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Ameren Missouri Program Year 2020 Annual EM&V Report

Volume 1: Portfolio Impact Summary

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Opinion Dynamics

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1. Introduction

This document presents a summary of impact evaluation and cost-effectiveness results for Program Year 2020 (PY2020)[1] of Ameren Missouri's 2019-2021 portfolio of energy efficiency and demand response programs, approved under the third cycle of the Missouri Energy Efficiency Investment Act (MEEIA). This is the first of four volumes that comprise the PY2020 Annual Evaluation, Measurement, and Verification (EM&V) Report.

Opinion Dynamics, along with its subcontractors Guidehouse, ADM Associates, Pammer Research, Sustainable Design & Behavior, Morgan Marketing Partners, and Washington University in St. Louis (collectively referred to as "the evaluation team"), was contracted by Ameren Missouri to provide independent evaluation of its 2019-2021 electric energy efficiency and demand response programs.

The overall goal of this evaluation effort was to determine the electric energy and demand savings from Ameren Missouri's program offerings and to identify opportunities to optimize program performance from either a savings or customer satisfaction and engagement perspective. Findings from the evaluation may be used by Ameren Missouri and relevant stakeholders to demonstrate progress against savings goals and targets,[2] modify program design and operations, inform strategies to achieve deeper program savings, and ensure customer satisfaction and cost-effectiveness.

Ameren Missouri's MEEIA Cycle III portfolio of energy efficiency and demand response programs consists of four sector-level portfolios, the Low-Income Portfolio, the Residential Portfolio, the Business Portfolio, and the Demand Response Portfolio. Each portfolio includes multiple programs that target specific market segments and/or equipment types. The overall portfolio includes 17 programs, including 6 that were newly offered in PY2019.[3]

[1] PY2020 was implemented from January 1, 2020 to December 31, 2020.

[2] Throughout this volume, we refer to "goals" and "targets." Ameren Missouri's 2019-21 MEEIA Energy Efficiency Plan sets annual first year energy and demand savings **goals**. In addition, Ameren Missouri developed impact **targets** that are used to determine Earnings Opportunities.

[3] In addition, the 2019-21 MEEIA Energy Efficiency Plan includes new residential and business education programs. This evaluation did not address these programs since Ameren Missouri does not directly claim savings for them.

Table 1. Ameren Missouri 2019-2021 Energy Efficiency and Demand Response Programs

Low-Income Programs	Residential Programs	Business Programs	Demand Response
▪ Residential Single Family Income Eligible * ▪ Residential Multifamily Income Eligible ▪ Business Social Services*	▪ Lighting ▪ Residential Efficient Products ▪ HVAC ▪ Residential Appliance Recycling* ▪ Energy Efficient Kits ▪ Home Energy Report ▪ Multifamily Market Rate*	▪ Standard ▪ Custom ▪ Retro-Commissioning ▪ New Construction ▪ Small Business Direct Install	▪ Residential Demand Response* ▪ Business Demand Response*

* New program in MEEIA Cycle III.

This document (Volume 1) provides a high-level summary of the evaluation's impact and cost-effectiveness findings. The other three volumes, and associated technical appendices, provide more-detailed information on evaluation methodologies and results, including impact, process, and cost-effectiveness analyses. The remainder of the EM&V Report is organized as follows:

- Volume 2: Residential Portfolio Evaluation Report
- Volume 3: Business Portfolio Evaluation Report
- Volume 4: Demand Response Portfolio Evaluation Report

2. Program Year 2020 Impact Results

This section summarizes PY2020 gross and net impact evaluation results. The first subsection summarizes results at the overall portfolio level; the following subsections provide results for the four sector-level portfolios.

2.1 Overall Impacts

The combined portfolio of PY2020 Ameren Missouri energy efficiency programs met or exceeded first year energy savings goals, driven by the strong performance of the Residential Portfolio, which achieved 130% of its net energy savings goal.[4] Both the Low-Income and Business Portfolios fell short of first year energy savings goals, at 91% and 79% of net goal, respectively. In contrast, the combined portfolio fell short of first year demand savings goals, at 94% of net goal. The Residential Portfolio achieved 99% of first year net demand goals, compared to 89% for the Low-Income and Business Portfolios. The PY2020 Residential Portfolio accounted for the largest share of first year ex post net energy savings (54%) and demand savings (56%), excluding Demand Response.

The Residential and Business Portfolios achieved strong first year gross realization rates (RRs) of 98% or above; gross RRs for the Low-Income Portfolio were slightly lower, at 94% for first year energy savings and 93% for first year demand savings. Net impact evaluation results varied as well, with savings-weighted average net-to-gross ratios (NTGR) of 75% for the Residential Portfolio and 83% for the Business Portfolio.[5] Table 2 summarizes portfolio first year energy and demand performance relative to goal.

Table 2. PY2020 Combined Portfolio First Year Impact Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Goal Net	% of Goal
First Year Energy Savings (MWh)							
Low-Income	13,320	94.3%	12,560	100.0%	12,560	13,858	91%
Residential [A]	187,914	109.4%	205,498	74.7%	153,497	118,389	130%
Business	146,947	97.9%	143,852	83.3%	119,805	152,347	79%
Portfolio Total	**348,181**		**361,911**		**285,862**	**284,595**	**100%**
Portfolio Total (EO Eligible)	**310,168**		**313,349**		**237,299**	**235,486**	**101%**
First Year Demand Savings (MW)							
Low-Income	3.28	92.7%	3.04	100.0%	3.04	3.41	89%
Residential [A]	56.54	110.4%	62.40	77.4%	48.26	48.90	99%
Business	41.67	101.5%	42.27	83.2%	35.18	39.49	89%
Portfolio Total	**101.48**		**107.71**		**86.49**	**91.80**	**94%**

[A] The 2019-21 MEEIA Energy Efficiency Plan does not include incremental MWh or MW goals for the PY2020 Home Energy Reports (HER) Program. For comparison purposes, this table includes PY2020 goals for HER that are equivalent to PY2019 goals.

[4] Demand Response is excluded from these summaries because we do not estimate incremental impacts for these programs, as discussed in more detail in Volume 3.

[5] Consistent with industry standards, this evaluation assumes a NTGR of 1.0 for low-income programs.

