Evergy Services, Inc. Commercial & Industrial Evaluation, Measurement, and Verification Report – FINAL Appendices

MEEIA Cycle 3 - Program Year 1 (2020)

Prepared for:

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Report Definitions

Note: Definitions provided in this section are limited to terms critical to understanding the values presented in this report.

Reporting Periods

Cycle 2

Refers to programs implemented in program years 2016-2019, which corresponds to April 2016-December 2019.

Cycle 3

Refers to programs implemented in program years 2020-2022, which corresponds to January 2020 – December 2022.

Savings Types

Gross Reported Savings

Savings reported in the Evergy Metro annual reports prior to any evaluation, measurement, and verification (EM&V) ex post gross adjustments and net-to-gross (NTG) adjustments. In previous Guidehouse EM&V reports, gross reported savings were referred to as ex ante gross savings.

Gross Verified Savings

Savings verified through Guidehouse's impact evaluation methods prior to NTG adjustments. In previous EM&V reports, gross verified savings were referred to as ex post gross savings.

Gross Realization Rates

The ratio of gross verified savings to gross reported savings.

Missouri Energy Efficiency Investment Act (MEEIA) Target

Three-year savings target approved by the Missouri Public Service Commission for a given program.

Net Verified Savings

Savings verified through Guidehouse's impact evaluation methods and inclusive of NTG adjustments.

Percentage of MEEIA Target Achieved

The ratio of net verified savings to the MEEIA target; reflects Evergy Metro's overall achievement toward the MEEIA target.

Net-to-Gross Components

Free Ridership (FR)

The program savings attributable to free riders—i.e., program participants who would have implemented a program measure or practice in the absence of the program.

Participant Spillover (PSO)

The additional energy savings achieved when a program participant—as a result of the program's influence—installs energy efficiency measures or practices outside the efficiency program after having participated.

Nonparticipant Spillover (NPSO)

The additional energy savings achieved when a nonparticipant implements energy efficiency measures or practices as a result of the program's influence (e.g., through exposure to the program) but that are not accounted for in program's gross verified savings.

Billing Analysis Approach to NTG

Approaches to estimating NTG that rely on the use of control groups, either through randomized control trials (RCTs) or quasi-experimental designs (e.g., the use of matching techniques to develop relevant nonparticipant comparison groups), and billing analysis to model participant net savings.

Key Report Sources

The following is a list of the most commonly referenced documents the evaluation team used for this year's analysis:

Illinois Technical Reference Manual Version 7.0. (Illinois TRM v7)
http://www.ilsag.info/il_trm_version_7.html

Illinois Technical Reference Manual Version 8.0. (Illinois TRM v8)
http://www.ilsag.info/il_trm_version_8.html

Illinois Technical Reference Manual Version 9.0. (Illinois TRM v9)
https://www.ilsag.info/technical-reference-manual/il-trm-version-9

Missouri Public Service Commission. Missouri Energy Efficiency Investment Act (MEEIA) Rules and the Stipulation and Agreement Issued December 16, 2019.

Missouri Code of State Regulations 20 CSR 4240-22.070 (8)

California Public Utilities Commission. *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects.* October 2001.
http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf.

Daniel M. Violette and Pamela Rathbun. "Estimating Net Savings: Common Practices," Chapter 23 in *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*. 2014. http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter23-estimating-net-savings_0.pdf.

Jane Peters and Ryan Bliss. *Common Approach for Measuring Free Riders for Downstream Programs.* Research Into Action. October 4, 2013.

California Public Utilities Commission. "2007 SPM Clarification Memo." 2007.
http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf.

Evaluation, Measurement, and Verification (EM&V) Plan for MEEIA Cycle 3 for Evergy Services, Inc. prepared by Guidehouse, Inc. December 2020.

Rachel Brailove, John Plunkett, and Jonathan Wallach. *Retrofit Economics 201: Correcting Commons Errors in Demand-Side Management Benefit-cost Analysis.* Resource Insight, Inc. Circa 1990.

Acronyms and Abbreviations

ASHP	Air Source Heat Pump
Btu	British Thermal Unit
C&I	Commercial & Industrial
CF	Coincident Factor
CFL	Compact Fluorescent Lamp
CSM	Customer Solution Manager
DR	Demand Response
EER	Energy Efficiency Ratio
EM&V	Evaluation, Measurement, and Verification
ESF	Energy Savings Factor
ETO	Energy Trust of Oregon
EUL	Effective Useful Life
FR	Free Rider(ship)
HOU	Hours of Use
HSPF	Heating Seasonal Performance Factor
HVAC	Heating, Ventilation, and Air Conditioning
IC	Implementation Contractor
IECC	International Energy Conservation Code
ISR	In-Service Rate
KCP&L	Kansas City Power and Light, now Evergy, Inc.
kW	Kilowatt
kWh	Kilowatt-Hour
LED	Light-Emitting Diode
MEEIA	Missouri Energy Efficiency Investment Act
NPSO	Nonparticipant Spillover
NTG	Net-to-Gross
O&M	Operations and Maintenance
OBEA	Online Business Energy Audit
PCT	Participant Cost Test
PITA	Program Influence on Trade Ally
PSO	Participant Spillover
PY	Program Year
RCx	Retrocommissioning
RIM	Ratepayer Impact Measure
RUL	Remaining Useful Life
SBL	Small Business Lighting
SCT	Societal Cost Test
SEER	Seasonal Energy Efficiency Ratio
SO	Spillover

SPM	Standard Practice Manual
TA	Trade Ally(ies)
TMY3	Typical Meteorological Year 3
TRC	Total Resource Cost
TRM	Technical Reference Manual
UCT	Utility Cost Test
WHF	Waste Heat Factor

Document Structure

As agreed to with stakeholders and discussed during the Evergy Missouri-West DSM Advisory Group quarterly meetings (December 7, 2020 and January 27, 2021), Guidehouse (also referred to as the evaluation team throughout this document) is providing a condensed evaluation, measurement, and verification (EM&V) report that presents key impact evaluation findings and recommendations. This report also summarizes the program year 1 (PY1) process evaluation findings that address the five required questions per the Missouri Code of State 20 CSR 4240-22.070 (8) (Missouri regulations). The document, provided separately from these Appendices, is divided into the following sections:

- **Summary of Approaches:** Provides a summary of the evaluation approaches for the impact evaluation, including the process for using secondary sources. It also includes overviews of the approach for net-to-gross, cost-effectiveness and process research.
- **Portfolio Findings and Evaluation Results:** This section provides findings and recommendations at the portfolio and sector level for gross and net savings, cost-effectiveness, and overarching process findings.

In addition to the condensed report, Guidehouse prepared several appendices to accompany the evaluation and provide further insight and documentation:

- **Appendix A. Introduction:** Provides an overview of the evaluation approach, including impact and process evaluation activities and cost-effectiveness.
- **Appendix B. Summary of Program Findings and Recommendations:** Details the findings and recommendations that resulted from each program's evaluation.
- **Appendix C. Cross-Cutting Methodologies:** Covers Guidehouse's overall approach toward cross-cutting methodologies, namely determining cost-effectiveness and net-to-gross (NTG) savings.
- **Appendix D – G. Program-Specific Methodologies:** Details program-specific impact and process evaluation methodologies, including any differences between the cross-cutting methodologies and those the evaluation team used for each program.
- **Appendix H. Survey Instruments:** Provides detailed survey guides, including participant, trade ally, and supplier interview guides, when applicable.
- **Appendix I. Cost-Effectiveness Data – CONFIDENTIAL**: An Excel databook containing the following:
  - All measure-specific input assumptions
  - Program-level administrative costs incurred by the program administrator
  - Detailed benefit and cost breakdowns by cost test and program or portfolio
- **Appendix J. Excel Databook – CONFIDENTIAL:** Provides additional analytical data and figures for each program and summary results tables for the portfolio.

Appendix A. Introduction

In accordance with the Missouri Energy Efficiency Investment Act (MEEIA) Rules and the Stipulation and Agreement, Evergy Services, Inc. (Evergy), on behalf of its affiliates Evergy MO West and Evergy Metro, has contracted with Guidehouse to evaluate, measure, and verify the information tracked by Evergy MO West and Evergy Metro for its portfolio of three commercial and industrial (C&I) demand-side management programs and one educational and behavioral program for the 3-year program cycle beginning January 1, 2020 through December 31, 2022. Specific Evergy programs covered by this evaluation include the following:

- C&I programs:
  - Business Energy Savings Program – Standard (Business Standard program)
  - Business Energy Savings Program – Custom (Business Custom program)
  - Business Energy Savings Program – Process Efficiency (Process Efficiency program)
- Educational and behavioral programs:
  - Online Business Energy Audit (OBEA)

Guidehouse conducted the following tasks as part of its impact evaluation, process evaluation, and cost-effectiveness analysis for program year (PY) 1:

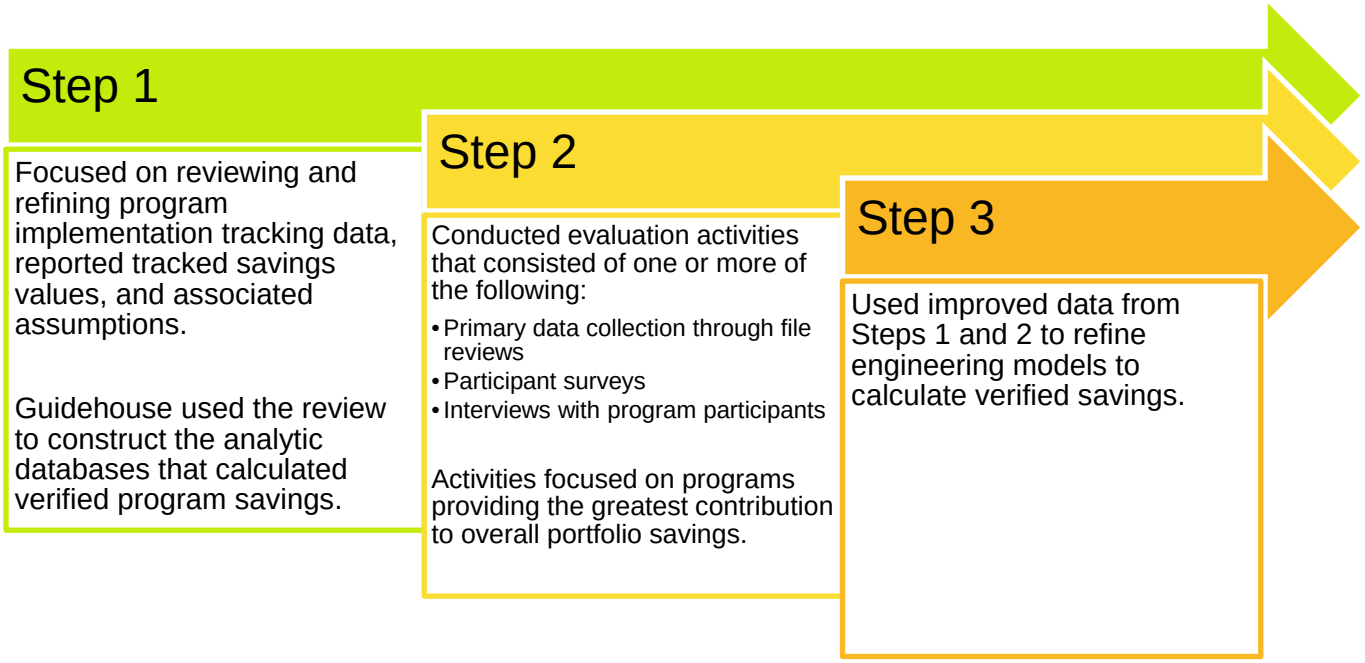
- Evaluate the gross and net energy and peak demand savings from Evergy's energy efficiency C&I programs
- Evaluate the effectiveness of and develop actionable recommendations to improve the design of Evergy's suite of C&I programs
- Estimate the cost-effectiveness of Evergy's C&I programs.

The evaluation team consists of Guidehouse and NMR Group, Inc. (NMR). As the primary contractor, Guidehouse is the main point of contact for Evergy and the implementation contractors (ICs). Guidehouse has ultimate responsibility for managing the effort, quality control, and confirming deliverables are submitted on time and on budget. NMR led the Process Efficiency and OBEA program evaluations and assisted in Business Custom file reviews. Throughout this report, this team is referred to as Guidehouse or the evaluation team.

A.1 Impact Evaluation Approach

The evaluation team employed a variety of methods to evaluate, measure, and verify the energy and demand savings achieved by each of the evaluated programs. The team summarizes the approach for gross impact, net savings analysis, and process evaluation in Figure A-1 and describes the key methods in the following sections.

Figure A-1. Gross Impact, Net Savings Analysis, and Process Evaluation Approach



Per Missouri regulations,[1] Evergy Metro and Evergy Missouri West (Evergy MO West) are required to complete an impact evaluation for each program using one or both of the methods and one or both of the protocols detailed as follows.

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 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.

[1] Missouri Code of State Regulations 20 CSR 4240-22.070 (8)

The evaluator will also be required to develop protocols to gather information and to provide estimates of program free ridership (FR), spillover (SO), and program net-to-gross (NTG) ratios.

Table A-1 summarizes the evaluation team's methods and protocols, as they align with Missouri requirements, for the impact evaluation.

Table A-1. Missouri Regulations and Impact Evaluation Methods and Protocols

Program		Impact Evaluation Method	Impact Evaluation Protocol
C&I Energy Efficiency Programs	Business Standard Program	1a	2a and 2b
	Business Custom Program	1a	2b
	Process Efficiency Program	1a	2b
Educational and Behavioral Programs	OBEA*	N/A	N/A

*Guidehouse does not recommend conducting an impact evaluation for this program because Evergy does not report savings. However, this type of program would likely be evaluated using 1b and 2a.

Source: Guidehouse analysis

A.1.1 Process for Using Secondary Sources

Evaluation results in MEEIA Cycle 3 reflect findings from research conducted concurrent with each program year. When all stakeholders and Evergy agree, these research findings are applied to current and following program years. For example, in PY1, Guidehouse conducted NTG research for the Business Custom program. The results from this research are applied to PY1 gross savings.

The evaluation team used primary in-state data when possible and when the team agreed with its applicability to Evergy's territories. Primary out-of-state data was used when primary in-state data was not available. Secondary out-of-state data was used when neither reliable primary in-state data or primary out-of-state data were available.

A.1.2 Net-to-Gross

Guidehouse used two primary methods to develop net savings for each program in PY1:

- **NTG ratios,** which involved the derivation of NTG components including FR and SO informed by participant and trade ally surveys.
- **Deemed NTG estimates,** which applied predetermined estimates that did not warrant data collection or were informed by MEEIA Cycle 2.

For programs where the NTG ratios were developed, the components were either based on data collected in MEEIA Cycle 2 and PY1 of MEEIA Cycle 3 from participants. Guidehouse used

the following component definitions, provided by the Uniform Methods Project,[2] to calculate the NTG ratios:

- **FR:** The program savings attributable to free riders—i.e., program participants who would have implemented a program measure or practice in the absence of the program.
- **Participant SO (PSO):** The additional energy savings achieved when a program participant—as a result of the program's influence—installs energy efficient measures or practices outside the efficiency program after having participated.
- **Nonparticipant SO (NPSO):** The additional energy savings achieved when a nonparticipant implements energy efficient measures or practices as a result of the program's influence (for example, through exposure to the program) but that are not accounted for in program savings.

Using these definitions, the evaluation team calculated the NTG ratio as follows in Equation A-1:

Equation A-1. NTG Ratio

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

Where:

FR rate = Free ridership rate
PSO rate = Participant spillover rate
NPSO rate = Nonparticipant spillover rate

Participating end-use customers are in the best position to articulate the likelihood that they are able to afford the increased-efficiency equipment without rebates. Trade allies are best suited to comment on the influences of a program beyond the rebate (such as a program's influence on their technical knowledge, stocking patterns, and typical product specifications and recommendations). Participants are often unaware of how these non-rebate program influences may have shaped their experiences with the trade ally, so they may be prone to overestimating FR in self-report surveys. Programs that leverage the NTG component method include Business Standard and Business Custom.

To address the evaluation, measurement, and verification (EM&V) auditor's comments regarding free ridership estimates, Guidehouse has made the following adjustments to the participant surveys:

- Added a question to the SO battery asking if they worked with the same contractor or a different contractor (or no contractor) to better assess the potential for SO double counting between PSO and NPSO.
- Added a question to the SO battery asking "how do you know the equipment is high efficiency?"

Additional detail on the NTG approach is provided in Appendix C.2.

[2] Daniel M. Violette and Pamela Rathbun. *Estimating Net Savings: Common Practices*, Chapter 23 in *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*. 2014. http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter23-estimating-net-savings_0.pdf.

A.2 Process Evaluation Approach

The evaluation team's process evaluation focused on addressing the five required questions per the Missouri regulations as shown in Figure A-2, and identifying program process improvements to increase program participation and savings.

Figure A-2. Five Required Questions per Missouri Regulations

QUESTION 1
What are the primary market imperfections that are 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 PY1, Guidehouse performed the activities shown in Figure A-3 to inform its process evaluation:

Figure A-3. Process Evaluation Activities

The evaluation team summarized findings for the Missouri-required process evaluation questions across all programs. PY1 program-specific process findings and recommendations are provided in Appendix B.

A.3 Cost-Effectiveness Approach

Guidehouse calculated benefit-cost ratios and total net benefits at the program and sector levels for the five standard benefit-cost tests: total resource cost (TRC) test, societal cost test (SCT), utility cost test (UCT), participant cost test (PCT), and ratepayer impact measure (RIM) test. Benefit-cost ratios are informative because they show the value of monetary benefits relative to the value of monetary costs as seen from various stakeholder perspectives.

The evaluation team's formulation of the benefit-cost tests followed the 2001 California Standard Practice Manual (SPM)[3] and did not account for the subsequent 2007 SPM Clarification Memo.[4]

Guidehouse's benefit-cost analysis accounted for the following cash flows:

- Avoided energy costs
- Avoided capacity costs
- Avoided operations and maintenance (O&M) costs
- Incentives
- Lost revenue/bill reductions
- Administrative costs[5]
- Participant equipment costs

Table A-2 summarizes how program costs and benefits are assigned to each of the cost tests consistent with the California SPM.

[3] California Public Utilities Commission. *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*. October 2001. http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf.

[4] California Public Utilities Commission. "2007 SPM Clarification Memo." 2007. http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf.

[5] Including portfolio-level costs related to energy efficiency and demand response (DR) programs, software development costs, EM&V costs, and educational program costs.

Table A-2. Cost and Benefit Assignments by Cost Test

Item	TRC Test	SCT	UCT	PCT	RIM Test
Avoided Costs	Benefit	Benefit	Benefit	N/A	Benefit
O&M Savings	Benefit	Benefit	N/A	Benefit	N/A
Incentives	Transfer	Transfer	Cost	Benefit	Cost
Lost Revenues	Transfer	Transfer	N/A	Benefit	Cost
Administrative Costs	Cost	Cost	Cost	N/A	Cost
Participant Equip. Costs*	Cost	Cost	N/A	Cost	N/A

*Based on the CA SPM, participant equipment costs are net costs for the TRC Test and the SCT. Participant equipment costs are gross costs for the PCT.

Source: Guidehouse analysis

A.3.1 Source of Benefit and Cost Assumptions

The sources of data used in the benefit-cost analysis are summarized in Table A-3. Many of the input assumptions used in Guidehouse's analysis came directly from Evergy. Critical assumptions that differed in the evaluation team's analysis were energy and peak demand savings (derived from verified data rather than reported estimates), NTG ratios, O&M benefits, effective useful life (EUL) and remaining useful life (RUL) values, and participant equipment costs. Reference Appendix I for detailed inputs and outputs from Guidehouse's benefit-cost model.

Table A-3. Sources of Benefit and Cost Data

Data*	Source
Avoided energy costs	Provided by Evergy
Avoided capacity costs	Provided by Evergy
Retail rates	Provided by Evergy
Load shapes	Developed by Guidehouse
Discount rates	Provided by Evergy and classified by Evergy as highly confidential
O&M savings	Guidehouse analysis
Participant equipment costs	Business Standard Program: Illinois Technical Reference Manual (TRM) and Evergy-prescribed values Business Custom Program: Incremental or total project cost as reported in the tracking database. The IC determines which type of cost is most appropriate given the type of project.
Energy and peak demand savings	Guidehouse engineering analyses
EUL	Illinois TRM, program tracking data, Evergy-prescribed values
RUL	Guidehouse analysis based on lifetime of replaced equipment and related mortality analysis techniques
NTG	Guidehouse NTG analysis
Line loss factors	Provided by Evergy
Incentives	Program tracking database

Data*	Source
Participation	Program tracking database
Administrative costs	Provided by Evergy

*Guidehouse did not provide the avoided energy and capacity costs in this report because they are confidential to Evergy.

