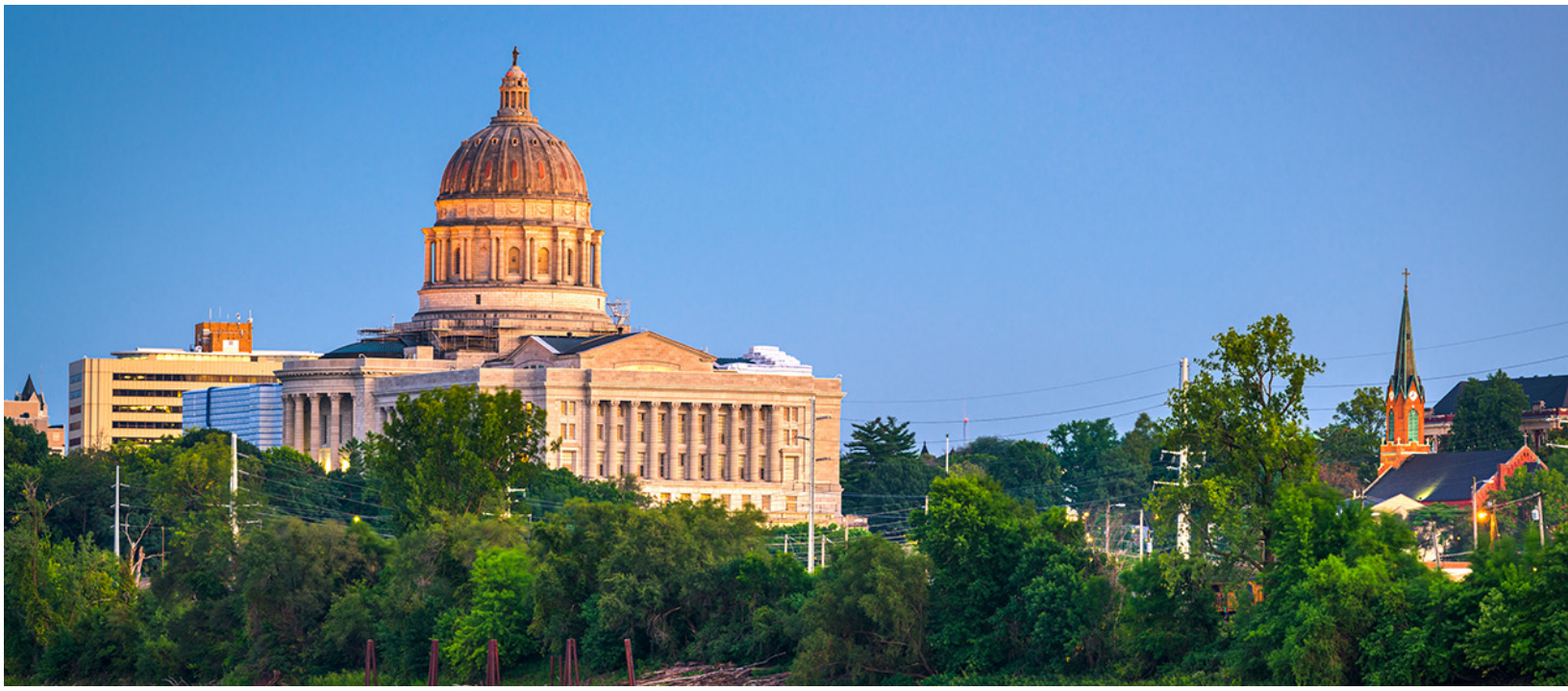
Independent EM&V Audit of the Ameren Missouri PY2021 Program Evaluations



Draft Report

Submitted by Evergreen Economics

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1 Executive Summary

In 2021, Ameren Missouri continued implementing its Missouri Energy Efficiency Investment Act (MEEIA) Cycle 3 DSM Programs (Case No. EO-2018-00211). The MEEIA Cycle 3 Programs covered in this audit include:

- **Residential Lighting** – The Residential Lighting Program is designed to increase sales and awareness of ENERGY STAR qualified LED lighting products. The target market consists of all residential customers within the Ameren Missouri service territory. In PY2021, the Lighting Program provided incentives through two channels: (1) upstream, through retail partners, and (2) through the Ameren Missouri Online Store.
- **Heating and Cooling (HVAC)** – The Heating, Ventilation, and Air Conditioning (HVAC) Program obtains energy and demand savings through improvements in the operating performance of existing residential cooling units or replacement of central air conditioning (CAC) units and heat pumps. The program offers measures through two channels: a Downstream Channel that focuses on encouraging improving the efficiency of HVAC systems at the point of installation and a Midstream Channel, that focuses on making super-efficient HVAC systems more broadly available to Ameren Missouri customers.
- **Home Energy Reports (HER)** – The HER Program was designed to promote changes in energy consumption behaviors that result in reduced electricity usage. The target market consists of residential customers in the Ameren Missouri service territory. This program is deployed as a randomized controlled trial, where customers are randomly assigned to a treatment or control group. The implementer also identifies and maintains a control group on non-participating customers.
- **Residential Efficient Products (REP)** – This program is designed to raise customer awareness of the benefits of high-efficiency products and to educate residential customers to save energy cost-effectively. Four measures were included in PY2021 including advanced thermostats, tier 1 and tier 2 power strips, variable speed and multi-speed pool pumps, and heat pump water heaters.
- **Energy Efficient Kits (EEK)** – The Energy Efficiency Kits program provides energy efficiency kits through an educational channel that primarily targets schools. The school kits provide participating teachers with classroom curriculum and energy savings kits to distribute to their students. The EEK Program includes a range of small energy-efficient products, such as LED light bulbs, hot water pipe wrap, low-flow showerheads, faucet aerators, and a dirty filter alarm.
- **Multifamily Market Rate (MFMR)** – The Multifamily Market Rate Program was designed to provide a one-stop-shop approach to assist owners and operators of multifamily Market Rate properties to overcome barriers to completing comprehensive retrofits. The program

serves multifamily properties that have three or more tenant units and receive electric service from Ameren Missouri.

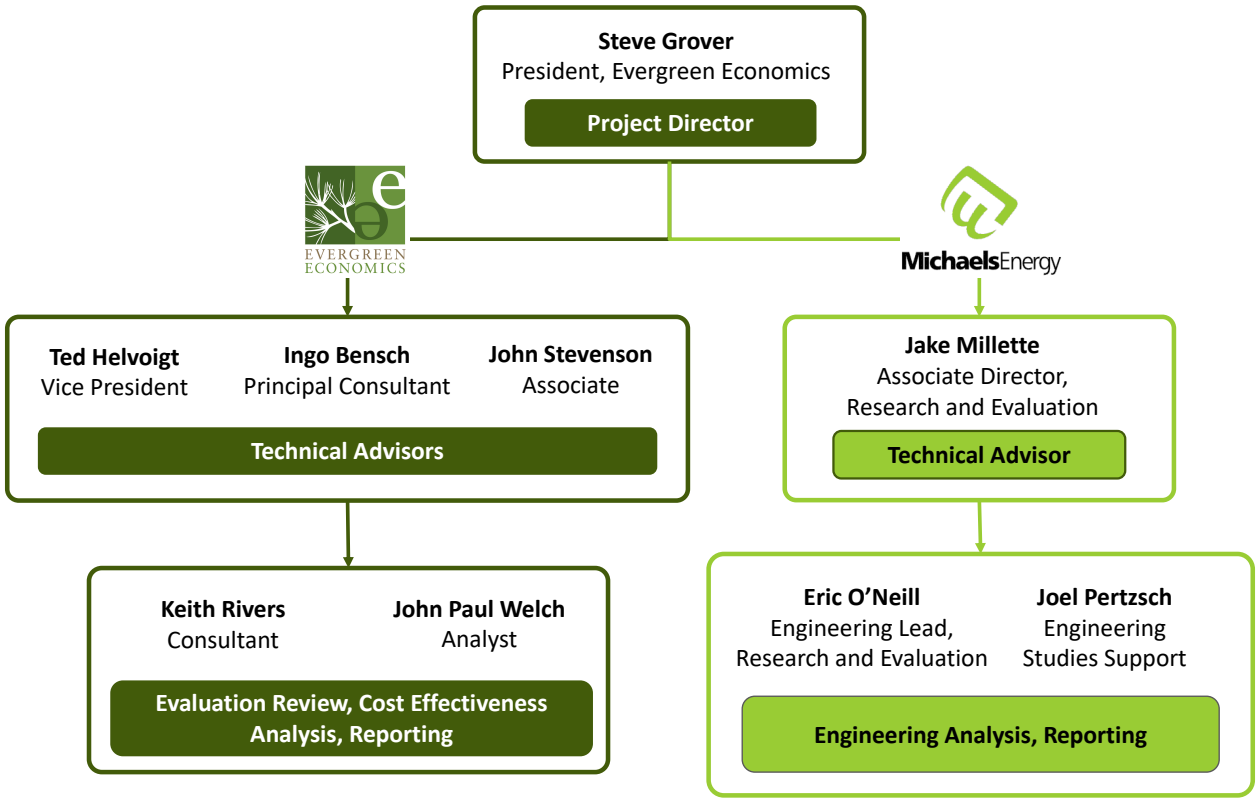
- **Pay As You Save (PAYS)** - New to PY2021 the PAYS program is a tariff on-bill financing. The program provides energy efficient measures including, LEDs, domestic hot water, insulation, air sealing, and HVAC, to residential customers. The program targets residential customers with energy usage higher than anticipated given housing characteristics.
- **Do-it-Yourself Kits** – In PY2021, Ameren Missouri offered energy efficient measures to income eligible single family and multifamily customers to assist them during the COVID-19 pandemic. These measures were distributed as kits and included advanced power strips, LEDs, pipe insulation, low-flow showerheads, weather stripping, window insulation, and smart thermostats. Additionally, customers who received the kits received a one-time bill credit of $150 for verified installations of the kit measures.
- **Residential Appliance Recycling (RAR)** – This program is designed to promote the retirement and recycling of inefficient refrigerators, freezers, dehumidifiers, and room air conditioners from households by offering turn-in incentives, free pickup of working equipment, and information on the operating costs of inefficient units.
- **Single-Family Income Eligible (SFIE)** – The Residential Single-Family Income Eligible Program, formerly known as the CommunitySavers Program, is designed to provide whole-home energy efficiency upgrades that result in long-term energy savings and bill reduction opportunities to low-income Ameren Missouri customers living in single family properties. The program includes two participation channels: (1) the Single-Family channel; (2) the Grant channel.
- **Multifamily Income Eligible (MFIE)** – The Multifamily Income Eligible Program is designed to deliver long-term energy savings and bill reduction opportunities to income eligible Ameren Missouri customers living in multifamily properties. Property owners and managers of multifamily properties with three or more units, and high populations of low-income residents are targeted for the program.
- **Business Social Services (BSS)**: This program targets commercial, nonprofit, and tax-exempt business customers that provide social services to the low-income public in federally designated opportunity zones. The program provides lighting and other measures at low- or no-cost to social services business customers with qualifying facilities.
- **Business Portfolio**– Designed to help businesses identify and implement energy saving projects, the Business portfolio includes the Custom, Standard, New Construction, Retro-Commissioning, and Small Business Direct Install programs.
- **Demand Response** – The Residential and Business Demand Response programs are designed to control the cooling load with the help of smart thermostats to achieve peak demand savings and energy savings.

Ameren Missouri contracted with Opinion Dynamics and its subcontractors (Guidehouse, ADM Associates, Pammer Research, Sustainable Design & Behavior, Morgan Marketing Partners, and

Washington University in St. Louis) to conduct comprehensive impact and process evaluations of Ameren Missouri's energy efficiency portfolio for Program Year 2021 (PY2021).

In 2021, the Missouri Public Service Commission (PSC) contracted with the Evergreen Economics team to serve in the capacity of Independent Auditor to review the evaluation, measurement, and verification (EM&V) work undertaken by the Opinion Dynamics evaluation team. Figure 1 shows the audit team members and organization, the individual team members by firm, and the associated audit responsibilities.

Figure 1: Evergreen Audit Team Organization



The audit team is required to review program evaluation activities and provide comments on compliance with 4 CSR 240-22.070(8) and the overall quality, scope, and accuracy of the program evaluation reports, as well as recommendations to improve the evaluation and reporting process.

A review of the PY2021 evaluation indicates that all evaluation reports are well written, complete, and meet the minimum requirements for impact and process evaluations stipulated in 4 CSR 240-22.070(8).

1.1 Summary of Audit Conclusions and Recommendations

Over the last year the audit team has had several meetings with ODC on analysis methods and were able to come to an agreement on several evaluation issues. ODC has also addressed many of the comments we made on a draft version of the PY2021 report. Below we identify some remaining issues and areas where we believe the evaluations can be improved.

Accepting *Ex Ante* Savings Estimates Without Documentation

In PY2021, there were several areas where the audit team identified savings values that appeared to be unusually high, but the evaluation team decided to accept the *ex ante* savings estimates from the program implementers rather than attempt to develop their own independent estimates. This was a particular problem for the new construction agriculture projects, but also occurred with some of the retrocommissioning, PAYS, and custom projects.

ODC noted that poor project documentation by the implementers often prevented them from verifying the *ex ante* values, and they were hesitant to recalculate savings without more information on these projects. ODC has included improving project documentation as one of its evaluation recommendations, and this situation should be revisited in the PY2022 evaluation to assess whether adequate documentation is being provided.

In general, a lack of documentation should not prohibit the evaluation team from doing some analysis to develop their own independent savings estimates. And accepting high savings estimates without any supporting documentation does not provide any incentive to the program implementers to improve their documentation practices.

If projects are not documented appropriately in PY2022, we recommend that ODC develop its own savings estimates based on reasonable assumptions for the various savings calculation parameters (e.g., hours of operation, baseline conditions, equipment efficiencies). The default response in these situations should not be to just accept the *ex ante* savings estimates from the implementer without proper documentation.

Rerunning Energy Models

A similar issue relates to projects where the implementors estimate savings by running energy model simulations. There are instances with the agriculture projects where the initial model runs are producing very high savings estimates, which are sometimes due in part to the implementer choosing the least efficient baseline possible. Because the model inputs were poorly documented, ODC did not attempt to rerun them and chose instead to just accept the original savings numbers without making any adjustments.

ODC generally agreed that rerunning models would be beneficial, but did not feel comfortable rerunning models when there was not sufficient documentation on the original model runs or

agreement on a reasonable baseline. They are working with the implementer on improving modeling documentation and the key model inputs with sufficient detail so that they can be rerun by the evaluation team using verified *ex post* conditions.

As we note above, we believe that the evaluation team has a responsibility to develop its own savings estimates rather than just accepting the implementers *ex ante* values without any supporting documentation, especially when the savings estimates appear unreasonably high. At a minimum, if the evaluation team has access to the models, we recommend that the evaluation do a baseline review for reasonableness on items that do not change with the project (e.g., do schedules reflect actual operating hours, is the modeled building size close to the actual building size, and are equipment efficiencies reasonable?). A vast majority of the model inputs that remain constant will have a trivial impact on the savings, so the evaluation should focus on inputs that can shift baseline values considerably. For the factors that do change between the baseline and efficient case model runs, identify where the input values change and confirm that they reflect reasonable baseline and efficiency conditions. The evaluation team should also verify that the model is calibrated correctly.

If there is not enough documentation to perform these minimum steps, then we still recommend that the evaluation team develop its own savings estimates rather than accepting the model results from the implementer. As noted above, accepting poorly documented savings estimates (especially when they appear unusually high) does not provide any incentive for the implementer to provide adequate documentation in the future.

Free Ridership for New Programs

For the PAYS program, ODC assigned a net-to-gross ratio of 1.0, implying that free ridership is zero. The PAYS program had only two projects in PY2021 and therefore a participant survey to determine free ridership was not realistic. A complete evaluation that includes free ridership research is scheduled for the PY2022 evaluation.

Net-to-gross ratios of 1.0 are usually reserved for low income programs and sometimes pilot programs, and neither condition appears to apply to this program. For new programs, if primary research on free ridership is not conducted, a default 1.0 net-to-gross value should not automatically be assumed unless it is a low income program. In the cases of new programs such as PAYS, a net-to-gross ratio should be assigned from the literature (assuming an appropriately similar financing program can be found). If a comparable evaluation study is not available, then the average value from the relevant Ameren MO program sector (either residential or commercial) should be assigned as a placeholder until the program can receive its own evaluation.

Free Ridership Adjustment for Covid-19

An issue that was discussed in the previous year (PY2020) was ODC's application of a 20 percent reduction in the free ridership rate for the BizSavers Program to account for Covid-19. In the PY2020 audit report, we registered our strong objections to this approach. Despite our concerns, we agreed to a compromise that allowed for a modified Covid-related adjustment to free ridership for PY2021.

It is apparent from the PY2021 evaluation report that Covid is having little impact on delaying projects and is unlikely to be affecting free ridership for the BizSavers program for all the reasons we raised last year. It is also becoming impossible to disentangle the effects of Covid from the many other factors that are negatively impacting the economy. Given these conditions, we recommend that all Covid-related adjustments to free ridership be eliminated beginning in PY2022.

Randomized Control Design

For the Residential Demand Response program, ODC states the following in the Demand Response Portfolio evaluation report (p. 27):

> Despite the discussions and efforts, telemetry data supplied to the evaluation team contained similar imperfections and gaps to prior years, necessitating additional discussions and explorations. Some of the data imperfections were remedied while others were not. Notably, the telemetry data did not contain information on treatment and control group assignments, limiting our ability to leverage experimental design for Nest devices. In light of the resources and time needed to support data explorations and corrections, the evaluation team, in concert with Ameren Missouri and following a discussion with the Independent Auditor decided to pursue a quasi experimental design leveraging a proxy day methodology for all device manufacturers, as opposed to our preferred approach of employing the most rigorous method for each device manufacturer, based on available data, which would have allowed us to employ a RCT design for Emerson and ecobee devices.[1] As a result, our impact methodology to estimate event impacts as well as resource capabilities leverages a proxy day design for all device manufacturers, which is consistent with the approach used in PY2019 and PY2020. Our approach for developing impacts from Emerson device optimization on non-event days leverages experimental design.

