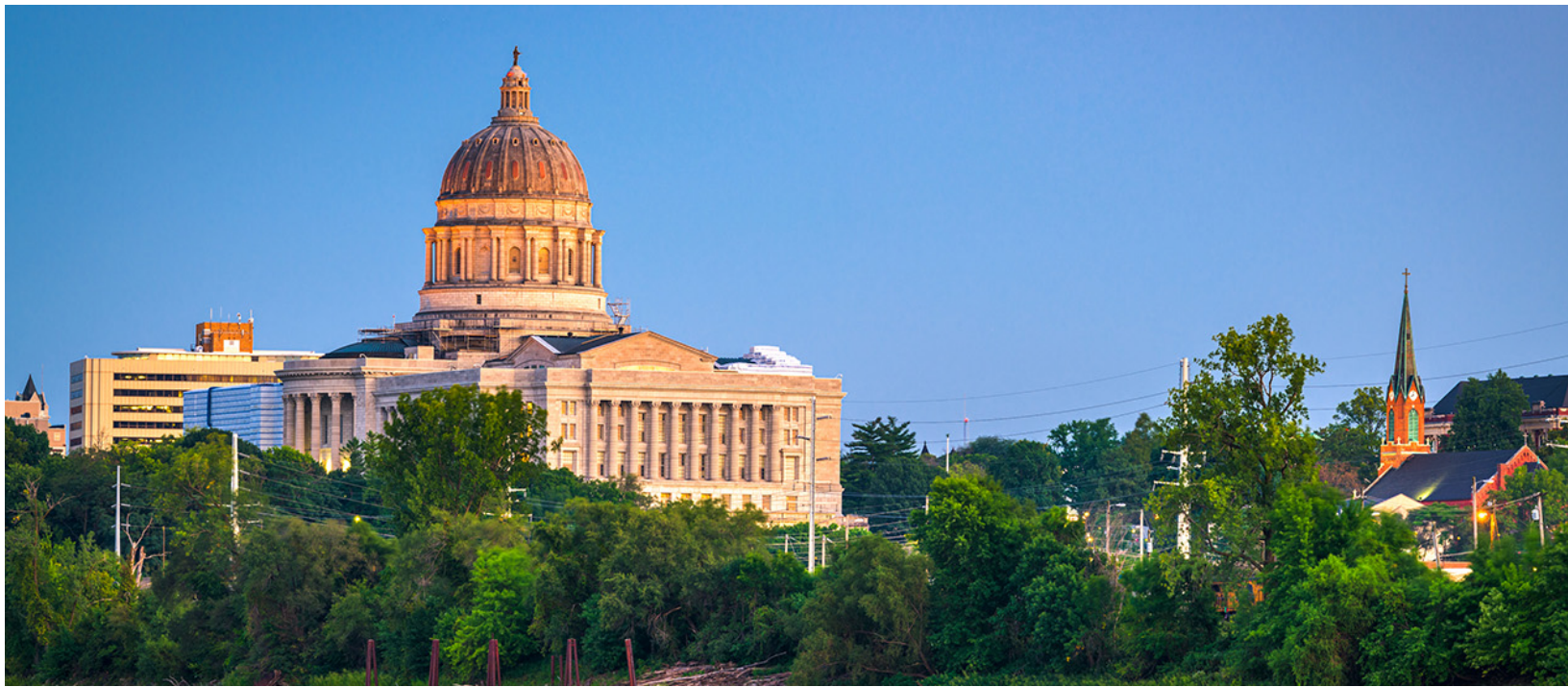




Independent EM&V Audit of the Evergy PY2023 Program Evaluations



Final Report

Submitted by Evergreen Economics

July 3, 2024



MichaelsEnergy

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1 Executive Summary

In January 2023, Evergy implemented its Missouri Energy Efficiency Investment Act (MEEIA) Cycle 3 Programs. The MEEIA Cycle 3 Programs covered in this audit include the following (descriptions summarized from the evaluation report):