Source: Guidehouse analysis

Appendix B. Summary of Program Findings and Recommendations

The following sections summarize Guidehouse's impact and process evaluation findings and recommendations by program.

B.1 Business Standard Program

The Business Standard program offers a diverse set of measures that have standardized measure savings and an incentive process that improves accessibility to the customer. These program aspects help increase the number of participants in the program for a broad segment of Evergy's customers, with more complex projects using the Business Custom program to tailor the upgrades to a customer's needs. Any Evergy commercial and industrial (C&I) customer is eligible to participate in the program. Program measures include energy efficiency projects such as lighting, lighting controls, motors, and HVAC. The Business Standard program added new measures and changed the incentives in Cycle 3 as compared with Cycle 2. Also, in July 2020, Evergy increased incentives through the end of program year (PY) 1 for small businesses for seven popular lighting measures and six food service measures. The objective of this incentive increase was to help customers dealing with the impacts of the COVID-19 pandemic.

B.1.1 Impact Evaluation Findings and Recommendations

Guidehouse found the program is consistently performing well in the territory, achieving 31% and 35% of its 3-year energy and demand savings targets in Evergy Metro territory and 32% and 35% of its 3-year energy and demand savings targets in Evergy MO West territory.

For the Business Standard program's impact evaluation, Guidehouse performed a deemed measure savings review and tracking database review, and applied the results of the onsite lighting study completed in Missouri Energy Efficiency Investment Act (MEEIA) Cycle 2 to capture improved primary inputs for the engineering analysis equations described in Appendix D. The evaluation team reviewed the tracking database to verify its validity and that it contains all necessary information to evaluate the program. The team reviewed the deemed measure savings and assessed the reasonability of the algorithms and assumptions used.

B.1.1.1 Findings

This section provides the evaluation team's findings from the PY1 Business Standard program impact evaluation.

In the Evergy Metro territory, the Business Standard program achieved a 108% realization rate for gross energy savings and a 105% realization rate for gross demand savings, as Table B-1 shows.

Table B-1. Business Standard Program PY1 Energy and Demand Savings Summary – Evergy Metro*

	Gross				Net	
	Reported Savings	Verified Savings	Realization Rate	MEEIA Cycle 3 3-Year Target	Verified Savings	Percentage of MEEIA 3-Year Target Achieved
Energy at Customer Meter (kWh)	16,217,890	17,464,540	108%	53,977,377	16,765,958	31%
Coinc Demand at Customer Meter (kW)	2,916	3,073	105%	8,523	2,950	35%

*Based on MEEIA Cycle 2 research, a net-to-gross (NTG) ratio of 0.96 was applied to the Business Standard program.

Source: Guidehouse analysis

In the Evergy MO West territory, the Business Standard program achieved a 108% realization rate for gross energy savings and a 106% realization rate for gross demand savings, as Table B-2 shows.

Table B-2. Business Standard Program PY1 Energy and Demand Savings Summary – Evergy MO West*

	Gross				Net	
	Reported Savings	Verified Savings	Realization Rate	MEEIA Cycle 3 3-Year Target	Verified Savings	Percentage of MEEIA 3-Year Target Achieved
Energy at Customer Meter (kWh)	14,366,301	15,537,675	108%	46,646,197	14,916,168	32%
Coinc Demand at Customer Meter (kW)	2,565	2,710	106%	7,514	2,601	35%

*Based on MEEIA Cycle 2 research, a NTG ratio of 0.96 was applied to the Business Standard program.

Source: Guidehouse analysis

Guidehouse calculated savings using data from the tracking database, onsite metering in Cycle 2, and secondary sources (e.g., the Illinois Technical Reference Manual, or TRM). Like previous years of this program, lighting measures accounted for close to 98% of the overall program savings. For this reason, the factors with the greatest impact on the overall program realization rate correspond with the lighting measure savings calculations. The Guidehouse team identified that some key factors influenced the verified savings the most. These key factors include assumptions around the baseline wattage, the recorded efficient wattage, hours of use (HOU), in-service rate (ISR), and coincidence factor (CF). These same key factors highly influenced the previous year's impact evaluation as well. The team addressed these key factors with the following steps:

1. First, Guidehouse aligned the baseline wattage for the verified savings using one of the following approaches:
    a. Aligning with the midpoint of the baseline wattage range listed in the measure name.
    b. Using secondary sources on baseline fixture wattage, including the Illinois TRM v8 and manufacturer specification sheets for the efficient lighting product that listed equivalent baseline products.
    c. Using the tracking database, which listed the baseline lamp or fixture type and the baseline lamp or fixture wattage. The tracking database indicated that the LED linear lamp and fixture market is shifting away from primarily T8s toward more T5HO lamp and fixture replacements. The tracking database also indicated that T12 replacements continue to represent a share of the measures. The tracking database also indicated that all the MR16 lamps were replacing 50W equivalent lamps in PY1.
2. Second, the Guidehouse team leveraged the recorded efficient wattage for the lamp or fixture in the verified lighting savings calculation for each measure incentivized.
3. Finally, the Guidehouse team included the results of the long-term onsite verification lighting study concluded in MEEIA Cycle 2 in the verified lighting savings calculation. The results of the long-term lighting study led to adjustments to the ISR, HOU, and CFs for lighting measures.

To determine the net savings, Guidehouse used the NTG analysis conducted in MEEIA Cycle 2, which indicated limited instances of free ridership (FR) at 5% and spillover (SO) at 0.5%. Based on these findings, the evaluation team applied an NTG ratio of 0.96.

B.1.1.2 Recommendations

Table B-3 summarizes Guidehouse's recommendations based on its impact evaluation findings.

Table B-3. Business Standard Program Impact Recommendations

Summary of Recommendations	
1. Guidehouse recommends the implementation contractor (IC) perform additional quality checks of the customer- or trade ally-reported efficient lamp/fixture wattage to ensure they match the value in the product specification sheets.	The evaluation team found that in a few cases the reported efficient measures did not match the specification sheets, such as in the case of a 14 W 4' linear lamp that had a reported efficient wattage of 7 W or an 18 W 4' linear lamp that had a reported wattage of 36 W. The team reviewed such instances and suggests providing more training to trade allies to understand that each measure in the Business Standard program is required to be a one-to-one replacement. This way the efficient wattage will always match the specification sheets, and the quantity will reflect the number of each lamp/fixture installed and replaced.
2. Guidehouse recommends the IC align with Evergy on the methodology for tracking the tonnage for HVAC and Cooling measures.	The tonnage in the IC's database did not always match the model specification sheets. In many instances, the difference was quite small, but the tracking data should always match the information in the specification sheets.

Summary of Recommendations	
3. Guidehouse recommends providing further guidelines, such as a lumen equivalency range, around what qualifies for the Interior LED 2x4 Linear Ambient Fixtures, Troffers, and Retrofit Kits replacing T8, T12, T5/T5HOs.	This measure category tends to be used as a catch-all with a wide range of efficient measures categorized together for LED replacements of linear fluorescents. For example, in PY1 efficient equipment wattages ranged from 9 W to 225 W across the Interior LED 2x4 Fixture or Retrofit Kit measures. Some of these products fit either in the Interior LED 1x4 or in the LED Low/High Bay fixture categories. These findings are further confirmed by reviewing the baseline lamps and fixtures reported for this measure category. The majority of the baseline fixtures were found to be Linear Ambient 3L or 4L 4' T8 fixtures. However, some 6L 4' T5HO or 2L 8' T12HO were also included in this measure which indicates that these measures are more likely LED High Bay than Linear Ambient fixture types.
4. Guidehouse recommends updating deemed savings for Networked Lighting Control measures to align with the IL TRM v9 algorithms.	The deemed savings values for Networked Lighting Controls are based on an assumed lighting watts controlled per square footage and an energy savings factor of 0.47. The evaluation team leveraged the reported lighting wattage controlled and the latest data on networked lighting controls energy savings factor (ESF) from the Illinois TRM v9 because this measure is not included in previous versions of the Illinois TRM. This change led to realization rates of 139% for energy and 225% for demand. It is likely that the lighting market is moving toward more networked lighting controls, and this measure may become a bigger part of lighting control savings.
5. Guidehouse recommends including an additional field in the tracking database for the energy efficiency ratio (EER) rating of the efficient unit installed for small <65 kBtu Air Source Heat Pump (ASHP) measures.	For small <65 kBtu ASHP measures, the IC's tracking data only listed the SEER and heating seasonal performance factor (HSPF) of the efficient and baseline measure. The EER is also needed to calculate the demand savings for this measure. Because this was not reported, the evaluation team was unable to verify that the manufacturer-listed EER was used by the IC.

Source: Guidehouse analysis

B.1.2 Process Evaluation Findings and Recommendations

For the process evaluation, Guidehouse conducted program staff interviews, reviewed program materials, and reviewed customer surveys administered by the implementer to identify opportunities to improve program processes.

B.1.2.1 Findings

The Business Standard program is an important component of Evergy's portfolio of C&I programs, as it represents approximately 65% of verified gross energy savings in the C&I sector in PY1. The process evaluation revealed many findings about the importance of this program. Table B-4 summarizes the Missouri-required process questions and associated answers to those questions.

Table B-4. Business Standard Program Missouri Requirement-Based Findings

Missouri Question	Guidehouse Findings
1. What are the primary market imperfections that are common to the target market segment?	The business sector faces a high barrier to participation because of the high upfront installation cost and a lack of understanding of lifetime value for energy efficient products. Evergy addresses these barriers by providing incentives and education, which reduce the incremental cost and improve the understanding of the long-term benefits. In addition, smaller business customers such as restaurants may have limited resources for researching energy conservation, leading to imperfect or incomplete information about the market. Evergy has developed targeted marketing materials, hosted webinars, and increased incentives in July 2020 to increase participation of smaller business customers in implementing energy efficiency measures. Evergy also created a resource page for small businesses and began offering a Virtual Energy Review for small businesses. Overall, small and medium businesses made up more than 50% of Business Standard projects across both territories.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Evergy has a well-defined target market of large and small commercial businesses for the Business Standard program. Evergy and its implementer track activity by trade ally and have bi-yearly Trade Ally Advisory Board meetings. The Trade Ally Advisory Board meetings had to happen virtually in PY1. At these meetings, Evergy provides a program status update and requests feedback from the trade ally representatives on the Advisory Board about all business programs. Evergy actively solicits feedback on the program by sending surveys to all customers that completed a project in the final email communication. Evergy reviews this feedback and incorporates it into the program design as warranted.
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?	The Business Standard program complements the Business Custom program by providing rebates for common energy efficiency upgrades, which are primarily lighting measures. Evergy is working toward further aligning the Business Standard and Business Custom programs, so that multiple end-use energy saving projects can be easily served across the entire portfolio. While the Business Standard program includes measures that address a variety of energy end uses for a participant, including the HVAC, refrigeration, and cooking energy end-uses, 94% of the projects in PY1 were for lighting or lighting control measures. Evergy and the IC are constantly evaluating the measure list to determine if it is meeting the needs of customers. Evergy added measures to the Business Standard program such as water and air-cooled chillers based on requests from the trade ally network. The other Evergy Business programs primarily address the end uses besides lighting, but they also tend to be dominated by lighting projects.

Missouri Question	Guidehouse Findings
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	The IC for the Business Standard program works one-on-one with larger customers and those larger customers' customer solution managers (CSMs). The trade ally network addresses medium and smaller customers. In addition, there is also targeted marketing for sectors with historically lower participation. In PY1, the implementer hosted targeted webinars for the public sector, schools, and customers interested in HVAC upgrades. These targeted webinars were in addition to general webinars for all business customers interested in energy efficiency upgrades available across all the business programs. Evergy's marketing activities meet the program's needs as evidenced by a sharp increase in projects once incentives were increased for a few small business measures in July 2020 through the end of PY1.
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 PY1, Evergy continued to have strong success with the efficient lighting measures in the Business Standard program. The effect from other end uses was around 2%, but other programs such as the Business Custom program covers many of those non-lighting measures.

Source: Guidehouse analysis

B.1.2.2 Recommendations

The Business Standard program is on track to achieve the 3-year Cycle 3 MEEIA target in both Evergy Metro and Evergy MO West territories, primarily through significant participation in efficient lighting measures. The program did see some increased participation in HVAC and Cooling measures and the School business type over previous years. The evaluation team provides the process recommendations listed in Table B-5 based on the PY1 evaluation.

Table B-5. Business Standard Program Missouri Requirement-Based Recommendations

Missouri Question	Guidehouse Recommendations
1. What are the primary market imperfections that are common to the target market segment?	Some customers do not have the lighting knowledge in-house to understand the differences between the lighting measures offered by the program. It also appears there is some confusion on the part of the trade allies. The program could continue efforts to offer additional education, technical support, and potentially new measure categories to: a) help customers identify energy efficient lighting projects; b) help customers and trade allies with the application process such that they apply for the most appropriate measure category; and c) identify areas where there continues to be confusion and provide specific training and examples to address this confusion. The increase in incentives in July 2020 through the end of PY1 also helped address the high capital cost of entry for small business customers and could be repeated if participation decreases.

Missouri Question	Guidehouse Recommendations
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The program could continue efforts deployed during PY1 that increased participation among the School strata and small businesses such that certain business types do not dominate the program. These efforts included targeted webinars explaining the benefits of implementing energy conservation, increased incentives for small businesses, and direct outreach to public sector and municipal customers.
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?	The program could continue the marketing and outreach efforts that led to the increased number of HVAC and Cooling measures incentivized in PY1 compared to previous program years. The program could continue to research methods to increase participation in the cooking end-use category because that end use is still seeing low participation even though significant potential for energy savings is likely. The program may need to diversify from lighting measures more in upcoming years as new building codes require highly efficient lighting and lighting controls in certain spaces.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	The following recommendations are provided to improve the communication channels and delivery mechanisms of the program: • Continue education and training of new and existing trade allies to reduce rebate application errors. • Create accessible targeted marketing materials that can be available on the program's website. • Continue efforts to streamline the rebate check delivery process because the customer survey indicated that was a challenge for some customers.
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?	The program saw low participation from some business types including those that may have been affected by the COVID-19 pandemic such as hotels, motels, restaurants, entertainment centers, and other assembly building types. The program could work to develop targeted marketing and targeted incentive increases for measures such as air conditioners or food service for these building types to increase participation in PY2 and PY3.

Source: Guidehouse analysis

B.1.3 Cost-Effectiveness Findings

This section presents Guidehouse's cost-effectiveness evaluation for the Business Standard program for each of the five standard benefit-cost tests. Please refer to Appendix A.3 for information on how benefits and program costs are allocated to each of the cost tests as well as the sources for the benefit and cost input assumptions.

The Guidehouse evaluation team applied a midlife adjustment to standard LED A bulbs and reflector LED bulbs (MR-16, B/BR, and PAR) offered through the Business Standard program. This adjustment reflects the natural growth of LED market share, which is anticipated to continue to grow over the life of the LED measures. The Illinois TRM v9 determined a single midlife adjustment based on estimates of the natural growth of the LED market share that resulted in the equivalent net present value of lifetime savings as the annual estimated decline. This midlife adjustment is applied in 2025 and is a 62% downward adjustment for LED A bulbs and a 40% downward adjustment for reflector LED bulbs. The annual savings claimed were

reduced 5 years into the life of the LED bulb measures to account for this downward adjustment and were incorporated into cost-effectiveness calculations.

Table B-6 presents the benefit-cost ratios for the five standard benefit-cost tests for Evergy Metro and Evergy MO West for PY1. Based on the team's benefit-cost analysis, Every Metro achieves a cost test ratio greater than 1.0 in the total resource cost (TRC) test, societal cost test (SCT), utility cost test (UCT), and participant cost test (PCT). Evergy MO West achieves a TRC ratio of 0.95 and an SCT, UCT, and PCT above 1.0.

Higher than average cycle startup costs and lower participation due to the COVID-19 pandemic contributed to the TRC results.

Table B-6. PY1 Cost-Effectiveness Results – Business Standard Program

Territory	TRC	SCT	UCT	PCT	RIM
Evergy Metro	1.01	1.19	2.31	1.57	0.59
Evergy MO West	0.95	1.12	2.21	1.60	0.53

RIM = ratepayer impact measure

Source: Guidehouse analysis

B.2 Business Custom Program

Evergy product managers and the IC made substantial efforts in PY1 to move the Business Custom program forward to align the program performance with the Cycle 3 target. The Business Custom program implemented 264 projects in 2020. In its first year of Cycle 3, the Evergy Metro Business Custom program achieved 34% and 43% of the 3-year MEEIA Cycle 3 target energy and coincidence peak demand savings, respectively. The Evergy MO West Business Custom program achieved 41% and 42% of the 3-year MEEIA Cycle 3 target energy and coincidence peak demand savings, respectively.

The Business Custom program provides incentives for energy efficient upgrades for business customers. This program is available to all C&I Evergy customers and is designed to cover a broad range of projects that do not fit within the Business Standard program. The Business Custom program:

- Delivers rebates—available for existing and new facilities—only to those projects that achieve a SCT score of 1.0 or higher and that have a simple payback period (before applying the rebate) of 1.5 years or greater.
- Calculates rebates in PY1 based on the following:
  - The program allows for a maximum incentive of $1,000,000 per customer (based on tax ID), per year, per jurisdiction, capped at $250,000 per project.
  - Participants that exceed the $250,000 per project threshold will be eligible for a reduced rate incentive.
  - Business Custom incentives will be capped at 75% of total measure costs and 100% of incremental costs unless otherwise specified.

  - Business Custom incentives levels are determined based on technology end use but are no lower than $0.04/kWh reduced annually and no higher than $0.45/kWh reduced annually.
- Requires preapproval from the IC before participants purchase and install equipment

B.2.1 Impact Evaluation Findings and Recommendations

Guidehouse's impact evaluation found that the Business Custom program had a 107% realization rate for gross energy and demand savings in the Evergy Metro territory and 97% and 89% realization rate for gross energy and demand savings in the Evergy MO West territory, respectively. In Evergy Metro, the program achieved 34% and 43% of the 3-year MEEIA target for net energy and demand savings, respectively. In Evergy MO West, the program achieved 41% and 42% of the 3-year MEEIA target for net energy and demand savings, respectively.

In PY1, the team conducted an impact evaluation, cost-effectiveness analysis, and process evaluation for the Business Custom program. For its impact evaluation, Guidehouse performed a tracking database review, sampling, telephone verification, and an engineering review of sampled projects. The evaluation team conducted NTG research in PY1 to help better understand the net impact of the Business Custom program.

B.2.1.1 Findings

Table B-7 summarizes the energy and peak demand savings and the corresponding realization rates for the Evergy Metro Business Custom program in PY1. Table B-8 shows the program's savings to date for the Evergy MO West Business Custom program in PY1. For Evergy Metro, Guidehouse verified 12,800,161 kWh of energy savings, 2,591 kW of coincidence peak demand savings, and realization rates of 107% for both. For Evergy MO West, the evaluation team verified 5,093,653 kWh of energy savings, 842 kW of coincidence peak demand savings, and realization rates of 97% and 89%, respectively.

Table B-7. Business Custom Program PY1 Energy and Demand Savings Summary – Evergy Metro

	Gross				Net*	
	Reported Savings†	Verified Savings‡	Realization Rate	MEEIA Cycle 3 3-Year Target	Verified Savings	Percentage of MEEIA 3-Year Target Achieved
Energy at Customer Meter (kWh)	11,954,187	12,800,161	107%	30,239,803	10,240,129	34%
Coinc Demand at Customer Meter (kW)	2,420	2,591	107%	4,834	2,073	43%

*Guidehouse calculated net verified savings by multiplying gross verified savings by the NTG ratio.
† The evaluation team characterized savings as reported and verified. Reported savings represent project savings estimated at the time of measure installation and reported in the program tracking database.
‡ Verified savings represent energy savings verified at the time of the evaluation.
Source: Guidehouse analysis

Table B-8. Business Custom Program PY1 Energy and Demand Savings Summary – Evergy MO West

	Gross				Net*	
	Reported Savings†	Verified Savings‡	Realization Rate	MEEIA Cycle 3 3-Year Target	Verified Savings	Percentage of MEEIA 3-Year Target Achieved
Energy at Customer Meter (kWh)	5,258,912	5,093,653	97%	10,016,241	4,074,922	41%
Coinc Demand at Customer Meter (kW)	949	842	89%	1,587	673	42%

*Guidehouse calculated net verified savings by multiplying gross verified savings by the NTG ratio.
† The evaluation team characterized savings as reported and verified. Reported savings represent project savings estimated at the time of measure installation and reported in the program tracking database.
‡ Verified savings represent energy savings verified at the time of the evaluation.