These are the same issues that occurred in PY2020 and it appears there has been no improvement from Uplight to address the situation in PY2021.

[1] While this decision is in conflict with the Independent Auditor recommendations from the PY2021 report, it was necessary in order to meet evaluation reporting timelines and avoid negative budgetary implications.

In discussions with ODC on this issue as part of the PY2022 evaluation, ODC indicated that Ameren has received a commitment from Uplight to integrate experimental design assignment as part of the telemetry data extracts. Uplight has also committed to providing an early telemetry data extract 5-7 weeks following the start of the 2022 event season. ODC Is also planning to work with Uplight to collaborate on the data exploration and cleaning steps.

This issue should be reviewed again in PY2022 to confirm that these steps were taken and that the evaluation was able to be completed to the appropriate level of rigor. If the problems with Uplight continue and they do not provide the data needed to complete the evaluation, Ameren should consider dropping Uplight as an implementer for this program.

2 Introduction

The Missouri Energy Efficiency Investment Act (MEEIA) was passed in 2009, launching a new era for energy efficiency programs in Missouri. The Missouri Public Service Commission (the PSC) adopted four administrative rules (4 CSR 240-3.163, 4 CSR 240-3.164, 4 CSR 240-20.093 and 4 CSR 240-20.094) referred to as "MEEIA rules") to implement MEEIA.[2] MEEIA directs the PSC to permit electric corporations to implement PSC-approved demand side management (DSM) programs, with a goal of achieving cost-effective demand-side savings.

In 2009, the State of Missouri and Ameren Missouri reached an agreement to create Ameren Missouri's suite of residential and commercial energy efficiency programs, which began in 2013 as MEEIA Cycle 1. The MEEIA Cycle 1 programs ended on December 31, 2015 for Ameren Missouri (Case No. EO-2012-0142). In early 2016, the PSC approved MEEIA Cycle 2 DSM programs for Ameren Missouri (Case No. EO-2015-0055). All Cycle 2 programs were implemented no later than the second quarter of 2016, and ended by February 28, 2019.[3] In 2019, Ameren Missouri began implementing its Missouri Energy Efficiency Investment Act (MEEIA) Cycle 3 DSM Programs (Case No. EO-2018-00211).

The MEEIA Cycle 3 programs covered in this audit include:

- **Residential Lighting** – The Residential Lighting Program is designed to increase sales and awareness of ENERGY STAR qualified LED lighting products. The target market consists of all residential customers within the Ameren Missouri service territory. In PY2021, the Lighting Program provided incentives through two channels: (1) upstream, through retail partners, and (2) through the Ameren Missouri Online Store.
- **Heating and Cooling (HVAC)** – The Heating, Ventilation, and Air Conditioning (HVAC) Program obtains energy and demand savings through improvements in the operating performance of existing residential cooling units or replacement of central air conditioning (CAC) units and heat pumps. The program offers measures through two channels: a Downstream Channel that focuses on encouraging improving the efficiency of HVAC systems at the point of installation and a Midstream Channel, that focuses on making super-efficient HVAC systems more broadly available to Ameren Missouri customers.
- **Home Energy Reports (HER)** – The HER Program was designed to promote changes in energy consumption behaviors that result in reduced electricity usage. The target market consists of residential customers in the Ameren Missouri service territory. This program is

[2] The PSC is currently in the process of revising the MEEIA rules.

[3] Some Cycle 2 long-lead projects are expected to continue after February 28, 2019, as a result of the PSC's July 20, 2017 *Order Approving Stipulation and Agreement*.

deployed as a randomized controlled trial, where customers are randomly assigned to a treatment or control group. The implementer also identifies and maintains a control group on non-participating customers.

- **Residential Efficient Products (REP)** – This program is designed to raise customer awareness of the benefits of high-efficiency products and to educate residential customers to save energy cost-effectively. Four measures were included in PY2021 including advanced thermostats, tier 1 and tier 2 power strips, variable speed and multi-speed pool pumps, and heat pump water heaters.
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- **Multifamily Income Eligible (MFIE)** – The Multifamily Income Eligible Program is designed to deliver long-term energy savings and bill reduction opportunities to income eligible

Ameren Missouri customers living in multifamily properties. Property owners and managers of multifamily properties with three or more units, and high populations of low-income residents are targeted for the program.

- **Business Social Services (BSS)**: This program targets commercial, nonprofit, and tax-exempt business customers that provide social services to the low-income public in federally designated opportunity zones. The program provides lighting and other measures at low- or no-cost to social services business customers with qualifying facilities.
- **Business Portfolio**– Designed to help businesses identify and implement energy saving projects, the Business portfolio includes the Custom, Standard, New Construction, Retro-Commissioning, and Small Business Direct Install programs.
- **Demand Response** – The Residential and Business Demand Response programs are designed to control the cooling load with the help of smart thermostats to achieve peak demand savings and energy savings.

To ensure that programs comply with Missouri's rules regarding electric utility resource planning, the PSC has long-term resource planning rules that contain requirements for impact evaluations and process evaluations. The goal of the impact and process evaluations is "to develop the information necessary to evaluate the cost-effectiveness and improve the design of existing and future demand-side programs and demand-side rates, to improve the forecasts of customer energy consumption and responsiveness to demand-side programs and demand-side rates and to gather data on the implementation costs and load impacts of demand-side programs and demand-side rates for use in future cost-effectiveness screening and integrated resource analysis."[4]

Key requirements of the evaluations as outlined in 4 CSR 240-22.070(8) include the following:

- Utilities are expected to complete annual full process and impact evaluations for each DSM program.
- At a minimum, impact evaluations should
    1. "develop methods of estimating the actual load impacts of each demand-side program" using one or both of the following methods:
        a. "Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences"; and
        b. "Comparisons between program participants' loads and those of an appropriate control group over the same time period".
    2. "develop load-impact measurement protocols that are designed to make the most cost-effective use of the following types of measurements, either individually or in combination: monthly billing data, load research data, end-use load metered data,

[4] 4 CSR 240-22.070(8) Evaluation of Demand-Side Programs and Demand–Side Rates

building and equipment simulation models, and survey responses or audit data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics".

3. Develop protocols to collect data regarding demand-side program market potential, participation rates, utility costs, participant costs and total costs.

- At a minimum, process evaluations should address the following five questions:
  1. What are the primary market imperfections that are common to the target market segment?
  2. Is the target market segment appropriately defined or should it be further subdivided or merged with other segments?
  3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target segment?
  4. Are the communication channels and delivery mechanisms appropriate for the target segment?
  5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?

Ameren Missouri contracted with Opinion Dynamics and its subcontractors (Guidehouse, ADM Associates, Pammer Research, Sustainable Design & Behavior, Morgan Marketing Partners, and Washington University in St. Louis) to conduct comprehensive impact and process evaluations of Ameren Missouri's energy efficiency portfolio for Program Year 2021 (PY2021).

In 2021, the PSC contracted with Evergreen Economics and Michaels Energy (the Evergreen team) to serve in the capacity of EM&V Auditor to review program evaluation activities. The audit involved verifying compliance with 4 CSR 240-22.070(8) in addition to assessing the overall quality, scope, and accuracy of the program evaluation reports. The following report presents the Evergreen team's review of the Ameren Missouri program evaluations for program year 2021 (PY2021).

To conduct this review, the Evergreen team conducted the following activities:

- Reviewed each program's evaluation report in its entirety, including impact, process, and cost effectiveness methodologies and results;
- Reviewed the evaluation survey instruments and responses (where available) to confirm that the methodologies used were reasonable and consistent with best practices and that reported findings aligned with the data collected; and

- Reviewed specific evaluation tools and methodologies used for calculating program savings, including selected measure-level savings calculations, and survey methods for developing net program impacts.

3 Impact Evaluation Summary

This section summarizes the key findings and recommendations from the impact evaluations of Ameren Missouri's low-income, residential, and business energy efficiency program portfolio.

3.1 Summary of Impact Evaluation Methods and Results

The evaluation teams conducted an array of impact evaluation approaches summarized by program below.

Single Family Income-Eligible

The Residential Single-Family Income-Eligible program is designed to provide whole-home energy efficiency upgrades to low-income customers living in single family properties. The program includes two participation channels: (1) the Single-Family channel; (2) the Grant channel.

Evaluation activities included program material and tracking systems reviews, an engineering analysis to verify ex ante savings values and estimate ex post gross impacts using Missouri Statewide Technical Reference Manual (TRM) algorithms, and interviews with program manager and implementation staff.

Multifamily Income-Eligible

The Multifamily Income-Eligible program is designed to offer a one-stop-shop approach to assist owners and operators of multifamily properties where residents meet certain income-related requirements. The ultimate goal of the program is to overcome barriers to completing comprehensive retrofits in multifamily buildings and deliver long-term energy savings and bill reductions opportunities to Ameren Missouri customers. Eligible measures include lighting, HVAC, building shell, domestic hot water, and refrigeration measures. In PY2020, program staff added a co-delivery component partnering with Ameren Missouri Gas and Spire Gas to deliver gas-saving measures and to split costs on dual-fuel measures such as building shell upgrades.

Evaluation activities included program material and database reviews, an engineering analysis to verify ex ante savings values and estimate ex post gross impacts using Missouri Statewide Technical Reference Manual (TRM) algorithms, a net impact analysis, and interviews with program manager and implementation staff.

Business Social Services Program

The Business Social Services (BSS) Program was a new program for Ameren Missouri in PY2019. 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. The

BSS Program offers no-cost LED interior lighting equipment and low-cost equipment of other end uses.

PY2021 evaluation activities included reviewing program materials, an engineering analysis for lighting measures, a net impact analysis, and interviews with the program manager and implementation staff.

Residential Lighting Program

The Ameren Missouri Residential Lighting Program is designed to increase sales and awareness of ENERGY STAR® qualified LED lighting products. In PY2021, the Lighting Program provided incentives through two channels: (1) upstream, through retail partners, and (2) through the Ameren Missouri Online Store.

In PY2019, Opinion Dynamics conducted a detailed review of the program logic model, a program material review, Online Store participant surveys, in-store customer intercepts, lighting shelf stocking surveys, price elasticity modeling, and retailer/manufacturer interview, in addition to a large-scale non-participant survey. Because there is no expectation of substantive shifts in any of these parameters, for PY2020 the evaluation team focused their process evaluation efforts on program/implementer interviews and program material reviews. To derive PY2021 gross and net impact results, Opinion Dynamics applied the PY2019 evaluation-derived key parameters and the appropriate TRM inputs to PY2021 Lighting Program-tracking data.

Efficient Products Program

As in past years, in PY2021 the Efficient Products Program used two delivery channels including the downstream Mail-In channel, and Online Store channel; however, the Online Store channel is the path that almost all participating Ameren Missouri customers use. The following measures are offered through the program:

- Advanced thermostats
- Tier 1 power strips
- Tier 2 power strips
- ENERGY STAR-certified variable-speed and multi-speed pool pumps
- ENERGY STAR-certified heat pump water heaters (HPWHs)

A total of 22,110 rebates were delivered to Ameren Missouri participants for the Efficient Products Program in PY2021.

For PY2021, the Opinion Dynamics team focused its efforts on an impact evaluation having completed detailed process and impact evaluations of the REP Program for PY2019. Evaluation activities included program material and database reviews, an engineering analysis to verify ex ante savings values and estimate ex post gross impacts using Missouri Statewide Technical Reference Manual (TRM) algorithms, a net impact analysis, and program manager and implementation staff interviews.

Heating Ventilation and Air Conditioning (HVAC) Program

The Heating, Ventilation, and Air Conditioning (HVAC) Program obtains energy and demand savings through improvements in the operating performance of existing residential cooling units or replacement of central air conditioning (CAC) units and heat pumps. The program offers measures through two channels: a Downstream Channel that focuses on encouraging improving the efficiency of HVAC systems at the point of installation and a Midstream Channel, that focuses on making super-efficient HVAC systems more broadly available to Ameren Missouri customers.

For the impact evaluation, Opinion Dynamics began reviewing program-tracking data in order to identify variables necessary for impact calculations. To calculate verified gross energy and demand savings, Opinion Dynamics used engineering algorithms and the Missouri Statewide Technical Reference Manual (TRM). A net impact analysis was also conducted.

Furthermore, the evaluation team conducted surveys for the PY2021 evaluation. These surveys sought to verify measure installation, measure participant satisfaction with program processes, the installed HVAC measure, trade ally interactions, and program informational materials. The surveys were then used to estimate participant FR and SO at the channel level. Additionally, distributors who had participated in the program in PY2021 were asked to complete in-depth interviews that gathered trade ally feedback on program requirements, processes, and design, including satisfaction with trade ally training and program materials and resources.

Appliance Recycling Program

The primary goal of the Appliance Recycling Program is to promote the retirement and recycling of inefficient refrigerators, freezers, dehumidifiers, and room air conditioners from households by offering turn-in incentives, free pickup of working equipment, and information on the operating costs of inefficient units. The program also provides participants with energy efficiency kits. Additionally, in PY2021, the program team introduced a limited-time Holiday Kits offering.

Evaluation activities included a program material review, an engineering analysis to verify ex ante savings values and estimate ex post gross impacts using Missouri Statewide Technical Reference Manual (TRM) algorithms, and a net impact analysis. 2019 estimates of Net-to-Gross Ratios, free

ridership, and spillover were used to determine PY2021 net savings estimations. Lastly, interviews were conducted with Holiday Kits program staff to understand the details of the new offering.

Energy Efficiency Kits Program

The Energy Efficiency Kits program provides energy efficiency kits through an educational channel that primarily targets schools. The school kits provide participating teachers with classroom curriculum and energy savings kits to distribute to their students. The EEK Program includes a range of small energy-efficient products, such as LED light bulbs, hot water pipe wrap, low-flow showerheads, faucet aerators, and a dirty filter alarm.

In PY2021, the evaluation team conducted a gross impact analysis by reviewing the program database to check that the data are complete and analyzed the program database to determine the kits distributed in PY2021. Ex post gross impacts were estimated using PY2020 realization rates. A net impact analysis applied the PY2019 evaluation-derived estimates for free ridership, participation spillover, and non-participant spillover to estimate PY2021 net impacts. Lastly, program material and data were reviewed to inform evaluation activities.

Home Energy Reports Program

Ameren Missouri designed the HER Program to promote changes in energy consumption behaviors that result in reduced electricity usage. This program is deployed as a randomized controlled trial, where customers are randomly assigned to a treatment or control group. Home energy reports provide the treatment customers with a comparison of their energy usage to the usage of similar homes based on home size and location. At the same time, the implementer identifies and maintains a control group of non-participation customers. Energy savings were estimated using a lagged dependent variable regression model that utilized data from both the treatment and control groups. Additionally, the evaluation team conducted interviews with program managers and implementers.

Multifamily Market Rate Program

In PY2021, Ameren Missouri continued to deliver the Multifamily Market Rate Program, which was a new program in PY2019. The program is designed to provide a one-stop-shop approach to assist owners and operators of multifamily Market Rate properties to overcome barriers to completing comprehensive retrofits.

PY2021 evaluation activities for the Multifamily Market Rate Program included reviewing program materials and the program tracking database, an engineering and net impact analysis, and interviews with program manager and implementation staff. To calculate verified gross energy and demand savings, Opinion Dynamics used engineering algorithms and the Missouri Statewide Technical Reference Manual (TRM).

Pay As You Save (PAYS) Program

New to PY2021 the PAYS program is a tariff on-bill financing. The program provides energy efficient measures including, LEDs, domestic hot water, insulation, air sealing, and HVAC, to residential customers. The program targets residential customers with energy usage higher than anticipated given housing characteristics.

The evaluation activities for PY2021 included program manager and implementer interviews, program material review, participant interviews and trade ally interviews, and an impact review.

Do-it-Yourself (DIY) Kits

In PY2021, Ameren Missouri offered energy efficient measures to income eligible single family and multifamily customers to assist them during the COVID-19 pandemic. These measures were distributed as kits and included advanced power strips, LEDs, pipe insulation, low-flow showerheads, weather stripping, window insulation, and smart thermostats. Additionally, customers who received the kits received a one-time bill credit of $150 for verified installations of the kit measures.

The evaluation activities included a gross impact analysis to estimate the ex post gross impacts using measure-level deemed savings values based on the Missouri Statewide Technical Reference Manual (TRM). Program materials and data were also reviewed to check that program data are complete and that program-installed measures meet all program requirements.

Standard and Custom Incentive Programs

The Standard and Custom programs are 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 Standard Incentive Program provides incentives for a range of prescriptive measures, while the Custom Incentive Program applies to measures that are not deemed and do not fall under the Standard Program.

The PY2021 evaluation of the Standard and Custom program included an engineering analysis of standard lighting measures, engineering desk reviews and onsite verification for select Standard and Custom end uses. Evaluation activities also included a program material review, net-to-gross and net impact analysis, and a participant survey to collect data to inform participant free ridership.

Retro-Commissioning Program

The Retro-Commissioning Program (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 implementation of program recommendations. The most common optimization measures involve compressed air, refrigeration, and building systems.

Opinion Dynamics conducted interviews with program managers and implementers before and after the program to inform evaluation planning and analysis. In addition, the evaluation team conducted engineering desk reviews and on-site verifications, reviewing supporting project documentation for all projects to ensure that original data were correctly entered from invoices and other documentation. Interviews with participants were also conducted to collect data to inform free ridership.

New Construction Program

The New Construction Program is designed to promote cost-effective, energy efficient design in nonresidential new construction and major renovation projects. In PY2021, participants could choose from three types of energy efficiency incentives: installed interior lighting, custom measures, and whole building performance modeling.

