Evergy Metro, Inc. Evaluation, Measurement, and Verification Report – FINAL

Program Year 2019

Prepared for:

Evergy Metro, Inc.

Submitted by:

Guidehouse, Inc.
1375 Walnut Street
Suite 100
Boulder, CO 80302

303.728.2500
Guidehouse.com

Reference No.: 185775
September 11, 2020

Table of Contents

Disclaimer

Copyright

Disclaimer

This report ("report") was prepared for Evergy Metro, Inc. on terms specifically limiting the liability of Guidehouse and is not to be distributed without Guidehouse's prior written consent. Guidehouse's conclusions are the results of the exercise of its reasonable professional judgment. By the reader's acceptance of this report, you hereby agree and acknowledge that (a) your use of the report will be limited solely for internal purpose, (b) you will not distribute a copy of this report to any third party without Guidehouse's express prior written consent, and (c) you are bound by the disclaimers and/or limitations on liability otherwise set forth in the report. Guidehouse does not make any representations or warranties of any kind with respect to (i) the accuracy or completeness of the information contained in the report, (ii) the presence or absence of any errors or omissions contained in the report, (iii) any work performed by Guidehouse in connection with or using the report, or (iv) any conclusions reached by Guidehouse as a result of the report. Any use of or reliance on the report, or decisions to be made based on it, are the reader's responsibility. Guidehouse accepts no duty of care or liability of any kind whatsoever to you, and all parties waive and release Guidehouse from all claims, liabilities and damages, if any, suffered as a result of decisions made, or not made, or actions taken, or not taken, based on this report.

Confidentiality

This report contains confidential and proprietary information. Any person acquiring this report agrees and understands that the information contained in this report is confidential and, except as required by law, will take all reasonable measures available to it by instruction, agreement or otherwise to maintain the confidentiality of the information. Such person agrees not to release, disclose, publish, copy, or communicate this confidential information or make it available to any third party, including, but not limited to, consultants, financial advisors, or rating agencies, other than employees, agents and contractors of such person and its affiliates and subsidiaries who reasonably need to know it in connection with the exercise or the performance of such person's business.

How to Use This Report

Guidehouse has constructed this report to consist of three key pieces:

- **Main Report:** This document—which provides the summary of our evaluation, measurement, and verification (EM&V) analyses and findings by program
- **Appendices:** The appendices are composed of an Excel file that provides detailed cost-effectiveness results, and a Word document that provides:
    - Survey instruments fielded by the Guidehouse team
    - Process maps that identify the key steps of each program
    - Methodology sections for each program that explain (in greater detail than in the main report) the Guidehouse team's approach to analyzing each program
- **Databook:** An Excel file that provides detail on the midstream calculations and inputs used in the engineering analyses.

Report Definitions

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

Reporting Periods

Cycle 1
Refers to programs implemented in the timeframe of program years 2013-2015 (PY2013-PY2015).

Cycle 2
Refers to programs implemented in the timeframe of program years 2016-2019 (PY2016-PY2019).

Cycle 3
Refers to program implemented in the timeframe of program years 2020-2022(PY2020-PY2022).

Savings Types

Gross Reported Savings
Savings reported in the Evergy Metro's annual reports prior to any EM&V ex-post gross adjustments and net-to-gross (NTG) adjustments. In MEEIA Cycle 1 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
Four-year savings target approved by the Missouri Public Service Commission for a given program cycle.

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 for the program cycle; reflects Evergy Metro's overall achievement toward the MEEIA target for the program cycle.

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 because of the program's influence (e.g., through exposure to the program) but is not accounted for in program's gross verified savings.

Net Sales Analysis Approach to NTG
Approaches to estimating NTG that rely on the effect of program activity on total sales, yielding a market-level estimate of NTG that take FR, PSO, and NPSO into account. This involves establishing the sales with the program and estimating sales in the absence of the program, often based on expert opinions (e.g., the input of trade allies), stated participant and non-participant actions in the absence of the program (e.g., in-store intercept surveys), quasi-experimental designs (e.g., the use of comparison areas), or statistical modeling (e.g., modeling the impact of program activity on sales), thereby identifying the overall lift associated with program activity. Note that in some cases, such as the Home Lighting Rebate (HLR) program, sales data are limited to program bulbs only. Regression analysis of this subset of sales facilitates FR estimation, but not spillover (SO) estimation. For lighting specifically, net savings are based on a combination of methods (shopper responses to in-store intercepts and regression analysis) to make certain the estimation reflects both FR and SO.