Source: Guidehouse analysis

The evaluation team made the following adjustments to the engineering calculations. These adjustments were the primary drivers of energy and coincident peak demand realization rates in PY1:

1. Applied a waste heat factor for energy (WHFe) based on the Illinois TRM v8 algorithm for calculation of energy savings.
2. Used the engineering algorithm outlined in the Illinois TRM v8 for estimating the peak demand savings while the IC used a kW factor approach.[6]
3. Applied a waste heat factor for demand (WHFd) and CF for calculation of peak demand savings to align with lighting spaces and operating schedules verified through phone interviews and desk reviews.
4. Adjusted lighting HOU to account for schedules verified through phone interviews and desk reviews.
5. Adjusted the baseline lighting power density (LPD) values according to the applicable International Energy Conservation Code (IECC) based on local jurisdiction.

[6] In MEEIA Cycle 2, at the request of Evergy, Guidehouse developed a list of kW factors by end use for calculation of peak demand savings based on the historically implemented Business Custom projects in the Evergy Metro service territory. The kW factor is ratio of the first-year peak demand savings to the first-year energy savings. It was established that the IC would use the kW factor to calculate peak demand savings, which is called the "kW factor approach," and Guidehouse would continue using the engineering approach to estimate peak demand savings. The engineering approach varies depending on the energy efficiency measures, summarized in the Business Custom Program- Specific Methodology Appendix E.

6. Consistently applied a savings calculation methodology that differs from the approach implemented by the IC for all non-lighting end-use categories.[7] The Guidehouse approach builds on the IC methodology by applying 8,760 hourly weather data to capture impacts based on time of day and seasonality.
7. Aligned the calculation of peak demand savings with the utility peak period[8] while the IC used the demand factor approach.
8. Made input and simulation adjustments to energy models provided by the IC to align with as-built conditions and leading practice evaluation methods.

B.2.1.2 Recommendations

Table B-9 summarizes Guidehouse's recommendations based on its impact evaluation findings.

Table B-9. Business Custom Program Impact Recommendations

Summary of Recommendations	
1. Guidehouse recommends the IC provide unlocked analysis workbooks.	Guidehouse recommends that all calculations, independent of measure type, should be initially performed in worksheets where the equations are transparent and easily reviewed to facilitate verification and evaluation. Currently, a subset of measure types uses locked worksheets, which make verification of the engineering analysis more difficult and time-intensive.
2. Guidehouse recommends the IC provide all energy models for applicable projects.	Ensure that final models and all accompanying model files are packaged together so accurate final modeling results stay intact, including weather and building simulation input files. Furthermore, ensure the correlating outputs from the final models match the reported energy savings values for each project involving an energy model. The IC should request modeling files in file formats that facilitate review such as Excel sheets or a comma separated values (.csv) file.
3. Guidehouse recommends using appropriate building codes.	Ensure the correct energy code is referenced for baseline engineering values and assumptions. Establish a systematic check within the program application that references the appropriate energy code based on local jurisdiction and project permit date to ensure the appropriate baseline code is assigned

[7] Both Guidehouse and the IC used the Typical Meteorological Year 3 (TMY3) weather data to estimate the pre- and post-retrofit power in the calculation of project savings. The TMY3 weather data includes 8,760 outdoor air dry-bulb temperatures and other weather parameters. For the HVAC Controls and Motors and Drives measures, the IC divided the 8,760 hourly temperatures to temperature bins in 2°, 5°, or other intervals and calculated the count of hours in each temperature bin. Then the IC predicted the pre- and post-retrofit power for each temperature bin. This approach does not estimate load corresponding to time and day of year. Alternatively, Guidehouse predicted pre- and post-retrofit power for each hour of each day (8,760 hours in total) based on the established regression models and the TMY3 weather data. Using this approach, Guidehouse was able to calculate the peak demand savings following the system peak period.

[8] The system peak period is the period during which demand savings are evaluated. The current Evergy peak period is 4:00 p.m.–6:00 p.m. on weekdays when daily maximum dry-bulb outdoor air temperature is >=95°F from June to August, excluding holidays.

Summary of Recommendations	
4. Guidehouse recommends the IC use an 8,760 hourly analysis.	Employ an 8,760 hourly analysis evaluation approach when appropriate, particularly for weather-dependent measures such as HVAC equipment. This methodology leverages weather data to analyze energy consumption variances by time of day and seasonality, which better represents the actual operating conditions of the installed equipment.

Source: Guidehouse analysis

B.2.1.3 Net-to-Gross

To capture the customer experience, the NTG analysis used primary research methods, which included fielding FR and SO surveys. Guidehouse sent the participant FR survey to the Cycle 3 PY1 participants from January through December 2020. Guidehouse sent the survey with questions focused on SO to participants from the second half of Cycle 2 PY4.

Survey responses indicated a weighted FR of 24% and a weighted participant SO (PSO) of 4%, resulting in a program NTG ratio of 80%. The nonparticipant SO (NPSO) was not quantified because the evaluation team did not conduct a trade ally survey in PY1. The Cycle 3 PY1 NTG ratio is higher than in Cycle 2 PY4, which is attributed to both the increase in participant SO and decrease in FR. PSO increased relative to prior years due to small lighting projects. The team generally expects to see minimal PSO from the Business Custom program due to participating customers' and trade allies' demonstrated willingness to go through the necessary preapproval application procedures. However, small lighting retrofit projects may be the exception because of the maturity of the market and the relative ease of doing these projects without the help of contractors. Guidehouse also acknowledges that 2020 was an unusual program year due to the COVID-19 pandemic and that may have affected the program performance and participation in ways that are difficult to quantify. Two of the thirteen respondents answered “don’t know” to the free ridership intention questions. These two respondents comprised 4% of the total program savings within the survey sample, and their effect on the final NTG numbers was minimal. For these “don’t know” responses, Guidehouse conducted a sensitivity test in which the score was treated as 0% FR, 50% FR, and 100% FR. The sensitivity test resulted in program-level free ridership ranging from 23% to 24%. The midpoint, treating these respondents as a 50% intention score averaged with the influence score they provided, resulted in a program-level free ridership value of 23.9%. This is rounded to 24% for the final program-level weighted FR. Responses to other questions and review of program communications support the idea that these two respondents are partial free riders, thus the Guidehouse team feels that the use of the midpoint value of 50% in lieu of “don’t know” responses is justified by the review of the participants’ full set of responses and communications. Appendix C describes in detail the methodologies for calculating FR, SO, and NTG. Table B-10 shows the components of the NTG ratio for the Business Custom program.

Table B-10. Business Custom Program NTG Components and Ratio, PY1

Program Year	Weighted FR	Weighted PSO	NPSO	NTG Ratio
PY1	0.24	0.04	N/A	80%

FR = free ridership, PSO = participant spillover, NPSO = nonparticipant spillover, NTG = net-to-gross

Source: Gudehouse’s NTG ratio research in PY1 for the Business Custom program

B.2.2 Process Findings and Recommendations

For the process evaluation, Guidehouse conducted interviews with program staff, reviewed program materials, and surveyed participants to identify opportunities to improve the Business Custom program processes.

B.2.2.1 Findings

The evaluation team addressed the five Missouri-required questions for process evaluation through program manager and implementation staff interviews and participant surveys. Participant survey response rates (Table B-11) were slightly lower but generally consistent with prior evaluation years.

Table B-11. Evergy Metro and Evergy MO West Business Custom Program Survey Sample Size and Responses

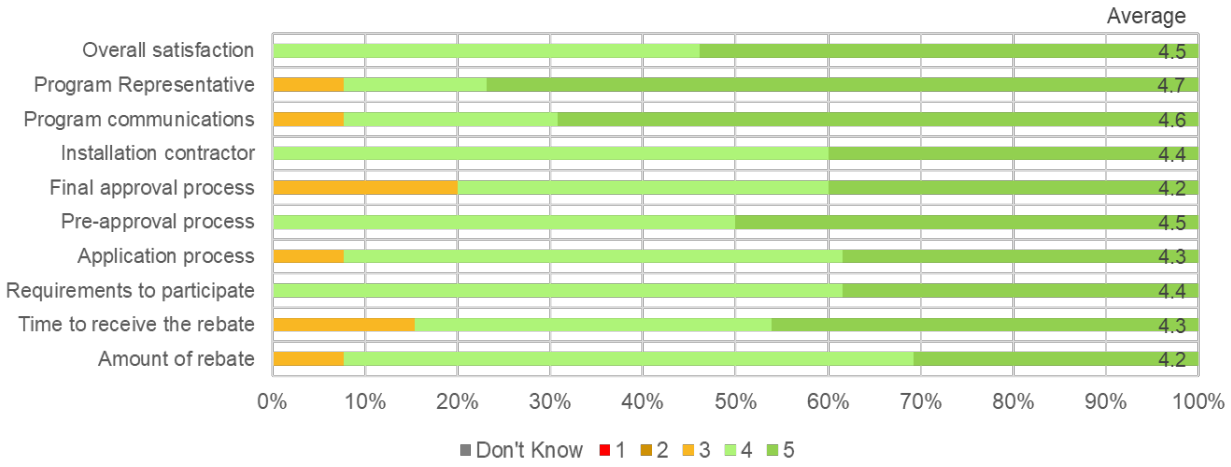
Year	Survey Type	Population Size	Completed Surveys	Response Rate
2020	Participant FR	69	13	19%
	Participant SO	135	21	16%
2019	Participant FR*	262	65	25%
	Participant SO	207	37	18%
	Trade Ally	57	18	32%
2018	Participant	270	63	23%
	Trade Ally	152	48	32%
2017	Participant	80	18	23%
	Trade Ally	56	11	20%

*Survey sent to MEEIA Cycle 2 PY3 participants (not surveyed in PY3) and MEEIA Cycle 2 PY4 participants.
Source: Guidehouse survey analysis

Survey respondents[9] ranked their satisfaction with the various aspects of the program high, with all categories receiving an average ranking of 4.2 to 4.7 (on a 1-5 scale, where 1 is low and 5 is high). Satisfaction increased relative to PY4 of MEEIA Cycle 2 ratings in almost all categories, with particularly notable increases in program communications (4.2 to 4.6) and the preapproval process (3.9 to 4.5).

[9] PY1 Participant FR survey

Figure B-1. Participant Satisfaction with Program Aspects



n=13

Source: Guidehouse survey analysis

Table B-12 summarizes the Missouri-required process questions and associated answers to those questions.

Table B-12. Business Custom Program Missouri Requirement-Based Findings

Missouri Question	Guidehouse Findings
1. What are the primary market imperfections that are common to the target market segment?	Project types included in the Business Custom program can be complex and take many years to complete. Customers may not understand fully the available energy savings from these types of projects, which requires utility education initiatives and incentives.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Guidehouse found that the target market is appropriately defined. All business customers are eligible to participate in the Business Custom program. Tier 1 customers provide the most energy savings to the program. The program could target small and medium sized customers. The small and medium business customers are highly targeted by the Business Standard program since the application process and incentives are easier to complete and receive.
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?	Due to the inclusion of some large new construction lighting projects in the Business Custom program, 51% of the energy savings came from lighting projects. New construction projects made up 48% of the total savings in the program. The air conditioning and heating measures made up 26% of savings with the rest of the savings achieved by savings in the appliances and other miscellaneous end-use categories such as refrigeration. Since the overall savings in the Business Custom program can be driven by one or two large projects, Guidehouse thinks that program participation appropriately reflects the end-use needs within the target market segment.

Missouri Question	Guidehouse Findings
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Due to the COVID-19 pandemic, marketing and promotion of the Business Custom program was primarily through emails and online webinars available to customers and trade allies. One in-person kickoff event for all Cycle 3 business programs was held at the beginning of 2020 and had over 80 customer attendees. The online communications throughout the year provided information about Evergy's business programs and supplemented the information available on Evergy's website. Customers indicated the in-person kickoff event and the online communications led them to complete Business Custom projects, indicating these communications are appropriate for the target market. The Business Custom program communicates closely with the CSMs who represent the larger Tier 1 customers. Participation from Tier 1 customers continued to be a large part of the Business Custom program in PY1, indicating these communications are working well.
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?	Customers and the trade allies that work with them need support to identify and implement large and non-standard energy efficiency projects that fall within the Business Custom program. There continued to be some confusion among trade allies about certain measures, such as motors and drives measures. However, this was not seen across all measure types. This finding indicates that the continued education of the business customers and trade allies can reduce confusion and increase participation in the Business Custom program. Also, some customers indicated some misunderstanding about their final rebate and felt that the communication and education could have been improved.

Source: Guidehouse analysis

B.2.2.2 Recommendations

The recommendations that correspond to Guidehouse's findings on the process evaluation are provided in Table B-13. These recommendations are based on the findings outlined above and are informed by the program manager interview, IC interview, and customer surveys conducted in PY1.

Table B-13. Business Custom Program Missouri Requirement-Based Recommendations

Missouri Question	Guidehouse Recommendations
1. What are the primary market imperfections that are common to the target market segment?	Some customers do not have the in-house engineering expertise to pursue complex custom projects or understand the benefits of these projects. The program should continue efforts to offer additional technical support to: a) help identify non-standard energy efficiency projects that do not fall within the Business Standard or Process Efficiency programs; b) help customers with the application process including the preapproval and post phase; and c) develop new industry-specific outreach campaigns, which help customers understand how custom projects benefit customers like them.

Missouri Question	Guidehouse Recommendations
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Evergy's Business Custom program should continue to work to identify new construction projects with potential for energy savings. These new construction projects may be in new business types such as indoor cannabis growing facilities that have not participated in the program before because they did not exist prior to changes in legislation. The IC should continue to work closely with the CSMs to identify opportunities to keep Tier 1 customers actively participating in Evergy's programs and meet the needs of these larger or national accounts.
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?	Trade allies and customers should continue to be encouraged to install non-lighting measures. These efforts could expand in PY2 (once COVID-19 pandemic restrictions are lifted) to include videos of specific case studies, in-person marketing events similar to the Cycle 3 kickoff event, trade shows, and additional training on the various non-lighting measures available through the Business Custom program. Also, PY1 participation included a peak load shift Business Custom project, which represented 5% of the demand savings in the program. Efforts should continue to educate customers and trade allies about the availability of this measure because it can lead to significant savings.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Evergy should continue efforts to market and communicate about the Business Custom program as part of the broader marketing efforts of Evergy's business programs, including the Business Standard and Process Efficiency programs. These efforts were shown in PY1 to lead to increased participation among smaller business customers in the Business Custom program. This increase was found by reviewing the customer participation in the incentive increase provided for the small and medium business customers as part of the Business Standard program in July 2020. Before the increase was provided, only two smaller customers had participated in projects with both Business Standard and Business Custom measures. After the incentive increase, nine smaller customers that took advantage of the incentive increase in the Business Standard program also participated in the Business Custom program.

Missouri Question	Guidehouse Recommendations
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?	Because some customers and trade allies continue to express some confusion and miscommunication about the Business Custom program in PY1, Evergy and the IC should offer additional technical support and education accessible to all customers. In some cases, the final incentives provided were lower than expected and in other cases they were higher than expected. However, the overall satisfaction with the program was very high in PY1, indicating the communication mechanisms are appropriate for most of the target market but may not be accessible for all eligible customers and trade allies. Further efforts to identify trade ally and customer communication issues through the Trade Ally Advisory Board meetings should be pursued. In addition, the IC could conduct follow-up interviews with any participants that express confusion or dissatisfaction to identify avenues to reduce such instances in PY2 and PY3. Guidehouse recommends that incentive levels for non-lighting end-uses are reviewed annually to ensure they are significant enough to not only increase participation in the program without increasing free ridership but to also consider the time and effort needed to complete the Business Custom application. Evergy did not see large impacts to program participation after reducing incentives close to 30% for some non-lighting categories between PY4 of Cycle 2 and PY1 of Cycle 3. This finding supports Guidehouse's recommendation to review incentive levels because they may not be properly aligned with the effort required to participate in the Business Custom program. This finding also supports recommendations to reduce other barriers such as lack of education that may be affecting non-lighting participation in the Business Custom program.

Source: Guidehouse analysis

B.2.3 Cost-Effectiveness Findings

This section presents Guidehouse's cost-effectiveness evaluation for the Business Custom program for each of the five standard benefit-cost tests. Please refer to Appendix A.3 for information on how benefits and program costs are allocated to each of the cost tests as well as the sources for the benefit and cost input assumptions.

Table B-14 presents the benefit-cost ratios for the five standard benefit-cost tests for Evergy Metro and Evergy MO West for PY1. Based on Guidehouse's benefit-cost analysis, Every MO West achieves a cost test ratio greater than 1.0 in the TRC, SCT, UCT, and PCT. Evergy Metro achieves a TRC ratio of 0.91 and an SCT, UCT, and PCT above 1.0.

Higher than average cycle startup costs, longer lead times for custom project fruition, and lower participation due to the COVID-19 pandemic contributed to the TRC results.

Table B-14. PY1 Cost-Effectiveness Results – Business Custom Program

Territory	TRC	SCT	UCT	PCT	RIM
Evergy Metro	0.91	1.17	3.07	1.20	0.65
Evergy MO West	1.38	1.76	2.72	2.47	0.57

Source: Guidehouse analysis

B.3 Process Efficiency Program

The Process Efficiency program is designed to provide a non-capital-intensive approach to energy efficiency engagement for businesses of all sizes and industries. Through its engagement process, the program seeks to ingrain energy management into its customer's business practices.

Currently, the program's activities are focused on providing retrocommissioning (RCx) services. RCx provides incentive offsets for comprehensive system energy optimization studies, allowing participants to identify low- and no-cost, long-term improvement strategies. Incentives are also offered on a $/kWh basis to address recommendations. Through the RCx process, participants receive recommendations for higher cost system improvements. These recommended measures can then be addressed through the Business Standard and Business Custom programs, along with other potential energy efficiency and demand response (DR) programs.

RCx project eligibility includes the following:

- Significantly higher than average energy usage intensity or conditioned area over 100,000 square feet
- Building over 2 years old or 2 years since the last building retrofit
- Existing energy management system

RCx incentives are based on approved energy savings associated with project measures, as well as a study reimbursement based on proven energy savings and study cost with a project simple payback of 18 months or less. An approved RCx Service Provider must complete an energy study to identify and describe recommended measures and submit a final report describing the implemented measures. The simple payback for the project, based on all measures, must be less than or equal to 18 months to be eligible for an RCx incentive. RCx study and measures are capped at 100% of total implementation cost. Measures creating a simple payback greater than 18 months may still be eligible for our Business Custom incentives. Projects over 500,000 kWh are required a minimum of 14 days of continuous, typical day equipment-level post-monitoring prior to completing documentation submission.

Each approved RCx project will have 6 months, from the date of offer signing, to complete the project and may not exceed November 30, 2022. The program aims to pre- and post-inspect a percentage (up to 100%) of all RCx projects and, at the discretion of the Evergy team, an appropriately detailed and illustrated study may serve as a pre-inspection for RCx projects.

B.3.1 Impact Evaluation Findings and Recommendations

B.3.1.1 Findings

An impact evaluation was not conducted for the Process Efficiency program because the program did not have any claimed program savings in PY1.

Table B-15. Process Efficiency Program PY1 Energy and Demand Savings Summary- Evergy Metro

	Gross				Net	
	Reported Savings	Verified Savings	Realization Rate	MEEIA Cycle 3 3-Year Target	Verified Savings	Percentage of MEEIA 3-Year Target Achieved
Energy at Customer Meter (kWh)	0	0	0%	19,454,539	0	0%
Coinc Demand at Customer Meter (kW)	0	0	0%	182	0	0%

Source: Guidehouse analysis

Table B-16. Process Efficiency Program PY1 Energy and Demand Savings Summary- Evergy MO West

	Gross				Net	
	Reported Savings	Verified Savings	Realization Rate	MEEIA Cycle 3 3-Year Target	Verified Savings	Percentage of MEEIA 3-Year Target Achieved
Energy at Customer Meter (kWh)	0	0	0%	20,470,674	0	0%
Coinc Demand at Customer Meter (kW)	0	0	0%	227	0	0%

Source: Guidehouse analysis

B.3.1.2 Recommendations

Guidehouse has no impact evaluation recommendations because there were no claimed PY1 savings associated with the Process Efficiency program.