Opinion Dynamics conducted interviews with program managers and implementers before and after the program to inform evaluation planning and analysis. In addition, the evaluation team conducted engineering desk reviews and on-site verifications, reviewing supporting project documentation for all projects to ensure that original data were correctly entered from invoices and other documentation. Interviews with participants were also conducted to collect data to inform free ridership. Lastly, a net-to-gross and net impact analysis was conducted to develop estimates for free ridership for indoor agriculture project and developed historical free ridership rates for non-indoor agriculture projects.

Small Business Direct Install (SBDI) Program

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. In PY2020, the program introduced HVAC, occupancy sensors, and exterior lighting measures to the program. These changes remained in effect in PY2021.

Opinion Dynamics conducted interviews with program managers and implementers before and after the program to inform evaluation planning and analysis. Additionally, an engineering analysis was also conducted for lighting measures to develop ex post savings using TRM algorithms, and a net impact analysis was conducted across all measures using PY2019 net-to-gross ratios.

3.1.1 Portfolio Level Findings

In this section, we provide a summary of the energy savings goals and accomplishments across Ameren Missouri's PY2021 energy efficiency program portfolio, as reported by the evaluation teams.

Table 1 and Table 2 show Ameren Missouri's energy efficiency targets, *ex ante* gross values, *ex post* gross values, the *ex post* net savings (evaluated) and net achievement compared to the targets for energy savings (MWh) and demand reductions (MW), respectively. To ensure clarity, these terms are defined as follows:

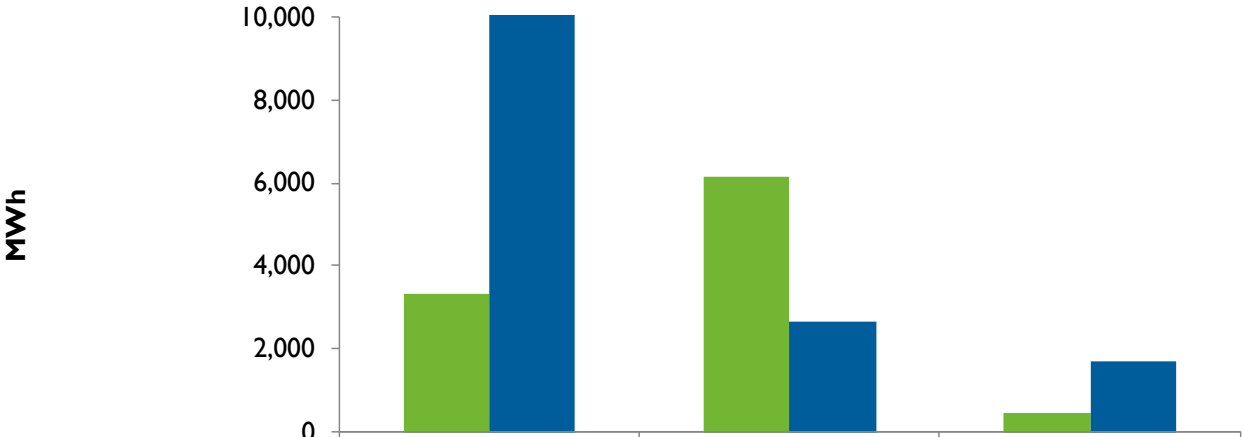
- **PSC-Approved Targets:** Annualized savings targets for the residential and commercial and industrial (C&I) sectors.
- ***Ex Ante* Gross Savings:** Annualized savings reported by Ameren Missouri or calculated using tracked program activity and the Ameren Missouri TRM savings values.
- ***Ex Post* Gross Savings:** Annualized savings calculated and provided by the evaluation team.
- ***Ex Post* Net Savings:** *Ex post* gross savings multiplied by the net-to-gross ratio, accounting for free ridership, participant spillover, and non-participant spillover.
- **Net-to-Gross (NTG) Ratio:** *Ex post* net savings divided by *ex post* gross savings.

Table 1: Ameren Missouri Portfolio Energy Savings in PY2021, MWh

Program	PSC – Approved Targets	*Ex Ante* Gross Savings	*Ex Post* Gross Savings	*Ex Post* Net Savings	NTG Ratio	% of Target Reached
Single Family Income-Eligible	10,822	3,574	3,335	3,335	100%	31%
Multifamily Income-Eligible	2,680	6,012	6,132	6,132	100%	229%
Business Social Services	1,700	463	472	472	100%	28%
Total Low-Income Portfolio	**15,202**	**10,050**	**9,939**	**9,939**	**100%**	**65%**
Lighting	11,238	97,062	99,891	63,740	64%	567%
Home Energy Reports	35,250	13,747	37,963	37,963	n/a	108%
HVAC	48,350	49,744	46,823	35,534	76%	73%
Efficient Products	9,800	8,246	8,972	7,724	86%	79%
Energy Efficiency Kits	4,199	5,437	4,420	3,466	78%	83%
Multifamily Market Rate	4,064	3,763	3,780	3,553	94%	87%
Appliance Recycling	3,345	1,952	2,220	1,341	60%	40%
Total Residential Portfolio	**116,246**	**179,950**	**204,070**	**153,321**	**75%**	**132%**
Standard	68,607	82,335	82,396	71,730	87%	105%
Custom	100,445	31,884	30,532	25,026	82%	25%
Small Business Direct Install	11,340	5,658	5,552	4,875	88%	43%
New Construction	12,076	52,293	49,175	37,082	75%	307%
Retro-Commissioning	12,076	6,953	6,928	6,429	93%	53%
Total C&I Portfolio	**204,544**	**179,123**	**174,583**	**145,141**	**83%**	**71%**
Total	**335,992**	**369,123**	**388,592**	**308,402**		**92%**

The low-income portfolio did not meet the target savings goal, achieving 65 percent of the net savings target. While the Multifamily Income-Eligible program surpassed its savings target by 229 percent, the Single-Family Income-Eligible program (i.e., the program with the highest savings target) achieved 31 percent of its savings target, and the Business Social Services program only achieved 28 percent (Figure 2).

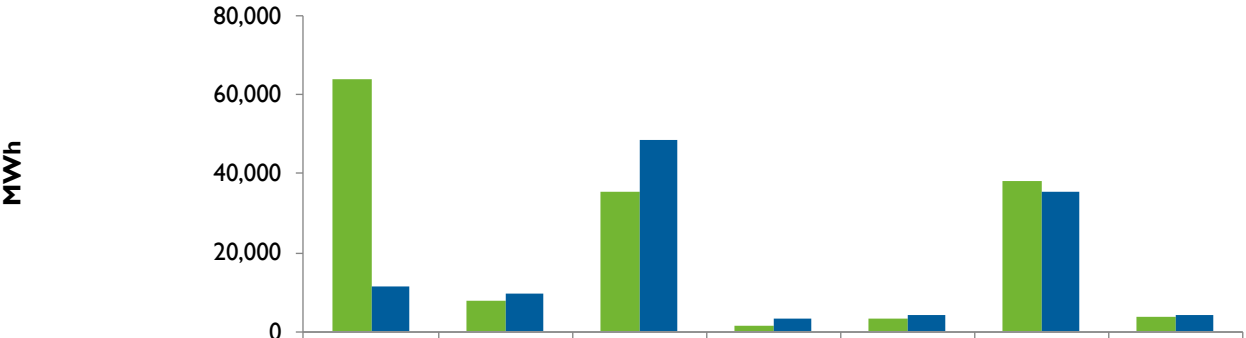
Figure 2: Low-Income Programs Planned and Evaluated Savings: PY2021 MWh



	Single Family Income-Eligible	Multifamily Income-Eligible	Business Social Services
MWh ExPost Net Savings	3,335	6,132	472
MWh 2021 Target Savings	10,822	2,680	1,700

In contrast, the residential portfolio surpassed the target savings goal, achieving 132 percent of the net savings target. The Lighting program had the highest savings relative to its target, meeting 567 percent of its target. The only other program to exceed its goal was the Home Energy Reports program, which achieved 108 percent of its target savings. However, all other residential programs missed their targets, with the lowest program achieving 40 percent of the target goal (the Appliance Recycling program; Figure 3).

Figure 3: Residential Programs Planned and Evaluated Savings: PY2021 MWh



	Lighting	Efficient Products	HVAC	Appliance Recycling	Energy Efficiency Kits	Home Energy Reports	Multifamily Market Rate
MWh ExPost Net Savings	63,740	7,724	35,534	1,341	3,466	37,963	3,553
MWh 2021 Target Savings	11,238	9,800	48,350	3,345	4,199	35,250	4,064

The 2021 C&I portfolio did not meet its approved targets, achieving 71 percent of the net savings target. Of the five PY2021 program areas, the Standard program and New Construction programs

surpassed their energy savings target, achieving 105 percent and 307 percent of their respective goals. However, like the residential portfolio, all other C&I programs did not meet their targets, with the lowest program achieving 25 percent of the target goal (the Custom program; Figure 4).

Figure 4: C&I Programs Planned and Evaluated Savings: PY2021 MWh

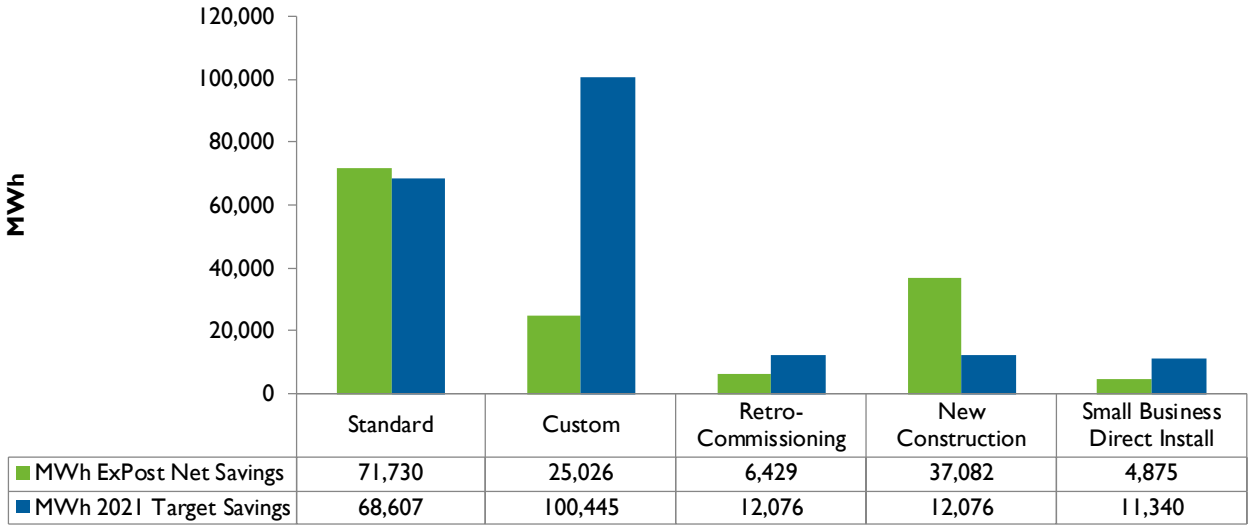


Table 2 displays approved targets for demand savings.

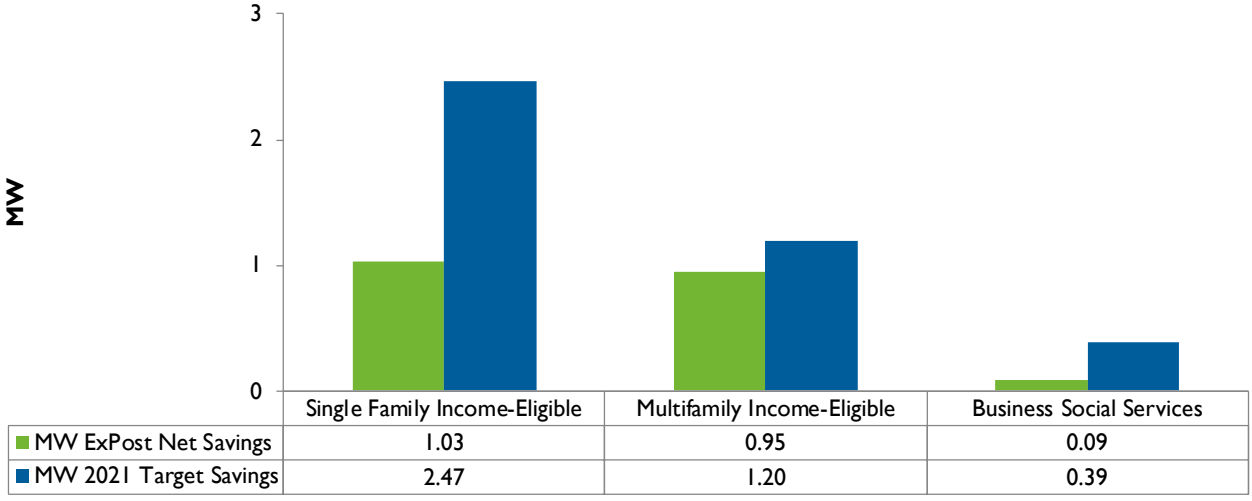
Table 2: Summary of PSC-Approved Targets for Demand Savings, MW

Program	PSC – Approved Targets	*Ex Ante* Gross Savings	*Ex Post* Gross Savings	*Ex Post* Net Savings	NTG Ratio	% of Target Reached
Single Family Income-Eligible	2.47	1.05	1.03	1.03	100%	42%
Multifamily Income-Eligible	1.20	0.79	0.95	0.95	100%	79%
Business Social Services	0.39	0.09	0.09	0.09	100%	23%
Total Low-Income Portfolio	**4.06**	**1.93**	**2.06**	**2.06**	**100%**	**51%**
Lighting	1.70	15.05	15.49	9.88	64%	581%
Home Energy Reports	16.43	6.41	17.69	17.69	n/a	108%
HVAC	26.07	33.62	32.47	22.50	69%	86%
Efficient Products	2.60	3.60	3.18	2.56	81%	99%
Energy Efficiency Kits	0.81	1.02	0.85	0.68	80%	84%
Multifamily Market Rate	1.30	0.93	0.93	0.88	94%	67%

Program	PSC – Approved Targets	*Ex Ante* Gross Savings	*Ex Post* Gross Savings	*Ex Post* Net Savings	NTG Ratio	% of Target Reached
Appliance Recycling	0.48	0.30	0.32	0.18	55%	36%
Total Residential Portfolio	**49.40**	**60.92**	**70.93**	**54.37**	**77%**	**110%**
Standard	13.59	19.74	20.72	18.03	87%	133%
Custom	29.20	14.65	13.80	11.31	82%	39%
Small Business Direct Install	1.97	1.07	1.09	0.96	88%	49%
New Construction	3.20	16.88	16.16	12.19	75%	380%
Retro-Commissioning	4.43	3.37	3.30	3.06	93%	69%
Total C&I Portfolio	**52.39**	**55.72**	**55.07**	**45.55**	**83%**	**87%**
Total	**105.85**	**118.57**	**128.07**	**101.98**		**96%**

The low-income portfolio did not reach its demand savings targets, achieving 51 percent of target savings. All three low-income programs did not meet their target goals, with the Multifamily Low-Income-Eligible achieving 79 percent of their target, followed by the Single-Family Low-Income-Eligible meeting 42 percent of their goal, and Business Social Services achieving 23 percent of their target goal (Figure 5).

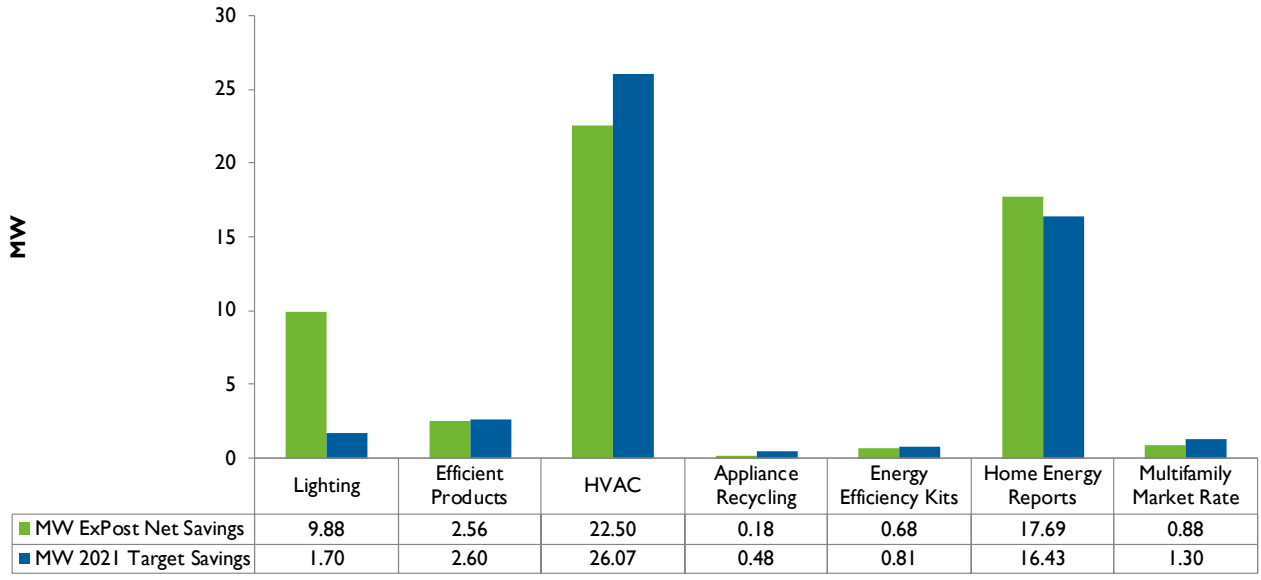
Figure 5: Low-Income Programs Planned and Evaluated Savings: PY2021 MW



The residential portfolio met its demand target, achieving 110 percent of target savings. The Lighting program performed best, achieving 581 percent of its demand goals. The Home Energy Reports program also exceeded its demand target, achieving 108 percent of target demand

savings. However, all other residential programs did not meet their target savings, with the lowest program achieving 36 percent of demand goals (the Appliance Recycling program; Figure 6).