- **Business Standard Program** – Designed to help commercial and industrial (C&I) customers save energy through a broad range of energy efficiency options that address all major end uses and processes. The program offers standard rebates as well as mid-stream incentives. The measures incentivized included lighting, lighting controls, HVAC equipment, and motors.
- **Business Custom Program** - Offered to all Evergy C&I customers, the program provides incentives for a broad range of projects that do not fit within the Business EER – Standard program.
- **Heating, Cooling and Home Comfort** – Designed to help residential customers increase awareness and incorporation of energy efficiency into their homes by providing education and financial incentives. The program encourages home improvements that increase operational energy efficiency and home comfort and consists of four components: 1) Energy Savings Kit, 2) Insulation and Air Sealing, 3) HVAC, and 4) Online Marketplace.
- **Energy Saving Products** – The program is designed to promote, cultivate, and facilitate the adoption of energy efficient products in residential homes. It is designed to expand both residential customer and sales associate knowledge of and familiarity with the advantages of various energy efficient products and promote efficient product adoption. Customers receive instant discounts for a variety of efficient measures including a selection of LED lighting measures, including standard, specialty, and smart bulbs.
- **Income-Eligible Multi-Family** – Targeting low income single family homes, the program provides point-of-sale incentives for the purchase of LED lightbulbs from qualifying retailers in low-income areas and discount supply stores. The program also has a “Giveaway Hub” that provides free energy efficient products to targeted low income customers.
- **Income-Eligible Single Family** – The program provides point-of-sale incentives for the purchase of LED lightbulbs from qualifying retailers in low-income areas and discount supply stores. income-eligible single family households with assistance through energy assessments, program applications, technical support, and equipment upgrade incentives. The program consists of three available channels: direct install, prescriptive, and custom measures.
- **Pay As You Save (PAYS)** – Supports the adoption of energy efficient equipment in residential homes by offsetting the upfront cost associated with major home improvements and upgrades. Each project approved through the program is designed to be



a cost-effective bundle of upgrades, meaning that the estimated savings on customer’s monthly bills from the installation of the upgrades must be more than the cost to install the measures. Customers finance the upgrades through a fixed monthly PAYS charge added to their monthly bills.

- **Business Demand Response** – Provides rebates to C&I customers for curtailing their energy usage during system peak demand periods. When Evergy calls an event, participants reduce their load toward a pre-defined firm power level to create demand savings.
- **Residential Demand Response** – Provides rebates to residential customers for curtailing their energy usage during system peak demand periods. When Evergy calls an event, participants reduce their load toward a pre-defined firm power level to create demand savings. Called upon devices will increase a customer’s setpoint between two- and five-degrees Fahrenheit.

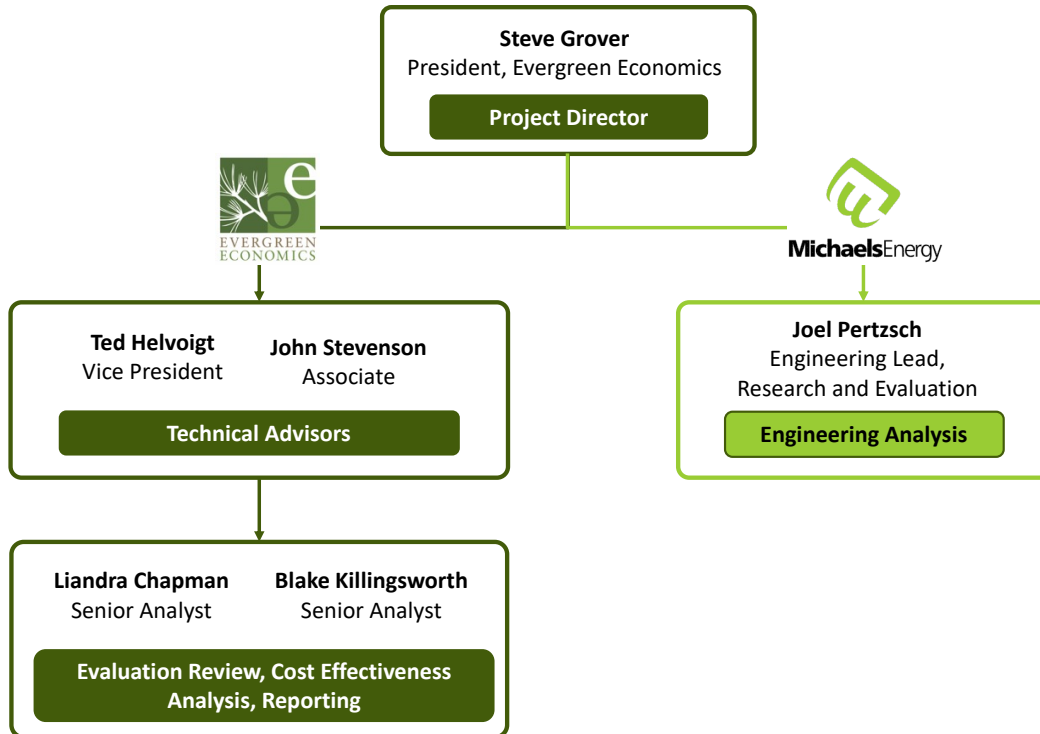
To ensure that programs comply with Missouri’s rules regarding electric utility resource planning, the PSC has rules requiring annual impact evaluations and process evaluations. Minimum requirements that evaluations must meet are stipulated in 4 CSR 240-22.070(8).