B.3.2 Process Evaluation Findings and Recommendations

B.3.2.1 Findings

Table B-17 summarizes the Missouri-required process questions and associated findings to those questions.

Table B-17. Process Efficiency Program Missouri Requirement-Based Findings

Missouri Question	Guidehouse Findings
1. What are the primary market imperfections that are common to the target market segment?	PY1 was the first year for the Process Efficiency program offering. The COVID-19 pandemic continues to slow down the program rollout and limit the number of applications. Because it is a new program, it takes time for customers and trade allies to understand the program better.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The program currently primarily targets industrial customers for implementing RCx projects. For the RCx sector, the target market is appropriately defined.
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?	The program is currently focused on providing services for RCx projects for industrial customers. Over time, express tune-up measures will be included, but the timeline to do that is not currently set.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	The program is in its first year, and Evergy had challenges promoting it due to the COVID-19 pandemic. However, all the communication channels are appropriate for the target market sector. The marketing and promotion activities involved a Business Energy Solutions forum, email campaign, direct mail, webinars, and an RCx-focused campaign for trade allies.
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?	The program is strategically streamlining the process by offering incentives for measures such as compressed air leak survey and repairs. The customers can then do other RCx measures under the same project without having to reapply. Evergy is pursuing innovative approaches to encourage customer engagement within the overall C&I suite of programs.

Source: Guidehouse analysis

B.3.2.2 Recommendations

Guidehouse addressed the five required process evaluation questions set forth in the Missouri regulations[10] for the Process Efficiency program; the evaluation team's recommendations are provided in Table B-18.

Table B-18. Process Efficiency Program Requirement-Based Recommendations

Missouri Question	Guidehouse Recommendation
1. What are the primary market imperfections that are common to the target market?	RCx projects can be complex and difficult to understand from a requirements standpoint. The program should continue efforts to educate and offer additional technical support to the trade allies, customers, and CSMs to: a) understand the program better; b) help identify energy efficiency projects; and c) develop RCx-specific outreach campaigns, which help customers understand how these measures benefit customers like them.

[10] 4 CFR- 240-22.070(8)

Missouri Question	Guidehouse Recommendation
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Ensure Evergy's CSMs have the training and expertise to help customers identify energy savings in their facilities through an in-depth audit and face-to-face interactions. The CSMs could also work more closely with the implementer to help identify potential projects and use the implementation staff to support the customer through the application process.
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?	Evergy could consider targeting and adding more measures similar to the compressed air leaks survey and repairs to facilitate engagement with the customers.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Evergy is currently leveraging multiple avenues to reach customers and trade allies. Evergy should consider RCx-focused events (after COVID-19 pandemic restrictions are lifted) for customers to generate awareness about the measures similar to the C&I Business Energy Solution Forum event at Arrowhead Stadium.
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?	A key challenge to this new program is that customers, trade allies, and CSMs do not completely understand it. Evergy could continue educating all the stakeholders and complete outreach efforts to generate awareness for the program. Evergy could also continue to look for innovative approaches to engage the customers similar to the leaks survey and repair incentives currently being offered.

Source: Guidehouse analysis

B.3.3 Cost-Effectiveness Findings

No savings were claimed for the Process Efficiency program; therefore, a cost-effectiveness analysis was not conducted in PY1.

Table B-19. PY1 Cost-Effectiveness Results – Process Efficiency Program

Territory	TRC Test	SCT	UCT	PCT	RIM Test
Evergy Metro	N/A	N/A	N/A	N/A	N/A
Evergy MO West	N/A	N/A	N/A	N/A	N/A

Source: Guidehouse analysis

B.4 Online Business Energy Audit

The Online Business Energy Audit (OBEA) for small and medium businesses is an online tool that enables business customers to track and analyze their energy use. The tool also provides educational materials on energy savings for heating, cooling, lighting, and other electrical equipment. OBEA encourages small and medium businesses to engage with the broader portfolio of demand-side management programs.

Business customers billed based on energy use (kWh) and not demand (kW) can access the tool through My Account. These customers can track their energy and access tips for saving energy. However, they cannot access the Neighbor Comparison or Energy Analyzer portions of the tool.

B.4.1 Impact Evaluation Findings and Recommendations

B.4.1.1 Findings

Because OBEA does not claim savings for program activities, a savings impact analysis was not part of the scope of the evaluation.

B.4.1.2 Recommendations

There are no savings associated with the OBEA program. The program tracks overall page views and customer-level activity on key program pages such as the Energy Analyzer and Tip Actions. This detailed information is valuable for tracking tool use and should be continued.

B.4.2 Process Evaluation Findings and Recommendations

B.4.2.1 Findings

Guidehouse addressed two program-specific questions and the five Missouri-required questions for process evaluation through staff interviews and a program materials review. The evaluation team interviewed and exchanged emails with the Evergy program manager and reviewed materials on the program website and provided by the program manager to inform the process evaluation.

Table B-20 summarizes the Missouri-required process questions and associated answers to those questions.

Table B-20. OBEA Programs Missouri Requirement-Based Findings

Program-Specific Question	Guidehouse Findings
1. How many unique visitors are using OBEA?	Businesses did not have access to the Energy Analyzer platform in 2020 because it was being upgraded. This information will be available toward the end of 2021.
2. How is it being used relative to other utilities?	Answering this question requires additional research—interviews need to be conducted with program staff of other utilities and is planned for PY2.

Missouri Question	Guidehouse Findings
1. What are the primary market imperfections that are common to the target market segment?	Some customers do not understand how their actions and appliances or equipment in their business can affect their energy use. The program was not promoted in PY1 while the platform was being updated with new features that were rolled out to customers starting January 2021. The OBEA tool educates customers on their energy use and provides tips to help them lower their use.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	In PY1, the program targeted small and medium business customers interested in making their businesses more energy efficient or reducing their electricity bill. The applicability of energy-saving tips is different for residential and small and medium business customers, so it is appropriate to have separate tools for these groups. In the future, OBEA may look to expand the offerings to all of C&I and not just restrict to small and medium businesses. There are currently no specific plans or timeline for this expansion.
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?	The tool appropriately reflects the diversity of end-use energy service needs of the target market. The new platform is also expected to have a modern look and be mobile-responsive, providing customers with a seamless experience on any web browser or smart device. The OBEA tool has the following components: • My Energy Usage: Customers can view their own usage on a monthly or annual basis. • Detailed interval data is being added to provide deeper insight and help businesses better understand their energy consumption. • Ways to Save: This tip library provides business-specific suggestions in the areas of lighting, HVAC, and refrigeration for customers to reduce their energy use. The library contains over 30 tips.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	OBEA did not do any targeted communications in PY1 because it is going through changes that will be rolled out in 2021.
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 is implementing changes to the program that are expected to address some of the identified barriers from previous years such as time to learn how to use the tool and the perceived value of the tool. The program is redesigning the portal by moving away from the tabular integration to a more integral experience with embedded insights as widgets at specific locations in the portal, with a focus on providing a holistic customer journey. Every widget or page of the tool includes energy-saving tips, ensuring that even if customers use only a portion of the available components, they still receive tips.

Source: Guidehouse analysis

B.4.2.2 Recommendations

Guidehouse addressed the five required process evaluation questions set forth in the Missouri regulations[11] for OBEA. Overall, the evaluation team found that the program meets the requirements. Table B-21 summarizes the team's conclusions and recommendations, including more in-depth evaluation after the revised tool has been live for a full program year.

Table B-21. OBEA Missouri Requirement-Based Recommendations

Missouri Question	Guidehouse Recommendation
1. What are the primary market imperfections that are common to the target market?	After the revised tool has been active for at least several months, Evergy may want to consider gathering additional feedback from customers to understand how effectively the tool engages and educates customers on their energy use and how to reduce it.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Evergy should continue to monitor the effectiveness of outreach to ensure small business customers learn about the tool. Evergy may want to consider segmentation or propensity modeling to understand who is using the tool and who is not to better target both groups.
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?	Evergy could consider a quick analysis to assess savings associated with the program by assigning rough savings estimates to tips and applying those estimates to customers who indicated they have taken the tip's action.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Evergy has used a variety of communication channels in the past. With the launch of the updated tool, using and assessing the efficacy of a variety of channels will continue to be important.
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?	After the new tool has been active for several months, Evergy may want to assess the most effective approaches to drive different types of customers to the tool through A/B testing, propensity modeling, or other approaches.

Source: Guidehouse analysis

[11] 4 CFR- 240-22.070(8)

Appendix C. Cross-Cutting Methodologies

This appendix covers Guidehouse's overall approach toward cross-cutting methodologies, namely determining cost-effectiveness and net-to-gross (NTG) savings.

C.1 Cost-Effectiveness Approach

Guidehouse calculated benefit-cost ratios and total net benefits at the program and sector levels for the five standard benefit-cost tests. These tests include the total resource cost (TRC) test, societal cost test (SCT), utility cost test (UCT), participant cost test (PCT), and ratepayer impact measure (RIM) test. Benefit-cost ratios are informative because they show the value of monetary benefits relative to the value of monetary costs as seen from various stakeholder perspectives. Cost-effectiveness values were calculated using Guidehouse's ProCESS model and leverage Guidehouse-verified evaluation, measurement, and verification (EM&V) findings including energy and demand impacts, operations and maintenance (O&M) savings, incremental costs, NTG ratios, participation numbers, program administrative costs, and measure lifetimes. Additionally, energy and demand avoided costs, end-use load shapes, retail rates, discount and inflation rates, and line loss factors were provided by Evergy or characterized by Guidehouse to support cost-effectiveness calculations. The ProCESS model imports measure, program, and utility data where appropriate to determine granular cost-effectiveness results. These results are then summed to various levels of aggregation to yield ratios and net present value benefits. Where available, program and avoided cost data and discount rates are consistent with those used by Evergy in calculating cost-effectiveness as part of their annual filing. For inputs not accessible through Evergy's planning model, Guidehouse researched inputs consistent with previous Evergy cost-effectiveness evaluations. Guidehouse's ProCESS model formulation of the cost-benefit tests followed the 2001 California Standard Practice Manual (SPM)[12] and does not account for the subsequent 2007 SPM Clarification Memo.[13]

Table C-1 summarizes how program costs and benefits are assigned to each of the cost tests, consistent with the California SPM. In this analysis, the TRC test and the SCT only differ in the discount rate assumed (i.e., externalities are not included in this SCT analysis). Refer to Table C-2 for sources of assumptions regarding discount rates. For comparison with Evergy Metro and Evergy MO West's reported cost-benefit ratios, this report provides TRC and SCT results without including incentives paid to free riders as required by the 2007 Clarification Memo.

[12] California Public Utilities Commission. October 2001. "California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects." http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf.

[13] California Public Utilities Commission. 2007. "2007 SPM Clarification Memo." http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf.

Table C-1. Cost and Benefit Assignments by Cost Test

Item	TRC Test	SCT	UCT	PCT	RIM Test
Avoided Costs	Benefit	Benefit	Benefit	N/A	Benefit
O&M Savings	Benefit	Benefit	N/A	Benefit	N/A
Incentives	Transfer	Transfer	Cost	Benefit	Cost
Lost Revenues	Transfer	Transfer	N/A	Benefit	Cost
Administrative Costs	Cost	Cost	Cost	N/A	Cost
Participant Equip. Costs	Cost	Cost	N/A	Cost	N/A

Source: Guidehouse

C.1.1 Sources of Benefit and Cost Assumptions

Table C-2 summarizes the sources of data used in the cost-benefit analysis. Many of the input assumptions used in Guidehouse's analysis came directly from Evergy. Critical assumptions that differed in Guidehouse's analysis were energy and peak demand savings (derived from verified data rather than reported estimates), NTG ratios, effective useful life (EUL) and remaining useful life (RUL) values, and participant equipment costs. Please refer to Appendix I for inputs to Guidehouse's cost-benefit model.

Table C-2. Sources of Benefit and Cost Data

Data*	Source
Avoided energy costs	Provided by Evergy
Avoided capacity costs	Provided by Evergy
Retail rates	Provided by Evergy
Load shapes	Developed by Guidehouse
Discount rates	Provided by Evergy and classified by Evergy as highly confidential
O&M savings	Guidehouse analysis
Participant equip. costs	Illinois Technical Reference Manual (TRM), Evergy-prescribed values
Energy and peak demand savings	Guidehouse engineering analyses
EUL	Illinois TRM, program tracking data, Evergy-prescribed values
RUL	Guidehouse analysis based on lifetime of replaced equipment and related mortality analysis techniques
NTG	Guidehouse NTG analysis
Line loss factors	Provided by Evergy
Incentives	Program tracking database
Participation	Program tracking database
Administrative costs	Provided by Evergy

*Guidehouse did not provide the avoided energy and capacity costs in this report as they are confidential to Evergy.

Source: Guidehouse

C.2 Net-to-Gross

This section outlines the methods Guidehouse used to estimate free ridership (FR) and spillover (SO) as part of its evaluation of the Evergy's portfolio of energy efficiency and demand response (DR) programs.

The goal of Guidehouse's approach is to accurately estimate NTG components using multiple methods to approximate not only FR but also SO over the course of the 3-year program cycle. The evaluation team used the following definitions, provided by the Uniform Methods Project,[14] to calculate net savings:

- **FR:** The program savings attributable to free riders—i.e., program participants who would have implemented a program measure or practice in the absence of the program.
- **Participant SO (PSO):** The additional energy savings achieved when a program participant—because of the program's influence—installs energy efficient measures or practices outside the efficiency program after having participated.
- **Nonparticipant SO (NPSO):** The additional energy savings achieved when a nonparticipant implements energy efficiency measures or practices as a result of the program's influence (e.g., through exposure to the program) but that are not accounted for in program savings.

Using these definitions, the team calculated the NTG ratio using Equation C-1.

Equation C-1. NTG Ratio

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

Guidehouse used several types of NTG estimates depending on the program type, data availability, and the level of effort planned for the evaluation. Some programs use the prior year's estimated NTG value in the absence of new NTG research. Some evaluated programs have no claimed savings and do not require NTG estimation. Table C-3 summarizes the NTG method used for each program.

Table C-3. NTG Methods by Program

Program Name*	Estimated in 2020	Deemed Value of 1.0	Used Prior Year's Value	Not Applicable (No Claimed Savings)
Business Custom Program	X			
Business Standard Program			X	
Process Efficiency Program				X
Business Online Energy Audit				X

[14] Daniel M. Violette and Pamela Rathbun. *Estimating Net Savings: Common Practices*, Chapter 23 in The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures. 2014. http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter23-estimating-net-savings_0.pdf.

C.2.1 Participant FR

This section presents the general FR methodology. FR was assessed using a customer self-report approach following the Research Into Action and Energy Trust of Oregon (ETO) framework. [15] This approach used surveys designed to assess the likelihood that participants would have installed some or all of the energy efficiency measures incented by the program even if the program had not existed. The participant surveys followed the same basic structure as the ETO framework.

Based on the ETO methodology, the FR analysis included the following two elements: 1) intention to carry out the energy efficient project without program funds; and 2) influence of the program in the decision to carry out the energy efficient project.

The total FR score was the sum of the intention and program influence scores, resulting in a score ranging from 0 to 100. This score was divided by 100 to convert it into a proportion for application to gross savings values (see Equation C-2).

Equation C-2. Total FR

$$\text{Free Ridership (FR)} = \frac{\text{Intention Score + Program Influence Score}}{100}$$

C.2.1.1 Participant FR Intention Score

The evaluation team assessed intention through several brief questions used to determine how the upgrade or equipment replacement likely would have differed if the respondent had not received program assistance. The initial series of question asked the respondent to identify, out of a limited set of options, what most likely would have occurred without program assistance. Specific wording of the questions varied based on the types of measures installed through the program, but the offered response options captured the following four general outcomes:

1. Would have canceled the project, upgrade, purchase, etc., or installed the lowest efficiency option
2. Would have postponed the project by at least 1 year
3. Would have done something that would have produced savings but not as much as those achieved through the project as implemented (smaller quantity and/or lower efficiency)
4. Would have done the project exactly as implemented through the program
5. Don't know

Respondents who said they would have canceled or postponed the entire project for at least a year or installed the lowest efficiency available were not considered free riders in terms of intention (a score of 0 for the intention score). The respondents that indicated they would have undertaken the project as implemented or purchased/installed the same energy efficient equipment without the program were considered total free riders in terms of intention (a score of

[15] Jane Peters and Ryan Bliss. *Common Approach for Measuring Free Riders for Downstream Programs.* Research Into Action. October 4, 2013.

50 for the intention component). Respondents who indicated they would have done something that would have resulted in less savings were considered partial free riders with an intention score between 5 and 45 depending on the combination of responses about the quantity and efficiency level of the equipment that would have been installed in the absence of the program. Table C-4 demonstrates the assignment of efficiency scores and timing adjustments, which combine to form the intention score (Intention = Efficiency * Timing Adjustment).

Table C-4. Efficiency Score and Timing Adjustment Determination

Efficiency Installed in Absence of Program	Efficiency Score
Same efficiency or higher	50
Almost as efficient	33.3
Somewhat less efficient	16.6
Lowest efficiency/lowest cost available	0
Don't know	25

Quantity Installed within One Year in Absence of Program	Timing Adjustment
All (or Don't Know)	1.0 (no change to Efficiency Score)
Most	0.66
Some	0.5
Few	0.33
None	0 (Intention Score becomes 0)

Source: Guidehouse

C.2.1.2 Participant FR Influence Score

Guidehouse assessed the program influence on the participant's decision to implement energy efficiency improvements by asking the respondent how much influence—on a scale of 1 (no influence) to 5 (great influence)—various program elements such as incentives and program information had on the decision to implement the measure. Respondents were asked to rate the program's influence on the efficiency and timing of their project separately, to make the influence questions easier for respondents to answer in situations where the program greatly influenced one element of the project but not the other.

A participant's program influence score was then set to the participant's maximum influence rating for any program element. The rationale was that if any given program element had a great influence on the respondent's decision then the program itself had that level of influence, even if other elements had less influence.

Respondents were asked to rate each of the following program elements on the 1-5 influence scale:

- Influence of the **program incentive** on the decision to complete a high efficiency project
- Influence of **educational or marketing materials from an Evergy program** on the decision to complete a high efficiency project
- Influence of **information from Evergy Business Energy Savings program staff** on the decision to complete a high efficiency project

If the respondent indicated that they would have installed the project at a later date in the absence of the program, they also were asked to rate the:

- Influence of the **program incentive** on the decision to complete the project at the time that they did rather than a later date
- Influence of **educational or marketing materials from an Evergy program** on the decision to complete the project at the time that they did rather than a later date
- Influence of the **information from Evergy Business Energy Savings program staff** on the decision to complete the project at the time that they did rather than a later date

The influence score is based on the highest rated program element. Table C-5 shows the influence score for each possible influence rating response. An influence rating response of 5 – Very influential resulted in an influence score of 0, contributing no value to the total FR score. Program influence and FR have an inverse relationship: the greater the program influence, the lower the FR, and vice versa.

Table C-5. FR Program Influence Scores

Maximum Program Influence Rating Response	Influence Score
1 (Not at all influential)	50
2	37.5
3	25
4	12.5
5 (Very influential)	0
Don't know	25

Source: Research Into Action and ETO Standard FR Protocol

FR is estimated individually for each participant survey respondent according to the algorithm described above and then savings are weighted by the individual participant's share of respondents' total energy savings to estimate program-level FR.

C.2.2 Participant SO

Guidehouse also assesses SO through the customer surveys. SO is the energy savings influenced by the program but that did not receive program incentives and are not included in the program records. Survey questions aimed to identify whether participants purchased or installed additional energy efficient products without an incentive. The following are examples of these SO questions:

1. Since your participation in the program, did you install or purchased any ADDITIONAL energy efficient products in your home that did NOT receive incentives through Evergy?
2. Could you describe the energy efficient product installed or purchased?
3. How did you know the product was energy efficient?
4. How many energy efficient products did you purchase without an incentive?

Additionally, the evaluation team included a question about the level of influence the program had on the respondent's decision to install the additional measures. An example of the question follows.

1. On a 1-5 scale where 1 is not at all influential and 5 is very influential, how influential was your experience in the Evergy program in your choice to install or purchase the energy efficient product?