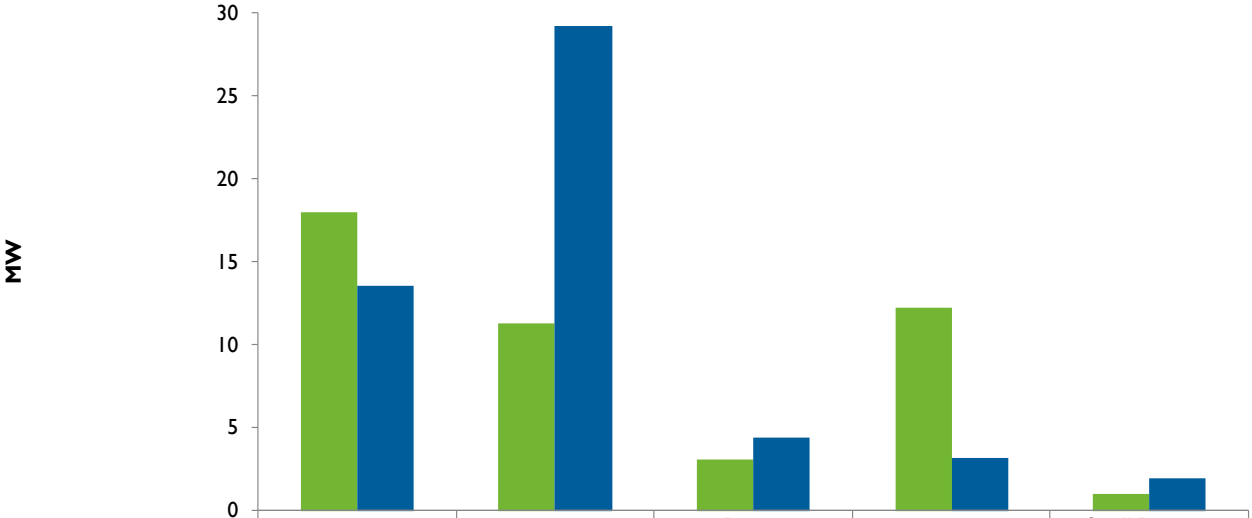
Figure 6: Residential Programs Planned and Evaluated Savings: PY2021 MW



	Lighting	Efficient Products	HVAC	Appliance Recycling	Energy Efficiency Kits	Home Energy Reports	Multifamily Market Rate
MW ExPost Net Savings	9.88	2.56	22.50	0.18	0.68	17.69	0.88
MW 2021 Target Savings	1.70	2.60	26.07	0.48	0.81	16.43	1.30

The 2021 C&I portfolio did not achieve its demand target, achieving 87 percent of its target demand savings. Similar to energy savings (MWh), the Standard and New Construction Programs performed the best, achieving 133 percent and 380 percent of their respective target demand savings goals. The rest of the C&I programs did not meet their demand savings goals, with the lowest program achieving 39 percent of its demand target (the Custom program; Figure 7).

Figure 7: C&I Programs Planned and Evaluated Savings: PY2021 MW



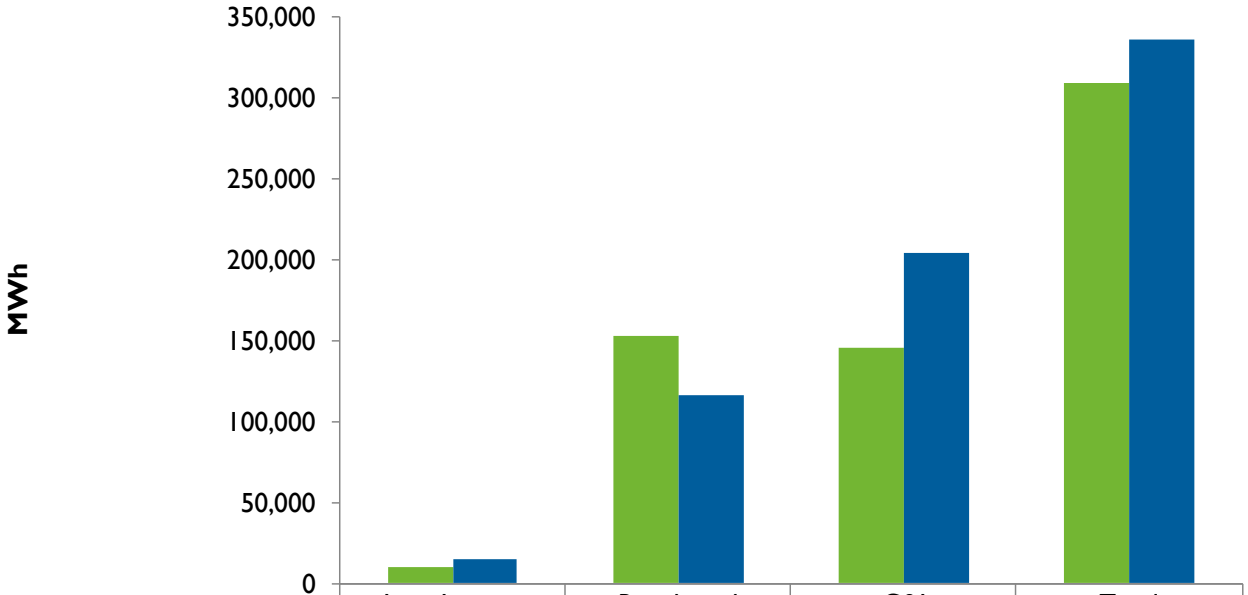
	Standard	Custom	Retro-Commissioning	New Construction	Small Business Direct Install
MW ExPost Net Savings	18.03	11.31	3.06	12.19	0.96
MW 2021 Target Savings	13.59	29.20	4.43	3.20	1.97

The following figures present summaries of program achievements in comparison with program goals**.** Figure 8 and

Figure 9 display the PY2021 energy and demand savings targets and achievements by sector, as reported by evaluators.

The PY2021 portfolio had a target energy savings goal of 335,992 MWh and actual net savings of 308,402 MWh, equating to approximately 92 percent of the program year energy goal. Only the Residential programs met or exceeded its energy savings goal, achieving 132 percent of its target, while the Low-Income and C&I programs did not meet their goals, reaching 65 percent and 71 percent of their respective targets (Figure 8).

Figure 8: Energy Savings and Achievements by Sector: PY2021 MWh

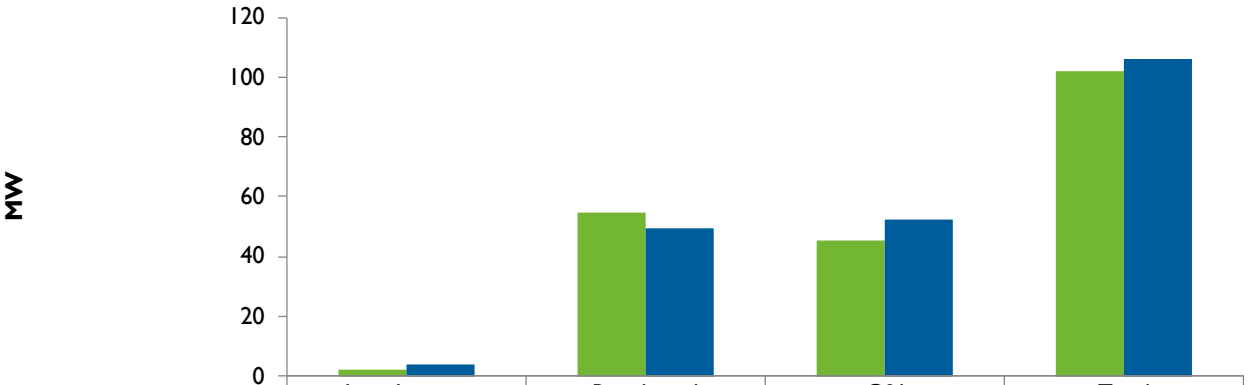


	Low Income	Residential	C&I	Total
MWh ExPost Net Savings	9,939	153,321	145,141	308,402
MWh 2021 Target Savings	15,202	116,246	204,544	335,992

Finally, PY2021 had a target demand savings goal of 105.85 MW and actual net savings of 101.98 MW, equating to approximately 96 percent of the year's demand goal. Similar to the energy savings goals, only the Residential program portfolio exceeded its goal, achieving 110 percent of it demand target. The Low-Income and C&I program did not meet their goals, reaching 51 percent and 87 percent of their respective targets. (

Figure 9).

Figure 9: Demand Savings Targets and Achievements by Sector: PY2021 MW



	Low Income	Residential	C&I	Total
MW ExPost Net Savings	2.06	54.37	45.55	101.98
MW 2021 Target Savings	4.06	49.40	52.39	105.85

4 Process Evaluation Summary

This section summarizes key methods and findings from the PY2021 process evaluations of Ameren Missouri's low-income, residential and business energy efficiency program portfolio.

In general, the audit team found that the process evaluations were thorough and followed best practices established for the industry. As noted below, the process evaluations were generally able to provide substantive answers to the required CSR questions.

4.1 Summary of Process Evaluation Methods and Alignment with Missouri CSR Minimum Requirements

The low-income, residential, and business program evaluations adopted a wide range of process evaluation methods. Table 3 below summarizes the process evaluation methods applied for each program.

Table 3: Process Evaluation Method Summary

Program	Methods	Description
Lighting	Program Manager and Implementer Interviews	Conducted interviews in October of PY2021 to understand program changes and staff's perspective on program implementation.
	Program Material Review	Reviewed any new program materials to inform evaluation activities.
	Tracking System Review	Reviewed program database to check that program data are complete and within range and that program-incented measures meet all program requirements.
Heating and Cooling	Program Manager and Implementer Interviews	Conducted interviews to assess changes in program design and implementation from PY2021, key program successes and challenges, program performance, and evaluation priorities.
	Program Material Review	Reviewed all program materials to inform evaluation activities.
	Tracking System Review	Reviewed implementer's tracking system to ensure that data required for the evaluation is being collected.
	Participant Survey	Collected data to inform gross impact analysis (e.g., verify installation and early replacement), NTG (i.e., free ridership and participant spillover), and yield process-related insights.

Program	Methods	Description
	Market Partner Surveys/In-Depth Interviews	Collected data to inform NTG (i.e., distributor free ridership and participant spillover) and yield Midstream channel process-related insights.
Home Energy Reports	Program Manager and Implementer Interviews	Conduct interviews in Q3 of PY2021 to understand program changes and staff perspectives on program implementation.
Residential Efficient Products	Program Manager and Implementer Interviews	Conducted interviews in Q3 of PY2021 to understand program staff's perspective on program implementation.
	Program Material Review	Reviewed new program materials to inform evaluation activities.
	Tracking System Review	Reviewed program database to check that program data are complete and that program-installed measures meet all program requirements.
Energy Efficiency Kits	Program Material Review	Reviewed program-tracking data and available program materials to inform evaluation activities.
	Tracking System Review	Reviewed program database to check that program data are complete and that program-installed measures meet all program requirements.
Multifamily Market Rate	Program Manager and Implementer Interviews	Conducted interviews in the Fall of PY2021 to understand program staff's perspective on program performance, implementation, and design changes.
	Program Material Review	Reviewed program materials to inform evaluation activities.
	Tracking System Review	Reviewed program database to check that program data were complete.
Appliance Recycling	Holiday Kits Program Staff Interview	Conducted an interview with Ameren Missouri and Franklin staff at the end of PY2021 to understand the details of the Holiday Kits offering and other program-tracking data-related items.
	Program Material Review	Reviewed available program materials to inform evaluation activities.
Pay As You Save	Program Manager and Implementer Interviews	Conducted interviews to understand program design, staff's perspective on program implementation, and any changes that occurred throughout PY2021. Probed to identify early program successes, challenges, and program performance.
	Program Material Review	Reviewed program materials to inform evaluation activities.

Program	Methods	Description
	Participant Interviews	Completed 12 interviews with PY2021 participants that did not proceed with recommended upgrades to explore drivers, barriers, participant experiences with the program, and satisfaction.
	Trade Ally In-Depth Interviews	Completed in-depth interviews with a sample of participating trade allies.
Single Family & Multifamily Income-Eligible	Program Manager and Implementer Interviews	Conducted interviews in the Fall of PY2021 to understand program staff's perspective on program performance implementation, and design changes.
	Program Material Review	Reviewed available program materials to inform evaluation activities.
	Tracking System Review	Reviewed the tracking system to ensure the implementer was collecting the data required to support evaluation efforts.

The Public Service Commission set minimum requirements for the program process evaluations in 4 CSR 240-22.070(9).[5] At a minimum, process evaluations should answer the following five key questions:

- **Question 1:** What are the primary market imperfections common to the target market segment?
- **Question 2:** Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?
- **Question 3:** Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?
- **Question 4:** Are the communication channels and delivery mechanisms appropriate for the target market segment?
- **Question 5:** What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?

In general, the evaluations provided substantive, updated responses to the five key questions that are clearly linked to the most recent evaluation findings. Each program evaluation provided a

[5] *Rules of Department of Economic Development, Division 240 - Public Service Commission, Chapter 22 - Electric Utility Resource Planning.* 2011. https://www.sos.mo.gov/cmsimages/adrules/csr/current/4csr/4c240-22.pdf

response to all five questions, and the full text response to these questions is provided as Appendix A to this report.

5 Review of Cost Effectiveness

The Evergreen team reviewed low-income, residential and business summary findings from the portfolio reports and the appropriate DSMore output files. This process involved reviewing the low-income, residential and business program DSMore aggregate files to confirm that calculations were performed correctly. This review was similar to those conducted in prior audits, with specific tasks including the following:

- Confirm that the reported program summary values matched those in the DSMore results file;
- Confirm that the reported costs matched the costs included in the DSMore input files (both incentive and overhead);
- Report current (PY2021) program results and compare against previous year results (PY2020).

Confirm summary values reported matched the values in the DSMore results files

The Evergreen team reviewed the reported summary cost-effectiveness values, as well as the net lifetime benefit and cost of conserved energy values to confirm the reported values matched the DSMore aggregate file results. The review consisted of checking all five cost-effectiveness tests for both the residential and business portfolio files. No discrepancies were found.

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

The Evergreen team reviewed the costs reported in each DSMore aggregate file for each program and compared them against the reported costs in the evaluation reports. No discrepancies were found.

Table 4 presents the total net lifetime benefits from low-income, residential and business programs reported in the PY2021 EM&V reports and compares the current year net benefits to previously reported PY2020 net benefits totals.

Table 4: Net Lifetime Benefits per Program

Program	Net UCT Lifetime Benefit (Reported) 2020	Net UCT Lifetime Benefit (Reported) 2021
Single Family – Income Eligible	$1,246,902	($1,737,626)
Multifamily – Income Eligible	($1,764,657)	($1,845,142)
Pay As You Save	N/A	($164,542)
Business Social Services	($71,054)	($91,532)
Lighting	$36,357,744	$27,258,374
Heating and Cooling	$9,056,463	$6,596,104
Home Energy Reports	$365,090	$3,616,848
Efficient Products	$1,076,439	$887,065
Energy Efficiency Kits	$1,243,302	$931,514
Multifamily Market Rate	$780,272	$931,097
Appliance Recycling	($88,827)	$110,894
Residential DR	$8,182,176	$3,799,497
Business Standard	$33,336,690	$25,581,730
Business Custom	$19,433,853	$13,253,947
Small Business Direct Install	$1,713,794	$1,549,722
New Construction	$5,317,834	$17,507,667
Retro-Commissioning	$3,724,678	$2,948,464
Business DR	$8,384,728	($12,102)

Table 5 compares the results of the four cost effectiveness tests between PY2020 and PY2021.[6]

[6] SCT results were calculated as part of the evaluation; however, they are excluded from the table below because they are equivalent to TRC results due to two factors: 1) Ameren Missouri does not included 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: Cost Effectiveness Test Results

Program	UCT		TRC		RIM		PCT	
	2020	2021	2020	2021	2020	2021	2020	2021
Single Family – Income Eligible	1.29	0.50	1.32	0.65	0.44	0.27	4.72	4.50
Multifamily – Income Eligible	0.51	0.57	0.72	0.64	0.29	0.28	4.49	4.32
Pay As You Save	N/A	0.76	N/A	0.68	N/A	0.39	N/A	4.08
Business Social Services	0.82	0.71	2.12	1.71	0.40	0.35	6.60	6.06
Lighting	4.64	5.60	6.45	7.64	0.55	0.50	N/A	N/A
Heating and Cooling	1.81	1.49	1.49	1.25	0.59	0.48	3.72	3.89
Home Energy Reports	1.22	3.17	1.22	3.17	0.42	0.50	N/A	N/A
Efficient Products	1.46	1.38	0.98	0.99	0.50	0.42	2.85	3.41
Energy Efficiency Kits	3.32	2.56	2.03	1.73	0.54	0.46	6.85	6.90
Multifamily Market Rate	2.02	1.98	1.34	1.71	0.52	0.50	3.53	5.82
Appliance Recycling	0.69	1.36	0.68	0.95	0.30	0.34	18.50	4.76
Residential DR	2.13	1.62	2.13	1.62	1.93	1.91	N/A	N/A
Business Standard	4.01	3.01	2.20	2.89	0.71	0.61	3.79	6.41
Business Custom	4.16	3.30	2.10	1.47	1.09	0.93	2.28	1.73
Small Business Direct Install	2.44	2.73	3.02	2.71	0.60	0.55	7.07	6.68
New Construction	3.46	3.15	1.33	1.32	0.77	0.78	1.87	1.89
Retro-Commissioning	5.19	3.04	4.94	2.66	1.08	0.92	6.03	3.96
Business DR	1.60	1.00	1.60	1.00	1.54	0.96	N/A	N/A

*Includes lifetime costs and benefits of Demand Response programs over a 10-year effective useful life.