Billing Analysis Approach to NTG

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

Key Report Sources

Below is a list of the most commonly referenced documents that the evaluation team used for this year's analysis.

Illinois Technical Reference Manual Version 5.0. (IL TRM v5)
http://www.ilsag.info/il_trm_version_5.html

Illinois Technical Reference Manual Version 6.0. (IL TRM v6)
http://www.ilsag.info/il_trm_version_6.html

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

Missouri Public Service Commission. Missouri Energy Efficiency Investment Act (MEEIA) Rules and the Stipulation and Agreement approved April 6, 2016, were approved by the Missouri Public Service Commission.

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 Plan: KCP&L Energy Efficiency and Demand Response Program 2013-2015 prepared by Navigant. October 2013.

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

ACUR	Air Conditioning Upgrade Rebate
AMI	Advanced Metering Infrastructure
BOEA	Business Online Energy Audit
BYOD	Bring Your Own Device
C&I	Commercial & Industrial
CBL	Customer Baseline
CET	Customer Engagement Tracker
CF	Coincident Factor
CL	Curtailable Load
CV	Coefficient of Variation
DI	Direct Install
DIY	Do It Yourself
DOE	Department of Energy (United States)
DR	Demand Response
DRI	Demand Response Incentive
DSM	Demand-Side Management
EA	Energy Analysis
EC	Energy Consultant
EE	Energy Efficiency
EEP	Energy Efficiency Professional
EER	Energy Efficiency Rebate (Business)
EISA	Energy Independence and Security Act
EM&V	Evaluation, Measurement, and Verification
EPD	Estimated Peak Demand
EUL	Effective Useful Life
EV	Electric Vehicle
ESI	Evergy Services, Inc.
FPL	Firm Power Level
FR	Free Rider(ship)
GPM	Gallons per Minute
GMO	Greater Missouri Operations
GPES	Great Plains Energy Services
GW	Gigawatt
GWh	Gigawatt-Hour
HDD	Heating Degree Day
HER	Home Energy Report
HLR	Home Lighting Rebate

HOEA	Home Online Energy Audit
HOU	Hours of Use
HVAC	Heating, Ventilation, and Air Conditioning
IC	Implementation Contractor
IE	Income-Eligible
IEMF	Income-Eligible Multifamily
IEW	Income-Eligible Weatherization
INF	Infinite benefit-cost ratio when there are positive benefits and no participant costs
ISR	In-Service Rate
KCP&L	Kansas City Power and Light
KCP&L-MO	KCP&L Missouri Operations Company
kW	Kilowatt
kWh	Kilowatt-Hour
LED	Light-Emitting Diode
LIHTC	Low Income Housing Tax Credit
M&V	Measurement and Verification
MEEIA	Missouri Energy Efficiency Investment Act
MHDC	Missouri Housing Development Commission
MO	Missouri
MOU	Memorandum of Understanding
MW	Megawatt
MWh	Megawatt-Hour
NPSO	Nonparticipant Spillover
NTG	Net-to-Gross
O&M	Operational and Maintenance
PCT	Participant Cost Text
PSO	Participant Spillover
PT	Programmable Thermostat
PY	Program Year
QC	Quality Control
QI	Quality Installation
RCT	Randomized Control Trial
RFP	Request for Proposal
RFQ	Request for Qualifications
RHR	Rush Hour Rewards
RIM	Ratepayer Impact Measure
RUL	Remaining Useful Life
SBL	Small Business Lighting
SCT	Societal Cost Test
SEER	Seasonal Energy Efficiency Ratio

SEM	Strategic Energy Management
SO	Spillover
SPM	Standard Practice Manual
SS	Seasonal Savings
TMY3	Typical Meteorological Year 3
TRC	Total Resource Cost
TRM	Technical Reference Manual
UCT	Utility Cost Test
USDA	United States Department of Agriculture
VFD	Variable Frequency Drive
W	Watts
WACC	Weighted Average Cost of Capital
WHE	Whole House Efficiency
WHF	Waste Heat Factor
WHFd	Waste Heat Factor Demand
WHFe	Waste Heat Factor Energy
WUM	What Uses Most

1. Introduction

This evaluation report is provided by Evergy Services, Inc. (ESI) on behalf of its affiliate Evergy Metro (formerly Kansas City Power and Light (KCP&L) – Missouri Operations Company (MO)) in accordance with the Missouri Energy Efficiency Investment Act (MEEIA) Rules and the Stipulation and Agreement of April 6, 2016, which were approved by the Missouri Public Service Commission. The analyses contained in this report are designed to evaluate, measure, and verify the information tracked by Evergy Metro for its portfolio of 15 demand side management (DSM) programs for program year (PY) 2019.