The evaluation team also estimated PY2020 last year ex post demand savings. Last year savings represent the savings expected to be generated by energy efficiency measures during the last year of a measure's effective useful life (EUL). Last year demand savings were estimated for the following three EUL categories: Less than 10 Year EUL, 10–14 Year EUL, and 15+ Year EUL.

At the portfolio level, Ameren Missouri achieved 167% of its net target in the <10 Year EUL category, 60% in the 10–14 Year EUL category, and 96% in the 15+ Year EUL category, excluding Demand Response. The Business Portfolio is the largest contributor to last year demand savings in the 15+ Year EUL category, accounting for 66% of last year demand in this category.

Table 3. PY2020 Combined Portfolio Last Year Demand Impact Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Target Net	% of Target
< 10 Year EUL (MW)							
Low-Income	1.01	101.6%	1.03	100.0%	1.03	0.61	169%
Residential	0.12	3,192.7%	3.72	73.0%	2.72	0.56	484%
Business	0.05	105.1%	0.05	85.4%	0.04	1.10	4%
Portfolio Total	**1.18**		**4.80**		**3.79**	**2.26**	**167%**
10–14 Year EUL (MW)							
Low-Income	0.44	90.1%	0.39	100.0%	0.39	0.27	145%
Residential	5.12	83.5%	4.27	100.3%	4.29	3.38	127%
Business	4.14	109.2%	4.53	86.4%	3.91	10.72	36%
Portfolio Total	**9.70**		**9.20**		**8.59**	**14.36**	**60%**
Portfolio Total (EO Eligible)	**9.26**		**8.80**		**8.20**	**14.09**	**58%**
15+ Year EUL (MW)							
Low-Income	1.55	94.5%	1.46	100.0%	1.46	2.49	59%
Residential	23.81	90.7%	21.60	67.5%	14.59	19.01	77%
Business	37.48	100.6%	37.70	82.9%	31.23	27.68	113%
Portfolio Total	**62.83**		**60.76**		**47.28**	**49.18**	**96%**
Portfolio Total (EO Eligible)	**61.28**		**59.30**		**45.82**	**46.69**	**98%**

2.2 Low-income Portfolio

Ameren Missouri's 2019-21 MEEIA Energy Efficiency Plan incorporated a significant investment increase in energy efficiency programs targeting low-income customers. The PY2020 Low-Income Portfolio included three programs designed to achieve savings in three distinct market segments:

- **Single Family Income Eligible (SFIE) Program:** The Residential SFIE Program was a new program for Ameren Missouri in PY2019. The program is designed to provide whole-home energy efficiency upgrades that result in long-term energy savings and bill reduction opportunities to Ameren Missouri low-income customers living in single family properties, including mobile homes and duplexes. The program leverages three participation channels: (1) the Single Family channel; (2) the Mobile Homes channel; and (3) the Grant channel. Due to the health risks associated with COVID-19, the program

team temporarily modified the program design for PY2020 and merged delivery of single family and mobile home projects into a single channel.

- **Multifamily Income Eligible (MFIE) Program**: Ameren Missouri has been offering energy efficiency programs for multifamily income eligible properties since 2015. In PY2020, Ameren Missouri continued to deliver the MFIE Program; designed to offer a one-stop-shop approach that assists 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.
- **Business Social Services (BSS) Program:** The 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 enduses. Service Providers supply and install measures, finalize paperwork for eligible participants, and identify additional energy efficiency opportunities not covered under the BSS Program.

The two residential low-income programs are implemented by Ameren Missouri's new residential program implementer, while the BSS Program is implemented by the business program implementer who continues to implement the various business program from the previous MEEIA cycle.

At the portfolio level, the low-income programs achieved 91% of first year net energy savings goals and 89% of first year net demand savings goals (see Table 4). This shortfall was mostly due to lower than expected participation as gross RRs were strong at 94% for energy savings and 93% for demand savings. Achieved last year demand savings ranged from 59% to 169% of target, depending on the EUL category.

Table 4. PY2020 Low-income Portfolio Impact Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Goal/Target Net	% of Goal/Target
First Year Savings							
Energy Savings (MWh)	13,320	94.3%	12,560	100.0%	12,560	13,858	91%
Demand Savings (MW)	3.28	92.7%	3.04	100.0%	3.04	3.41	89%
Last Year Demand Savings							
< 10 EUL (MW)	1.01	101.6%	1.03	100.0%	1.03	0.61	169%
10–14 EUL (MW)	0.44	90.1%	0.39	100.0%	0.39	0.27	145%
15+ EUL (MW)	1.55	94.5%	1.46	100.0%	1.46	2.49	59%

At the program level, performance against savings goals was mixed. While the MFIE Program achieved almost double its first year energy savings goals, the SFIE and BSS programs fell short of their respective goals. Conversely, the SFIE Program met its first year demand savings goal while the MFIE and BSS programs did not (see Table 5). The SFIE Program also performed strongly against last year demand targets in the Less than 10 Year and in the 10–14 Year EUL categories, while all three programs fell short of target in the 15+ Year EUL category (see Table 6).

Notably, both residential income qualified programs performed well against the average percent of energy savings per property metric established for this MEEIA cycle (i.e., achieving at least 10% savings per property):

The SFIE Program achieved an average of 16% savings per property while the MFIE Program achieved an average of 30% savings per property (see Section 3).