6 Audit Conclusions

Over the last year the audit team has had several meetings with ODC on analysis methods and were able to come to an agreement on several evaluation issues. ODC has also addressed many of the comments we made on a draft version of the PY2021 report. Below we identify some remaining issues and areas where we believe the evaluations can be improved.

Accepting *Ex Ante* Savings Estimates Without Documentation

In PY2021, there were several areas where the audit team identified savings values that appeared to be unusually high, but the evaluation team decided to accept the *ex ante* savings estimates from the program implementers rather than attempt to develop their own independent estimates. This was a particular problem for the new construction agriculture projects, but also occurred with some of the retrocommissioning, PAYS, and custom projects.

ODC noted that poor project documentation by the implementers often prevented them from verifying the *ex ante* values, and they were hesitant to recalculate savings without more information on these projects. ODC has included improving project documentation as one of its evaluation recommendations, and this situation should be revisited in the PY2022 evaluation to assess whether adequate documentation is being provided.

In general, a lack of documentation should not prohibit the evaluation team from doing some analysis to develop their own independent savings estimates. And accepting high savings estimates without any supporting documentation does not provide any incentive to the program implementers to improve their documentation practices.

If projects are not documented appropriately in PY2022, we recommend that ODC develop its own savings estimates based on reasonable assumptions for the various savings calculation parameters (e.g., hours of operation, baseline conditions, equipment efficiencies). The default response in these situations should not be to just accept the *ex ante* savings estimates from the implementer without proper documentation.

Rerunning Energy Models

A similar issue relates to projects where the implementors estimate savings by running energy model simulations. There are instances with the agriculture projects where the initial model runs are producing very high savings estimates, which are sometimes due in part to the implementer choosing the least efficient baseline possible. Because the model inputs were poorly documented, ODC did not attempt to rerun them and chose instead to just accept the original savings numbers without making any adjustments.

ODC generally agreed that rerunning models would be beneficial, but did not feel comfortable rerunning models when there was not sufficient documentation on the original model runs or agreement on a reasonable baseline. They are working with the implementer on improving modeling documentation and the key model inputs with sufficient detail so that they can be rerun by the evaluation team using verified *ex post* conditions.

As we note above, we believe that the evaluation team has a responsibility to develop its own savings estimates rather than just accepting the implementers *ex ante* values without any supporting documentation, especially when the savings estimates appear unreasonably high. At a minimum, if the evaluation team has access to the models, we recommend that the evaluation do a baseline review for reasonableness on items that do not change with the project (e.g., do schedules reflect actual operating hours, is the modeled building size close to the actual building size, and are equipment efficiencies reasonable?). A vast majority of the model inputs that remain constant will have a trivial impact on the savings, so the evaluation should focus on inputs that can shift baseline values considerably. For the factors that do change between the baseline and efficient case model runs, identify where the input values change and confirm that they reflect reasonable baseline and efficiency conditions. The evaluation team should also verify that the model is calibrated correctly.

If there is not enough documentation to perform these minimum steps, then we still recommend that the evaluation team develop its own savings estimates rather than accepting the model results from the implementer. As noted above, accepting poorly documented savings estimates (especially when they appear unusually high) does not provide any incentive for the implementer to provide adequate documentation in the future.

Free Ridership for New Programs

For the PAYS program, ODC assigned a net-to-gross ratio of 1.0, implying that free ridership is zero. The PAYS program had only two projects in PY2021 and therefore a participant survey to determine free ridership was not realistic. A complete evaluation that includes free ridership research is scheduled for the PY2022 evaluation.

Net-to-gross ratios of 1.0 are usually reserved for low income programs and sometimes pilot programs, and neither condition appears to apply to this program. For new programs, if primary research on free ridership is not conducted, a default 1.0 net-to-gross value should not automatically be assumed unless it is a low income program. In the cases of new programs such as PAYS, a net-to-gross ratio should be assigned from the literature (assuming an appropriately similar financing program can be found). If a comparable evaluation study is not available, then the average value from the relevant Ameren MO program sector (either residential or commercial) should be assigned as a placeholder until the program can receive its own evaluation.

Free Ridership Adjustment for Covid-19

An issue that was discussed in the previous year (PY2020) was ODC's application of a 20 percent reduction in the free ridership rate for the BizSavers Program to account for Covid-19. In the PY2020 audit report, we registered our strong objections to this approach. Despite our concerns, we agreed to a compromise that allowed for a modified Covid-related adjustment to free ridership for PY2021.

It is apparent from the PY2021 evaluation report that Covid is having little impact on delaying projects and is unlikely to be affecting free ridership for the BizSavers program for all the reasons we raised last year. It is also becoming impossible to disentangle the effects of Covid from the many other factors that are negatively impacting the economy. Given these conditions, we recommend that all Covid-related adjustments to free ridership be eliminated beginning in PY2022.

Randomized Control Design

For the Residential Demand Response program, ODC states the following in the Demand Response Portfolio evaluation report (p. 27):

> Despite the discussions and efforts, telemetry data supplied to the evaluation team contained similar imperfections and gaps to prior years, necessitating additional discussions and explorations. Some of the data imperfections were remedied while others were not. Notably, the telemetry data did not contain information on treatment and control group assignments, limiting our ability to leverage experimental design for Nest devices. In light of the resources and time needed to support data explorations and corrections, the evaluation team, in concert with Ameren Missouri and following a discussion with the Independent Auditor decided to pursue a quasi experimental design leveraging a proxy day methodology for all device manufacturers, as opposed to our preferred approach of employing the most rigorous method for each device manufacturer, based on available data, which would have allowed us to employ a RCT design for Emerson and ecobee devices.[7] As a result, our impact methodology to estimate event impacts as well as resource capabilities leverages a proxy day design for all device manufacturers, which is consistent with the approach used in PY2019 and PY2020. Our approach for developing impacts from Emerson device optimization on non-event days leverages experimental design.

These are the same issues that occurred in PY2020 and it appears there has been no improvement from Uplight to address the situation in PY2021.

[7] While this decision is in conflict with the Independent Auditor recommendations from the PY2021 report, it was necessary in order to meet evaluation reporting timelines and avoid negative budgetary implications.

In discussions with ODC on this issue as part of the PY2022 evaluation, ODC indicated that Ameren has received a commitment from Uplight to integrate experimental design assignment as part of the telemetry data extracts. Uplight has also committed to providing an early telemetry data extract 5-7 weeks following the start of the 2022 event season. ODC Is also planning to work with Uplight to collaborate on the data exploration and cleaning steps.

This issue should be reviewed again in PY2022 to confirm that these steps were taken and that the evaluation was able to be completed to the appropriate level of rigor. If the problems with Uplight continue and they do not provide the data needed to complete the evaluation, Ameren should consider dropping Uplight as an implementer for this program.

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Appendix A: Full Process Evaluation Responses to Minimum Question Requirements

This appendix provides a summary of the detailed responses to minimum process evaluation requirement questions.

Table 6: Minimum Process Evaluation Questions

Issue Number	Question
Issue 1	What are the primary market imperfections common to the target market segment?
Issue 2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?
Issue 3	Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?
Issue 4	Are the communication channels and delivery mechanisms appropriate for the target market segment?
Issue 5	What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?

Table 7: Issue 1 - What are the primary market imperfections common to the target market segment?

Program	2020 Summary Response	2021 Summary Response
Single Family Income Eligible	Income eligible households face multiple barriers to investing in energy efficiency either through Ameren Missouri programs or outside of them. Market imperfections include: • The high upfront cost of energy-efficient products relative to household capital and • Available credit, even when taking into account traditional utility program incentives, • Lack of access to traditional forms of information about energy efficiency programs, • Housing stock that may need health and safety improvements, which can preclude • Efficiency upgrades unless these issues are addressed first, and Split incentives between property owners and renters, for those who rent their home.	Income-eligible households face multiple barriers to investing in energy efficiency either through Ameren Missouri programs or outside of them. Market imperfections include: • The high upfront cost of energy-efficient products relative to household capital and available credit, even when taking into account traditional utility program incentives, • Lack of access to traditional forms of information about energy efficiency programs, • Housing stock that may need health and safety improvements, which can preclude efficiency upgrades unless these issues are addressed first, and split incentives between property owners and renters, for those who rent their home.
Multifamily Income Eligible	Market imperfections specific to the multifamily sector include (1) the split incentive for in-unit measures between property owners, managers, and residents, (2) awareness of the potential for saving money and energy through energy efficiency upgrades, (3) costs associated with energy efficiency upgrades, (4) knowledgeable staff available to install energy-efficient upgrades, and (5) the time investment to plan, budget and implement energy efficiency upgrades.	Market imperfections specific to the multifamily sector include (1) the split incentive for in-unit measures between property owners, managers, and residents; (2) awareness of the potential for saving money and energy through energy efficiency upgrades; (3) costs associated with energy efficiency upgrades; (4) knowledgeable staff available to install energy-efficient upgrades; and (5) the time investment to plan, budget, and implement energy efficiency upgrades.
Lighting	Market imperfections have historically been product availability, customer awareness of energy-efficient lighting options and benefits, and the higher cost of these products. For PY2019, we found the following:	Market imperfections have historically been product availability, customer awareness of energy-efficient lighting options and benefits, and the higher cost of these products. For PY2019, we found the following:

Program	2020 Summary Response	2021 Summary Response
	Product availability is no longer a barrier. LEDs are the most frequently stocked bulb at lighting retailers across all bulb types (i.e., standard, reflector, and specialty). Customer awareness is a decreasing barrier. The vast majority of customers have LEDs installed in their homes. Two-thirds of customer light sockets also contain either a CFL or an LED. LEDs still cost more than incandescent bulbs, but the price difference has narrowed. • Despite these positive signs of market progress, customer use of efficient bulbs varies by household income and use case (i.e., socket type). Lower-income customers have lower LED penetration and efficient bulb saturation than other customers. Low-income customers are also more likely to purchase the lowest cost bulb rather than consider factors like energy efficiency. Sockets that take a standard bulb also have greater efficient bulb saturation than reflector or specialty sockets.	• Product availability is no longer a barrier. LEDs are the most frequently stocked bulb at lighting retailers across all bulb types (i.e., standard, reflector, and specialty). • Customer awareness is a decreasing barrier. The vast majority of customers have LEDs installed in their homes. Two-thirds of customer light sockets also contain either a CFL or an LED. • LEDs still cost more than incandescent bulbs, but the price difference has narrowed. • Despite these positive signs of market progress, customer use of efficient bulbs varies by household income and use case (i.e., socket type). Lower-income customers have lower LED penetration and efficient bulb saturation than other customers. Low-income customers are also more likely to purchase the lowest cost bulb rather than consider factors like energy efficiency. Sockets that take a standard bulb also have greater efficient bulb saturation than reflector or specialty sockets.
Efficient Products	The primary market imperfections for the REP Program are customer awareness of energy efficient product options and their benefits, and the higher price of efficient products. In terms of knowledge, many customers are not aware of energy efficiency and energy- efficient technologies. And even those that are aware are often not informed of actual energy savings opportunities available in their homes. For programs like the REP Program, customer awareness of the availability of the rebate is paramount. Customers need to either be proactive and search out the rebates, or they need to be informed of them via marketing or a contractor. For PY2019, we	The primary market imperfections for the REP Program are customer awareness of energy-efficient product options and their benefits, and the higher price of efficient products. In terms of knowledge, many customers are not aware of energy efficiency and energy-efficient technologies. And even those that are aware are often not informed of actual energy savings opportunities available in their homes. For programs like the REP Program, customer awareness of the availability of the rebate is paramount. Customers need to either be proactive and search out the rebates, or they need to be informed of them via marketing or a contractor. For PY2019, we

Program	2020 Summary Response	2021 Summary Response
	found that only 36% of residential customers were aware of the REP Program, which limits participation. Other market imperfections are measure-specific and generally apply to the market potential: • Only 4% of homes in the Ameren Missouri service territory have inground pools. Thus, the market for pool pumps is very limited, and the product selection is largely driven by contractor recommendations. While nearly every home has at least one thermostat, thermostats do not routinely fail, so customers will need another reason to replace existing thermostats. The desire for advanced technology is a factor driving advanced thermostat uptake. Thermostats have become a consumer product, and like other advanced technologies, many people appreciate and want the technology. Still, others do not and could view advanced thermostats as overly complicated or expensive. Greater customer awareness of new thermostat technology and its energy savings potential could help drive customers to advanced thermostats.	found that only 36% of residential customers were aware of the REP Program, which limits participation. Other market imperfections are measure-specific and generally apply to the market potential: • Only 4% of homes in the Ameren Missouri service territory have inground pools. Thus, the market for pool pumps is very limited, and the product selection is largely driven by contractor recommendations. • While nearly every home has at least one thermostat, thermostats do not routinely fail, so customers will need another reason to replace existing thermostats. The desire for advanced technology is a factor driving advanced thermostat uptake. Thermostats have become a consumer product, and like other advanced technologies, many people appreciate and want the technology. Still, others do not and could view advanced thermostats as overly complicated or expensive. Greater customer awareness of new thermostat technology and its energy savings potential could help drive customers to advanced thermostats.
HVAC	At a high level, the primary market imperfections include the high upfront cost of high-efficiency HVAC equipment and a lack of customer awareness regarding the benefits of such systems (i.e., energy and utility bill savings). Contractors play an important role in addressing these market imperfections by educating customers and promoting program incentives to make the high-efficiency equipment affordable alternatives to standard efficiency equipment.	At a high level, the primary market imperfections include the high upfront cost of high efficiency HVAC equipment and a lack of customer awareness regarding the benefits of such systems (i.e., energy and utility bill savings). Contractors play an important role in addressing these market imperfections by educating customers and promoting program incentives to make the high efficiency equipment affordable alternatives to standard efficiency equipment.

Program	2020 Summary Response	2021 Summary Response
	Midstream research conducted for PY2020 also suggests, however, that there is an organic segmentation to the customer population that warrants consideration. Different segments of customers face different barriers—or at least the importance of the barriers can vary. The barriers faced by customers of higher sociodemographic attainment are not the same barriers of someone whose income is too high to qualify as a low-income customer but is still not high enough to be able to afford the initial costs of an energy-efficient system upgrade. While the former may easily be a candidate for super-efficient equipment, the latter is not really a candidate for any equipment, regardless of efficiency level. Of course, in between are customers who can bear the cost of higher-efficiency equipment but might not be able to bear the additional costs associated with super-efficient equipment. While each of these different segments of customer face the same general barriers, the significance and importance of the different barriers certainly varies.	Midstream research conducted for PY2020 suggested, however, that there is an organic segmentation to the customer population that warrants consideration. Different segments of customers face different barriers and the importance of the certain barriers can vary by customer. For example, customers of higher sociodemographic attainment do not encounter the same barriers as customers whose income is too high to qualify as a low-income customer, but are nonetheless unable to afford the initial costs of an energy-efficient system upgrade. While the former may easily be a candidate for super-efficient equipment, the latter is not really a candidate for any equipment, regardless of efficiency level. Another customer segment may be able to bear the cost of higher efficiency equipment but might not be able overcome the additional cost barrier associated with super-efficient equipment. While each of these different segments of customer face the same general barriers, the significance and importance of the different barriers certainly varies.
Appliance Recycling	The primary market imperfection that the program addresses is residential customers' low impetus to remove old, inefficient refrigerators and freezers from the grid. Often customers will keep a spare refrigerator or freezer for secondary use or dispose of it in a way that it continues to be used as opposed to disposing of the appliance permanently.	The primary market imperfection the program addresses is residential customers' low impetus to remove old, inefficient refrigerators and freezers from the grid. Often customers will keep a spare refrigerator or freezer for secondary use or dispose of it in a way that it continues to be used as opposed to disposing of the appliance permanently.
Energy Efficiency Kits	The primary market imperfection that the program addresses is the lack of consumer awareness about (or the reluctance to purchase) the energy-saving kit items. The program addresses these two barriers to installation by providing the kit items free of charge and educating the children (and, indirectly, household members) about the energy savings potential of installing the items. All potential housing stock characteristics may be included in kit product distribution due to the program being offered to	The primary market imperfections the program addresses are the lack of consumer awareness about and/or the reluctance to purchase the energy-saving kit items. The program addresses these two barriers by providing the kit items free of charge and educating the students (and, indirectly, household members) about the energy-saving potential of installing the items. All potential housing stock characteristics may be included in kit product distribution due to the program being offered to all

Program	2020 Summary Response	2021 Summary Response
	all sixth-grade students. The 2019 residential baseline study results indicate shrinking opportunity for the standard LEDs included in the kit. Nearly 70% of light sockets in Ameren Missouri's service territory that take a standard bulb contain an efficient bulb (either CFL or LED). LEDs also had higher FR than other kit measures, suggesting that many families were already using LEDs and would purchase them on their own. Faucet flow rate data from the baseline study indicate somewhat more opportunity for high-efficiency faucet aerators (39% of customers have aerators with flow rates greater than 2.2 GPM).	students in a participating classroom. The 2019 residential baseline study results indicate shrinking opportunity for the standard LEDs included in the kit. Nearly 70% of light sockets in Ameren Missouri's service territory that take a standard bulb contain an efficient bulb (either CFL or LED). LEDs also had higher FR than other kit measures, suggesting that many families were already using LEDs and would purchase them on their own. Faucet flow rate data from the baseline study indicate somewhat more opportunity for high-efficiency faucet aerators (39% of customers have aerators with flow rates greater than 2.2 GPM).
Home Energy Reports	Though we did not complete a survey for the PY2020 evaluation, PY2019 survey responses from the treatment and control customers indicated that they have a general understanding of how behavioral changes lead to reductions in energy usage. A market imperfection common to both customer groups is the lack of a more nuanced awareness of how their actions to reduce energy consumption impact their utility bills. Reports sent through the HER Program are designed to address this market imperfection for treatment customers by providing them with information about energy efficiency program opportunities and recommendations to modify behaviors to reduce energy consumption in their homes.	Though we did not complete a survey for the PY2021 evaluation, PY2019 survey responses from the treatment and control customers indicated they have a general understanding of how behavioral changes lead to reductions in energy usage. One market imperfection common to both customer groups is the lack of a more nuanced awareness of how their actions to reduce energy consumption impact their utility bills. Reports sent through the HER Program are designed to address this market imperfection for treatment customers by providing them with information about energy efficiency program opportunities and recommendations to modify behaviors to reduce energy consumption in their homes.
Multifamily Market Rate	Market imperfections specific to the multifamily sector include (1) the split incentive for in-unit measures between property owners, managers, and residents, (2) awareness of the potential for saving money and energy through energy efficiency upgrades, (3) costs associated with larger non-lighting measure	Market imperfections specific to the multifamily sector include (1) the split incentive8 for in-unit measures between property owners, managers, and residents; (2) awareness of the potential for saving money and energy through energy efficiency upgrades; (3) costs associated with larger non-lighting measure upgrades; (4)

[8] The split incentive occurs when the tenant pays the cost of the electricity use, but the owner is responsible for choices that affect building and equipment efficiency.