The 1-5 influence ratings form a SO influence score as follows:

- 1 (low program influence) = 0%
- 2 = 25%
- 3 = 50%
- 4 = 75%
- 5 (high program influence) = 100% (full attribution)

For each participant, Guidehouse calculated SO for measures reported as the product of the measure savings, number of units, and influence score, as illustrated in Equation C-3.

Equation C-3. SO Savings from Installed Measures

$$\text{Measure SO} = \text{Measure Savings} * \text{Quantity} * \text{SO Influence Score}$$

For each participant, the evaluators then totaled the measure-level SO savings to give the participant-level SO savings reflected in Equation C-4. To be conservative, Guidehouse assumed that no participant would have an SO project with higher savings than the program-incented project, effectively capping each participant's spillover at their program kWh savings.

Equation C-4. Overall Participant SO

$$\text{Participant SO} = \text{Minimum} (\Sigma\text{Measure SO} , \text{Project Savings})$$

Finally, the team summed the SO across participants and divided the program total SO savings by the program total savings in the sample to yield a participant SO percentage, as shown in Equation C-5.

Equation C-5. Participant SO Percentage

$$\%\ \text{Participant SO} = \frac{\sum \text{Participant SO (population)}}{\text{Program Savings in Sample}}$$

C.2.3 Trade Ally FR and NPSO

The following sections present details on the trade ally NTG methods. No trade ally surveys were completed in Cycle 3 PY1, but will be completed in PY2 and/or PY3. These sections are included for reference.

Guidehouse's trade ally (TA) net-to-gross (NTG) analysis employs an incremental scoring approach (i.e., 1=0%, 2=25%, 3=50%, 4=75%, 5=100%) for all scoring.

C.2.3.1 Program Influence on Trade Ally and FR Methodology

The analysis used the responses to the program influence on trade ally (PITA) questions in three ways:

- To qualitatively provide insight and context for the NTG analysis
- To ensure that trade allies' responses to direct measure-level FR questions are consistent with their account of the program's influence
- To form part of an attribution factor to determine what share of non-incented high efficiency project savings should be attributed to the program as SO

Guidehouse's analysis resulted in a marketing influence score based on questions that focus on how trade allies are marketing energy efficient products due to program influence. Table C-6 presents the question and resulting program volume influence scores.

Table C-6. Calculation of Marketing Influence Score

Response to Question: How much influence has that marketing assistance had on your ability to successfully market energy efficiency to your customers? (Scale of 1-5)	Marketing Influence Score
1 (Not at all influential)	0%
2	25%
3	50%
4	75%
5 (Very influential)	100%

Source: Guidehouse

Guidehouse also asked trade allies about the likelihood that they would have recommended the same high efficiency measures in the absence of the program. That response was converted into a recommendation program influence score as shown in Table C-7. A high likelihood score converts into a low program influence score and vice versa.

Table C-7. Calculation of Recommendations Influence Score

Response to Question: Since participating in the Evergy program, have you changed your energy efficiency offerings to customers? For instance, have you added more high efficiency products to your offerings, stopped offering lower efficiency models, or started recommending higher efficiency models as the "default" option? If the program had never been available, what is the likelihood that you would have made those same changes? (Scale of 1-5)	Recommendations Influence Score
1 (Not at all likely)	100%
2	75%
3	50%
4	25%
5 (Very likely)	0%

Source: Guidehouse

Finally, the team calculated an overall PITA score. The score is the maximum of the previously calculated influence scores. The maximum of the scores is used rather than an average because using an average would unduly underestimate the program's impact in instances where the program has had a strong influence on the high efficiency sales of a trade ally who has always recommended high efficiency measures, for example.

Trade Ally Direct Estimate of FR. The surveys ask a series of program influence questions prior to direct queries regarding the trade ally's views on FR to assist the trade ally in recalling the diversity of ways in which the program may have influenced their high efficiency projects including the program's influence on trade allies that participants can't see on their marketing and stocking practices. The program influence questions were asked generally about all high efficiency measures. The direct FR questions focused specifically on the trade ally's top three measures based on program savings. The trade allies were asked to directly assess FR by estimating the number of units they would have sold in the absence of the program after being reminded of how many units they sold through the program. The trade ally estimates of free ridership are used as a cap on the participant estimates of free ridership on a measure-by-measure basis whenever the estimates are lower than participant free ridership, based on the rationale that participants have the best sense of their ability to afford high efficiency measures without rebates, but participants may not be aware of the ways in which the program has influenced trade allies beyond the provision of rebates. Averaging participant and trade ally free ridership would penalize the program in situations where participants indicate the influence rebates have on them because trade allies don't always know the financial realities their customers are facing. The evaluation team therefore doesn't want to increase the free ridership that participants report on the basis of trade allies' incomplete information. However, if participants are unaware of the fact that trade allies might not have even offered high efficiency without the program, though, they can't accurately report that they would have done high efficiency in the absence of the program. The trade ally questions focus specifically on these changes that participants would be unaware of. Guidehouse did not used trade ally free ridership as a cap in the Cycle 2 PY4 analysis because it was not lower than participant free ridership.

These trade ally estimates of free ridership are estimated at the measure level as described in the following equation.

Equation C-6. Trade Ally Free Ridership Estimated at Measure Level

$$Trade\ Ally\ FR_{\ Measure} = \frac{\sum Trade\ Allies'\ Direct\ Estimate\ of\ Units\ Sold\ without\ Program}{\sum Program\ Incented\ Units}$$

C.2.3.2 NPSO Methodology

Trade allies answered a series of questions to establish the possible existence of SO for their top three highest saving measures.

Estimating the Number of Non-Incented High Efficiency Projects. For each measure, the survey asked the trade ally to estimate how many (if any) additional projects it completed without rebates. Trade allies often reported that spillover occurred because customers did not want to take the time to complete the program-related paperwork, whereas the participants have demonstrated that they are willing to take the time to complete program paperwork to receive rebates when working with a participating trade ally who is aware of the program rebates. This

suggests that the participating trade allies' reported spillover is occurring with nonparticipating customers who don't value rebates enough to take the time to apply for them.

Attributing Non-Incented Projects to the Program. For each SO measure, Guidehouse calculated the number of SO projects by multiplying each trade ally's total number of non-incented projects by an attribution factor based on the trade ally's responses to program influence questions. If the trade ally said that the program did not have any influence on the non-incented measures, the attribution factor was automatically 0% (meaning that no SO was assigned to the program for those measures for that trade ally). Otherwise, the attribution factor was based on the PITA score (discussed above) and the trade ally's response to the following question on program influence:

"How influential do you think the program was on these additional units sold without rebates?" (Scale of 1-5)

The 1-5 influence ratings form a SO influence score as follows:

- 1 (low program influence) = 0%
- 2 = 0%
- 3 = 50%
- 4 = 100%
- 5 (high program influence) = 100%

Equation C-7. Attribution Factor

$$\text{Attribution} = \text{PITA Score} * \text{SO Influence Score}$$

Next, Guidehouse calculated the number of SO projects per trade ally for each measure by multiplying the total number of non-incented projects by the attribution factor.

Equation C-8. Number of SO Projects by Trade Ally and Measure

$$\#\text{ of SO Projects}_{Measure} = \#\text{ of Non-Incented Projects}_{Measure} * \text{Attribution}$$

Estimating SO Project Savings. SO was calculated for each trade ally/measure combination separately. Guidehouse then calculated the total number of SO projects per measure category and multiplied the total number of SO projects across all trade allies by the measure's savings adjustment factor.

Equation C-9. Savings-Adjusted SO at the Measure Level

$$SO_{Measure} = \frac{\sum \#\text{ of SO Projects}_{Measure}}{\#\text{ of Program Projects}_{Measure}}$$

Finally, Guidehouse calculated a program-level SO estimate by weighting each measure's SO estimate by the measure's share of total program energy savings, as shown in Equation C-10.

Equation C-10. SO at the Program Level

$$SO = \sum SO_{Measure} * \frac{\text{Program Savings}_{Measure}}{\text{Program Savings}_{Total}}$$

C.2.4 Application of Baseline Energy Codes

The Standard program uses an assumed code that represents an approximate weighted average of the energy codes adopted in the territories. Since the majority of the participants in the Standard program are customers located in Kansas City, MO (KCMO), Guidehouse believes it is appropriate to use KCMO's energy code for the Standard measures. Once KCMO updates their energy code, which they are currently considering to be IECC 2021, then Guidehouse will reevaluate which baseline code is most appropriate for the Standard program.

For the sampled projects for the Custom program, Guidehouse reviews the county or city code and applies the most relevant code as applicable for new construction and replace-on-burnout HVAC projects. For early replacement HVAC projects, which are uncommon, Guidehouse uses a dual baseline approach to calculate savings. The existing equipment baseline is used until the assumed end of useful life of the existing equipment and then the code baseline is used for the remaining useful life of the new equipment. The following table outlines what was assumed for PY1 and the plan for PY2 based on the current energy codes for the Custom program.

Table C-8. Custom Program Energy Code Analysis

Location	Assumed Energy Code for PY1	Planned Energy Code for PY2 Evaluation	Source for the planned energy code for PY2 evaluation
No Code	IECC 2009	IECC 2012	More conservative to estimate savings.
City of Kansas City, MO	IECC 2012	IECC 2012	https://www.kcmo.gov/city-hall/departments/city-planning-development/building-and-rehabilitation-code
Jackson County, MO	IECC 2009	IECC 2009	https://www.jacksongov.org/DocumentCenter/View/267/54-Building-Code-PDF
Sedalia, MO	IECC 2015	IECC 2015	https://library.municode.com/mo/sedalia/codes/code_of_ordinances?nodeId=CD_ORD_CH10BUBURE_ARTIVBUCO
Raytown, MO	IECC 2012	IECC 2018	https://www.raytown.mo.us/index.asp?SEC=3B107F85-E8A5-482D-BF3E-F6BE008B599C
Riverside, MO	IECC 2009	IECC 2018	https://www.riversidemo.com/buildingcodes/page/building-inspections
Buckner, MO	IECC 2003	IECC 2003	https://ecode360.com/29975606#33347316

Belton, MO	IECC 2012	IECC 2012	https://library.municode.com/mo/belton/codes/unified_development_code?nodeId=UNDECO_CH10BUST
Smithville, MO	IECC 2012	IECC 2012	https://www.smithvillemo.org/pview.aspx?id=1943
Warrensburg, MO	IECC 2006	IECC 2018	https://www.warrensburg-mo.com/197/Building-Inspections-Permits
Platte County, MO	IECC 2009	IECC 2018	https://drive.google.com/drive/folders/0B3XJaCcHmN_qNkNoM3JuWElyZ0U
Gladstone, MO	IECC 2015	IECC 2018	https://www.gladstone.mo.us/CommunityDev/adoptedcodes.php
Grandview, MO	IECC 2012	IECC 2018	https://www.grandview.org/work/city-government/community-development/ordinances-codes
North Kansas City, MO	IECC 2012	IECC 2018	http://www.nkc.org/departments/community_development/permits_and_applications

Source: Guidehouse analysis

Appendix D. Business Standard Program-Specific Methodologies

Evergy designed the Business Standard program 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—including lighting, HVAC equipment, and motors—are proven technologies that are readily available with known performance characteristics.

Based on Missouri regulations, the evaluation team used method 1a and protocol 2a and 2b to evaluate the Business Standard program. This evaluation of the Business Standard program consisted of the following activities:

- Gross impact evaluation (detailed in Appendix D.1)
- Process evaluation (detailed in Appendix D.2)
- NTG analysis based on work conducted in Cycle 2 PY1 (detailed in Appendix B.1.3)

D.1 Impact Evaluation

The evaluation team conducted the bulk of the Business Standard program gross impact evaluation activities in Cycle 2 PY1, with smaller efforts in MEEIA Cycle 3 PY1 to update results in a cost-effective manner. The impact evaluation assessed gross energy and demand savings by conducting the following activities:

- Tracking database review
- Deemed measure savings review

D.1.1 Tracking Database Review

The evaluation team conducted a thorough review of the program tracking database in February 2021 that included 12 months of data (January 2020-December 2020) for the program year. Guidehouse reviewed the program tracking database to assess the availability of data fields that help the impact evaluation, including the following:

- Participant contact details and installation address
- Building type
- Installed measure information (quantity, measure type, size, capacity, efficiency levels)
- Reported energy and demand savings at the measure and project[16] levels
- Project costs (implementation cost and incremental equipment cost)
- Trade ally contact information

[16] A project is a unique application that includes single or multiple Standard and Custom measures.

D.1.2 Deemed Measure Savings Review

The Evergy Missouri Energy Efficiency Investment Act (MEEIA) TRM documents assumptions for deemed measure savings for the Business Standard program. The evaluation team reviewed the deemed measure savings used to calculate the reported savings for the Business Standard program. This review identified and verified the accuracy and completeness of the engineering algorithms and assumptions used in the deemed savings calculations to ensure they reflect equipment performance in Evergy's service territory. Guidehouse reviewed the baseline and efficient case wattages, hours of use (HOU), waste heat factors (WHFs), and coincident factors (CFs) used for lighting measures. For non-lighting measures, Guidehouse reviewed the baseline and efficient case ratings and calculation variables such as HOU, CF, etc. used to calculate the deemed savings. The deemed measure savings do not differentiate by building type whereas many of the values used for calculating savings such as HOU, WHFs, and CFs do vary by building type.

Table D-1 summarizes the assumed baseline wattages for all the lighting measures included in the Business Standard program savings. The majority of these are from the Illinois TRM v8, but some updates were made to more closely match the baseline wattage range, baseline wattage lamp type listed in the measure name, or the baseline lamp or fixture types listed in the tracking data.

Table D-1. Baseline Wattage Assumptions

Primary Key	Library Measure Name	Baseline Wattage Assumption
102.3	LED Exit Sign	10.5
102.4	LED Exit Sign	10.5
109.2	Remove 4ft Lamp from T8 or T12 system	30.8
109.3	Remove 4ft Lamp from T8 or T12 system	30.8
110.2	Remove 8ft Lamp from T8 or T12 System	56
110.3	Remove 8ft Lamp from T8 or T12 System	56
149.3	Exterior LED replacing > 400W Fixture or Mogul Screw-Base Lamp	1078
150.3	Exterior LED replacing 251W-400W Fixture or Mogul Screw-Base Lamp	325
151.3	Exterior LED replacing 175W-250W Fixture or Mogul Screw-Base Lamp	213
152.3	Exterior LED replacing < 175W Fixture or Mogul Screw-Base Lamp	151
154.3	Parking Garage LED replacing 101W-175W Fixture or Mogul Screw-Base Lamp	137
166.2	Interior LED Linear Lamp Replacing 4ft T8, T12, or T5 Lamp	33
166.3	Interior LED Linear Lamp Replacing 4ft T8, T12, or T5 Lamp	33
167.2	Interior LED Linear Lamp Replacing 2ft T8, T12, or T5 Lamp	17

Primary Key	Library Measure Name	Baseline Wattage Assumption
168.3	Interior LED 1X4 Retrofit Kit replacing T8, T12 or T5/T5HO fixture	77.33
169.2	Interior LED 2X4 Retrofit Kit replacing T8, T12 or T5/T5HO fixture	115
169.3	Interior LED 2X4 Retrofit Kit replacing T8, T12 or T5/T5HO fixture	115
170.2	Interior LED 2X2 Retrofit Kit replacing T8, T12 or T5/T5HO fixture	77.33
170.3	Interior LED 2X2 Retrofit Kit replacing T8, T12 or T5/T5HO fixture	77.33
171.2	Interior LED 1X4 Troffer or Linear Ambient replacing T8, T12 or T5/T5HO fixture	77.33
171.3	Interior LED 1X4 Troffer or Linear Ambient replacing T8, T12 or T5/T5HO fixture	77.33
172.1	LED 2X4 Troffer or Linear Ambient replacing T8, T12 or T5/T5HO fixture	112
172.2	Interior LED 2X4 Troffer or Linear Ambient replacing T8, T12 or T5/T5HO fixture	112
173.2	Interior LED 2X2 Troffer or Linear Ambient replacing T8, T12 or T5/T5HO fixture	77.33
173.3	Interior LED 2X2 Troffer or Linear Ambient replacing T8, T12 or T5/T5HO fixture	77.33
174.4	LED Refrig Case Lights w/Doors 4ft 5ft or 6ft repl Fluor Refrig Case Lights w/Doors 4ft 5ft or 6ft	84.75
217.2	LED High Bay fixture replacing > 750W fixture	1078
220.3	LED Low Bay Fixture replacing 150W-300W fixture	225
221.3	LED Low/High Bay Fixture replacing 301W-450W fixture	375
221.4	LED Low/High Bay Fixture replacing 301W-450W fixture	375
223.3	LED High Bay fixture replacing > 750W fixture	1078
226.1	LED low bay mogul screw-base lamp/retrofit kit replacing 150W - 300W fixture	225
226.2	LED low bay mogul screw-base lamp/retrofit kit replacing 150W - 300W fixture	225
227.1	LED low/high bay mogul screw-base lamp/retrofit kit replacing 301W - 450W fixture	375
227.2	LED low/high bay mogul screw-base lamp/retrofit kit replacing 301W - 450W fixture	375
228.2	LED high bay mogul screw-base lamp/retrofit kit replacing 451W - 750W fixture	600
313.1	Interior 8' LED Linear Lamp Replacing 8ft T8 or T12 Lamp	59.5
313.2	Interior 8' LED Linear Lamp Replacing 8ft T8 or T12 Lamp	59.5

Primary Key	Library Measure Name	Baseline Wattage Assumption
352	LED <=11 Watt Lamp Replacing Interior Halogen A 28-52 Watt Lamp	40
352.1	LED <=11 Watt Lamp Replacing Interior Halogen A 28-52 Watt Lamp	40
354	LED <=14 Watt Lamp Replacing Interior Halogen BR/R 45-65 Watt Lamp	55
355	LED <=13 Watt Lamp Replacing Interior Halogen MR-16 35-50 Watt Lamp	50
356	LED <=20 Watt Lamp Replacing Interior Halogen PAR 48-90 Watt Lamp	70

Source: Guidehouse analysis

D.1.3 Verified Savings Analysis

This section describes Guidehouse's methodology for the completion of the onsite metering and associated analysis of the sites selected for metering from the Cycle 2 PY1 Business EER Standard project sample. Guidehouse used results of the sampling of the Cycle 2 PY1 project population for all subsequent program years based on a review of the mix of building types showed that the project populations are similar.

D.1.3.1 Sampling

For the MEEIA Cycle 2 evaluation, Guidehouse selected a sample of projects completed in 2016 for onsite EM&V in 2017. The data collected from this sample of projects has been leveraged since the onsite EM&V was completed based on the assumption that the population of projects are still representative of the entire current year populations of the Business Standard program within a stratum. Guidehouse evaluated both service territories in a combined sample based on discussions with the implementer at the time and Evergy product managers. Guidehouse feels that this is still a reasonable approach due to similarities in program execution. Additional detail on the sampling is available in the Cycle 2 PY1 Report and Appendix. Guidehouse completed both short-term and long-term metering at the sampled sites. Table D-2 lists the meter count by building type for the short-term metering.

Table D-2. MEEIA Cycle 2 Onsite EM&V – Business Standard Program Meter Count by Building Type

Strata	MEEIA Cycle 2 Business Standard		MEEIA Cycle 2 Small Business Lighting		MEEIA Cycle 1 Loggers		Total
	Evergy MO West	Evergy Metro	Evergy MO West	Evergy Metro	Evergy MO West	Evergy Metro	
Industrial	14	6			13		33
Office	3	20	0	6			29
Other	7	7	7	4	36		61
Retail	17	17	8	3	51	7	103
School	15	29			1		45

Strata	MEEIA Cycle 2 Business Standard		MEEIA Cycle 2 Small Business Lighting		MEEIA Cycle 1 Loggers		Total
	Evergy MO West	Evergy Metro	Evergy MO West	Evergy Metro	Evergy MO West	Evergy Metro	
Warehouse	12	17	5		26		60
Exterior	7	7	2	2			18
Total	**75**	**103**	**22**	**15**	**127**	**7**	**349**

Source: Guidehouse analysis

Table D-3 lists the meter count by building type for the long-term metering. A total of 18 sites were included in the long-term metering and a total of 97 lighting loggers were installed.