Guidehouse conducted the following tasks as part of its impact evaluation, process evaluation, and cost-effectiveness analysis for PY2019:

- Evaluate the gross and net energy and peak demand savings from Evergy Metro's energy efficiency (EE) and demand response (DR) programs
- Evaluate the effectiveness of and develop actionable recommendations to improve the design of Evergy Metro's suite of EE and DR programs
- Estimate the cost-effectiveness of Evergy Metro's EE and DR programs

The evaluation team consists of Guidehouse, Inc., Illume Advising LLC (Illume), and NMR Group, Inc. (NMR). As the primary contractor, Guidehouse is the main point of contact for Evergy Metro and the implementation contractors (ICs). Guidehouse has ultimate responsibility for managing the effort, for quality control, and for ensuring that deliverables are submitted on time and on budget. Illume, a women-owned business, applied its recognized national expertise in behavioral research and evaluation to lead the evaluation of the Home Energy Report (HER), Income-Eligible Multifamily (IEMF), and Online Energy Audit (OEA) programs. NMR led the Home Lighting Rebate (HLR) and Small Business Lighting (SBL) program evaluations. Throughout this report, the team is referred to as Guidehouse or the evaluation team.

1.1 Document Structure

As agreed to with Stakeholders and discussed during the Evergy Missouri Metro-West DSMAG Quarterly Meetings (December 3, 2019 and March 6, 2020), the Guidehouse team is providing a condensed EM&V report that presents key impact evaluation findings and recommendations. Additionally, this report provides an summary of the MEEIA Cycle 2 portfolio process evaluation findings that address the five required questions per the Missouri Code of State 20 CSR 4240-22.070 (8) (Missouri regulations). Guidehouse divided the document 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.

Several appendices accompany this document, including:

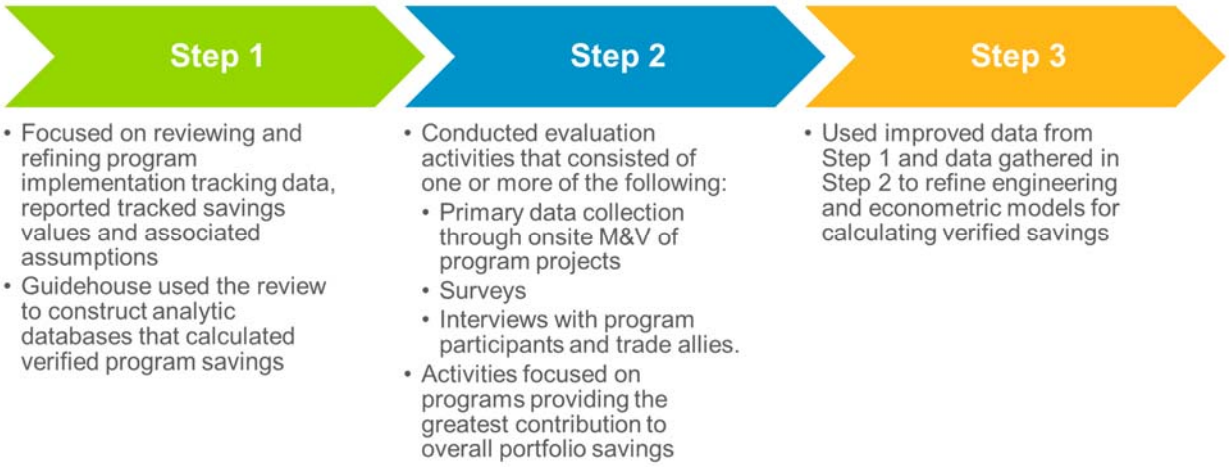
- **Appendix A. Survey Instruments:** Provides detailed survey guides, including participant, trade ally, and supplier interview guides.
- **Appendix B. Standard Methodologies:** Covers Guidehouse's overall approach toward cross-cutting methodologies, namely determining cost-effectiveness and NTG savings.
- **Appendix C. Missouri Requirements for Impact Evaluation:** Provides an overview of MO regulation requirements for conducting an impact evaluation.
- **Appendix D – O. Program-Specific Methodologies:** Details program-specific methodologies, including any differences between the standard methodologies and those the evaluation team used for each program.
- **Appendix P. Summary of Program Findings and Recommendations:** Details the findings and recommendations that resulted from the evaluation of each program.
- **Appendix R. 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/portfolio.
- **Excel Databook – CONFIDENTIAL:** Provides additional analytical data and figures for each program in addition to summary results tables for the portfolio.