Program	2020 Summary Response	2021 Summary Response
	upgrades, (4) knowledgeable staff available to install energy-efficient upgrades, and (5) the time investment to plan, budget and implement energy efficiency upgrades.	knowledgeable staff available to install energy-efficient upgrades; and (5) the time investment to plan, budget and implement energy efficiency upgrades.
Pay As You Save		At a high level, the primary market imperfection that the program addresses is the high cost of energy efficiency home upgrades. Financing plays an important role in addressing this market imperfection by offsetting the upfront cost and ensuring manageable payments over time. Another market imperfection the program seeks to alleviate is split incentives. By tying the program cost to the premises rather than the participant, the program is designed to include renters that may not have been willing to make an investment in a temporary home previously. It also entices landlords who may have been unwilling to incur the cost of equipment upgrades that would provide cost savings for their tenants.
BizSavers	Based on PY2019 research, the primary market barriers to adoption of energy- efficient equipment in the business sector are 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 PY2020, business customers experienced additional barriers as a result of the COVID-19 pandemic, including competing priorities for available capital and uncertainty about the future. Based on our research, these barriers trumped the more traditional cost-related barriers in PY2020 and resulted in delays or cancellations of investment projects.	Based on PY2019 research, the primary market barriers to adoption of energy-efficient equipment in the business sector are 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 as a result of the COVID-19 pandemic, including material shortages and difficulty hiring or maintaining staff, although the impacts of these barriers on planned capital projects appears limited.
Residential DR		Smart thermostat penetration in the Ameren Missouri service territory was relatively low in PY2019, with smart thermostats comprising only 8% of all thermostats. It is likely that most, if not

Program	2020 Summary Response	2021 Summary Response
		all, of the devices enrolled in the program in PY2021 were newly purchased devices as the program marketed to and enrolled all interested existing smart thermostat owners as part of the PY2019 outreach. Program participation goals for PY2022 will require continued strong sales of smart thermostats and strong engagement to sustain future enrollment goals. Broadband internet access, which is presently at 85% in Ameren Missouri service territory, limits the number of homes that can participate in the program. Based on research conducted in PY2019, customers have a variety of concerns about participating in the central air conditioning (CAC) DR solution, including concerns about allowing the utility to control customer's thermostats, potential negative impact on comfort, data security, and knowledge of the participation process. While none of these concerns emerged as extreme barriers, comfort was the one about which customers reported the most worry.
Business DR		Ameren Missouri customers generally lack experience with demand response programs and therefore are less used to the load reduction strategies and not as skilled at estimating their load reduction potential during peak periods in the summer. As the program enters its fourth year, some program participants are gaining more experience. Lack of interval data in Ameren Missouri service territory limits visibility into customer hourly load profile to ensure more effective targeting and more accurate goal setting.

Table 8: Issue 2 - Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?

Program	2020 Summary Response	2021 Summary Response
Single Family Income Eligible	Ameren Missouri has defined the target customer market as occupants of single-family housing who live in areas where most residents have an annual income at or below 80% of AMI. This criterion is aligned with income eligible program eligibility requirements in other states and should not be merged with any other income-based market segments. Additionally, the program's typical community-driven channels each target a specific housing stock subsegment (single family and mobile homes). This helps to target community and measure selection, as well as audits and measure installation assumptions. But the program team should consider that the program is set up to serve one type of housing at a time. Implementation experience shows many neighborhoods have mixed housing stock (including single family, small multifamily, and mobile homes). Notably, Ameren Missouri gained approval through the 11-step stakeholder process to change program eligibility to allow the program team to serve attached dwellings of four or fewer units in addition to detached homes and duplexes. In future years, when the program team can return to the original program design, this change will help the program serve a larger share of homes per neighborhood.	Ameren Missouri has defined the target customer market as occupants of single family housing who live in areas where most residents have an annual income at or below 80% of AMI. This criterion is aligned with income-eligible program eligibility requirements in other states and should not be merged with any other income-based market segments. Additionally, the program's typical community-driven components each target a specific housing stock subsegment (single family and mobile homes). This helps to target community and measure selection, as well as audits and measure installation assumptions, but the program team should consider that the program is set up to serve one type of housing at a time. Still, implementation experience shows many neighborhoods have mixed housing stock (including single family, small multifamily, and mobile homes). Notably, Ameren Missouri gained approval through the 11-step stakeholder process to change program eligibility to allow the program team to serve attached dwellings of four or fewer units in addition to detached homes and duplexes. Going forward, this change will help the program serve a larger share of homes per neighborhood.
Multifamily Income Eligible	Yes, the target market is appropriately defined as a building including three or more units with Ameren Missouri electric service and located in an area where most residents have an annual income at or below 80% of AMI. This program also addresses multifamily property needs for both common area	Yes, the target market is appropriately defined as a building including three or more units with Ameren Missouri electric service and located in an area where most residents have an annual income at or below 80% of AMI. This program also addresses multifamily property needs for both common area and

Program	2020 Summary Response	2021 Summary Response
	and in-unit upgrades.	in-unit upgrades.
Lighting	The target market for the Residential Lighting Program is all residential customers within Ameren Missouri service territory. The program targets low-income customers by engaging discount stores that do not typically sell lighting such as St. Vincent De Paul, Salvation Army, Goodwill, and Habitat Restore. These stores tend to serve lower-income customers. By bringing low-cost LEDs into these stores, the program attempted to reach customers it may not reach through other participating retailers or programs. • Given the high level of efficient bulb socket saturation among non-low-income customers, the program could benefit from a more targeted design. Truly subdividing the market into low-income versus non-low-income and using tailored program designs for each customer segment would be appropriate.	The target market for the Residential Lighting Program is all residential customers within Ameren Missouri service territory. The program targets low-income customers by engaging discount stores that do not typically sell lighting such as St. Vincent De Paul, Salvation Army, Goodwill, and Habitat Restore. These stores tend to serve lower income customers. By bringing low-cost LEDs into these stores, the program attempted to reach customers it may not reach through other participating retailers or programs. Given the high level of efficient bulb socket saturation among non-low-income customers, the program could benefit from a more targeted design. Truly subdividing the market into low-income versus non-low-income and using tailored program designs for each customer segment would be appropriate.
Efficient Products	Officially (per MEEIA III), the target market for the REP Program is all residential customers within the Ameren Missouri service territory. When the measure mix is considered (heat pump water heaters, pool pumps, and advanced thermostats), however, the actual market is predominantly homeowners. That said, virtually all residences (even rentals) could benefit from advanced Tier 1 or Tier 2 power strips. Some measures like pool pumps should be targeted at residences with pools, but no further subdivision seems needed.	Officially (per MEEIA III), the target market for the REP Program is all residential customers within the Ameren Missouri service territory. When the measure mix is considered (heat pump water heaters, pool pumps, and advanced thermostats), however, the actual market is predominantly homeowners. That said, virtually all residences (even rentals) could benefit from Tier 1 or Tier 2 advanced power strips. Some measures, like pool pumps, should be targeted at residences with pools, but no further subdivision seems needed.
HVAC	The HVAC Program's target market segment includes single family and multifamily residential homeowners with central cooling systems that are older or in need of replacement due to their operating condition. However, our research this year	The HVAC Program's target market segment includes single family and multifamily residential homeowners with central cooling systems that are older or in need of replacement due to their operating condition. Our research in PY2020 suggests the target

Program	2020 Summary Response	2021 Summary Response
	suggests the target market structure should be revised to incorporate the added complexity that the addition of the Midstream Channel revealed. There are at least three segments of customers that fall under the program- described target market but are not actually served by the program. First, there are low-income customers that qualify for the Single-Family Income Eligible Program. Though the program was changed in 2020 to address challenges posed by the COVID-19 pandemic (namely no in-home work was permitted), these customers would typically be the target of the Single-Family Income Eligible Program and not the HVAC Program. Second, are customers with incomes that exceed the criteria for low-income, but still are unable to afford the costs associated with upgrading to an energy- efficient system—of any efficiency level. The reality is that this is likely a sizable segment—maybe even the biggest—and energy-efficient HVAC equipment is not really accessible to them. No program is serving this latter segment. Though savings opportunities surely exist with this segment, accessing them will likely require alternative program designs. Third and final, is a unique segment of customers who are willing to make energy- efficient HVAC upgrades and can afford to, but only with the rebates. The program requirement that an existing operating system can be at most 12 SEER limits some of these customers from participating (i.e., there may be customers that would benefit from participating, but have systems that don't meet this threshold). Consequently, this is also a segment that does not really have access to energy-efficient equipment.	market segment should be revised to incorporate the added complexity that the addition of the Midstream channel revealed. There are at least three customer segments that fall under the program-described target market but are not actually served by the program. First, there are low-income customers who qualify for the CommunitySavers® Program. Though the program was changed in PY2020 to address challenges posed by the COVID-19 pandemic, these customers would typically be the target of the CommunitySavers® Program and not the HVAC Program. Second, are customers who have incomes that exceed the criteria for low-income, but are still unable to overcome the cost barrier of upgrading to an energy-efficient system. Though savings opportunities surely exist with this segment, accessing them will likely require alternative program designs. The third and final unserved customer segment includes those who are willing to make energy-efficient HVAC upgrades but can only overcome the cost barrier of these upgrades with rebates. The COVID-19 pandemic continued to impact the accessibility of the HVAC Program for all customer segments as the cost of equipment increased across all efficiency levels. Supply chain disruptions and inflation in 2021 triggered price increases of approximately 20% across all equipment incented in the Midstream and Downstream channels. Nonetheless, the program experienced significant growth from PY2020 to PY2021.
Appliance Recycling	Yes. The evaluation team conducted a residential baseline study in 2019 that found that 37% of residents have a secondary refrigerator, an additional 8% have a third refrigerator, and 39%	Yes. The evaluation team conducted a residential baseline study in 2019 that found that 37% of residents have a secondary refrigerator, an additional 8% have a third refrigerator, and 39%

Program	2020 Summary Response	2021 Summary Response
	report the presence of a stand-alone freezer.62 This indicates ample opportunity to achieve savings by removing these additional appliances from the grid. Participant survey responses indicate 29% of recycled appliances were primary units, which, in the absence of the program, a customer might retain for secondary use. Regarding appliance age, baseline data indicates that there are very few existing appliances of vintages earlier than 1990 (1% of primary refrigerators, 10% of secondary refrigerators, and 12% of secondary freezers). Participant survey data indicate that 36% of recycled units are of vintages earlier than 1990. Thus, the program is successfully motivating the recycling of these units.	report the presence of a stand-alone freezer.9 This indicates ample opportunity to achieve savings by removing these additional appliances from the grid. Participant survey responses indicate 29% of recycled appliances were primary units, which, in the absence of the program, a customer might retain for secondary use. Regarding appliance age, baseline data indicates that there are very few existing appliances of vintages earlier than 1990 (1% of primary refrigerators, 10% of secondary refrigerators, and 12% of secondary freezers). Participant survey data indicate that 36% of recycled units were manufactured earlier than 1990. Thus, the program is successfully motivating the recycling of these units.
Energy Efficiency Kits	Yes. The program targets residential customers with children in the sixth grade. The intent is to increase awareness of energy efficiency and Ameren Missouri's energy efficiency programs and achieve energy savings through the installation of kit items.	Yes. The program targets residential customers with children in middle school. The intent is to increase awareness of energy efficiency and Ameren Missouri's energy efficiency programs and achieve energy savings through the installation of kit items.
Home Energy Reports	In PY2020 Ameren Missouri and the HER program implementation team made adjustments based on the PY2019 evaluation to target higher energy users and customers in single family homes to be included in Wave 4. The program implementer included the top two quartiles in terms of energy consumption in the program from the legacy waves (i.e., Waves 1 and 2). These customers were virtually all single-family customers. Unlike the legacy waves, 25% of the treated Wave 3 customers lived in multifamily housing with generally lower energy consumption, limiting energy savings potential from those participants. The implementation team	The target market segment is appropriately defined. The program sends paper and/or email HERs to treatment customers who received these forms of treatment in previous years, with Wave 1 receiving HERs over the longest period of time. Ameren Missouri did not add any waves of customers to this program in PY2021, as this is the last year of operation for the HERs Program.

[9] The evaluation team conducted a survey with 1,395 residential customers between July 31 and August 24, 2019, and in-home audits with a subsample of 120 baseline survey respondents between August 14 and September 25, 2019.

Program	2020 Summary Response	2021 Summary Response
	addressed this in PY2020 as the newest wave (Wave 4) exclusively targeted single-family customers with higher energy usage.	
Multifamily Market Rate	Yes, the target market is appropriately defined as a building including three or more units with Ameren Missouri electric service. This program addresses the need for both common area and in-unit upgrades.	Yes, the target market is appropriately defined as a building including three or more units with Ameren Missouri electric service. This program addresses the need for both common area and in-unit upgrades.
Pay As You Save		The PAYS Program's target algorithms are proprietary, but the target market segment includes customers with single and multifamily residential homes that have higher usage than the housing characteristics would suggest. Only homes expected to have the required savings potential receive targeted marketing materials. There is no income requirement for the target market segment. As the program is intended to have no up-front cost; however, it is well-positioned to serve moderate-income customers who do not qualify for low-income incentives but would be unable to afford the up-front costs of weatherization and HVAC upgrades. Our PY2021 interviews found the targeted marketing was not performing as expected. As a result, the program team was considering introducing an additional mass marketing strategy with modified messaging. Rather than advertising the PAYS Program as having "no upfront cost," it would state that PAYS could help to "offset your upgrade." This would extend the target market to customers that could afford a copay to meet the 80/20 rule rather than just trying to target customers that would qualify with little to no upfront cost
BizSavers	Ameren Missouri's BizSavers portfolio serves businesses of varying sizes and sectors. The SBDI Program recognizes the unique challenges of small businesses though small businesses can still participate in the Standard or Custom programs if the	Ameren Missouri's BizSavers portfolio serves businesses of varying sizes and sectors. The SBDI Program recognizes the unique challenges of small businesses though small businesses can still participate in the Standard or Custom programs if the offerings are

Program	2020 Summary Response	2021 Summary Response
	offerings are a better match to customer needs. The current target audience for the SBDI Program is commercial electric customers that are 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 (50% of PY2020 projects were completed in the office and retail segments). The new BSS Program serves nonprofit organizations that provide services to the low-income public. The PY2019 program was small in scope, with 31 projects completed by 14 organizations that offer a mix of family, social, and healthcare services; the PY2020 program was even smaller, with only 12 projects completed by eight organizations. Given the extremely small participation and targeted outreach strategy to-date, insights into the reach of the program and appropriateness of market segmentation are still limited. The SBDI program appears to have been successful in serving renters, a frequently underserved market segment by business portfolios. According to program tracking data renters accounted for 54% of PY2020 SBDI Program participants, which tracks extremely well with Ameren Missouri's business customers overall (36% are renters) according to market research in support of Ameren Missouri's 2019 potential study.	a better match to customer needs. The current target audience for the SBDI Program is commercial electric customers that are 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 (58% of PY2021 projects were completed in the office and retail segments). Savings realized through this program have decreased over the PY2019-PY2021 program cycle, likely due, in part, to the COVID-19 pandemic. The SBDI program appears to have been less successful in serving renters, a frequently underserved market segment by business portfolios, than in prior program years. According to program tracking data renters accounted for 25% of PY2021 SBDI Program participants, compared to 54% of PY2020 SBDI Program participants and 36% of Ameren Missouri's population of business customers (according to market research in support of Ameren Missouri's 2019 potential study). The new BSS Program serves nonprofit organizations that provide services to the low-income public. The program is small in scope, with 31 projects completed by 14 organizations in PY2019; 12 projects completed by eight organizations in PY2020; and 23 projects completed by 16 organizations in PY2021. Given the extremely small participation and targeted outreach strategy to-date, insights into the reach of the program and appropriateness of market segmentation are still limited.
Residential DR		All residential customers with central air conditioning (CAC) systems (including heat pumps) and a program-supported smart thermostat are eligible to participate. Given the nature of the program design, which relies on smart thermostats to deliver

Program	2020 Summary Response	2021 Summary Response
		demand impacts during DR events, the target market is appropriately defined, and further market segmentation is not necessary.
Business DR		Targeting medium and large facilities with a customized DR offering is appropriate due to the heterogeneity of facility types, operations, and appropriate load reduction strategies. The program has been focused on customers with the highest load reduction opportunities during the peak summer period, which is consistent with the program goals of shaving peak load.

Table 9: Issue 3 - Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?