Evergy contracted with the evaluation teams led by Guidehouse, Inc. (Guidehouse) and ADM Associates (ADM). The evaluation teams conducted comprehensive impact and process evaluations of Evergy Metro’s and Evergy Missouri West’s energy efficiency portfolios in PY2023.

In 2023, the Missouri Public Service Commission (PSC) contracted with Evergreen Economics and Michaels Energy (the Evergreen team) to serve in the capacity of EM&V Auditor. Figure 1 shows the audit team members and organization, the individual team members by firm, and the associated audit responsibilities.

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.

Figure 1: Evergreen Audit Team Organization



1.1 Summary of Audit Conclusions and Recommendations

Over the last year, the audit team has had meetings and communications with the Guidehouse and ADM evaluation teams on analysis methods, and we were able to reach agreement on a several evaluation issues prior to the final evaluation reports being produced.

Our remaining audit conclusions and recommendations for PY2023 are provided below.

Net Impacts need to be reported and used for cost effectiveness testing. Our biggest recommendation for PY2023 relates to how net impacts are handled in the evaluation. As part of the “Stipulation Agreement¹”, it was decided that a 100 percent NTG ratio would be used for the low income and demand response programs, while 83.5 percent would be used for everything else. In the Guidehouse and ADM evaluation reports, only gross impact numbers were reported; net impacts were omitted entirely. The 83.5 percent was used for the Throughput Disincentive recovery calculation, however.

From an evaluation standpoint, this is not a grey area; in jurisdictions that are concerned with net impacts, the evaluation industry best practice is to include the realized net impact results in the

¹ Non-Unanimous Stipulation and Agreement Regarding the Implementation of Certain MEEIA Programs Through Plan Year 2023 and Motion for Expedited Treatment.

evaluation report. As just one example, we note that a deemed NTG ratio was used for Ameren Missouri for PY2023, and the ODC evaluation reports included net impacts in the summary tables and used net impacts in the cost effectiveness tests.

A much more serious problem is the omission of net impacts from the cost effectiveness tests. The California Standard Practice Manual, on which the Evergy cost effectiveness calculations are based, clearly states that net impacts are to be used in the TRC, SCT, UCT and RIM tests. For all programs except low income and the demand response program, a NTG ratio of 83.5 percent should have been used instead of the 100 percent value applied by both ADM and Guidehouse. As a consequence, the TRC, SCT, UCT and RIM tests were all done incorrectly in PY2023 for the Business Standard, Business Custom, Energy Savings Products, HCHC and PAYS programs. It should also be noted that in the C&I final summary evaluation report, Guidehouse claims that they are presenting “net benefits” in the cost effectiveness tables, and that the total “net benefits” for Evergy Metro and Evergy West are \$8,280,612 and \$4,436,797 (p. 25). These statements are all incorrect; they are gross benefits, not net benefits.

The lack of reporting net impacts and omitting them from the cost effectiveness tests calls into serious question the independence of the evaluation. We strongly urge that future evaluations correct this so that the cost effectiveness calculations are completed accurately and the evaluations can be consistent with industry best practices.

More verification work needed. The Evergy evaluation focus has shifted over time to the point where in PY2023, very little primary data collection is being done. This is due (presumably) to the Stipulation Agreement that allows for a deemed NTG ratio and does not require any process evaluation. For the C&I programs, only a few customers were called to verify project details, an activity mentioned only in passing in the evaluation report with no additional details given. On the residential side, an online survey for the PAYS program was conducted (sample size not reported) and an additional 11 customers were surveyed for the Appliance Recycling program. These two programs combined account for approximately one percent of the savings for the entire portfolio.

There is still an important evaluation responsibility for verify the equipment installations and to collect data on key impact parameters such as existing equipment efficiencies, operating hours, building types, and condition of replaced equipment (i.e., early replacement vs replace on failure). While this information is often collected by the program implementers, it needs to be confirmed independently by the evaluation teams. In PY2023, all of the gross savings calculations by the evaluation team rely on data provided by the program implementers, with no additional follow up to confirm that these data are accurate. There is often additional data needed by evaluators that is not routinely collected by the implementation teams. We recommend that future evaluations include plans for more customer surveys to update key impact savings parameters and verify equipment installations.