Table 5. PY2020 Low-Income Portfolio First Year Impact Summary by Program

Program	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Goal Net	% of Goal
First Year Energy Savings (MWh)							
SFIE	9,475	92.3%	8,748	100.0%	8,748	10,415	84%
MFIE	3,260	99.5%	3,243	100.0%	3,243	1,650	197%
BSS	585	97.3%	569	100.0%	569	1,793	32%
Total Low-Income	**13,320**	**94.3%**	**12,560**	**100.0%**	**12,560**	**13,858**	**91%**
First Year Demand Savings (MW)							
SFIE	2.67	91.0%	2.43	100.0%	2.43	2.34	104%
MFIE	0.50	99.6%	0.49	100.0%	0.49	0.73	68%
BSS	0.11	102.7%	0.11	100.0%	0.11	0.34	33%
Total Low-Income	**3.28**	**92.7%**	**3.04**	**100.0%**	**3.04**	**3.41**	**89%**

Table 6. PY2020 Low-income Portfolio Last Year Demand Impact Summary by Program

Program	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Target Net	% of Target
< 10 Year EUL (MW)							
SFIE	0.95	101.6%	0.96	100.0%	0.96	0.57	170%
MFIE	0.06	100.3%	0.06	100.0%	0.06	-	n/a
BSS	0.01	102.7%	0.01	100.0%	0.01	0.04	24%
Total Low-Income	**1.01**	**101.6%**	**1.03**	**100.0%**	**1.03**	**0.61**	**169%**
10–14 Year EUL (MW)							
SFIE	0.32	86.8%	0.28	100.0%	0.28	0.08	362%
MFIE	0.10	98.7%	0.10	100.0%	0.10	-	n/a
BSS	0.02	104.1%	0.02	100.0%	0.02	0.19	10%
Total Low-Income	**0.44**	**90.1%**	**0.39**	**100.0%**	**0.39**	**0.27**	**145%**
15+ Year EUL (MW)							
SFIE	1.12	92.3%	1.04	100.0%	1.04	1.65	63%
MFIE	0.34	99.8%	0.34	100.0%	0.34	0.73	47%
BSS	0.08	102.3%	0.09	100.0%	0.09	0.11	79%
Total Low-Income	**1.55**	**94.5%**	**1.46**	**100.0%**	**1.46**	**2.49**	**59%**

2.3 Residential Portfolio

The PY2020 Residential Portfolio included the following seven energy efficiency programs:

- **Residential Lighting Program:** The Ameren Missouri Residential Lighting Program is designed to increase sales and awareness of ENERGY STAR® qualified LED lighting products. Ameren Missouri delivers the Lighting Program through two channels: (1) upstream, through retail partners, and (2) through the Ameren Missouri Online Store. Through its upstream channel, the program provides incentives to retail partners to reduce costs and increase sales of qualified LED lighting products. Though the incentives are paid to the retailers, they translate into immediate point-of-purchase (POP) discounts for customers when they purchase program-qualified LEDs. The Online Store offers Ameren Missouri customers a select assortment of efficient LED lighting products that customers can purchase directly from the site.
- **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 new Midstream Channel, introduced in PY2020, that focuses on making super-efficient HVAC systems more broadly available to Ameren Missouri customers. The HVAC Program improves the efficiency of CAC systems, air-source heat pumps (ASHPs), ground source heat pumps (GSHPs), and ductless mini-split heat pumps (DMSHPs) by providing incentives for new high-efficiency systems. Trade allies play a critical role in delivering both channels, while HVAC distributors are key to delivering the new Midstream Channel.
- **Home Energy Report (HER) 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.
- **Residential Efficient Products (REP) Program:** The REP Program is designed to raise customer awareness of the benefits of high-efficiency products, educate residential customers about energy use in their homes, and offer information, products, and services to residential customers to achieve cost-effective energy savings. The target market consists of all residential customers within the Ameren Missouri service territory. The REP Program is designed to be an umbrella program, incorporating various program partners, products, and program delivery strategies.
- **Energy Efficiency Kits (EEK) Program:** The EEK Program provides energy efficiency kits and education materials to customers through an educational channel that targets, but is not limited to, sixth-grade students. The program combines a set of classroom activities with projects in the home to install energy-efficient products. The EEK Program includes a range of small energy-efficient products, such as LED light bulbs, hot water pipe wrap, low-flow showerheads, and faucet aerators. Due to changes in how schools operated in PY2020 as a result of the COVID-19 pandemic, the program team developed a set of processes and educational materials designed to be deployed virtually to supplement existing materials designed for use in the classroom.

- **Multifamily Market Rate (MFMR) Program:** Ameren Missouri continued to deliver the MFMR 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. The program serves multifamily properties that have three or more tenant units and receive electric service from Ameren Missouri.
- **Residential Appliance Recycling (RAR) Program:** The primary goal of the RAR 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. The RAR Program was re-introduced in PY2019.

At the portfolio level, the PY2020 Ameren Missouri residential programs exceeded their first year energy savings goal but fell just short of their first year demand savings goal, achieving 153,497 MWh and 48.26 MW respectively (Table 7). Performance related to last year demand savings was mixed with the portfolio exceeding the target for Less than 10 Year EUL and the 10–14 Year EUL categories, but not meeting the 15+ Year EUL target.

Table 7. PY2020 Residential Portfolio Impact Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Goal/Target Net	% of Goal/Target
First Year Savings							
Energy Savings (MWh)	187,914	109.4%	205,498	74.7%	153,497	118,389	130%
Demand Savings (MW)	56.54	110.4%	62.40	77.4%	48.26	48.90	99%
Last Year Demand Savings							
< 10 EUL (MW)	0.12	3,193%	3.72	73.0%	2.72	0.56	484%
10–14 EUL (MW)	5.12	83.5%	4.27	100.3%	4.29	3.38	127%
15+ EUL (MW)	23.81	90.7%	21.60	67.5%	14.59	19.01	77%

Portfolio performance was largely driven by the Residential Lighting, HVAC, and HER programs, which collectively contributed approximately 91% of Ameren Missouri's first year residential energy savings. The Lighting Program, in particular, drove strong residential performance, contributing 49% of portfolio net energy savings and achieving 567% of its goal. As shown in Table 8, the Lighting and HER programs exceeded first year energy and demand savings goals, while the other residential programs did not.