Table D-3. Cycle 2 Onsite EM&V – Business Standard Program Meter Count by Building Type for Long-Term Metering

Strata	Long-Term Sampling Standard		Total
	Evergy MO West	Evergy Metro	
Office	3	20	23
School	15	29	44
Warehouse	12	18	30
Total	**30**	**67**	**97**

Source: Guidehouse analysis

Table D-4 presents a comparison of the program participation by strata between Cycle 2 PY1-PY4 (i.e. 2016-2019), and MEEIA Cycle 3 PY1 (i.e., 2020) for the Standard program. The percent of total reported savings by strata is similar among all program years. However, some strata such as Warehouse have seen a decrease in the percentage of reported energy and demand savings because high bay measures with overestimated savings accounted for a large fraction of the Warehouse strata savings. With the correction made to this measure for Cycle 2 PY2, the percent of the total savings in the Warehouse strata decreased in Cycle 2 PY2 and has remained relatively similar since that time PY1 did see an increase in participation in the School strata and a decrease in the Other strata. The Other strata includes many assembly type buildings such as movie theaters, college and university assembly areas, and hotels/motels. These building types may have a seen a decrease in occupancy due to the COVID-19 pandemic, which could have impacted their participation in the program.

Table D-4. Comparison of Reported Savings by Strata from 2016 through 2020

Strata	% of Total Reported kWh					% of Total Reported kW				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
Industrial	21%	22%	8%	5%	7%	22%	23%	7%	5%	6%
Office	2%	7%	17%	24%	17%	2%	8%	19%	24%	19%
Other	16%	21%	28%	33%	13%	15%	16%	27%	31%	11%
Retail	8%	11%	35%	14%	16%	7%	11%	35%	14%	15%
School	6%	2%	2%	18%	31%	6%	3%	2%	19%	33%
Warehouse	47%	37%	10%	6%	16%	48%	39%	10%	7%	16%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Guidehouse analysis

Table D-5 provides the number of buildings metered and the number of meters for each stratum for the 2016-2017 lighting study, as well as relative precision values for energy and demand impacts for each building type. Guidehouse used a confidence and relative precision target analysis to confirm that enough individual buildings were metered to provide reasonable values for HOU and CF. For the combined Evergy MO West and Evergy Metro sample, the relative precision and confidence for each building type fell within the target range of 90/20 confidence and precision at the program level.

Table D-5. Business Standard Program Metering by Strata

Program	Stratum	Buildings		Meters	Energy	Demand
		Year-End Building Population	Building Sample Size	Meters Sample Size	Relative Precision at 90% Confidence (one-tailed)	Relative Precision at 90% Confidence (one-tailed)
Standard and SBL	Industrial	163	7	33	7.3%	5.9%
	Office	144	5	29	34.6%	29.9%
	Other	262	9	61	27.8%	22.2%
	Retail	251	12	103	34.6%	17.4%
	School	94	8	45	9.5%	14.5%
	Warehouse	206	9	60	13.9%	10.9%
	Total	**1,120**	**50**	**331**	**13.5%**	**10.4%**

Source: Guidehouse analysis

Guidehouse also calculated the relative precision for the CF and HOU for each stratum at end of the long-term metering. The following table presents these results at the 90% confidence interval. The overall relative precision for the mix of building types falls within the 90/20 target range.

Table D-6. Business Standard Program Relative Precision by Strata

Strata	CF Relative Precision at 90% Confidence	HOU Relative Precision at 90% Confidence
Industrial	29%	44%
Office	15%	19%
Other	9%	20%
Retail	6%	7%
School	9%	19%
Warehouse	14%	24%
Exterior	N/A	7%
Total Program	**9%**	**14%**

Source: Guidehouse analysis

D.1.3.2 Onsite Verification and Metering

In MEEIA Cycle 2, Guidehouse completed the onsite verification and metering of sampled projects for the Business Standard program. For the sample selected in 2016, Guidehouse stratified the Standard program population by building type, including Industrial, Office, Retail, School, Warehouse, and Other. Guidehouse developed the sample by building type to capture the hours of operation (HOU) and coincident demand factors (CF) by building type for the lighting measures installed in the Standard program.

Guidehouse metered most of the sampled projects for the short-term duration (8 weeks, February 2017-April 2017) and completed long term metering of a smaller sample for three strata. The three strata were selected based on feedback from the Evergy team on which building types were of most interest to them. Guidehouse selected three strata—school, warehouse, and office—for the long-term (12 months) metering.

The evaluation team retrieved short-term data for the three long-term metering strata in April 2017, along with the other short-term sites. The evaluation team also collected metering data in October 2017 and for a final time in March 2018. Guidehouse used onsite verification to verify project implementation information and to collect the operating parameters for installed lighting projects. Guidehouse used the metered data (lighting loggers, current data loggers, etc.) to develop building type level inputs for HOUs and CFs used in the verified savings calculations for all verifications since 2017.

D.1.3.3 Hours of Use and Coincident Factor Analysis Methodology

The following discussion is for reference, as Cycle 3 PY1's analysis used the results from the MEEIA Cycle 2 lighting logger activities. The evaluation team stratified each of the building type strata (Industrial, Office, Retail, etc.) into large and small building types, because the HOU for large and small customers is measurably different. The evaluation team stratified the sites by size based on whether the reported energy savings for a site were greater than 100,000 kWh or the reported demand savings by site were greater than 10 kW. Guidehouse did not use building size (e.g., square footage) as a method to stratify the population because these data were not available for all sites. However, for the sites with square footage data, Guidehouse compared the stratification using the kWh and kW savings criteria to the building size and found good

correlation. Guidehouse used the substrata to determine the weighted strata HOU and CF as outlined in Figure D-1.

Figure D-1. Methodology for Determining Strata HOU and CF from Logger Data

Step 1: Stratify Cycle 2 PY1 population by size	• Use information on reported kWh and kW savings by site to stratify into large and small sites
Step 2: Determine a substrata weight	• Determine what % each strata's kWh savings is represented by small or large sites in the Cycle 2 PY1 population
Step 3: Assign a substrata to each HOU and CF determined from the logger data by space type	• Roll up the lighting logger data to be by space type withing the site • Link the results of step 1 to the logger data so that each logger data point by space type is assigned to a substrata
Step 4: Assign a substrata for Cycle 1 and SBL logger sites	• Use reported kWh or KW to assign a substrata for Cycle 1 sites • All small business lighting sites from the short terms sampling are assigned to the small strata
Step 5: Determine a substrata HOU and CF	• Equally weight all logger calculated HOUs and CFs within a substrata • Result will be 13 HOUs and CFs
Step 6: Determine a weighted strata HOU and CF	• Weight substrata results by substrata population weight determined in Step 2 • End result will be a 7 strata HOU and CF

The results of this analysis using the long-term metering data compared to the HOU and CF calculated for Cycle 2 PY1 from just the short-term logger data are presented in Table D-7. Overall, the HOU decreased between 7-19% for all interior space types. The HOU increased for exterior space types 15% due to some of the long-term metering sites having exterior loggers that recorded higher HOU. The CF increased for the industrial, other, and school strata, and decreased for the office, retail, and warehouse strata. The change for the three strata with long-term metering, school, office, and warehouse, is based on seasonal variations in operating hours captured in the long-term metering.

Table D-7. Comparison Between Cycle 2 PY1 and Cycle 2 PY2 for CF and HOU for Standard Program

Strata	Results of Short-Term Logger Analysis		Results of Long-Term Logger Analysis and Updated Weighting		% Change	
	CF	HOU	CF	HOU	CF	HOU
Industrial	0.62	5,144	0.64	4,584	3%	-11%
Office	0.75	4,484	0.69	3,636	-8%	-19%
Other	0.67	5,280	0.73	4,925	9%	-7%
Retail	0.83	5,662	0.74	4,921	-10%	-13%
School	0.59	4,074	0.63	3,642	6%	-11%
Warehouse	0.64	4,110	0.55	3,611	-15%	-12%
Exterior	0.0	4,702	0.0	5,392	0%	15%

Source: Guidehouse analysis

D.1.3.4 Analysis

The following section describes the evaluation team's analysis methodology to calculate the verified energy savings and coincident peak demand savings for the Business Standard program measures. Guidehouse applied the following calculation algorithms using guidance from the Evergy MEEIA TRM and the Illinois TRM v8 which includes industry standard algorithms for engineering review of the following measures implemented:

1. Lighting
2. Lighting Controls
3. High Efficiency Reach-in Refrigerators
4. Variable Speed Drive Compressor
5. Package Terminal Air Conditioner
6. Single-Package Unitary Air Conditioners
7. Air Source Heat Pumps
8. ENERGY STAR Hot Holding Cabinets
9. Pool Pump VSD

Lighting Measures

The team referenced the Evergy MEEIA TRM to obtain the calculation inputs. The waste heat factors for energy and demand savings are based on Section 4.5 from the Illinois TRM v8 (Table D-8).

Table D-8. Waste Heat Factors for Lighting Measures

Strata	WHFe	WHFd
Industrial	1.02	1.04
Office	1.11	1.31
Other	1.08	1.30
Retail	1.12	1.29
School	1.10	1.44
Warehouse	1.02	1.17
Exterior	1.00	1.00
Refrigerators	1.41	1.41

Source: Illinois TRM v8

Energy Savings

Equation D-1. Energy Savings for C&I Lighting Measures

$$\Delta kWh = \frac{(Watts_{base} - Watts_{ee}) * ISR * Hours * WHF_e}{1{,}000}$$

Where:

$Watts_{base}$ Wattage of actual baseline lighting fixture/lamp. The evaluation team used the following data sources (listed by priority)

1. Aligning with the midpoint of the baseline wattage range listed in the measure name.
2. Wattages from secondary sources on baseline fixture wattage, including the Illinois TRM v8 and manufacturer specification sheets for the efficient lighting product which listed equivalent baseline products
3. Using the tracking database, which listed the baseline lamp or fixture type and the baseline lamp or fixture wattage. The tracking database indicated that the LED linear lamp and fixture market is shifting away from primarily T8s toward more T5HO lamp and fixture replacements. The tracking database also indicated that T12 replacements continue to represent a share of the measures. The tracking database also indicated that all the MR16 lamps were replacing 50W equivalent lamps in PY1.

$Watts_{ee}$ Actual wattage of installed efficient lighting. The evaluation team used the following data sources (listed by priority):

1. Actual wattage from the tracking database
2. Wattage listed by the manufacturer for the efficient technology reported in the tracking database

ISR In-service rate (99% assumed for interior lighting, 97% assumed for exterior lighting based on the onsite findings)

Hours[17] Average HOU per year. The evaluation team used the following data sources to get the HOU (listed by priority):
1. HOU according to space type based on results of the long-term metering
2. HOU from Section 4.5 of the Illinois TRM v8 for parking garage measures

WHF_e Waste heat factor for energy to account for cooling energy savings from efficient lighting. The waste heat factor varies according to space type and is based on Section 4.5 from the Illinois TRM v8.

Coincident Peak Demand Savings

Equation D-2. Coincident Peak Demand Savings for C&I Lighting Measures

$$\Delta kW = \frac{(Watts_{Base}\text{-}Watts_{EE})*ISR*CF*WHF_d}{1000}$$

Where:

$Watts_{base}$ Same as above
$Watts_{ee}$ Same as above
ISR Same as above
CF Summer peak coincidence demand factor. The evaluation team used the following data sources to get the CF (listed by priority):
1. CF according to space type based on results of the long-term metering
2. CF according to space type from Section 4.5 of the Illinois TRM v8 for parking garages

WHF_d Waste heat factor for demand to account for cooling energy savings from efficient lighting. The waste heat factor varies according to space type and is based on Section 4.5 from the Illinois TRM v8.

Lighting Controls

The team referenced the Evergy MEEIA TRM to obtain the calculation inputs. The waste heat factors for energy and demand savings are based on Section 4.5 from the Illinois TRM v8 (Table D-9).

[17] The referenced version of the Evergy MEEIA TRM uses annual HOU from the IL TRM v4 for the Office-Midrise space type for most interior lighting measures.

Table D-9. Waste Heat Factors for Lighting Control Measures

Strata	WHFe	WHFd
Industrial	1.02	1.04
Office	1.11	1.31
Other	1.08	1.30
Retail	1.12	1.29
School	1.10	1.44
Warehouse	1.02	1.17
Exterior	1.00	1.00
Refrigerators	1.41	1.41

Source: Illinois TRM v8

Energy Savings

Equation D-3. Energy Savings for C&I Lighting Control Measures

$$\Delta\text{kWh} = kW_{Controlled} * \text{Hours} * \text{ESF} * WHF_e * \text{ISR}$$

Where:

$kW_{Controlled}$ Total lighting load connected to the control in kilowatts. Savings is per control. The evaluation team used the following data sources (listed by priority):

1. Actual wattage from the tracking database for Networked Lighting Controls
2. Based on minimum wattage per control installed required in the application to achieve measure approval in the Business Standard program: 425W per control for Occupancy and Vacancy Sensors and 570W per control for Daylighting controls. Lighting control projects completed with lower wattage controlled per control are recommended to submit through the Business Custom program and are excluded from the Business Standard program. Lighting control projects for fixture level controls are submitted through the Business Custom program.

Hours Average hours of use per year. The evaluation team used the HOU according to space type based on results of the long-term metering.

ESF Energy savings factor (represents the percentage reduction to the operating Hours
from the non-controlled baseline lighting system) 0.24 for Occupancy and Vacancy Sensors, 0.28 for Daylighting controls based on Illinois TRM v8 and 0.5 for Networked Lighting Controls based on Illinois TRM v9.

WHF_e Waste heat factor for energy to account for cooling energy savings from efficient lighting. The waste heat factor varies according to space type and is based on Section 4.5 from the Illinois TRM v8.

ISR In-service rate (99% assumed for interior lighting, 97% assumed for exterior lighting based on the onsite findings)

Coincident Peak Demand Savings

Equation D-4. Coincident Peak Demand Savings for C&I Lighting Control Measures

$$\Delta kW = kW_{Controlled} * WHF_d * (CF_{base} - CF_{LC}) * ISR$$

Where:

$kW_{Controlled}$	Same as above
ISR	Same as above
CFbase	Summer peak coincidence demand factor. The evaluation team used the following data sources to get the CF (listed by priority): 1. CF according to space type based on results of the long-term metering 2. CF according to space type from Section 4.5 of the Illinois TRM v8 for parking garages
CFLC	Retrofit Summer Peak Coincidence Factor for the lighting system with Lighting Controls installed is assumed to be 0.15 regardless of building type.
WHF_d	Waste heat factor for demand to account for cooling energy savings from efficient lighting. The waste heat factor varies according to space type and is based on Section 4.5 from the Illinois TRM v8.

High Efficiency Reach-in Refrigerators

Energy Savings

Equation D-5. Energy Savings for High Efficiency Reach-In Refrigerators

$$\Delta kWh = (kWh_{base} - kWh_{ee}) * 365.25$$

Where:

Algorithm assumes 15 ft^3 of actual chilled compartment volume and uses a baseline and efficient saving value from solid door refrigerators and references Section 4.2.2 of the IL TRM v8.

kWh_{base}	Baseline maximum daily energy consumption = 0.05*15 ft^3+1.36=2.11 kWh
kWh_{ee}	Efficient maximum daily energy consumption = 0.066*15 ft^3 +0.31= 1.3 kWh

Coincident Peak Demand Savings

Equation D-6. Coincident Peak Demand Savings for High Efficiency Reach-in Refrigerators

$$\Delta kW = \Delta kWh \ / 8766 * CF$$

Where:

CF	Coincidence factor = 0.937

Variable Speed Drive Compressor

Energy Savings

Equation D-7. Energy Savings for Variable Speed Drive Compressor

$$\Delta kWh = 0.9 \times hp_{compressor} \times HOURS \times (CF_b - CF_e)$$

Where:

ΔkWh	Gross customer annual kWh savings for the measure
$hp_{compressor}$	Compressor motor nominal hp
0.9	Compressor motor nominal hp to full load kW conversion factor
HOURS	Compressor total hours of operation below depending on shift 1,976 for single shift Weekdays 3,952 for 2 shift Weekdays 5,928 for 3 shift Weekdays 8,320 for 3 shift weekdays plus weekends
CF_b	Baseline compressor factor = 0.890
CF_e	Efficient compressor = 0.705

Coincident Peak Demand Savings

Equation D-8. Coincident Peak Demand Savings for Variable Speed Drive Compressor

$$\Delta kW = \Delta kWh / HOURS * CF$$

Where:

CF	Coincidence Factor = 0.59 for single shift 0.95 for 2-shift 0.95 for 3-shift 0.95 for 4-shift

Package Terminal Air Conditioner (PTAC)

Guidehouse applied the International Energy Conservation Code (IECC) 2012 as the baseline for baseline SEER, EER, and other baseline energy efficiency ratings. For the installed energy efficiency equipment, Guidehouse confirmed energy efficiency ratings by checking the model numbers and manufacturers of products provided from the tracking database.

Energy Savings

Equation D-9. Energy Savings for PTAC

$$\Delta kWh = (kBtu/hrcool) * [(1/EERbase) – (1/EERee)] * EFLHcool$$

Where:

$kBtu/_{hrcool}$	Capacity of cooling equipment (1 ton = 12 kBtu/hr)
EER_{base}	Energy efficiency ratio of the baseline equipment based on the IECC 2012 For units < 65 kBtu/hr, assume the following conversion from SEER to EER for calculation of peak savings: EER = (-0.02 * $SEER^2$) + (1.12 * SEER)
EER_{ee}	Energy efficiency ratio of efficient equipment. The evaluation team used the following data sources (listed by priority):

1. Checking the model numbers and manufacturers of installed energy efficiency equipment, or,

2. Tracking data

$EFLH_{cool}$ Equivalent full load hours for cooling are provided in Section 4.4 HVAC End Use of the Illinois TRM v8 and vary by space type.

Coincident Peak Demand Savings

Equation D-10. Coincident Peak Demand Savings for PTAC

$$\Delta kW = (kBtu/hrcool) * [(1/EERbase) – (1/EERee)] *CF$$

Where:

CF Summer peak coincident demand savings factor from the Evergy MEEIA TRM = 91.3% (based on the value in the Illinois TRM v8)

Single-Package or Split System Air Conditioners

Guidehouse applied the International Energy Conservation Code (IECC) 2012 as the baseline rating for the baseline SEER, IEER, and EER. For the installed energy efficiency equipment, Guidehouse confirmed energy efficiency ratings by checking the model numbers and manufacturers of products provided from the tracking database.

Energy Savings

Equation D-11. Energy Savings for Single-Package or Split System Air Conditioners

For units with cooling capacities less than 65 kBtu/hr:

$$\Delta kWh = (kBtu/hr) * [(1/SEERbase)-(1/SEERee)] * EFLH$$

For units with cooling capacities equal to or greater than 65 kBtu/hr:

$$\Delta kWh = (kBtu/hr) * [(1/IEERbase)-(1/IEERee)] * EFLH$$

Where:

kBtu/hr Capacity of the cooling equipment installed in kBtu per hour (1 ton of cooling capacity equals 12 kBtu/hr)

$SEER_{base}$ Baseline SEER from IECC 2012

$SEER_{ee}$ Efficient case SEER value. The evaluation team used the following data sources (listed by priority):

1. Checking the model numbers and manufacturers of installed energy efficiency equipment, or,

2. Tracking data

$IEER_{base}$ Baseline IEER from IECC 2012

$IEER_{ee}$ Efficient case IEER value. The evaluation team used the following data sources (listed by priority):

1. Checking the model numbers and manufacturers of installed energy efficiency equipment, or,

2. Tracking data

EFLH — Equivalent Full Load Hours for Cooling are provided in Section 4.4 HVAC End Use of the Illinois TRM v8 and vary by space type.

Coincident Peak Demand Savings

Equation D-12. Coincident Peak Demand Savings for Single-Package or Split System Air Conditioners

$$\Delta kW = (kBtu/hr) * [(1/EERbase) - (1/EERee)] * CF$$

Where:

kBtu/hr — Same as above.

EER_{base} — Baseline EER from IECC 2012 or for air-cooled units < 65 kBtu/hr, the following conversion was used based on the baseline SEER assumed: $EER = (-0.02 * SEER^2) + (1.12 * SEER)$

EER_{ee} — Efficient case EER value. The evaluation team used the following data sources (listed by priority):

1. Checking the model numbers and manufacturers of installed energy efficiency equipment, or,

2. Tracking data

CF — Summer peak coincident demand savings factor from the Evergy MEEIA TRM = 91.3% (based on the value in the Illinois TRM v8)

Air Source Heat Pump

Guidehouse applied the International Energy Conservation Code (IECC) 2012 as the baseline rating for the baseline SEER, IEER, and EER. For the installed energy efficiency equipment, Guidehouse confirmed energy efficiency ratings by checking the model numbers and manufacturers of products provided from the tracking database.