Statewide TRM needed. For future years, a statewide Technical Reference Manual (TRM) should be developed so that the same reference document is used to calculate savings for both Ameren Missouri and Evergy. Currently there are two separate (but similar) TRM's being used by each utility, even though essentially the same programs are being offered in both territories. Having a single TRM will help ensure that the savings calculations are being done consistently in cases where programs and measures are the same across territories.

Future net impact analysis. If the evaluation teams return to updating the net-to-gross ratios in the future, we recommend that they continue to work toward more consistency of survey methods and scoring algorithms across the residential and non-residential sectors. Similarly, we also recommend that future net impact methods strive for more consistency between Ameren MO and Evergy for programs that have similar designs.

The best way to accomplish this would be for both utility evaluation teams to use the net impact scoring algorithms included in the most current version of the Illinois TRM. As we have commented in previous years, the Illinois TRM net impact methods are superior to those that have been used by ADM in the past, as the Illinois approach has a less arbitrary scoring and response weighting algorithm, and is less likely to bias the free ridership scores downward.

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 Commission-approved demand side management (DSM) programs, with a goal of achieving cost-effective demand-side savings.

In 2009, the State of Missouri and Evergy reached an agreement to create Evergy Metro’s and Evergy Missouri West’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 KCP&L-MO (Case No. EO-2012-0142). In early 2016, the PSC approved MEEIA Cycle 2 DSM programs for KCP&L-MO (Case No. EO-2015-0055). For PY2022, program evaluation reports were filed for Evergy as part of Case No. EO-2019-0132.

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.”³

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

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

³ 4 CSR 240-22.070(8) Evaluation of Demand-Side Programs and Demand-Side Rates

- 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, 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?

Evergy contracted with Guidehouse, Inc. and ADM Associates as the Evaluation, Measurement & Verification (EM&V) contractors to conduct comprehensive impact and process evaluations of Evergy Metro’s and Evergy Missouri West’s energy efficiency portfolio. Guidehouse evaluated the commercial energy efficiency programs, and ADM conducted evaluations of the residential energy efficiency and demand response programs.

In 2023, 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 and provide comments on compliance with 4 CSR 240-22.070(8) and the overall quality, scope, and accuracy of the program evaluation reports. The following report presents Evergreen Economics’ review of the Evergy Metro and Evergy Missouri West program evaluations for PY2023.

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

3.1 Summary of Impact Evaluation Methods

Guidehouse and ADM followed the Missouri Code of State Regulations 4 CSR-240-22-070 (8), completing impact evaluations for each Evergy Metro and Every Missouri West program that reported energy savings in 2023. Missouri regulations state that programs should be evaluated using one or both methods and one or both protocols detailed below.

1) *Impact Evaluation Methods*

“At a minimum, comparisons of one or both of the following types shall be used to measure program and rate impacts in a manner that is based on sound statistical principles:

- a) Comparisons of pre-adoption and post-adoption loads of program or demand-side rate participants, corrected for the effects of weather and other intertemporal differences.
- b) Comparisons between program and demand-side rate participants’ loads and those of an appropriate control group over the same time period.”

2) *Load Impact Measurement Protocols*

“The evaluator shall develop load impact measurement protocols designed to make the most cost-effective use of the following types of measurements, either individually or in combination:

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

Guidehouse conducted the impact evaluation for the commercial sector programs (Business Standard, Business Custom). The gross savings estimates were developed by conducting an engineering review the participant tracking data, and then making adjustments as needed based on customer-specific data (where available). Additional engineering adjustments were made based on engineering judgment to align the savings values with current market conditions and best evaluation practices. The final gross savings values were calculated using the savings algorithms prescribed in the Evergy TRM.

ADM followed a similar process to complete the impact evaluation for the residential and low-income sector programs. For each program, ADM reviewed the participant tracking data and then calculated the final realized *ex post* savings using the algorithms from the Evergy TRM. For the residential and business demand response programs, final impacts were calculated using customer

billing data and comparing actual energy usage with the prescribed baseline during the called demand response events.

3.1.1 Net-to-Gross Calculation Methods

Under the current Stipulation Agreement, there was no new net impact evaluation research conducted in PY2023. While a deemed NTG ratio was stipulated, net impacts were not calculated for PY2023, in contrast to all prior years.