Table 8. PY2020 Residential Portfolio First Year Impact Summary

Program	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Goal Net	% of Goal
First Year Energy Savings (MWh)							
Lighting	105,291	109.6%	115,409	64.8%	74,812	13,203	567%
HVAC	38,830	95.1%	36,908	76.5%	28,245	47,594	59%
HER [A,B]	24,693		36,002		36,002	35,250	102%
REP	9,823	91.4%	8,981	85.8%	7,705	9,188	84%
EE Kits	5,429	80.0%	4,346	78.5%	3,410	6,551	52%
MFMR	3,022	98.1%	2,964	94.0%	2,786	3,270	85%

Program	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Goal Net	% of Goal
RAR	826	107.5%	888	60.5%	537	3,333	16%
Total Residential	**187,914**	**109.4%**	**205,498**	**74.7%**	**153,497**	**118,839**	**130%**
First Year Demand Savings (MW)							
Lighting	15.85	112.9%	17.90	64.8%	11.60	1.97	588%
HVAC	23.98	96.9%	23.24	69.9%	16.24	25.40	64%
HER [A,B]	11.51		16.78		16.78	16.43	102%
REP	3.42	84.0%	2.88	80.3%	2.31	2.43	95%
EE Kits	0.98	82.9%	0.81	79.3%	0.65	1.16	56%
MFMR	0.67	99.1%	0.67	94.0%	0.63	1.04	60%
RAR	0.13	99.2%	0.13	55.2%	0.07	0.47	15%
Total Residential	**56.54**	**110.4%**	**62.40**	**77.4%**	**48.26**	**48.80**	**99%**

[A] The 2019-21 MEEIA Energy Efficiency Plan does not include incremental MWh or MW goals for the PY2020 HER Program. For comparison purposes, this table includes PY2020 goals for HER that are equivalent to PY2019 goals.

[B] All savings for the HER Program are net savings. As such, we do not present a gross RR, and ex post gross savings equal ex post net savings.

Table 9 shows last year demand savings across the portfolio, by EUL category. The portfolio achieved 484% of target for the Less than 10 Year EUL category, which was driven by a small portion of LEDs sold through the Upstream channel of the Lighting Program that were installed in business applications (6 year EUL as opposed to 19 year EUL for similar LEDs installed in residential spaces). The performance in the 10–14 EUL Category (127% of target) was driven largely by non-participant spillover (NPSO) measures, particularly those attributable to the HVAC Program, which accounted for 88% of all NPSO demand savings. Despite strong performance by the Lighting Program, the portfolio fell short of its target in the 15+ Year EUL category (77% of target) due to significant shortfalls in this category for the HVAC Program, which accounted for 85% of the target but only contributed 30% of ex post net savings in this category.

Table 9. PY2020 Residential Portfolio Last Year Demand Impact Summary

Program	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Target Net	% of Target
< 10 Year EUL (MW)							
Lighting	-	n/a	3.11	64.8%	2.02	-	n/a
HVAC	-	n/a	0.47	123.8%	0.58	-	n/a
HER							
REP	-	n/a	-	n/a	0.03	0.03	103%
EE Kits	-	n/a	-	n/a	0.01	-	n/a
MFMR	0.04	1.00	0.04	94.0%	0.03	0.19	18%
RAR	0.08	1.29	0.10	44.5%	0.05	0.34	13%
Total Residential	**0.12**	**3,192.7%**	**3.72**	**73.0%**	**2.72**	**0.56**	**484%**

Program	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Target Net	% of Target
10–14 Year EUL (MW)							
Lighting	-	n/a	-	n/a	-	-	n/a
HVAC	0.74	78.9%	0.58	228.8%	1.34	-	n/a
HER							
REP	3.42	84.0%	2.88	76.6%	2.20	2.39	92%
EE Kits	0.71	83.9%	0.59	90.2%	0.53	0.76	70%
MFMR	0.22	98.2%	0.21	94.0%	0.20	0.22	91%
RAR	0.03	27.2%	0.01	135.1%	0.01	-	n/a
Total Residential	**5.12**	**83.5%**	**4.27**	**100.3%**	**4.29**	**3.38**	**127%**
15+ Year EUL (MW)							
Lighting	15.85	93.3%	14.78	64.8%	9.58	1.97	486%
HVAC	7.25	85.0%	6.17	71.8%	4.43	16.17	27%
HER							
REP	-	n/a	-	n/a	0.08	-	n/a
EE Kits	0.28	80.3%	0.22	46.0%	0.10	0.40	26%
MFMR	0.42	99.4%	0.42	94.0%	0.39	0.47	84%
RAR	0.01	106.8%	0.01	83.7%	0.01	-	n/a
Total Residential	**23.81**	**90.7%**	**21.60**	**67.5%**	**14.59**	**19.01**	**77%**

2.4 Business Portfolio

The PY2020 Business Portfolio included five energy efficiency programs, all of which were offered in the previous MEEIA cycle:

- **Custom Incentive Program:** The Custom Incentive Program applies to processes, technologies, and energy efficiency measures that are not deemed and therefore do not fall under the Standard Program. Custom projects are sometimes complex and always unique, requiring customer-specific incentive applications and calculations of estimated energy savings. The Custom Program also relies on a network of trade allies. HVAC equipment was the predominant enduse in PY2020, but the program also incented motors, lighting, and other measures.
- **Standard Incentive Program:** The Standard Incentive Program is designed to promote the installation of energy-efficient technologies by providing incentives for a range of prescriptive measures. The program employs simple and streamlined program processes and leverages a network of trade allies to assist with project implementation and raising customer awareness. The PY2020 program was heavily focused on LED interior lighting equipment.
- **Small Business Direct Install (SBDI) Program:** The SBDI Program encourages small business customer participation through a simple, immediate, and streamlined program process. A group of SBDI Program Service Providers delivers the energy-efficient measures at low-cost to small business customers.

These Service Providers supply, install, and finalize paperwork for eligible participants, and are tasked with identifying additional energy efficiency opportunities not covered under the SBDI Program.

- **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 the Ameren MO service territory. In addition to interior lighting incentives, New Construction Program participants are eligible for custom incentives and a whole building performance incentive for completing a whole building energy model.
- **Retro-Commissioning (RCx) Program:** The RCx Program is designed to help customers retro-commission existing facilities. Program activities include conducting a retro-commissioning study, benchmarking existing building system performance levels, identifying operating system performance optimization improvements, and, where applicable, providing financial incentives to support implementation of program recommendations. The program relies on qualified Retro-Commissioning Service Providers to deliver measurable energy savings.

The PY2020 Business Portfolio achieved 119,805 MWh of first year net energy savings and 35.18 MW of first year net demand savings, achieving 79% and 89%, respectively, of its goals. The portfolio exceeded its target for last year demand savings in the 15+ Year effective useful life (EUL) category (113% of target) but fell short of target in the 10–14 Year EUL category (36% of target) and the <10 Year EUL category (4% of target).