Program	2020 Summary Response	2021 Summary Response
Single Family Income Eligible	Opinion Dynamics' recent baseline study of residential Ameren Missouri customers shows that income eligible households tend to have lower-efficiency products in their home compared to their non-income eligible counterparts, including efficient lighting. These results are consistent with findings from around the United States. The program's mix of end use measures appropriately reflects these needs. The program offers measures that cover major single family and mobile home energy saving needs, including building envelope, HVAC and thermostats, refrigeration, lighting, domestic hot water, and plug load measures. Additionally, the program cross-promotes opportunities for additional savings through the Ameren Missouri HVAC Program. However, the program team had to adjust the measure offerings for PY2020 due to COVID-19. The program team made an effort to cover as many end uses as possible in the revised offering. Vacant properties received the	The baseline study of residential Ameren Missouri customers completed in PY2019 shows that income-eligible households tend to have lower-efficiency products in their home compared to their non-income-eligible counterparts, including lighting. These results are consistent with findings from around the United States. The program's mix of end use measures appropriately reflects these needs. The program offers measures that cover major single family and mobile home energy-saving needs, including building envelope, HVAC and thermostats, refrigeration, lighting, domestic hot water, and plug load measures. Additionally, the program cross-promotes opportunities for additional savings through the Ameren Missouri HVAC Program. In PY2021, differently from the previous year, the program team was able to offer its full suite of measures to homes that had only partially benefited from the program in PY2020 and to new participants. This was possible by leveraging the

Program	2020 Summary Response	2021 Summary Response
	full suite of measures, while occupied residences received lighting, domestic hot water, and HVAC measures.	relationships built with CBOs and housing organizations and offering relocation incentives to customers to vacate their homes while COVID-19 restrictions were in place.
Multifamily Income Eligible	Yes, the program offers measures that cover all major multifamily common area and in- unit end use needs, including lighting, appliances, space cooling, space heating, building shell (e.g., insulation and windows), and water heating. The tracking data indicates that 7 of the 15 properties treated through the program received both tenant and common area upgrades. While COVID-19 impacted the range of projects that could be completed in PY2020, in future years the program team could increase the comprehensiveness of solutions offered to the target market segment by encouraging greater participation in the one-stop-shop channel.	Yes, the program offers measures that cover all major multifamily common area and in-unit end use needs, including lighting, appliances, space cooling, space heating, building shell (e.g., insulation and windows), and water heating. While COVID-19 impacted the range of projects that could be completed in PY2021, the implementation team delivered a comprehensive set of solutions to the target market segment through the one-stop-shop model. The tracking data indicates 91% of measures that produced electric savings were installed in tenant units. Additionally, at least 17 of the 31 unique properties treated through the program in PY2021 received both tenant and common area upgrades.10 The program team can continue to increase the comprehensiveness of solutions offered to the target market segment by encouraging participation in the one-stop-shop channel.
Lighting	Standard bulbs are the most commonly used bulb in customer homes and have long been the focus of the Residential Lighting Program. This focus made sense when socket saturation of efficient bulbs was low across all use cases. In our PY2019 evaluation, we found that 70% of light sockets that take a standard bulb contain an efficient bulb. A shift in program focus to LED reflector and specialty bulbs, which cost more and lag in use, would be appropriate. An exception is the low-income customer segment, as noted previously. Low-income customers	Standard bulbs are the most commonly used bulb in customer homes and have long been the focus of the Residential Lighting Program. This focus made sense when socket saturation of efficient bulbs was low across all use cases. In our PY2019 evaluation, we found that 70% of light sockets that take a standard bulb contain an efficient bulb. A shift in program focus to LED reflector and specialty bulbs, which cost more and lag in use, would be appropriate. An exception is the low-income customer segment, as noted previously. Low-income customers could still

[10] This represents a minimum because some properties that did not receive both common area and in-unit installations in PY2021, could have had phases of their projects completed in previous years.

Program	2020 Summary Response	2021 Summary Response
	could still use support increasing their use of all efficient bulb types, including standard bulbs.	use support increasing their use of all efficient bulb types, including standard bulbs.
Efficient Products	The REP Program currently offers only five measures: (1) advanced thermostats, (2) Tier 1 power strips, (3) Tier 2 power strips, (4) heat pump water heaters, and (5) pool pumps. When one considers the diversity of energy-consuming items in the typical residence (the target market), a very wide range of other end use measures appear potentially applicable to the REP Program. Of course, cost-effectiveness and overlap with other programs needs to be considered. ENERGY STAR room air conditioners, air purifiers, and dehumidifiers were included when developing targets/goals in 2018, so they may be good candidates for measure expansion.	The REP Program currently offers only five measures: (1) advanced thermostats, (2) Tier 1 power strips, (3) Tier 2 power strips, (4) heat pump water heaters, and (5) pool pumps. When one considers the diversity of energy-consuming items in the typical residence (the target market), a very wide range of other end use measures appear potentially applicable to the REP Program. Of course, cost-effectiveness and overlap with other programs needs to be considered. ENERGY STAR®11 room air conditioners, air purifiers, and dehumidifiers were included when developing targets/goals in 2018, so they may be good candidates for measure expansion.
HVAC	The HVAC Program offers incentives for heating and cooling equipment at various efficiency levels. The HVAC Program also correctly accounts for market and federal code changes, phasing out offerings (i.e., ECMs) when they are no longer effective under evolved market conditions. As noted above, however, the program requirement that the existing unit cannot exceed 12 SEER is a limitation. This limitation may be too stringent as the current federal minimum standard is 13 SEER (which is also the baseline for ROF measures), and the minimum SEER qualifying for the program is 15 SEER. Technically, the SEER ceiling could be increased to 13 (or even 14) SEER while still providing energy savings. Of course, baselines adjustments might be warranted for such higher SEER systems.	The HVAC Program offers incentives for heating and cooling equipment at various efficiency levels. The HVAC Program also correctly accounts for market and federal code changes. The program requirement that the existing unit cannot exceed 12 SEER will change for PY2022. The new 13.99 SEER limit should enable more customers to access the program and incented technologies.

[11] The ENERGY STAR® name and mark are registered trademarks owned by the US EPA.

Program	2020 Summary Response	2021 Summary Response
Appliance Recycling	Yes. The program allows refrigerators or freezers to be recycled, along with window air conditioners and/or dehumidifiers at the same time. In PY2020, 3% of recycled appliances were dehumidifiers and room air conditioners, demonstrating there is a market, albeit small, for these additional measures to be recycled. During the PY2019 RAR participant survey, customers did not mention requests for additional measures to be included in the program.	Yes. The program allows refrigerators or freezers to be recycled, along with window air conditioners and/or dehumidifiers. In PY2021, 4% of recycled appliances were dehumidifiers and room air conditioners, demonstrating there is a small market for these additional measures to be recycled. During the PY2019 RAR participant survey, customers did not mention requests for additional measures to be included in the program.
Energy Efficiency Kits	Yes. Since the residential customer end use technologies can vary so widely in age, make, model, and pre-existing efficiencies, kit programs like this must carefully weigh the cost of included items and the potential for the items not to be installed by the customer. Results from the PY2019 participant survey indicated the following measure in-service rates: at least one LED bulb (88%), hot water pipe insulation (56%), showerhead (54%), bathroom faucet aerator (48%), furnace filter whistle (44%), and kitchen faucet aerator (40%).	Yes. Since existing residential customer technologies can vary widely in age, make, model, and pre-existing efficiencies, kit programs must carefully weigh the cost of included items and the potential for the items not to be installed by the customer. Results from the PY2019 participant survey indicated the following measure in-service rates: at least one LED bulb (88%), hot water pipe insulation (56%), showerhead (54%), bathroom faucet aerator (48%), furnace filter whistle (44%), and kitchen faucet aerator (40%).
Home Energy Reports	The main form of treatment for customers is the paper or electronic HER. The HERs reflect the diversity of end use energy service needs of residential homes, which is the target market. They include information related to the last 13 months of electric consumption, including load that is disaggregated by home area, as well as comparisons of monthly energy usage to similar homes. Reports also include customized tips aimed at modifying behavior related to the installation of LED lighting to replace less efficient lighting, installing programmable or advanced thermostats, and adjusting the way customers operate their washers/dryers, dishwashers, and HVAC equipment. In addition, HERs include information about applicable energy efficiency rebate programs that may lead customers to retrofit aging inefficient equipment.	The main form of treatment for customers is the paper and/or electronic HER. The HERs reflect the diversity of enduse energy service needs of residential homes—the target market. They include information related to the last 13 months of electric consumption, including load that is disaggregated by home area, as well as comparisons of monthly energy usage to similar homes. Reports also include customized tips aimed at modifying behavior related to the installation of LED lighting to replace less efficient lighting, installing programmable or advanced thermostats, and adjusting the way customers operate their washers/dryers, dishwashers, and HVAC equipment. In addition, HERs include information about applicable energy efficiency rebate programs that may lead customers to retrofit aging inefficient equipment.

Program	2020 Summary Response	2021 Summary Response
Multifamily Market Rate	Yes, the program offers measures that cover all major multifamily common area and in- unit end use needs, including lighting, appliances, space cooling, space heating, ventilation, building shell (e.g., insulation and windows), and water heating. The tracking data indicates that 5 of the 14 properties treated through the program in PY2020 received both in-unit and common area upgrades. While COVID-19 impacted the range of projects that could be completed in PY2020, in future years the program team could increase the comprehensiveness of solutions offered to the target market segment by encouraging greater participation in the one-stop-shop channel.	Yes, the program offers measures that cover all major multifamily common area and in-unit enduse needs, including lighting, appliances, space cooling, space heating, ventilation, building shell (e.g., insulation and windows), and water heating. While COVID-19 impacted the range of projects that could be completed in PY2021, as well as the measures that could be installed as part of those projects, the implementation team delivered a comprehensive set of solutions to the target market segment through the one-stop-shop model. The tracking data indicates that 66% of measures were installed in tenant units and 34% were installed in common areas or exterior locations in PY2021. The program team can continue to increase the comprehensiveness of solutions offered to the target market segment by encouraging participation in the one-stop-shop channel.
Pay As You Save		The PAYS program includes a mix of derive measures that are customized based on the needs of each home. The upgrades include the installation of LEDs, domestic hot water, insulation, HVAC, and air sealing measures, among others. In our interviews we found the lack of natural gas-derived technologies in the program did not reflect the diversity of the energy needs within the target market segment. Given the prevalence of gas heating in Ameren Missouri territory, the program could benefit from including natural gas-derived technologies. Ameren Missouri staff indicated this is being planned for future years.
BizSavers	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 low incentives rendered an officially eligible measure effectively ineligible. The most common suggestion was to add outdoor	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 low incentives rendered an officially eligible measure effectively ineligible. The most common suggestion was to add outdoor lighting to the list of

Program	2020 Summary Response	2021 Summary Response
	lighting to the list of available measures, which the program did for the Standard and SBDI programs during PY2020. 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, uptake of non-lighting measures in PY2020 was limited to 15 smart thermostats, accounting for 0.2% of program savings. While the BSS Program offers a range of measures across different technologies, the program was almost exclusively focused on lighting measures in both PY2019 and PY2020. 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 to the program in PY2020—including occupancy sensors, VFDs, and kitchen ventilation controls—incentive levels remained largely unchanged. The cost of delivering the program remains a concern to implementation staff and appears to affect the number and types of projects pursued.	available measures, which the program did for the Standard and SBDI programs during PY2020, but then discontinued again 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, 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. While the BSS Program offers a range of measures across different technologies, the program was almost exclusively focused on lighting measures in PY2019, PY2020, and PY2021. 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 to the program in PY2020—including occupancy sensors, VFDs, and kitchen ventilation controls—incentive levels remained largely unchanged over the 3-year program cycle. The cost of delivering the program remains a concern to implementation staff and appears to affect the number and types of projects pursued.
Residential DR		Program-eligible devices cover the most prominent device manufacturers—Nest, ecobee, and Emerson. Inclusion of devices from other manufacturers, however, could help increase the program's reach. It is our understanding that Uplight and Franklin Energy are working on introducing those devices as part of the program in PY2022.
Business DR		The program's approach to load reduction is customized to each facility, which is appropriate given unique energy demands of

Program	2020 Summary Response	2021 Summary Response
		medium and large customers and the resulting load shaving opportunities.

Table 10: Issue 4 - Are the communication channels and delivery mechanisms appropriate for the target market segment?

Program	2020 Summary Response	2021 Summary Response
Single Family Income Eligible	The program team's typical communication and delivery channels are appropriate to the target market segment. Staff use a variety of community-centric approaches to promote the program, including through community groups and mobile home park owners; conducting direct outreach to residents through neighborhood canvassing; holding meet- and-greet events with community leaders in popular community gathering places like restaurants; and working with Ameren Missouri to identify community non-profits serving income eligible areas who could distribute efficient products to their constituents. These approaches are appropriate for the target market segment because they work around traditional time, geographic, and other barriers to learning about energy efficiency and the availability of utility-sponsored programs. In PY2020, the program team adapted their approach due to COVID-19. The program team targeted housing organizations with large portfolios of properties rather than contacting customers directly. This streamlined outreach strategy allowed the program team to treat many more properties in PY2020 compared to PY2019. However, the program did not reach any mobile home residents through this approach. Notably, program delivery was also limited in terms of the measures implemented at each property.	The program team's typical communication and delivery channels are appropriate to the target market segment. Staff use a variety of community-centric approaches to promote the program, including through community groups and mobile home park owners; conducting direct outreach to residents through neighborhood canvassing; holding meet-and-greet events with community leaders in popular community gathering places like restaurants; and working with Ameren Missouri to identify community non-profit organizations serving income-eligible areas that could distribute efficient products to their constituents. These approaches are appropriate for the target market segment because they work around traditional time, geographic, and other barriers to learning about energy efficiency and the availability of utility-sponsored programs. In PY2020, the program team adapted their approach due to COVID-19. The program team targeted housing organizations with large portfolios of properties rather than contacting customers directly. This streamlined outreach strategy allowed the program team to treat many more properties in PY2020 compared to PY2019. The program team continued to take advantage of this outreach strategy in PY2021, which added greater efficiency to the implementation of the program and was able to target both single family and mobile home customers.

Program	2020 Summary Response	2021 Summary Response
	For the Grant channel, the program is targeting CBOs that are prepared to distribute and install energy efficiency measures outside of the Single-Family channel. However, most of the measures distributed or installed through this channel in PY2020 went through CBOs in and around St. Louis. Notably, the share of measures delivered through St. Louis-based CBOs decreased from PY2019 to PY2020 (from 99% to 75%) and the number of participating CBOs in the channel increased from 6 to 19. This indicates the program team is expanding the reach of the channel and providing access to more customers outside of the St. Louis metropolitan area. The program team should continue to focus on CBO recruitment in 2021 with the goals of expanding the number of actively participating CBOs, enrolling CBOs specifically prepared to complete eligible direct installation (such as more Community Action Agencies), and enrolling CBOs serving rural communities.	For the Grant Channel, the program team is targeting CBOs that are prepared to distribute and install energy efficiency measures outside of the Single Family Channel. While most of the measures distributed or installed through this channel in PY2020 went through CBOs in and around St. Louis, the Grant Channel had a broader geographic reach in PY2021 incorporating CBOs from Central and West Central Missouri, and other locations in the territory. The program team should continue to focus on CBO recruitment in 2022 with an aim of expanding the number of actively participating CBOs, especially those serving rural communities, and those prepared to complete eligible direct installation.
Multifamily Income Eligible	The program uses a mix of communication channels including traditional channels such as e-mail blasts and distribution of collateral at industry events. The primary recruitment channel used is ICAST's existing relationships with larger property ownership and management companies. The program also leverages more tailored outreach to smaller scale property owners. This varied approach generates participation from varying customer types in the target market segment.	The program uses a mix of communication channels including traditional channels such as e-mail blasts and distribution of collateral at industry events. The primary recruitment channel used is ICAST's network of existing relationships with larger property ownership and management companies. The program also leverages more tailored outreach to smaller scale property owners. This varied approach generates participation from varying customer types in the target market segment.
Lighting	For the Upstream Channel, the program used in-store and out of store marketing. Our PY2019 evaluation found that in-store marketing was the primary driver of sales. Given the nature of the product, marketing at the point-of-purchase is appropriate. Program implementers added new discount retailers to the program increase the focus on low-income customers. This was an effective strategy that the program should continue and even	For the Upstream Channel, the program used in-store and out-of-store marketing. Our PY2019 evaluation found that in-store marketing was the primary driver of sales. Given the nature of the product, marketing at the point-of-purchase is appropriate. Program implementers added new discount retailers to the program to increase the focus on low-income customers. This was an effective strategy that the program should continue and even