In past evaluation years, NTG ratio is designed to account for the following net impact components:

- **Free Ridership (FR)** – Program savings attributable to program participants who would have implemented a program measure or practice in the absence of the program.
- **Participant Spillover (PSO)** – Additional energy savings achieved when a program participant installs energy efficiency measures or practices as a result of the program’s influence outside the efficiency program.
- **Nonparticipant Spillover (NPSO)** – Additional energy savings achieved when a nonparticipant implements energy efficiency measures or practices because of the program’s influence (e.g., through exposure to the program).

The NTG ratio for each program adjusts gross program savings to account for the presence of free ridership, participant spillover, and non-participant spillover. The general formula for calculating the NTG ratio is:

$$\text{NTG Ratio} = 1 - \text{FR rate} + \text{PSO rate} + \text{NPSO rate}$$

For low income (i.e., income-eligible) and demand response programs, a NTG of 1.0 is typically used.

3.2 Summary of Impact Evaluation Results

The PY2023 gross and net impacts for the Evergy Metro and Every Missouri West’s program portfolios are summarized below based on the Guidehouse and ADM evaluation reports.

These impact components shown in these tables are defined as follows:

- **Ex Ante Gross Savings:** Annualized savings reported by Evergy Metro and Evergy Missouri West or calculated using tracked program activity to 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 NTG ratio, designed to account for free ridership and spillover effects.



Table 1 and Table 2 show the energy and demand impacts for Evergy Metro’s programs. The gross impact results and realization rates are taken from the evaluation report. As part of the audit, we also calculated the realized *ex post* net impacts using the NTG ratios from the Stipulation Agreement.

For the PY2023 Evergy Metro programs, total net savings were 30,561,204 kWh (87 percent of total *ex ante* gross savings) and 23,814 kW (96 percent of gross savings).



Table 1: Energy Metro Portfolio Energy Savings in PY2023, kWh

Program	Evaluator	<i>Ex Ante</i> Gross Savings	<i>Ex Post</i> Gross Savings	Gross Realization Rate	Net-to-Gross Ratio	<i>Ex Post</i> Net Savings
Business Standard Program	Guidehouse	11,030,376	10,106,534	92%	83.5%	2,923,190
Business Custom Program	Guidehouse	12,701,802	13,502,595	106%	83.5%	144,017
Total Commercial Portfolio		23,732,178	23,609,129			2,235,960
Heating, Cooling and Home Comfort	ADM	3,789,603	3,500,826	92%	83.5%	2,923,190
Energy Saving Products	ADM	174,661	172,475	99%	83.5%	144,017
Income-Eligible Multi-Family	ADM	2,145,283	2,235,960	104%	100%	2,235,960
Income-Eligible Single Family	ADM	3,228,967	4,444,178	138%	100%	4,444,178
Pay As You Save	ADM	371,605	317,330	86%	83.5%	264,971
Total Residential Portfolio		9,710,119	10,670,769			10,012,315
Appliance Recycling	ADM	37,319	35,215	94%	83.5%	29,405
Efficient Radon Fans	ADM	0	0	N/A	83.5%	-
Energy-Saving Trees	ADM	30,572	24,985	82%	83.5%	20,862
Virtual Energy Management	ADM	32,685	27,819	85%	83.5%	23,229
Total Pilot Portfolio		100,576	88,019			73,496
Residential Demand Response	ADM	761,771	761,771	100%	100%	761,771
Business Demand Response	ADM	0	0	N/A	100%	-
Total Demand Response Portfolio		761,771	761,771	100%		761,771
Total Portfolio		34,304,644	35,129,688			30,561,204

Table 2: Evergy Metro Portfolio Demand Savings in PY2023, kW

Program	Evaluator	<i>Ex Ante</i> Gross Savings	<i>Ex Post</i> Gross Savings	Gross Realization Rate	Net-to-Gross Ratio	<i>Ex Post</i> Net Savings
Business Standard Program	Guidehouse	2,281	1,532	67%	83.5%	1,279.22
Business Custom Program	Guidehouse	2,508	2,782	111%	83.5%	2,322.97
Total Commercial Portfolio		4,789	4,314			3,602.19
Heating, Cooling and Home Comfort	ADM	2,239.40	2,102.93	94%	83.5%	1,755.95
Energy Saving Products	ADM	28.48	28.11	99%	83.5%	23.47
Income-Eligible Multi-Family	ADM	297.66	337.32	113%	100%	337.32
Income-Eligible Single Family	ADM	377.58	526.95	140%	100%	526.95
Pay As You Save	ADM	82.90	80.24	97%	83.5%	67.00
Total Residential Portfolio		3,026.02	3,075.55			2,710.69
Appliance Recycling	ADM	20.33	9.09	45%	83.5%	7.59
Efficient Radon Fans	ADM	0	0	N/A	83.5%	0.00
Energy-Savings Trees	ADM	0	0	N/A	83.5%	0.00
Virtual Energy Management	ADM	0	7.69	--	83.5%	6.42
Total Pilot Portfolio		20.33	16.78			14.01
Business Demand Response	ADM	15,111.90	14,802.23	98%	100%	14,802.23
Residential Demand Response	ADM	4,745.56	2,685.17	57%	100%	2,685.17
Total Demand Response Portfolio		19,857.46	17,487.40			17,487.40
Total Portfolio		27,692.81	24,893.73			23,814.29



