IF$_{kW}$ of 1.032 was developed based on PY2021 ex post energy and demand lighting savings.

Opinion **Dynamics**

CONTACT:

Antje Flanders
Vice President
aflanders@opiniondynamics.com

BOSTON
PORTLAND
SAN DIEGO
SAN FRANCISCO