Savings-weighted portfolio-level gross realization rates (RR) ranged from 98% for energy savings to 109% for last year demand savings in the 10–14 Year EUL category, while savings-weighted net-to-gross ratios (NTGR) ranged from 83% to 86%.

Table 10 summarizes first year and last year annual gross and net savings for the Business Portfolio in PY2020.

Table 10. PY2020 Business Portfolio Savings Summary

	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Goal/Target Net	% of Goal/Target
First Year Savings							
Energy Savings (MWh)	146,947	97.9%	143,852	83.3%	119,805	152,347	79%
Demand Savings (MW)	41.67	101.5%	42.27	83.2%	35.18	39.49	89%
Last Year Demand Savings							
< 10 EUL (MW)	0.05	105.1%	0.05	85.4%	0.04	1.10	4%
10–14 EUL (MW)	4.14	109.2%	4.53	86.4%	3.91	10.72	36%
15+ EUL (MW)	37.48	100.6%	37.70	82.9%	31.23	27.68	113%

The Standard Program was the largest program in Ameren Missouri's Business Portfolio in PY2020, contributing 59% of first year ex post net energy savings and 47% of first year ex post net demand savings. The Standard Program and the New Construction Program both exceeded their first year net impact energy and demand savings goals. All other programs fell short of first year net impact energy and demand goals.

Portfolio-wide, the primary driver of low program-specific performance relative to net savings goals was lack of participation. For all programs other than Standard and New Construction, even gross ex ante savings are

below net goals (in some cases significantly), indicating that the shortfall was not primarily a result of low RRs or NTGRs.

Table 11 summarizes first year annual gross and net savings for all programs in the PY2020 Business Portfolio.

Table 11. PY2020 Business Portfolio First Year Savings Summary by Program

Program	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Goal Net	% of Goal
First Year Energy Savings (MWh)							
Standard	85,129	97.3%	82,832	85.0%	70,390	56,470	125%
Custom	35,049	97.0%	34,010	82.4%	28,031	69,882	40%
SBDI	5,565	97.8%	5,442	87.8%	4,778	10,118	47%
New Construction	15,106	97.0%	14,655	70.0%	10,258	8,660	118%
RCx	6,099	113.4%	6,913	91.8%	6,346	7,217	88%
Total Business	**146,947**	**97.9%**	**143,852**	**83.3%**	**119,805**	**152,347**	**79%**
First Year Demand Savings (MW)							
Standard	18.50	105.5%	19.51	85.0%	16.58	11.40	145%
Custom	15.47	98.1%	15.18	82.4%	12.51	21.39	58%
SBDI	1.06	102.5%	1.09	87.8%	0.96	1.75	55%
New Construction	4.36	86.6%	3.78	70.0%	2.64	2.30	115%
RCx	2.27	119.3%	2.71	91.8%	2.49	2.65	94%
Total Business	**41.67**	**101.5%**	**42.27**	**83.2%**	**35.18**	**39.49**	**89%**

Program performance relative to target net demand savings by EUL category varied widely, but overall, the Business Portfolio achieved 4% of target last year net demand savings in the <10 Year EUL category, 36% of target last year net demand savings in the 10–14 Year EUL category, and 113% of target last year net demand savings in the 15+ Year EUL category. All programs had their strongest performance relative to targets in the 15+ Year EUL category, but only the Standard Program, New Construction Program, and RCx Program surpassed their targets (achieving 277%, 127%, and 133% of target, respectively).

While the Custom Program accounted for only 23% of the Business Portfolio's ex post net energy savings, it significantly contributed to the portfolio's ex post last year demand savings, particularly in the 15+ Year EUL category (18.38 MW or 39% of the total Business Portfolio).

Table 12 summarizes last year annual gross and net savings for all programs in the PY2020 Business Portfolio by EUL category.

Table 12. PY2020 Business Portfolio Last Year Demand Savings Summary by Program

Program	Ex Ante Gross	Gross RR	Ex Post Gross	NTGR	Ex Post Net	Target Net	% of Target
< 10 Year EUL (MW)							
Standard	0.04	105.4%	0.04	85.0%	0.03	1.08	3%
Custom	-	n/a	-	n/a	-	-	n/a
SBDI	0.01	103.3%	0.01	87.8%	0.01	0.01	48%
New Construction	-	n/a	-	n/a	-	-	n/a
RCx	-	n/a	-	n/a	-	-	n/a
Total Business	**0.05**	**105.1%**	**0.05**	**85.4%**	**0.04**	**1.10**	**4%**
10–14 Year EUL (MW)							
Standard	2.82	109.2%	3.08	85.0%	2.62	5.28	50%
Custom	0.39	88.4%	0.34	82.4%	0.28	3.01	9%
SBDI	0.06	101.8%	0.07	87.8%	0.06	0.72	8%
New Construction	-	n/a	-	n/a	-	0.21	0%
RCx	0.87	119.3%	1.04	91.8%	0.95	1.49	64%
Total Business	**4.14**	**109.2%**	**4.53**	**86.4%**	**3.91**	**10.72**	**36%**
15+ Year EUL (MW)							
Standard	15.64	104.8%	16.39	85.0%	13.93	5.04	277%
Custom	15.08	98.4%	14.84	82.4%	12.23	18.38	67%
SBDI	0.99	102.5%	1.02	87.8%	0.89	1.02	88%
New Construction	4.36	86.6%	3.78	70.0%	2.64	2.09	127%
RCx	1.40	119.3%	1.68	91.8%	1.54	1.16	133%
Total Business	**37.48**	**100.6%**	**37.70**	**82.9%**	**31.23**	**27.68**	**113%**

2.5 Demand Response Portfolio

The PY2020 Demand Response Portfolio included two programs, one for residential customers and one for business customers, both new in MEEIA Cycle III:

- **Residential Demand Response Program**: Ameren Missouri continued to work with a team of partners to capture demand and energy benefits. The Residential DR Program was designed to control cooling load with the help of smart thermostats to achieve peak demand savings and energy savings. Eligible customers include Ameren Missouri electric customers with CAC systems, including heat pumps, and a program-qualifying smart thermostat. Qualifying smart thermostats in PY2020 include ecobee®, Nest®, and Emerson™ devices.[6] Customers either enroll existing devices (the bring-your-own-thermostat or BYOT channel) or purchase and install qualifying devices through the Ameren Missouri Online Marketplace (the Marketplace channel). Franklin Energy administered the program, and Uplight delivered the program. While the program was originally designed as an integrated program aiming to deliver energy savings using optimization strategies alongside demand reductions, the program's pursuit of energy optimization savings in PY2020 was limited by the wide deployment of energy optimization algorithms among all of their customers by two major manufacturers (Nest and ecobee). The program therefore focused its efforts on demand reductions and associated event day energy savings.
- **Business Demand Response Program:** The Business Demand Response Program is designed to reduce load during periods of peak demand. Enel X is the program aggregator, responsible for recruiting and enrolling customers, developing customized load reduction nominations and load curtailment strategies, dispatching demand response events, and maintaining customer relationships with participating businesses. Eligible business customers can participate in DR events through a variety of strategies, including direct load control and manual response. Each enrolled facility receives a customized load curtailment strategy, focusing on a variety of energy loads such as lighting, HVAC, chillers, motors, and processing equipment.

At the end of the PY2020 event season, the demand response portfolio achieved 71.09 MW in average load reduction as well as 475.02 MWH in energy savings (Table 13). Milder than normal temperatures during the PY2020 event season, the effects of the COVID-19 pandemic on business customer baseline load and their ability to perform in events, and challenges associated with event dispatches for certain thermostat manufacturers (on the Residential DR side) were the key driving factors behind the savings.

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

Table 13. 2020 Event Season Performance Summary

Program	Participants [a]	Event Season MW Performance	Event Season MWh Performance [b]
Residential DR Program	13,041	17.40	94.75
Business DR Program	279	53.69	380.27
Total DR Portfolio	**13,320**	**71.09**	**475.02**

[a] Participant count for the Residential DR program represents the average number of participants among whom events were dispatched.
[b] Energy savings for the Business DR Program exclude test events.

To compare the DR portfolio performance against the MEEIA III MW goals, Opinion Dynamics calculated weather-normalized resource capability estimates. Resource capability reflects total demand under control by the programs at program year-end and available to be called under conditions consistent with Ameren Missouri's peak forecasting weather assumptions. Figure 1 summarizes portfolio performance toward MEEIA III cumulative goals, for both demand and energy. As can be seen in the figure, the programs exceeded the demand goal of 74.83 MW by 9.27 MW for a total of 84.10 MW, achieving 112% of the goal, but fell considerably short of the energy savings goals, achieving 495.43 MWh, or 14% of the 3,411 MWh target.[7]

Figure 1. DR Portfolio Performance Against MEEIA III Cumulative Goals

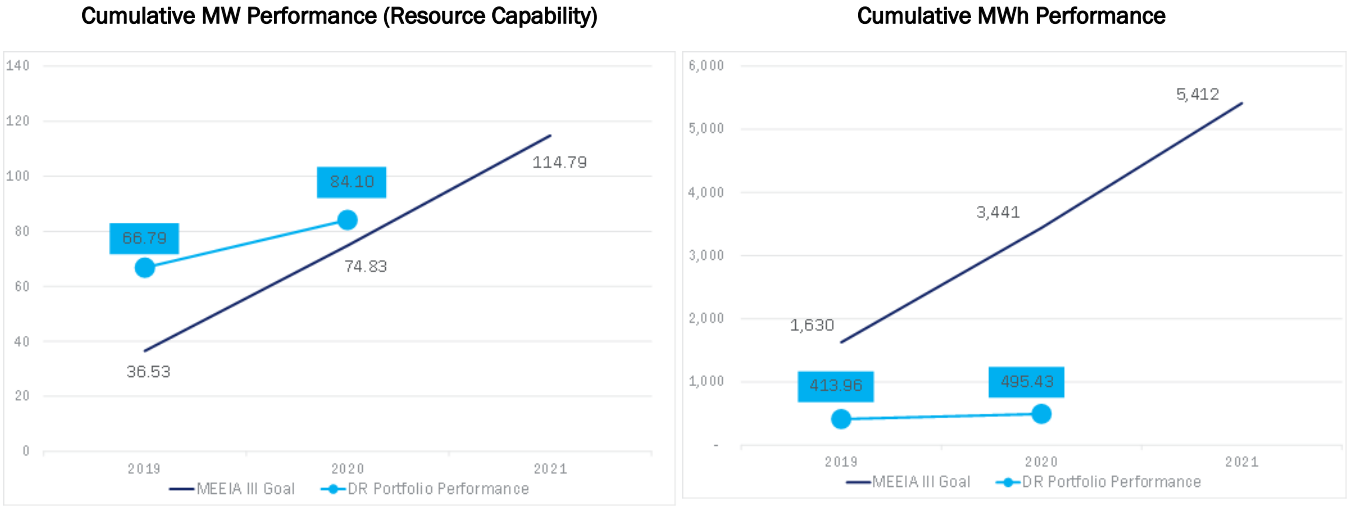

Table 14 provides a detailed summary of each program's performance against MEEIA III goals, including participation goals. As can be seen in the table, both programs exceeded goals in terms of customer enrollment as of the end of PY2020 (172% for the Residential DR Program; 285% for the Business DR Program). From a resource capability perspective, both programs performed strongly as well, which positions them well for the years ahead. More specifically, the Residential DR Program achieved 28.74 MW and 116%

[7] Energy savings for the Business DR program include savings from the two December test events in addition to the event season events.

of its goal, while the Business DR Program achieved 55.36 MW and 111% of its goal. In contrast, both programs underperformed against the energy savings goal (4% and 40% for the Residential and Business DR programs, respectively). Energy savings for the Residential DR Program are calculated based on event day impacts during the event season. Energy savings for the Business DR Program include savings achieved during the two December test events, in addition to the savings achieved during the two events called during the event season. Across the portfolio, lower than planned energy savings are due to fewer than expected events dispatched in PY2020 due to milder than normal weather. For the Residential DR Program, energy savings were primarily impacted by inability to dispatch program-driven energy optimization algorithms.