The evaluation team used the following data sources (listed by priority) for SEERee, HSPFee, and EERee :

1. Checking the model numbers and manufacturers of installed energy efficiency equipment
2. Tracking data

Energy Savings

Equation D-13. Energy Savings for Measure of Air Source Heat Pump

For units with cooling capacities less than 65 kBtu/hr:

$$\Delta kWh = \text{Annual kWh Savings}_{cool} + \text{Annual kWh Savings}_{heat}$$

Annual kWh Savings$_{cool}$ = (kBtu/hr$_{cool}$) * [(1/SEERbase) – (1/SEERee)] * EFLH$_{cool}$

Annual kWh Savings$_{heat}$ = (kBtu/hr$_{heat}$) * [(1/HSPFbase) – (1/HSPFee)] * EFLH$_{heat}$

For units with cooling capacities equal to or greater than 65 kBtu/hr:

ΔkWh = Annual kWh Savings$_{cool}$ + Annual kWh Savings$_{heat}$

Annual kWh Savings$_{cool}$ = (kBtu/hr$_{cool}$) * [(1/EERbase) – (1/EERee)] * EFLH$_{cool}$

Annual kWh Savings$_{heat}$ = (kBtu/hr$_{heat}$)/3.412 * [(1/COPbase) – (1/COPee)] * EFLH$_{heat}$

Where:

kBtu/hr$_{cool}$	Capacity of the cooling equipment actually installed in kBtu per hour
SEERbase	Seasonal Energy Efficiency Ratio of the baseline equipment based on the IECC 2012
SEERee	Seasonal Energy Efficiency Ratio of the installed energy efficient equipment.
EFLH$_{cool}$	Equivalent Full Load Hours for cooling are provided in Section 4.4 HVAC End Use of the Illinois TRM v8.0
HSPFbase	Heating Seasonal Performance Factor of the baseline equipment based on the IECC 2012
HSPFee	Heating Seasonal Performance Factor of the installed energy efficient equipment. If rating is COP, HSPF = COP * 3.413
EFLH$_{heat}$	Equivalent Full Load Hours for Heating are provided in section 4.4 HVAC End Use of the Illinois TRM v8.0
EERbase	Energy Efficiency Ratio of the baseline equipment based on the IECC 2012 For units < 65 kBtu/hr, assume the following conversion from SEER to EER for calculation of peak savings:[18] EER = (-0.02 * SEER^2) + (1.12 * SEER)
EERee	Energy Efficiency Ratio of the installed energy efficient equipment
kBtu/hr$_{heat}$	Capacity of the installed heating equipment in kBtu per hour
3.412	Btu per Wh
COPbase	Coefficient of performance of the baseline equipment based on IECC 2012. If rating is HSPF, COP = HSPF / 3.413
COPee	Coefficient of performance of the installed energy efficient equipment

Coincident Peak Demand Savings

Equation D-14. Coincident Peak Demand Savings for Measure of Air Source Heat Pump

$$\Delta kW_{SSP} = (kBtu/hr * (1/EERbase - 1/EERee)) * CF_{SSP}$$

Where:

kBtu/hr	Same as above.
EERbase	Same as above.
EERee	Same as above.

[18] Based on Wassmer, M. (2003). A Component-Based Model for Residential Air Conditioner and Heat Pump Energy Calculations. Masters Thesis, University of Colorado at Boulder. Note this is appropriate for single speed units only.

CF Summer peak coincident demand savings factor from the Illinois TRM v8 = 91.3%

ENERGY STAR Hot Holding Cabinets

The team referenced the Evergy MEEIA TRM to obtain the calculation inputs.

Energy Savings

Equation D-15. Energy Savings for ENERGY STAR Hot Holding Cabinets

$$\Delta kWh = (IdleRate_{Base} - IdleRate_{EE}) * \text{Hours} * \text{Days}/1000$$

Where:

$IdleRate_{Base}$ Idle energy rate (W) of baseline Hot Holding Cabinets
= 40 * Interior volume (ft3) of new Hot Holding Cabinets

$IdleRate_{EE}$ Idle energy rate (W) of ENERGY STAR Hot Holding Cabinets. See table below for idle energy rates based on interior volume

Table D-10. Idle Energy Rates Based on Interior Volume

Interior Volume (ft3)	Idle Energy Consumption Rate (W)
0 < V < 13	21.5 * V
13 ≤ V < 28	(2.0 * V) + 254.0
28 ≤ V	(3.8 * V) + 203.5

Hours Average daily hours of operation. The evaluation team used 15 hours per day referring to the Evergy MEEIA TRM

Days Annual days of operation. The evaluation team used 365.25 day per year referring to the Evergy MEEIA TRM

Coincident Peak Demand Savings

Equation D-16. Coincident Peak Demand Savings for ENERGY STAR Hot Holding Cabinets

$$\Delta kW = \Delta kWh * CF$$

Where:

ΔkWh Electric energy savings, calculated above

CF Summer peak coincidence demand factor.The evaluation team used the value as 0.36 based on the Evergy MEEIA TRM

Pool Pump VSD

For the pool pump VSD the energy and demand savings are sourced from the MEEIA TRM.

ΔkWh Electric energy savings= 2481 kWh
ΔkW Electric demand savings= 0.281 kW

D.2 Process Evaluation

In MEEIA Cycle 3 PY1, Guidehouse addressed the five Missouri-required questions for process evaluation through interviews with program staff.

Table D-11 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

Table D-11. Process Evaluation Research Questions and Approaches

Process Evaluation Research Question	Evaluation Activities
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews
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 staff interviews
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews
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 staff interviews • Review of Evergy's Customer Survey

Source: Guidehouse

D.2.1 Program Staff Interviews

Guidehouse conducted a program manager interview and an implementation contractor (IC) interview. Specific process evaluation topics addressed included the following:

- Program operation, challenges, successes, and goals
- Qualification process for trade allies to apply for rebates through the program
- Qualifications for customers to participate in the program

D.2.2 Review of Evergy's Customer Surveys

Guidehouse reviewed the results of the customer survey completed by Evergy to understand if there are any barriers to customer acceptance of the program and address the five Missouri-required questions.

Appendix E. Business Custom Program-Specific Methodologies

The Business Custom program is designed to help C&I customers save energy and peak demand through a broad range of energy efficiency options that align with customers' needs.

Based on Missouri regulations, the evaluation team used method 1a and protocol 2b to evaluate the Business Custom program. This evaluation of the Business Custom program consisted of the following activities:

- Gross impact evaluation (detailed in Appendix E.1)
- Process evaluation (detailed in Appendix E.2)

E.1 Impact Evaluation

Guidehouse performed the following impact evaluation activities:

- Tracking database review
- Engineering review consisting of:
    - Engineering desk review
    - Measure and project verification via phone interviews

E.1.1 Tracking Database Review

The evaluation team conducted a thorough review of the program tracking database as described in Section D.1.1.

E.1.2 Engineering Desk Review

Based on the program tracking database review, Guidehouse drew a sample of the program population for an engineering review. Assessing savings for a sample of the program population is a uniform method for the evaluation of large energy efficiency programs.[19] This section describes Guidehouse's methodology for the sampling and engineering review of the Business Custom program in PY1 of MEEIA Cycle 3.

E.1.2.1 Sampling

Guidehouse used a stratified ratio estimation sampling design to develop an efficient sample achieving 90/10 confidence/precision on the program-level realization rate. The following steps were taken:

- Review the program tracking database and define the confidence and precision at the overall program level
- Define the statistical stratum based on program characteristics

[19] Chapter 11: Sample Design Cross-Cutting Protocol. National Renewable Energy Laboratory (NREL). https://www.nrel.gov/docs/fy17osti/68567.pdf

- Estimate an appropriate variance for each stratum
- Select a random sample within each stratum

The evaluation team then divided the population of premises with energy efficiency projects by reported energy savings into the following strata:

- Certainty
- Large
- Small

Stratification aligns with the premise size variability and allows the sample to have a good representation of the population. Guidehouse randomly selected premises proportionately within each stratum to ensure both of the following:

- The evaluation of the largest premises and contributors to the program performance
- The fair representation of smaller premises in the evaluation

The Certainty stratum included the largest premises with energy efficiency projects implemented in the program year, each of which reported 0.9 GWh or greater of energy savings. The evaluation team removed very small premises for sampling. The total savings of those very small premises made up no more than 2% of the total program savings. Guidehouse then divided the remaining premises into Large and Small strata, with Large premises constituting the top 50% of the remaining program savings and Small premises the bottom 50%. The evaluation team then randomly selected premises within each stratum across both territories to determine the final sample. The sample was later separated by territory in order to determine the territory level realization rates, similar to previous evaluation years.

A census was evaluated for the Certainty stratum, while random samples were taken for both the Large and Small strata from projects across the two territories. The random sampling in the Large strata led to a selection of all Large strata projects in Evergy MO West and only a sample of the Large projects in Evergy Metro. The sampled projects in the Certainty and Large strata were separated between Evergy Metro and Evergy MO West to determine the program level weighted realization rate. As a result of the random sample in the Small strata, all Small projects sampled fell within the Evergy Metro Small stratum and none were sampled from Evergy MO West. Because of this, both the energy and demand precision for the Missouri West Small stratum were calculated using the sampled projects from the Metro Small stratum and the full Small project population.

E.1.2.2 Engineering Review Methodology

The evaluation team requested project files for the sampled projects from Evergy and the implementation team. Guidehouse reviewed the project files and all the assumptions made by the implementer in developing reported savings. The team also conducted telephone interviews as necessary to ensure full understanding of the project. Guidehouse then verified the energy and coincidence peak demand savings for each sampled project using industry standard evaluation methodologies based on the Uniform Methods Protocols,[20] all of which are detailed

[20] https://www.energy.gov/eere/about-us/ump-protocols

further below in this section. Finally, Guidehouse calculated realization rates (RR) for the program using the following process.

Equation E-1. Realization Rates Per Stratum

$$RR_{stratum} = \frac{\sum_{sampled} E_{ex-post}}{\sum_{sampled} E_{ex-ante}}$$

Where:

E Electric energy savings or peak demand reduction for each project in the stratum

Realization rates in each stratum were applied to the project population of that stratum using Equation E-2:

Equation E-2. Realization Rates Per Stratum and Project Population

$$E_{i,ex-post} = RR_{stratum} * E_{i,ex-ante}$$

The program level realization rate for the program was calculated using Equation E-3:

Equation E-3. Realization Rates for the Entire Program

$$RR_{program} = \frac{\sum_{i=1}^{5} E_{i,ex-post}}{\sum_{i=1}^{5} E_{i,ex-ante}}$$

The evaluation team's engineering review methodology to calculate the verified energy savings and coincident peak demand savings for the Business Custom program measures is described below. Guidehouse applied industry standard methodologies for engineering review of the following measures or similar measures implemented in PY1.

- Lighting Measures
- Building Management System (BMS) Upgrades
- Variable Speed Drive for Pump or Fan
- HVAC
- Refrigeration Upgrade
- New Construction

Energy savings for various measures from the list above are occasionally calculated by the implementation contractor (IC) using various energy modeling software applications in lieu of engineering calculation algorithms. In these instances, the evaluation team adheres to the following high level verification framework:

1. Verify that a portion of the savings of a given project are generated from an energy modeling platform by means of documentation references or identifying modeling output files.
2. Request all relevant modeling files, if not already provided with the received project documentation. This includes, but is not limited to, model executable files, weather files, model output files, hourly simulation results, and various model reports.

3. Perform energy simulations of the ex ante model(s) with no changes to ensure the savings from the modeling files received match the claimed savings.
4. Verify all aspects of the model inputs, which vary based on the type of measures included in the model. This includes, but is not limited to, weather files, equipment capacities and quantities, lighting power densities, baseline equipment, equipment efficiencies, building and space areas, and system configurations.
5. Perform energy simulations to include any ex post evaluation changes to the energy model(s).
6. Export hourly 8,760 consumption trends from the model(s) for the purpose of calculating utility peak demand savings.

Lighting Measures

Energy Savings

Equation E-4. Energy Savings for C&I Lighting Measures

$$\Delta kWh = (kW_{base}\text{-}kW_{ee}) * ISR * Hours * WHF_e$$

Where:

kW_{base}	kW of the baseline lighting, based on kW of existing lighting fixtures for retrofit projects or based on the building-area method or space-by-space method defined in the energy code for new construction projects
kW_{ee}	kW of the post-retrofit or energy efficient lighting system, based on lighting plans and specifications and verified by phone interview
HOURS	Average hours of use per year, based on project information and verified by phone interview
WHF_e	Waste heat factor for energy, based on the researched factors through the long-term metering study for each building type
ISR	In-service rate, based on project information and verified by phone interview

Equation E-5. Energy Savings for C&I Lighting Controls

$$\Delta kWh = kW_{controlled} * ISR * Hours * ESF * WHF_e$$

Where:

$kW_{controlled}$	Total lighting load connected to the installed lighting controls, based on lighting plans and specifications and verified by phone interview
ESF	energy savings factor for installed lighting controls, based on the Illinois TRM v8 for each building type

Coincident Peak Demand Savings

Equation E-6. Coincident Peak Demand Savings for C&I Lighting Measures

$$\Delta kW = (kW_{base}\text{-}kW_{ee}) * ISR * CF * WHF_d$$

Where:

CF — Summer peak demand coincidence factor, based on Guidehouse's long-term metering study results and verified by phone interview to confirm lighting operation schedule

WHF_d — Waste heat factor for demand, based on the researched factors through long-term metering study for each building type

Equation E-7. Coincident Peak Demand Savings for C&I Lighting Controls

$$\Delta kW = kW_{controlled} * ISR * (CF_{baseline} - 0.15) * WHF_d$$

Where:

$CF_{baseline}$ — Summer peak demand coincidence factor, based on Guidehouse's long-term metering study results for each building type

Building Management System (BMS) Upgrades

No Building Management System Upgrade projects were included in PY1 Business Custom program. In the past when these measures have been included the sample, Guidehouse applied consumption data analysis, also called billing data analysis, for the BMS upgrade measures.

Variable Speed Drive for Pump or Fan

Guidehouse applied the end use regression model approach for the estimation of energy and peak demand savings for variable speed drive projects. Guidehouse performed an end use regression analysis using the following steps.

1. Review the metering data and other variables (such as outdoor air temperature, production data—this depends on the project type)
2. Create a regression relationship between the metering data and other variables for both pre- and post-retrofit periods
3. Predict the pre- and post-retrofit hourly power using the created regression models and other variables
    a. Other variables depend on the project type. For example, if the regression analysis is run for metering data and weather data, the TMY3 data is used for the prediction
4. Calculate the project savings by subtracting the post-retrofit consumption from the pre-retrofit consumption

HVAC and HVAC Controls

Guidehouse applied an 8,760 hourly data analysis approach for the determination of energy and peak demand savings for the weather-dependent HVAC measures. Code baseline is assumed for replace-on-burnout projects for HVAC projects. For early replacement projects, Guidehouse uses a dual baseline (existing baseline and code baseline). For HVAC controls implemented on existing HVAC systems, Guidehouse uses the existing system as the baseline. The steps for Guidehouse's 8,760 hourly data analysis approach are as follows:

1. Create a regression model comparing the demand against dry bulb temperatures or other relevant variables
    a. For example, the regression model could be performed for a performance curve for a cooling system, pump, or fan
2. Calculate the hourly power for each hour using the regression model
3. Calculate the pre- and post-retrofit energy consumptions by summing up the 8,760 hours of power
4. Calculate the pre- and post-retrofit peak demand by extracting average savings that fall within the peak period

Refrigeration Upgrade

Guidehouse applied the end-use regression model approach for the estimate of energy and peak demand savings for the refrigeration upgrade project. The detailed methodology is summarized in the section 'Variable Speed Drive for Pump or Fan'.

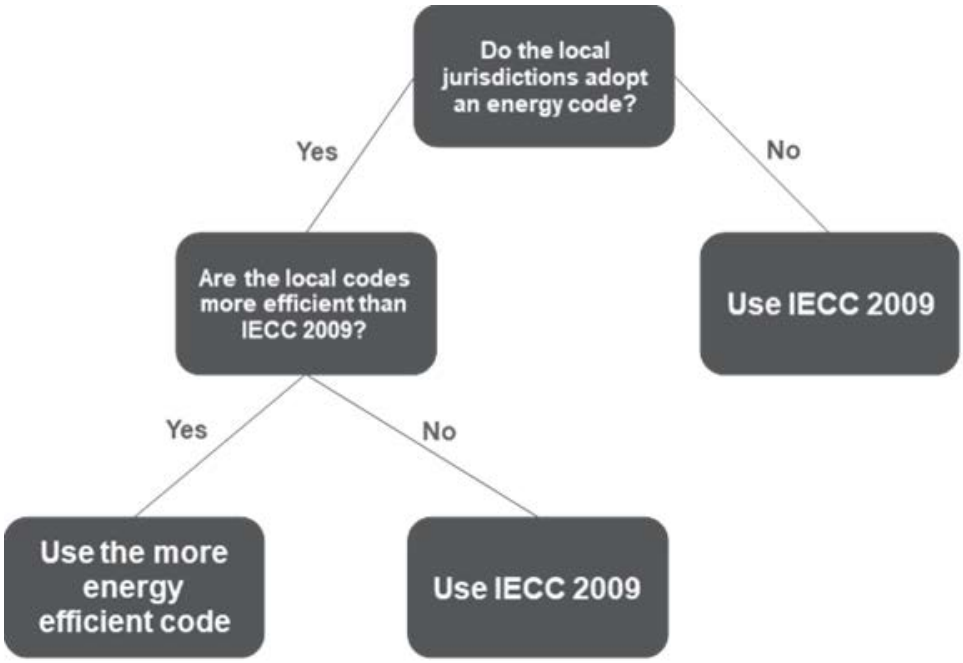
New Construction

Guidehouse used the 8,760 hourly data analysis approach summarized in the preceding HVAC section for the estimate of energy and peak demand savings for non-lighting new construction projects, specifically weather-dependent HVAC measures. Guidehouse applied the relevant codes and standards for evaluation of new construction projects as described below. HVAC controls in new construction projects leverage the code baseline as well. All of the projects included in the sample for the Business Custom program in PY1 had a local energy code.

- **Baseline standard or code for Business Custom new construction projects**

  Guidehouse established the following rule of thumb for energy code, as shown in Figure E-1.

Figure E-1. Evergy Business Custom Program Baseline Code



- **Calculation approach for Business Custom new construction lighting projects**

  The evaluation team used the building-area or space-by-space method defined by the energy code to calculate savings for the Business Custom program's new construction lighting projects.

E.2 Process Evaluation

Guidehouse addressed the five Missouri-required questions for process evaluation through program staff interviews, a program materials review, one round of participant free-ridership surveys, and one round of participant spillover surveys, for the Business Custom program.

Table E-1 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

Table E-1. Process Evaluation Research Questions and Approaches

Process Evaluation Research Question	Evaluation Activity
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews • Materials review • Participant surveys
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review • Participant surveys
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 staff interviews • Materials review • Participant surveys
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review • Participant surveys
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 staff interviews • Materials review • Participant surveys

Source: Guidehouse

E.2.1 Program Staff Interviews

Guidehouse conducted a program manager interview and an IC interview as described in Section D.2.1.

E.2.2 Materials Review

Guidehouse conducted a review of the program description and documents available from Evergy to understand the Business Custom program application process and program requirements. Guidehouse reviewed the following program documents:

- Program tracking database
- Bill inserts, brochures, point of sales materials, and other marketing collateral
- Contractor/trade ally training materials
- Program implementation manual
- Internal process checklists or flowcharts
- Any regulatory filings regarding the program
- Program logic model

E.2.3 Participant Surveys

The evaluation team conducted free ridership and satisfaction surveys with all PY1 Business Custom participants in February-March 2021, and spillover surveys with Business Custom participants from the second half of Cycle 2 PY4 at the same time.

Appendix F. Process Efficiency Program-Specific Methodologies

The Process Efficiency program did not have any program savings in Cycle 3 PY1. The Process Efficiency program is designed to provide a non-capital-intensive approach to energy efficiency engagement for businesses of all sizes and industries. The program, through its engagement process, seeks to ingrain energy management into their customer's business practices. Currently, the program activities are focused on providing RCx services.

Based on Missouri regulations, the evaluation team planned to use method 1a and protocol 2b to evaluate the Process Efficiency program. However, this evaluation of the Process Efficiency program consisted only of the process evaluation activities since the program did not have any program savings in PY1. Appendix F.1 outlines the general impact evaluation approach for this program. Appendix F.2 details the process evaluation activities undertaken.