Table 3 and Table 4 show the analogous impact results for the PY2023 Evergy West programs. As before, the gross impact results and realization rates are taken from the evaluation report. The audit team also calculated the realized *ex post* net impacts using the NTG ratios from the Stipulation Agreement and included them in the tables.

For the PY2023 Evergy West programs, total net savings were 27,198,845 kWh (89 percent of total *ex ante* gross savings) and 42,491 kW (98 percent of gross savings).

Table 3: Evergy MO West Portfolio Energy Savings in PY2023, kWh

Program	Evaluator	<i>Ex Ante</i> Gross Savings	<i>Ex Post</i> Gross Savings	Gross Realization Rate	Net-to-Gross Ratio	<i>Ex Post</i> Net Savings
Business Standard Program	Guidehouse	9,120,810	9,899,260	109%	83.5%	8,265,882
Business Custom Program	Guidehouse	6,268,569	5,045,554	80%	83.5%	4,213,038
Total Commercial Portfolio		15,389,379	14,944,814			12,478,920
Heating, Cooling and Home Comfort	ADM	5,695,066	4,928,197	87%	83.5%	4,115,044
Energy Saving Products	ADM	183,977	181,495	99%	83.5%	151,548
Income-Eligible Multi-Family	ADM	340,123	342,700	101%	100%	342,700
Income-Eligible Single Family	ADM	7,444,620	8,795,361	118%	100%	8,795,361
Pay As You Save	ADM	529,903	465,696	88%	83.5%	388,856
Total Residential Portfolio		14,193,689	14,713,449			13,793,510
Appliance Recycling	ADM	2,045	1,930	94%	83.5%	1,612
Efficient Radon Fans	ADM	0	0	N/A	83.5%	-
Energy-Savings Trees	ADM	0	0	N/A	83.5%	-
Virtual Energy Management	ADM	141,211	95,025	67%	83.5%	79,346
Total Pilot Portfolio		143,256	96,955			80,957
Residential Demand Response	ADM	0	0	N/A	100%	-
Business Smart Thermostat	ADM	844,294	845,458	100%	100%	845,458
Total Demand Response Portfolio		844,294	845,458			845,458
Total Portfolio		30,570,618	30,600,676			27,198,845

Table 4: Evergy MO West Portfolio Demand Savings in PY2023, kW

Program	Evaluator	<i>Ex Ante</i> Gross Savings	<i>Ex Post</i> Gross Savings	Gross Realization Rate	Net-to-Gross Ratio	<i>Ex Post</i> Net Savings
Business Standard Program	Guidehouse	1,844	1,797	97%	83.5%	1,500.50
Business Custom Program	Guidehouse	1,389	1,377	99%	83.5%	1,149.80
Total Commercial Portfolio		3,233	3,174			2,650.29
Heating, Cooling and Home Comfort	ADM	3,291.52	2,930.95	89%	83.5%	2,447.34
Energy Saving Products	ADM	34.09	33.63	99%	83.5%	28.08
Income-Eligible Multi-Family	ADM	30.86	35.74	116%	100%	35.74
Income-Eligible Single Family	ADM	874.78	1,055.02	121%	100%	1,055.02
Pay As You Save	ADM	104.73	101.23	97%	83.5%	84.53
Total Residential Portfolio		4,335.98	4,156.57			3,650.71
Appliance Recycling	ADM	1.15	0.51	44%	83.5%	0.43
Efficient Radon Fans	ADM	0	0	N/A	83.5%	-
Energy-Saving Trees	ADM	0	0	N/A	83.5%	-
Virtual Energy Management	ADM	0.01	26.27	0%	83.5%	21.94
Total Pilot Portfolio		1.16	26.78			22.36
Business Demand Response	ADM	32,225.30	32,748.21	102%	100%	32,748.21
Business Demand Response	ADM	5,114.93	3,419.70	67%	100%	3,419.70
Total Demand Response Portfolio		37,340.23	36,167.91			36,167.91
Total Portfolio		44,910.37	43,525.26			42,491.27