Table 14. DR Portfolio Performance Against MEEIA III Goals

Program	Cumulative 2020 MEEIA III Goal	PY2020 Performance	Goal Achieved (%)
Participation as of the End of PY2020 (Participants)			
Residential DR Program	14,438	24,835	172%
Business DR Program	100	285	285%
Total DR Portfolio	**14,538**	**25,120**	**173%**
Resource Capability (MW)			
Residential DR Program	24.83	28.74	116%
Business DR Program	50.00	55.36	111%
Total DR Portfolio	**74.83**	**84.10**	**112%**
Energy Savings (MWH)			
Residential DR Program	2,441	94.75	4%
Business DR Program	1,000	400.68	40%
Total DR Portfolio	**3,441**	**495.43**	**14%**

In addition to the event season performance and resource capability performance, we also calculated cumulative DR capability (Table 15). Cumulative DR capability is calculated to support the Earnings Opportunities (EO) metric for Ameren Missouri's DR programs. For the Residential DR Program, the cumulative DR capability mirrors the resource capability. For the Business DR Program, however, per the MEEIA III Plan, the cumulative DR capability is based on the performance of only tested participants, as opposed to all participants enrolled in the program at year-end. In PY2020, all Business DR participating customers were tested as part of either summer events or events dispatched in the winter. Therefore, cumulative DR capability is equal to the resource capability.

Table 15. DR Portfolio Summary of Cumulative DR Capability Estimated Impacts by Program

Program	Target (MW)	PY2020 Performance (MW)	% of Target Achieved
Residential DR Program	24.83	28.74	116%
Business DR Program	50.00	55.36	111%
Total DR Portfolio	**74.83**	**84.10**	**112%**

3. Earnings Opportunities

This section provides the evaluated inputs necessary for calculating Ameren Missouri's PY2020 achieved EO metrics. Ameren Missouri included seven EO metrics in its 2019-21 Energy Efficiency Plan. Those metrics are:

1. Average Percent Energy Savings per Property for the MFIE Program;
2. Average Percent Energy Savings per Property for the SFIE Program (Excluding Efficiency Home Grants);
3. Energy Savings of the HER Program;
4. Subtotaled Portfolio Energy Savings for energy efficiency programs (excluding HER, Low-Income programs, BSS, and DR programs);
5. Subtotaled Coincident Peak Demand Savings from Measures with a 10–14 Year EUL (excluding HER, Low-Income programs, BSS, and DR programs);
6. Subtotaled Coincident Peak Demand Savings from Measures with a 15+ Year EUL (excluding HER, Low-Income programs, BSS, and DR programs); and
7. Cumulative Demand Response Capability for the Demand Response Programs.

We have included the relevant inputs, equations, earnings opportunity targets, and final calculated payouts from the EO Calculator[8] along with the evaluated results in Table 16 below. The source column provides a reference to where each evaluated value can be found in the PY2020 Evaluation Report. Each EO metric also has a performance target and maximum performance cap built into the EO Calculator.

[8] Ameren Missouri 2019-21 MEEIA Energy Efficiency Plan, Appendix N

Table 16. Evaluated Earnings Opportunity Metrics

EO Metric	Unit of Evaluated Value	Evaluated Value a	EO Target b	EO Cap Multiplier c	EO Maximum d = b*c	EO Eligible Performance e = min of (a or d)	Payout Amount per Unit f	EO Payout Amount g = e * f	Source of Evaluated Value
1[a]	% of Baseline Usage	30.67%	10%	125%	12.50%	12.50%	$33,333	$416,667	Vol 2. Table 112
2[a]	% of Baseline Usage	15.85%	10%	125%	12.50%	12.50%	$33,333	$416,667	Vol 2. Table 102
3[b]	MWh	36,002	35,250	105%	37,013	36,002	$4.73	$170,221	Vol 1. Table 8
4	MWh	237,299	235,486	115%	270,809	237,299	$7.65	$1,814,580	Vol 1. Table 2
5	MW	8.20	14.10	125%	17.62	8.20	$87,086	$713,767	Vol 1. Table 3
6	MW	45.82	46.69	125%	58.36	45.82	$108,897	$4,989,527	Vol 1. Table 3
7	MW	84.10	74.83	125%	93.54	84.10	$19,902	$1,673,726	Vol 1. Table 14

[a] A threshold criterion that at least 85% of the Commission-approved annual budget (administrative cost plus customer incentive cost less the cost of Low-Income Efficiency Housing Grants) for the program year in question is spent. If Ameren does not meet this criterion the EO Eligible performance is 0%.

[b] A threshold criterion is that the HER Program is cost effective as evaluated under the Total Resource Cost Test. If Ameren did not meet this criterion the EO Eligible performance is 0%. As seen in Table 17 below, the HER Program was cost effective in PY2020 with a TRC score of 1.22.

4. Cost-Effectiveness Results

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

The evaluation team assessed the cost-effectiveness of all 17 Ameren Missouri energy efficiency and demand response programs as well as three sector-level portfolios (low-income, residential, and business) and the overall combined portfolio of programs. We assessed cost-effectiveness using all five costs-effectiveness tests recommended by the California Standard Practice Manual[9] and used in prior evaluations:

- **Total Resource Cost (TRC) Test:** Perspective of all utility customers (participants and nonparticipants) in the utility service territory;
- **Utility Cost Test (UCT):** Perspective of utility, government agency, or third-party program implementer;
- **Ratepayer Impact Measure (RIM) Test:** Impact of efficiency measure on nonparticipating ratepayers overall;
- **Participant Cost Test (PCT):** Perspective of the customers installing the measures; and
- **Societal Cost Test (SCT):** Perspective of all utility customers (participants and nonparticipants) in the utility service territory.[10]

The TRC test is the primary test of cost-effectiveness, per Ameren Missouri's 2019-21 Energy Efficiency Plan. It compares all program benefits (in terms of avoided energy production, transmission and distribution, and capacity) against the utility administrative costs and any out-of-pocket costs incurred by participating customers. Because incentives are both a cost to the utility and a benefit to participants, they are excluded from calculations using the TRC test.