Program	2020 Summary Response	2021 Summary Response
	expand, if possible. In turn, the program should reduce its emphasis on sales of standard bulbs at non-discount stores. The Online Store accounted for just over 1% of program sales and savings. With the growing customer reliance on online shopping more generally, the Online Store has unrealized potential. The channel is particularly useful for targeted marketing to underserved customers, which is more difficult to do through the mass market Upstream Channel.	expand, if possible. In turn, the program should reduce its emphasis on sales of standard bulbs at non-discount stores. The Online Store accounted for just over 1% of program sales and savings. With the growing customer reliance on online shopping more generally, the Online Store has unrealized potential. The channel is particularly useful for targeted marketing to underserved customers, which is more difficult to do through the mass market Upstream Channel.
Efficient Products	In PY2020, program marketing activities included TV/radio ads, social media ads, paid search optimization, e-mail campaigns, including rebate information on energy statements or Home Energy Reports, and location-based ads and promotions. In PY2019, most participants who purchased products through the Online Store reported learning about the program through direct communication from Ameren Missouri or the Ameren Missouri website. Mass marketing does not appear to have been that effective. Customers who purchased pool pumps and heat pump water heaters were more likely to learn about the program through a contractor than other communication channels. Increasing outreach to contactors to increase their involvement with the program could increase participation for these measures.	In PY2020, program marketing activities included TV/radio ads, social media ads, paid search optimization, e-mail campaigns, including rebate information on energy statements or Home Energy Reports, and location-based ads and promotions. In PY2019, most participants who purchased products through the Online Store reported learning about the program through direct communication from Ameren Missouri or the Ameren Missouri website. Mass marketing does not appear to have been that effective. Customers who purchased pool pumps and heat pump water heaters were more likely to learn about the program through a contractor than other communication channels. Increasing outreach to contactors to increase their involvement with the program could increase participation for these measures.
HVAC	The HVAC Program is primarily driven by contractors. A majority of participants report having first heard about the program through contractors (this was 68% last year when only offering Downstream; it was 62% this when only considering the Midstream Channel). Notably, the HVAC Program is the most well-known program of all Ameren Missouri residential programs, with 60% of general population survey respondents reporting awareness of the program.	The HVAC Program's participation is primarily driven by contractors and customer-facing marketing materials. In PY2020, a majority of participants reported having first heard about the program through contractors. Marketing materials such as e-mails, newsletters, bill inserts, the Ameren Missouri website, home energy reports, and mass media advertising also contributed to program awareness. Collectively, these channels are effectively reaching a wide range of customers, but as noted above, some

Program	2020 Summary Response	2021 Summary Response
	Ameren Missouri also promotes the HVAC Program through other forms of outreach including e-mails, newsletters, bill inserts, the Ameren Missouri website, home energy reports, and mass media advertising. Collectively, these channels are effectively reaching a wide range of customers, but as noted above, some customers are still likely limited from accessing energy- efficient HVAC equipment for various reasons.	customers are still likely limited from accessing energy-efficient HVAC equipment for various reasons.
Appliance Recycling	Yes. Ameren Missouri primarily advertises this program through bill inserts and direct e- mail campaigns. Based on PY2019 RAR participant survey responses, physical collateral is the primary mechanism responding participants report hearing about the program.	Yes. Ameren Missouri primarily advertises this program through bill inserts and direct e-mail campaigns. Based on PY2019 RAR participant survey responses, physical collateral is the primary mechanism through which responding participants reported hearing about the program.
Energy Efficiency Kits	Yes, though adjustments could be made to better align the program with teachers' unique needs. The program provides teachers with teaching materials, student education worksheets, the kit materials, and installation instructions. Further, in PY2020 program staff developed specific digital instructional and take-home materials to aid in delivering the program's educational content when schools offered remote or hybrid learning.	Yes, though adjustments could be made to better align the program with teachers' unique needs. The program provides teachers with teaching materials, student education worksheets, the kit materials, and installation instructions. Further, in PY2021, program staff provided specific digital instructions and take-home materials to aid in delivering the program's educational content.
Home Energy Reports	The communication channels and delivery mechanisms are appropriate for the target market. Based on the PY2019 participant survey, the majority of respondents were satisfied with the way they receive HERs, and with the information they contained. Additionally, the HERs made customers aware of the energy efficiency programs Ameren Missouri offers. Late in PY2019, Ameren Missouri launched an additional communication channel for this program—an online portal that provides similar information as the HERs, but on a continual basis. These forms of communication are used to inform customers about how much energy they use as well as about	The communication channels and delivery mechanisms are appropriate for the target market. Based on the PY2019 participant survey, the majority of respondents were satisfied with the way they receive HERs, and with the information they contained. Additionally, the HERs made customers aware of the energy efficiency programs Ameren Missouri offers. Ameren Missouri also operates an additional communication channel for this program—an online portal that provides similar information as the HERs, but on a continual basis. These forms of communication are used to inform customers about how much energy they use as well as about equipment upgrade

Program	2020 Summary Response	2021 Summary Response
	equipment upgrade opportunities and behavioral changes they can make to reduce electricity usage.	opportunities and behavioral changes they can make to reduce electricity usage
Multifamily Market Rate	The program uses a mix of communication channels including traditional channels such as e-mail blasts and distribution of collateral at industry events. The primary recruitment channel used is ICAST's existing relationships with larger property ownership and management companies. The program also leverages more tailored outreach to smaller scale property owners. This varied approach generates participation from varying customer types in the target market segment.	The program uses a mix of communication channels including traditional channels such as e-mail blasts and distribution of collateral at industry events. The primary recruitment channel used is ICAST's network of existing relationships with larger property ownership and management companies. The program also leverages more tailored outreach to smaller scale property owners. This varied approach generates participation from varying customer types in the target market segment.
Pay As You Save		The program uses a targeted marketing approach with "good fit" customers based on high energy usage and property characteristics. Targeted customers receive a home energy report as the primary marketing approach.
BizSavers	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. However, the program is expanding its direct customer outreach through social media, search engine marketing, segment-specific collateral, email blasts, and other efforts. While trade allies/contractors are still the primary source of information for program participants (reported by 62% of Standard and 69% of Custom survey respondents), these	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. However, the program is expanding its direct customer outreach through social media, search engine marketing, segment-specific collateral, email blasts, and other efforts. While trade allies/contractors are still the primary source of information for program participants (reported by 57% of Standard and 53% of Custom PY2021 survey respondents), these numbers have

Program	2020 Summary Response	2021 Summary Response
	numbers are slightly lower than those reported by PY2019 participants (77% Standard and 83% Custom), with other information channels (including BizSavers representatives, Ameren Missouri's website, and e-mail blasts) becoming more important. Notably, more than one-third (38%) of Standard/Custom participants prefer e-mail outreach or electronic newsletters as an information channel for energy efficiency opportunities, which aligns well with recent program outreach efforts.	decreased over the 3-year program cycle (62% Standard and 59% Custom in PY2020; 77% Standard and 83% Custom in PY2019), with other information channels (including BizSavers representatives, Ameren Missouri's website, and e-mail blasts) becoming more important. This trend likely reflects a change in outreach strategy by the implementer due to COVID-19. Notably, almost half (44%) of Standard/Custom participants prefer e-mail outreach or electronic newsletters as an information channel for energy efficiency opportunities.
Residential DR		E-mail outreach along with outreach via devices and device apps are cost-effective and targeted given program design and the target market segment. The "virtual" aspect of program enrollment and event dispatch ensured program operations remained uninterrupted during the second year of the COVID-19 pandemic.
Business DR		Program implementer feedback indicates no program delivery issues.

Table 11: Issue 5 - What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?

Program	2020 Summary Response	2021 Summary Response
Single Family Income Eligible	The program team can increase the rate of customer acceptance by continuing to expand the network of participating CBOs in the Grant channel. This channel offers the opportunity to engage with many Ameren Missouri customers across the service territory. The distribution and installation arms of the channel offer opportunities for participants to install measures across a range of end uses.	The program team can increase the rate of customer acceptance by continuing to expand the network of participating CBOs in both the Grant Channel and the Single-Family Channel. This collaborative work with community partners offers the opportunity to engage with many Ameren Missouri customers across the service territory. The distribution and installation arms of both programs offer opportunities for participants to install measures across a range of end uses.

Program	2020 Summary Response	2021 Summary Response
	Per our recommendation in the PY2019 evaluation, once the program returns to its original design, the program team may consider methods to achieving more savings per community by overcoming split incentives in single family rental housing (to serve more homes) and should continue to validate the match between measure eligibility criteria by carefully observing on-the-ground housing stock (to provide more savings per home).	
Multifamily Income Eligible	As noted in PY2019, one potential strategy to overcome split incentive issues is the promotion of Green Leases. Green Leases are contracts between landlords and tenant(s) that negotiate the mutual benefit of installing energy efficient or green measures in shared buildings. For shared buildings, owners are burdened with green upgrade costs, while tenants benefit from lower operating costs. Without green leases, there is little incentive for owners to make green upgrades to tenant units. Green leases are designed to allow both parties financial benefits and incentives, and multifamily building types are ideal buildings. The other market imperfections outlined above are largely targeted by the program's one- stop-shop model. As such, increasing participation and/or the share of projects in the program utilizing those services should help to more effectively overcome imperfections such as lack of awareness and information, project costs, limited staff knowledge, and the time needed to plan efficiency projects.	One potential strategy to overcome split incentive issues is the promotion of Green Leases. Green Leases are contracts between landlords and tenant(s) that negotiate the mutual benefit of installing energy-efficient or green measures in shared buildings. For shared buildings, owners are burdened with green upgrade costs, while tenants benefit from lower operating costs. Without green leases, there is little incentive for owners to make green upgrades to tenant units. Green leases are designed to allow both parties financial benefits and incentives, and multifamily building types are ideal buildings for their use. The other market imperfections outlined above are largely targeted by the program's one-stop-shop model. As such, increasing participation and/or the share of projects in the program utilizing those services should help to overcome imperfections, such as lack of awareness and information, project costs, limited staff knowledge, and the time needed to plan efficiency projects more effectively.
Lighting	Price is the remaining market imperfection, but much more so for low-income customers. The program should continue its partnerships with low-income retailers that do not traditionally sell lighting and other retailers in low-income neighborhoods.	Price is the remaining market imperfection, but much more so for low-income customers. The program should continue its partnerships with low-income retailers that do not traditionally sell lighting and other retailers in low-income neighborhoods.

Program	2020 Summary Response	2021 Summary Response
	Customers have been slower to adopt reflector and specialty efficient lighting, in part because the previous product, CFLs, was expensive and did not meet customer expectations. LEDs are a superior product and price have fallen, but they still cost more than incandescent bulbs. The program could do more to increase adoption by focusing program budget on non-standard products.	Customers have been slower to adopt reflector and specialty efficient lighting, in part because the previous products, CFLs, were expensive and did not meet customer expectations. LEDs are a superior product and price has fallen, but LEDs still cost more than incandescent bulbs. The program could do more to increase adoption by focusing program budget on non-standard products.
Efficient Products	In PY2019, customers seemed largely satisfied with both the Online Store and Mail-in Channels. Increased participation can likely be attained by expanding the breadth of measures rebated under the program, however, focusing additional marketing efforts on contractors, and increasing general customer awareness of the energy efficiency opportunities as well as available rebates.	In PY2019, customers seemed largely satisfied with both the Online Store and Mail-in Channels. Increased participation can likely be attained by expanding the breadth of measures rebated under the program; however, focusing additional marketing efforts on contractors, and increasing general customer awareness of the energy efficiency opportunities as well as available rebates.
HVAC	Leverage the insights that arose with the introduction of the Midstream Channel. Acknowledge that the contractors operating in each channel are different, and much of this is likely based on the sociodemographic attainment of their targeted customer base. Segment the HVAC customer population to ensure that the program design and messaging are in alignment with the unique set of barriers and needs faced by the different segments.	Leverage the insights that arose with the introduction of the Midstream Channel. Acknowledge that the contractors operating in each channel are different, and much of this is likely based on the sociodemographic attainment of their targeted customer base. Segment the HVAC customer population to ensure that the program design and messaging are in alignment with the unique set of barriers and needs faced by the different segments.
Appliance Recycling	Ameren Missouri can annually revisit program assumptions regarding the percent of equipment in residential use that was manufactured prior to 1990, the percent of equipment recycled that is primary versus secondary, and the size of freezers recycled through the program.	Ameren Missouri can annually revisit program assumptions regarding the percent of equipment in residential use that was manufactured prior to 1990, the percent of equipment recycled that is primary vs. secondary, and the size of freezers recycled through the program.
Energy Efficiency Kits	Based on responses to the PY2019 participant survey, some participating teachers/parents would appreciate an opt-in system, which could reduce waste and increase adoption rates—i.e., only providing kits to students whose parents opt-into the program.	Based on responses to the PY2019 participant survey, some participating teachers/parents would appreciate an opt-in system, which could reduce waste and increase adoption rates—i.e., only providing kits to students whose parents opt-into the program.

Program	2020 Summary Response	2021 Summary Response
Home Energy Reports	The PY2020 evaluation did not include process research designed to answer this question. The PY2019 evaluation provided the following recommendation: HERs increased awareness of energy saving opportunities. Treatment customers were more likely to be aware of energy savings opportunities compared to control customers (64% compared to 53%). However, a higher percentage of treatment customers reported feeling like they do not have control over the amount of household energy that is used relative to control customers. Since treatment customers receive HERs, Ameren Missouri should consider providing information about how much energy various end uses and behavioral changes are projected to save for the average home. One potential way to communicate this is to monetize the energy savings so that treatment customers gain some understanding of how much money they can save by replacing old equipment and/or making changes to how they use energy.	The PY2021 evaluation did not include process research designed to answer this question. The PY2019 evaluation provided the following recommendation: HERs increased awareness of energy saving opportunities. Treatment customers were more likely to be aware of energy savings opportunities compared to control customers (64% compared to 53%). However, a higher percentage of treatment customers reported feeling like they do not have control over the amount of household energy that is used relative to control customers. Since treatment customers receive HERs, Ameren Missouri should consider providing information about how much energy various enduses and behavioral changes are projected to save for the average home. One potential way to communicate this is to monetize the energy savings so that treatment customers gain some understanding of how much money they can save by replacing old equipment and/or making changes to how they use energy.
Multifamily Market Rate	As noted in PY2019, one potential strategy to overcome split incentive issues is the promotion of Green Leases.58 Green Leases are contracts between landlords and tenant(s) that negotiate the mutual benefit of installing energy efficient or green measures in shared buildings. For shared buildings, owners are burdened with green upgrade costs, while tenants benefit from lower operating costs. Without green leases, there is little incentive for owners to make green upgrades to tenant units. Green leases are designed to allow both parties financial	One potential strategy to overcome split incentive issues is the promotion of Green Leases.12 Green Leases are contracts between landlords and tenant(s) that negotiate the mutual benefit of installing energy-efficient or green measures in shared buildings. For shared buildings, owners are burdened with green upgrade costs, while tenants benefit from lower operating costs. Without green leases, there is little incentive for owners to make green upgrades to tenant units. Green leases are designed to allow both parties financial benefits and incentives, and multifamily building types are ideal buildings for their use.

[12] Consortium for Building Energy Innovation (CBEI). "Creating an Energy Savings Win-Win for Owners and Tenants." *Split Incentives and Green Leases.* Last modified July 27, 2020. http://www.cbei.psu.edu/split-incentives-and-green-leases/index.html.

Program	2020 Summary Response	2021 Summary Response
	benefits and incentives, and multifamily building types are ideal buildings.	The other market imperfections outlined above are largely targeted by the program's one-stop-shop model. As such, increasing participation and/or the share of projects in the program utilizing those services should help to overcome imperfections, such as lack of awareness and information, project costs, limited staff knowledge, and the time needed to plan efficiency projects, more effectively.
Pay As You Save		Given the high prevalence of gas heat in Missouri and the importance of HVAC savings in qualifying projects under PAYS 80/20 savings rules, the program should consider gas co-delivery to maximize eligibility and associated savings. After addressing this issue, the program would be positioned to implement targeted marketing strategies among renters/landlords and moderate-income residents who the PAYS Program is situated to serve.
BizSavers	The PY2020 evaluation did not include process research designed to answer this question. The PY2019 evaluation provided the following recommendations, some of which were adapted in PY2020: 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. • The program added exterior lighting (offered in combination with interior lighting projects) in the summer of 2020. • Other new measures include occupancy sensors, VFDs for certain applications, kitchen ventilation controls, compressed air measures, and high-volume low-speed fans.	The PY2021 evaluation did not include process research designed to answer this question. The PY2019 evaluation provided the following recommendations, some of which were adapted in PY2020 or PY2021: 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. • The program added exterior lighting (offered in combination with interior lighting projects) in the summer of 2020 but discontinued the measure in PY2021. • Other new measures introduced in PY2020 included occupancy sensors, VFDs for certain applications, kitchen

Program	2020 Summary Response	2021 Summary Response
	Revisit incentive levels to improve the uptake of non-lighting measures. • InresponsetoCOVID19 impacts, the program offered a 15% bonus incentive for HVAC measures (compared to 10% for lighting measures). In addition, it increased incentive levels for central air conditioning equipment and heat pumps. • Notably, the Standard Program saw a substantial increase in HVAC projects and savings during PY2020. 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 re-engaging and supporting its trade ally network. However, any expansion of the network in PY2020 was limited. Increase customer-focused, strategic, targeted marketing to customers. • As noted above, the program has been expanding its direct customer outreach through social media, search engine marketing, segment-specific collateral, email blasts, and other efforts.	ventilation controls, compressed air measures, and high-volume low-speed fans. 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 certain Standard lighting measures. • Notably, the Standard Program saw a substantial increase in HVAC projects and savings over the 3-year program cycle. 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 re-engaging and supporting its trade ally network. However, any expansion of the network in PY2020 or PY2021 was limited. Increase customer-focused, strategic, targeted marketing to customers.

Program	2020 Summary Response	2021 Summary Response
		• As noted above, the program has been expanding its direct customer outreach through social media, search engine marketing, segment-specific collateral, email blasts, and other efforts. These efforts have been successful as more participants now hear about the program through these channels.
Residential DR		Aligning acquisition channels and introducing new device manufacturers into the program could help capture more customers as well as different customers; thus ensuring achievement of participation goals in future years and serving a broad spectrum of Ameren Missouri customer segments. Monitoring de-enrollment trends and reasons can help anticipate additional enrollment needs, as well as craft program engagement to minimize participant attrition. Working to ensure sustained performance over multi-hour events by better understanding override behaviors and tailoring messaging and engagement strategies to minimize those behaviors, thus increasing the depth of demand impacts, will be important to continued effectiveness of the program.
Business DR		Enel X is actively working on developing processes for expediting participant payment. Enel X is also exploring strategies for streamlined and cost-effective enrollment of customers with smaller nominations to ensure cost-effective recruitment and engagement of customers. Enel X is actively working to explore ways to achieve more performance among already enrolled participants. Enel X plans to deploy additional metering to ensure timely communication of event performance with a larger share of participating customers.