4 Process Evaluation Summary

In accordance with the current Stipulation Agreement, there were no formal process evaluations required for the PY2023 programs. ADM did complete a limited process evaluation for several programs (Pay As You Save, Product & Services Incubator) that involved interviews with program staff and implementation contractors, and participant surveys for the Pay As You Save and Appliance Recycling programs.

In prior years, the requirements for process evaluations were set by the Public Service Commission in 4 CSR 240-22.070(8)⁴ that involved providing responses to five process evaluation 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?

While not required for PY2023, ADM provided a narrative response to each of these questions for the residential and demand response programs based on the PY2023 results combined with evaluation research completed in prior years.

⁴ 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>

5 Review of Cost Effectiveness

Guidehouse and ADM analyzed program cost effectiveness using the five-standard benefit-cost tests that cover a range of different stakeholder perspectives:

- **Total Resource Cost (TRC) Test** – Compares the benefits and costs from the perspective of all utility customers, including energy program participants and nonparticipants.
- **Societal Cost Test (SCT)** – Compares the benefits and costs to all stakeholders in the utility service territory, state, or nation as a whole.
- **Utility Cost Test (UCT)** – Compares the benefits and costs to the utility implementing the program.
- **Participant Cost Test (PCT)** – Compares the benefits and costs from the perspective of the customer installing the measure.
- **Ratepayer Impact Measure (RIM) Test** – Compares the benefits and costs from the perspective on non-participating ratepayers, and the impact of energy programs on customer rates.

These tests historically have been conducted so they are consistent with the 2001 California Standard Practice Manual (SPM).⁵ As noted earlier, however, this is no longer the case in PY2023 due to the use of gross impacts rather than net impacts for the benefit calculations. As a consequence, the TRC, SCT, UCT and RIM tests were all done incorrectly for the Business Standard, Business Custom, Energy Savings Products, HCHC and PAYS programs. This error results in cost effectiveness for these programs to be overstated, as the kWh and kW savings benefits are inflated from 83.5 percent to 100 percent.

Table 5 and Table 6 show the cost effectiveness test results from the evaluation reports. The Evergreen team reviewed residential and commercial summary findings from the portfolio reports and compared them to the output files to confirm that the cost effectiveness test details that were provided in the main report matched those included in the model output files. We have not included the PY2022 cost effectiveness results as we have in the past, as these results are no longer comparable.

⁵ California Public Utilities Commission. October 2001. "California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects."

https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/utilities_and_industries/energy_electricity_and_natural_gas/cpuc-standard-practice-manual.pdf

Table 5: Evergy Metro Cost Effectiveness Test Results

Program	TRC	SCT	UCT	PCT	RIM
	2023	2023	2023	2023	2023
Business EER - Standard	1.19	1.50	2.28	1.88	0.59
Business EER - Custom	0.97	1.24	3.49	1.25	0.69
Energy Saving Products	0.32	0.38	0.32	2.78	0.19
Heating, Cooling and Home Comfort	1.06	1.32	1.33	3.66	0.37
Income-Eligible Multi-Family	2.28	2.51	0.86	7.76	0.39
Income-Eligible Single Family	3.83	4.31	1.92	20.44	0.36
Pay As You Save	0.28	0.35	0.31	5.63	0.19
Business Demand Response	1.27	1.27	0.75	N/A	0.75
Residential Demand Response	1.23	1.43	0.68	7.52	0.49

Table 6: Evergy West Cost Effectiveness Test Results

Program	TRC	SCT	UCT	PCT	RIM
	2023	2023	2023	2023	2023
Business EER - Standard	1.39	1.72	2.22	2.44	0.57
Business EER - Custom	0.92	1.14	2.14	1.45	0.60
Energy Saving Products	0.42	0.51	0.39	3.14	0.21
Heating, Cooling and Home Comfort	1.08	1.36	1.41	3.06	0.42
Income-Eligible Multi-Family	0.74	0.83	0.30	14.56	0.20
Income-Eligible Single Family	4.97	5.52	2.59	19.92	0.37
Pay As You Save	0.27	0.33	0.29	6.83	0.18
Business Demand Response	2.39	2.39	0.93	N/A	0.93
Residential Demand Response	1.34	1.56	0.73	7.24	0.56

6 Audit Conclusions

Over the last year, the audit team has had meetings and communications with the Guidehouse and ADM evaluation teams on analysis methods, and we were able to reach agreement on a several evaluation issues prior to the final evaluation reports being produced.