F.1 Impact Evaluation

Impact evaluation was not conducted for the Process Efficiency program since the program did not have any program savings in PY1.

F.2 Process Evaluation

In PY1, Guidehouse addressed the five Missouri-required questions for process evaluation through interviews with program staff.

Table F-1 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

Table F-1. Process Evaluation Research Questions and Approaches

Process Evaluation Research Question	Evaluation Activities
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews
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 staff interviews
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews
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 staff interviews

Source: Guidehouse

F.2.1 Program Staff Interviews

Guidehouse conducted a program manager interview and an implementation contractor (IC) interview. Specific process evaluation topics addressed included the following:

- Program operation, challenges, successes, and goals
- Qualification process for trade allies to apply for rebates through the program
- Qualifications for customers to participate in the program

F.2.2 Materials Review

Guidehouse reviewed the following program planning and marketing materials to research the key considerations of the five Missouri questions, namely:

- Evergy program description documents
- IC's presentations

Appendix G. Online Business Energy Audit Program-Specific Methodologies

The Online Business Energy Audit (OBEA) is an opt-in online tool that provides energy-saving tips and help customers track their energy usage. The tool encourages customers to take energy-saving actions in their businesses through actions they can take on their own and by participating in other Evergy energy efficiency programs.

Evergy does not report energy savings for the OBEA tool. This evaluation program consisted of the following activities for PY1:

- Process evaluation (detailed in Appendix G.1)

G.1 Process Evaluation

Guidehouse addressed the five Missouri-required questions for process evaluation through staff interviews and a program materials review.

Table G-1 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

Table G-1. Process Evaluation Research Questions and Approaches

Process Evaluation Research Question	Evaluation Activity
Program-Specific Questions	
1. How many unique visitors are using OBEA?	• Program staff interviews • Materials review
2. How is it being used relative to other Utilities?	• Program staff interviews • Materials review
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews • Materials review
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review
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 staff interviews • Materials review
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review
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 staff interviews • Materials review

Source: Guidehouse

G.1.1 Program Staff Interviews

Guidehouse conducted in-depth interviews with Evergy's product lead to better understand the OBEA program and the key considerations of the five Missouri questions, namely:

- Program's performance to date
- Any issues or challenges faced
- Potential opportunities for improvement
- Effectiveness of program communication

G.1.2 Materials Review

Guidehouse reviewed the following program planning and marketing materials to research the key considerations of the five Missouri questions, namely:

- Screen shots of the online tools available to customers through OBEA
- Screen shots of bill forecast and bill comparison
- Data on customer logins and tips usage
- Lists of tips used in OBEA
- Evergy program description documents

Appendix H. Survey Instruments

H.1 Business EER Custom Program Participant Online Survey Guide

Sample Variables

<MEASURE>: Rebated measure, using simplified measure name; pluralized if quantity is more than 1
<MEASURECAT>: "Lighting", "Building Optimization", "Compressed Air", "Variable Speed Drive for Pump or Fan", "Misc. Custom", "New Construction", "Air Optimization/Balancing", "Refrigeration", "Custom Packaged RTU", "Chiller Plant Optimization", "Energy Management System", "Economizers", "Constant Volume to Variable Volume Air Volume Conversion"
<REBATE>: The dollar value of the rebate the participant received for the measure
<MEASUREQTY>: The quantity of measures installed
<COMPANY>: The name of the customer's company
<SERVICE ADDRESS>: The address where the rebated measures were installed.
<SurveyType>: FR (full survey except spillover questions and $50 gift card) or SO (spillover and satisfaction questions only and $25 gift card)

Introduction

Thank you for participating in the Evergy Business Energy Savings Custom Program participant survey. All data collected is confidential and will only be used to inform our internal evaluation. The surveys will not affect your energy efficiency project, applications, rebates, or service.

If you accidentally close the survey or aren't able to finish today, your progress will be saved - just click the link in your email again.

At the end of the survey if you would like to receive the [$50/$25] Amazon e-gift card, we will ask for your email address in thanks for your time in completing the survey. The gift card will be emailed to you within two weeks of completing the survey.

Screening Questions

S1. Our records show that your organization <COMPANY> received <rebate amount> in Evergy Business Energy Savings Custom Program incentives to complete a <measure> project at <SERVICE ADDRESS>. Is this correct?

1. Yes [CONTINUE TO S2]
2. No [SKIP TO S3]
98. Don't know [SKIP TO S3]

[ASK IF S1=Yes]
S2. Were you directly involved in the decision to purchase and install and complete the <MEASURE> project at <SERVICE ADDRESS>? (Note that you may have completed other energy efficient projects but this survey will focus on <MEASURE>.)

1. Yes [SKIP TO S4]
2. No [CONTINUE TO S3]
98. Don't know [SKIP TO TERMINATE]

[ASK IF S1=2, 98 or S2=2,98]
S3. Is there someone else at your organization who might be more familiar with the energy efficiency upgrade project? If so, would you please provide us with their email address?

1. Yes, please enter email address [SKIP TO TERMINATE]

2. No [SKIP TO TERMINATE]

3. Don't know [SKIP TO TERMINATE]

[ASK IF S2=Yes]

S4. Are you an employee of <COMPANY> or the owner/property manager at <SERVICE ADDRESS>, or were you involved in the project in some other capacity (e.g., as an installation contractor or energy services provider)?

1. Employed at <COMPANY> or owner/property manager at <SERVICE ADDRESS> [SKIP TO S6]
2. Employed by another organization [CONTINUE TO S5]
98. Don't know [SKIP TO TERMINATE]

[ASK IF S4=Employed by another organization]
S5. We are looking to survey the decision-maker at <COMPANY> who made the purchase decision to install <MEASURE>. Could you provide us with the name and email address of the project decision-maker at <COMPANY> that you worked with?

[ENTER NAME/EMAIL, THEN TERMINATE]
98. Don't know [SKIP TO TERMINATE]

[ASK IF S4=Employed at <COMPANY> or owner]
S6. Could you please verify your name and email address? (Note: this information is requested for survey management purposes only; your responses will remain anonymous and will not be linked with any of your contact information.)

[ENTER NAME/EMAIL]

[Display if S2=2 or 98 or S4=2 or 98]
Terminate Message: Those are all the questions we have for you. Thank you for your time.

[If <SurveyType>=SO, skip to Participant Spillover section]

Awareness and Participant Journey

A1. How did you first learn about the Business Energy Savings Custom Program? [ROTATE 1-13]

1. Evergy newsletter
2. Evergy bill insert
3. Other mailing from Evergy
4. Evergy community event
5. Evergy website
6. Evergy field representative
7. Newspaper, magazine, or other print media advertisement
8. Radio advertisement
9. Family, friend, or word of mouth
10. Contractor, Vendor, or Equipment Installer
11. Evergy call center
12. Evergy information received after participating in another Evergy program
13. Social Media Ad
14. Other Evergy emails
15. Other, Please Describe
98. Don't know

A2. What made your company first decide to purchase the new <MEASURECAT> equipment? [SELECT ALL THAT APPLY; ROTATE 1-9]

1. Recommended by contractor
2. Old equipment stopped working
3. Old equipment needed too many repairs
4. Was paying high utility bills and wanted to save money
5. Wanted to improve our work environment
6. Wanted to make our company more "green"/reduce greenhouse gas emissions
7. Wanted to improve the property value
8. Wanted to reduce operation and maintenance costs
9. Learned about the availability of a rebate from Evergy
10. Received a rebate from Evergy or other utility in the past
97. Other, Please Describe
98. Don't know

A3. What was the status of your old equipment when you decided to buy the new <MEASURECAT> equipment? [SELECT ONE]

1. It was working and did not need any repairs beyond regular maintenance
2. It was working but needed minor repairs
3. It was working but needed major repairs
4. It was not working but was repairable
5. It was not working and could not be repaired
6. Not applicable, rebated <MEASURE> was new equipment
7. Other, please describe
98. Don't know

Multiple Projects

[Ask if ProjectQty> 1]
MP1. Our records show that you've completed multiple projects through this program. Would you say that your experience with the program and decision-making process has been similar for all projects?

1. Yes

2. No

98. Don't know

[Ask if MP1= 2 or 98]
MP2. Can you describe how your experience was different at other locations?

[Open-ended text box]

Participant Free Ridership

[Ask if A4 <>9]
FR1. Had you already decided to purchase the new <MEASURECAT> equipment before you learned about the program?

1. Yes
2. No
98. Don't know

[Ask if FR1=1 or A4=9, else skip to FR3]
FR2a. Prior to learning about the Business Energy Savings Custom Program, had you received a cost estimate for the full cost of the <MEASURE> project at the same scope and efficiency level as completed through the program?

1. Yes
2. No
98. Don't know

[Ask if FR2a=1, else skip to FR3]
FR2b. Did you have a budget to cover that full cost without any discounts or incentives prior to learning about the Business Energy Savings Custom Program?

1. Yes
2. No
98. Don't know

FR3. <u>If the program incentive was not available,</u> would you have purchased any equipment or made any upgrades at the time that you did or within the next year, regardless of efficiency level? [ROTATE; ALLOW ONE RESPONSE]

1. Yes, I would have purchased the same quantity of equipment at the same time or within the next year (regardless of efficiency level)
2. [IF MEASUREQTY>1] I would have purchased a smaller quantity of equipment at the same time or within the next year (regardless of efficiency level)
3. No, I would not have purchased any equipment of any efficiency level at that time or within a year after that point

98. Don't know

[Ask if FR3 = 2]

FR3a. How many fewer <MEASURE> would you have purchased?

1. Most of them (approximately two-thirds of the <MEASURES> or more)
2. Some of them
3. Few of them (approximately one-third of the <MEASURES> or fewer)

98. Don't know

FR3b. <u>If the program incentive was not available</u>, what efficiency level would you have selected for this project when you did complete it? [ROTATE; ALLOW ONE RESPONSE]

1. Same efficiency as installed through the project
2. Almost as efficient
3. Somewhat less efficient
4. Much less efficient (minimal efficiency level available)
5. Lowest cost available (regardless of efficiency)

98. Don't know

[Ask if FR3 = 1 and FR3b=1]

FR3c. You stated that without the program incentive, you would have completed exactly the same project. Does that mean your business would have paid at least an additional ${e://Field/Rebate} to cover the entire cost of the ${e://Field/Measure} project?

1. Yes
2. No

98. Don't know

FR4a. On a scale of 1 to 5, where 5 is "very influential" and 1 is "not at all influential," how influential were the following elements on your decision to complete this high efficiency <MEASURE> project rather than a lower efficiency project?
[For FR4 responses 1, 2 and 3 record responses 1 through 5, DK, NA]

1. Program incentive
2. Educational or marketing materials from an Evergy program
3. Information from Evergy program staff
4. Information from the installation contractor/trade ally

FR4b. On a scale of 1 to 5, where 5 is "very influential" and 1 is "not at all influential," how influential were the following elements on your decision to complete the <MEASURE> project at the time that you did rather than at a later date?
[For FR4 responses 1, 2 and 3 record responses 1 through 5, DK]

1. Program incentive
2. Educational or marketing materials from an Evergy program
3. Information from Evergy program staff
4. Information from the installation contractor/trade ally

[Skip to Awareness and Participant Journey Part 2 section]

Participant Spillover

SO1. Since learning about the program, did you install any *additional* energy efficient equipment or make any additional energy efficiency upgrades at the same facility or at any other facility within Evergy's Missouri service territory?

1. Yes
2. No
98. Don't know

[Ask if SO1 = 1, else skip to PS1]
SO2. Did you apply for an incentive from Evergy for the additional energy-efficient equipment or upgrade?

1. Yes, and I received an incentive from Evergy
2. Yes, but I did not receive an incentive from Evergy
3. No

98. Don't know

[Ask if SO2=2]
SO3. Do you know why you did not receive an incentive from Evergy for the additional energy-efficient equipment or upgrade?

[OPEN ENDED]
98. Don't know

[Ask if SO2=3]
SO4. Why didn't you apply for an incentive from Evergy for the additional energy-efficient equipment or upgrade?
[OPEN ENDED]
98. Don't know

[Ask if SO2 = 2 or 3, else skip to PS1]
SO5. How influential was Evergy's Business Energy Savings Custom Program on your decision to install the *additional* energy efficient equipment which did not receive incentives? Please rate on a 5-point scale in which 5 means "very influential" and 1 means "not at all influential."

[1-5, DK]
[Ask if SO5=2, 3, 4, or 5, else skip to PS1]
SO6. Please describe the energy efficient equipment that was installed without incentives:
a. Enter description:
b. Enter quantity: [NUMERIC]
c. Enter approximate installation date [DATE]
d. How do you know this equipment is high efficiency? [OPEN ENDED]

SO7. Was this additional energy-efficient equipment installed by the same contractor that installed the equipment that was rebated by Business Energy Savings Custom Program?
1. Same contractor
2. Different contractor
3. Not applicable; we did not use a contractor to install the additional equipment
4. Not sure

[Skip to Participant Satisfaction section]

Awareness and Participant Journey Part 2

A_6A. On a scale of 1 to 5 where 1 means "strongly disagree" and 5 means "strongly agree," please rate your agreement with the following statements:

1. The program is easy to work with and understand.
2. When I had questions, I knew who to contact.
3. I had enough information about measure eligibility and rebates to make decisions about which equipment to install.
98. Don't know

[Ask if A_6A 1-3 is less than 4]

A_6B_1. Please describe what aspects of the program were not easy to work with or understand.
A_6B_2. Please describe any confusion there may have been regarding who to contact.
A_6B_3. **Please describe the lack of clarity there may have been regarding the measure eligibility or rebates.**

A6. How easy was it to find a Evergy Authorized Trade Ally (i.e., Evergy -approved contractor) for your Business Energy Savings Custom Program rebate project? Please use a scale of 1 to 5, where 1 is "not at all easy" and 5 is "extremely easy".
[Record 1-5, 98. DK,]

98. N/A: Self-directed project and did not use a Trade Ally [Skip to A8]

[Ask if A6 != 98]
A7. How did you find the Evergy Authorized Trade Ally you used for your Business Energy Savings Custom Program rebate project? Please select all that apply.
[ROTATE; Multiple Response]

1. Evergy website
2. Knew the Trade Ally from a previous project
3. Someone referred the Trade Ally
4. Other, please specify [Open end; record verbatim]

98. Don't know

A8. Who submitted the pre-approval application for your project?
[ROTATE; Single Response]

1. [If A6 !=98] A Evergy authorized Trade Ally
2. Myself
3. Another company employee
4. Other, please specify [Open end; record verbatim]

98. Don't know

[Ask if A8 = 2; else skip to A10]
A9. How easy was it to complete your Business Energy Savings Custom Program project pre-approval application? Please use a scale of 1 to 5, where 1 is "not at all easy" and 5 is "extremely easy".
[Record 1-5, DK, Refused]

[Ask if A5 != 99]
A10. How would you rate your satisfaction with the following aspects of the trade ally's project recommendations? Please rate these on a 5-point scale where 5 means "extremely satisfied" and 1 means "not at all satisfied" [Record 1-5, DK, Refused for each].

a. The number of measure options the Trade Ally recommended
b. The attractiveness of the measure options the Trade Ally recommended
c. The Trade Ally's explanation of the measure options recommended

A10a. [Ask for each aspect from A9a where the response was < 3] **Why did you provide this rating for the number of measure options the trade ally recommended?**
[OPEN ENDED; Record verbatim]

A10b. [Ask for each aspect from A9b where the response was < 3] **Why did you provide this rating for the attractiveness of the measure options the trade ally recommended?**
[OPEN ENDED; Record verbatim]

A10c. [Ask for each aspect from A9c where the response was < 3] **Why did you provide this rating for the trade ally's explanation of the measure options recommended?**
[OPEN ENDED; Record verbatim]

Participant Satisfaction

[Ask if Survey Type = FR]

PS1. How would you rate your satisfaction with the following aspects of the Evergy Business Energy Savings Custom Program? Please rate on a 5-point scale in which 5 means "very satisfied" and 1 means "not at all satisfied."

[ROTATE a-f, RECORD 1-5, DK]

a. Amount of rebate
b. Time it took to receive the rebate

c. Requirements to participate in program
d. Program Communications
e. [ASK IF A8 != 2] Application process
f. [ASK IF A8 = 2] Pre-approval application process
g. [ASK IF A8 = 2] Final approval process
h. [ASK IF ProjectIncentive>$10,000] Inspection process (if applicable)
i. The Program representative
j. Your installation contractor
k. Overall satisfaction with the program

[Ask PS2a if PS1a was < 3]
PS2a. Why did you provide this rating for the amount of the rebate?
[OPEN ENDED]

[Ask PS2b if PS1b was < 3]
PS2b. Why did you provide this rating for the time it took to receive the rebate?
[OPEN ENDED]

[Ask PS2c if PS1c was < 3]
PS2c. Why did you provide this rating for the program communications?
[OPEN ENDED]

[Ask PS2d if PS1d was < 3]
PS2d. Why did you provide this rating for the requirements to participate in the program?
[OPEN ENDED]

[Ask PS2e if PS1e was < 3]
PS2e. Why did you provide this rating for the application process?
[OPEN ENDED]

[Ask PS2f if PS1f was < 3]
PS2f. Why did you provide this rating for the pre-approval application process?
[OPEN ENDED]

[Ask PS2g if PS1g was < 3]
PS2g. Why did you provide this rating for the final approval application process?
[OPEN ENDED]

[Ask PS2h if PS1h was < 3]
PS2h. Why did you provide this rating for the inspection process?
[OPEN ENDED]

[Ask PS2i if PS1i was < 3]
PS2i. Why did you provide this rating for the Program Representative?
[OPEN ENDED]

Ask PS2jif PS1j was < 3]
PS2j. Why did you provide this rating for your installation contractor?
[OPEN ENDED]

[Ask PS2k if PS1k was < 3]
PS2k. Why did you provide this rating for your overall satisfaction with the program?
[OPEN ENDED]

[ASK ALL]

PS3. How likely you would be to participate in Evergy rebate programs again? Please rate on a 5-point scale in which 5 is "very likely" and 1 is "not at all likely."

[For PS9a-PS9c, Record responses 1 through 5, DK]

PS4. Have you recommended the Evergy Business Energy Savings Custom Program to colleagues or friends?

1. Yes

2. No
98. Don't Know

[Ask if Survey Type = FR]

PS5. Were there any other types of energy saving equipment or upgrades that you wanted to install but that Evergy did not approve?
[OPEN ENDED, None]

PS6. Please share any suggestions you may have for improving the Evergy Business Energy Savings Custom Program.
[OPEN ENDED, None]

PS7. Based on your overall experience as a customer of Evergy, how would you rate your satisfaction with the company on a scale of 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?
[1-5, DK]

[Ask if PS7<3, else skip to PI1]
PS8. What were the reasons that you give it that rating?
[OPEN-ENDED]

Firmographics

Just a few questions left.

F1. What type of organization is <COMPANY>?

[ROTATE]
1. Office
2. Retail
3. Convenience Store
4. Grocery
5. Restaurant
6. Industrial
7. Light Manufacturing
8. Warehouse
9. Church
10. K-12 School
11. College/University
12. Government Building
13. Other (PLEASE SPECIFY)
14. Don't know

F2. Which of the following descriptions best fits the facility at <SERVICE ADDRESS>?

1. Your organization's only location
2. One of several locations within Evergy service territory
3. One of several locations both within and outside of Evergy service territory
4. Your organization's headquarters, with several locations within Evergy service territory
5. Your organization's headquarters, with several locations both within and outside of Evergy service territory
6. Other, please describe (SPECIFY)

98. Don't know

F3. Would you like a follow-up call from program staff regarding any of your experiences in the program, to share additional comments or ask questions?

1. Yes

2. No

[ASK IF F3 = 1]

F4. Please provide your phone number (this will only be used for the follow-up call).

[NUMERIC PHONE NUMBER ENTRY]

Close

We would like to offer you a [$50/$25] Amazon e-gift card in thanks for completing our survey. If you would like to receive this gift card, please enter your preferred email address below. If you would not like the gift card, please check "No thanks."

Your email address will only be used to send the e-gift card. You will receive the gift card within two weeks of completing the survey. Be sure to click the forward arrow below to record your response.

a. Please enter your email address:

b. No thanks, I do not wish to receive an Amazon gift card

Survey completion message

Thank you for your time in completing this survey. Your responses will help Evergy improve their programs to better serve customers like you!