The PY2020 cost-effectiveness analysis was completed by Morgan Marketing Partners using DSMore software. DSMore is a financial analysis tool designed to evaluate the costs, benefits, and risks of energy efficiency programs and measures. Developed and licensed by Integral Analytics based in Cincinnati, Ohio, DSMore estimates the value of an energy efficiency measure at an hourly level across distributions of weather and/or energy costs or prices. The software references over 30 years of historic weather variability to appropriately model weather variances.

In order to maintain consistency with Ameren Missouri's planning assumptions the evaluation team relied on the same DSMore planning tools used to develop Ameren Missouri's planning values. It was important to ensure that differences in cost-effectiveness results compared to planning values were driven by deviations

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

between planned and realized costs and benefits of delivering energy efficiency programs as opposed to differences in the underlying financial assumptions within in the DSMore model itself.

A number of overall and sector-level costs are reflected in the program-level cost-effectiveness analysis. These overarching costs include those for EM&V, education and outreach, portfolio administration, and data tracking. These costs were allocated by each program's share of the portfolio's avoided cost benefits. All results shown in the tables below account for portfolio and indirect costs allocated to each program on this basis.

Overall, the Ameren Missouri combined portfolio of energy efficiency and demand response programs was cost-effective as delivered in PY2020, according to every test except the RIM test. The combined portfolio achieved a TRC score of 2.14 and a UCT score of 2.66. According to the TRC test, each sector-level portfolio was also cost-effective.[11]

Table 17 summarizes the cost-effectiveness results for all programs in the Low-income, Residential, and Business portfolios.[12]

[11] MEEIA and the Revised Statues of Missouri (RSMo) acknowledge low-income programs as a special circumstance and do not require the programs to be cost-effective as implemented. Results are shown for comparative and planning purposes.
[12] For cost-effectiveness testing the DR programs are included in the respective Business and Residential portfolios.

Table 17. Summary of PY2020 Low-income, Residential, and Business Program Cost Effectiveness

Program	TRC	UCT	RIM	PCT
Low-Income Portfolio				
SFIE	1.32	1.29	0.44	4.72
MFIE	0.72	0.51	0.29	4.49
BSS	2.12	0.82	0.40	6.60
Low-Income Total	**1.11**	**0.93**	**0.39**	**4.71**
Residential Portfolio				
Lighting	6.45	4.64	0.55	n/a
HVAC	1.49	1.81	0.59	3.72
HER	1.22	1.22	0.42	n/a
REP	0.98	1.46	0.50	2.85
EE Kits	2.03	3.32	0.54	6.85
MFMR	1.34	2.02	0.52	3.53
RAR	0.68	0.69	0.30	18.5
Residential DR [A]	2.13	2.13	1.93	n/a
Residential Total	**2.56**	**2.68**	**0.63**	**11.57**
Business Portfolio				
Standard	2.20	4.01	0.71	3.79
Custom	2.10	4.16	1.09	2.28
SBDI	3.02	2.44	0.60	7.07
New Construction	1.33	3.46	0.77	1.87
RCx	4.94	5.19	1.08	6.03
Business DR [A]	1.60	1.60	1.54	n/a
Business Total	2.00	3.04	0.90	3.12
Portfolio Total	**2.14**	**2.66**	**0.72**	**5.58**

[A] Includes the lifetime costs and benefits of Demand Response programs over a 10-year effective useful life.

Overall, Ameren Missouri's combined portfolio of energy efficiency programs generated $206 million dollars in lifetime benefits at a cost of $96 million, resulting in $110 million dollar in net benefits (based on the TRC tests). The UTC test results in a similar total net benefits ($128 million). The Residential Portfolio generated just under $56 million dollars of TRC-lifetime net benefits while the Business Portfolio generated just under $54 million dollars of TRC-lifetime net benefits.

Table 18 provides a summary of the total cost and benefits associated with each program in the Low-income, Residential, and Business portfolios under the TRC test and UCT tests.

Table 18. Summary of TRC Cost and Benefits (2019 Dollars)

Program	Lifetime Benefits	TRC Test		UCT Test	
		Program Costs	Net Benefits	Program Costs	Net Benefits
Low-Income Portfolio					
SFIE	$5,534,276	$4,207,760	$1,326,516	$4,287,373	$1,246,902
MFIE	$1,871,200	$2,602,860	-$731,661	$3,635,857	-$1,764,657
BSS	$320,558	$151,384	$169,173	$391,611	-$71,054
Low-Income Total	**$7,726,033**	**$6,962,005**	**$764,028**	**$8,314,841**	**-$588,808**
Residential Portfolio					
Lighting	$46,340,081	$7,187,571	$39,152,511	$9,982,337	$36,357,744
HVAC	$20,272,529	$13,625,150	$6,647,379	$11,216,066	$9,056,463
HER	$2,003,663	$1,638,573	$365,090	$1,638,573	$365,090
REP	$3,441,814	$3,495,455	-$53,641	$2,365,375	$1,076,439
EE Kits	$1,801,229	$886,966	$914,263	$557,927	$1,243,302
MFMR	$1,545,670	$1,157,006	$388,664	$765,397	$780,272
RAR	$194,967	$287,910	-$92,943	$283,794	-$88,827
Residential DR [A]	$15,421,568	$7,239,393	$8,182,176	$7,239,393	$8,182,176
Residential Total	**$91,021,522**	**$35,518,023**	**$55,503,499**	**$34,048,862**	**$56,972,660**
Business Portfolio					
Standard	$44,395,891	$20,138,534	$24,257,357	$11,059,201	$33,336,690
Custom	$25,589,936	$12,178,852	$13,411,084	$6,156,083	$19,433,853
SBDI	$2,902,807	$959,852	$1,942,955	$1,189,013	$1,713,794
New Construction	$7,480,336	$5,606,666	$1,873,671	$2,162,503	$5,317,834
RCx	$4,612,885	$933,828	$3,679,057	$888,207	$3,724,678
Business DR [A]	$22,244,824	$13,860,096	$8,384,728	$13,860,096	$8,384,728
Business Total	**$107,226,679**	**$53,677,829**	**$53,548,850**	**$35,315,102**	**$71,911,577**
Portfolio Total	**$205,974,234**	**$96,157,856**	**$109,816,378**	**$77,678,806**	**$128,295,428**

[A] Includes the lifetime costs and benefits of Demand Response programs over a 10-year effective useful life.

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