Our remaining audit conclusions and recommendations for PY2023 are provided below.

Net Impacts need to be reported and used for cost effectiveness testing. Our biggest recommendation for PY2023 relates to how net impacts are handled in the evaluation. As part of the Stipulation Agreement, it was decided that a 100 percent NTG ratio would be used for the low income and demand response programs, while 83.5 percent would be used for everything else. In the Guidehouse and ADM evaluation reports, only gross impact numbers were reported; net impacts were omitted entirely. The 83.5 percent was used for the Throughput Disincentive recovery calculation, however.

From an evaluation standpoint, this is not a grey area; in jurisdictions that are concerned with net impacts, the evaluation industry best practice is to include the realized net impact results in the evaluation report. As just one example, we note that a deemed NTG ratio was used for Ameren Missouri for PY2023, and the ODC evaluation reports included net impacts in the summary tables and used net impacts in the cost effectiveness tests.

A much more serious problem is the omission of net impacts from the cost effectiveness tests. The California Standard Practice Manual, on which the Evergy cost effectiveness calculations are based, clearly states that net impacts are to be used in the TRC, SCT, UCT and RIM tests. For all programs except low income and the demand response program, a NTG ratio of 83.5 percent should have been used instead of the 100 percent value applied by both ADM and Guidehouse. As a consequence, the TRC, SCT, UCT and RIM tests were all done incorrectly in PY2023 for the Business Standard, Business Custom, Energy Savings Products, HCHC and PAYS programs. It should also be noted that in the C&I final summary evaluation report, Guidehouse claims that they are presenting “net benefits” in the cost effectiveness tables, and that the total “net benefits” for Evergy Metro and Evergy West are \$8,280,612 and \$4,436,797 (p. 25). These statements are all incorrect; they are gross benefits, not net benefits.

The lack of reporting net impacts and omitting them from the cost effectiveness tests calls into serious question the independence of the evaluation. We strongly urge that future evaluations correct this so that the cost effectiveness calculations are completed accurately and the evaluations can be consistent with industry best practices.

More verification work needed. The Evergy evaluation focus has shifted over time to the point where in PY2023, very little primary data collection is being done. This is due

(presumably) to the Stipulation Agreement that allows for a deemed NTG ratio and does not require any process evaluation. For the C&I programs, only a few customers were called to verify project details, an activity mentioned only in passing in the evaluation report with no additional details given. On the residential side, an online survey for the PAYS program was conducted (sample size not reported) and an additional 11 customers were surveyed for the Appliance Recycling program. These two programs combined account for approximately one percent of the savings for the entire portfolio.

There is still an important evaluation responsibility for verify the equipment installations and to collect data on key impact parameters such as existing equipment efficiencies, operating hours, building types, and condition of replaced equipment (i.e., early replacement vs replace on failure). While this information is often collected by the program implementers, it needs to be confirmed independently by the evaluation teams. In PY2023, all of the gross savings calculations by the evaluation team rely on data provided by the program implementers, with no additional follow up to confirm that these data are accurate. There is often additional data needed by evaluators that is not routinely collected by the implementation teams. We recommend that future evaluations include plans for more customer surveys to update key impact savings parameters and verify equipment installations.

Statewide TRM needed. For future years, a statewide TRM should be developed so that the same reference document is used to calculate savings for both Ameren Missouri and Evergy. Currently there are two separate (but similar) TRM's being used by each utility, even though essentially the same programs are being offered in both territories. Having a single TRM will help ensure that the savings calculations are being done consistently in cases where programs and measures are the same across territories.

Future net impact analysis. If the evaluation teams return to updating the net-to-gross ratios in the future, we recommend that they continue to work toward more consistency of survey methods and scoring algorithms across the residential and non-residential sectors. Similarly, we also recommend that future net impact methods strive for more consistency between Ameren MO and Evergy for programs that have similar designs.

The best way to accomplish this would be for both utility evaluation teams to use the net impact scoring algorithms included in the most current version of the Illinois TRM. As we have commented in previous years, the Illinois TRM net impact methods are superior to those that have been used by ADM in the past, as the Illinois approach has a less arbitrary scoring and response weighting algorithm, and is less likely to bias the free ridership scores downward.