2. Summary of Approaches

The team summarizes the approach for gross impact, net savings analysis, and process evaluation below and describes the key methods in the following sections.

2.1 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 Evergy Metro's DSM programs. Guidehouse's **gross impact** evaluation strategy had three basic components:



In accordance with Missouri regulations,[1] Evergy Metro is required to complete an impact evaluation for each program using one or both methods and one or both protocols detailed below.

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

    a. Comparisons of pre-adoption and post-adoption loads of program or demand side rate participants, corrected for the effects of weather and other intertemporal differences

    b. Comparisons between program and demand side rate participants' loads and those of an appropriate control group over the same 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:

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

a. Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses

b. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics

Guidehouse's methods and protocols for the impact evaluation (as they align with the MO requirements) are summarized in Table 2-1..

Table 2-1. MO Regulations Impact Evaluation Methods and Protocols

Program		Impact Evaluation Method	Impact Evaluation Protocol
Commercial and Industrial (C&I) Energy Efficiency (EE) Programs	Business EER – Standard Program	1a	2a and 2b
	Business EER – Custom Program	1a	2b
	Block Bidding*	1a	2b
	Strategic Energy Management (SEM)	1a	2b
	Small Business Lighting (SBL)	1a	2a and 2b
Residential EE Programs	Income-Eligible Weatherization* (IEW)	N/A	N/A
	Whole House Efficiency (WHE)	1a	2b
	Income-Eligible Multifamily (IEMF)	1a	2b
	Home Lighting Rebate (HLR)	1a**	2b
Educational/Behavioral Programs	Home Energy Report (HER)	1b	2a
	Business Online Energy Audit	N/A	N/A
	Home Online Energy Audit	N/A	N/A
DR Programs	Business Programmable Thermostat	1b	2b
	Residential Programmable Thermostat	1b	2b
	Demand Response Incentive (DRI)	1a	2a

*No savings were claimed for the IEWx program in PY2019.

**The upstream nature of the HLR program does not allow for identification of participants and nonparticipants for assessments for comparisons of load shapes; for budgetary reasons, the evaluation did not include an hours of use study, which could have provided lighting load shapes for all households.

Source: Guidehouse analysis

2.1.1 Process for Using Secondary Sources

Evaluation results in MEEIA Cycle 2 reflect findings from research conducted concurrent with each program year. When all stakeholders and Evergy Metro agree, these research findings are applied to the following program years. For example, in PY2019, Guidehouse conducted NTG research for the Business Energy Efficiency Custom program. The results from this research were applied to PY2019 gross savings.

The evaluation team uses primary in-state data when possible and agrees with the applicability to the Evergy Metro territories. Primary out-of-state data is used when primary in-state data is not available. Secondary out-of-state data is used when neither reliable primary in-state data or primary out-of-state data are available.

2.1.2 Net-to-Gross

Guidehouse used three primary methods to develop net savings for each program in PY2019:

- **Net to gross (NTG) ratios,** which involved the derivation of NTG components including free ridership (FR) and spillover (SO) informed by participant and trade ally surveys.
- **Direct estimation** of net savings, which involved conducting billing or net sales analyses.
- **Deemed NTG estimates,** which applied pre-determined estimates that did not warrant data collection or were informed by MEEIA Cycle 1's NTG findings for programs that did not have substantial program changes between Cycle 1 and Cycle 2, or by NTG findings from research conducted in PY2016, PY2017, PY2018 and PY2019.

For programs where the NTG ratios are developed, the components are either based on data collected in PY2016, PY2017, PY2018 and PY2019 from participants and—where appropriate—from trade allies. 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 EE measures or practices outside the efficiency program after having participated.
- **Nonparticipant SO (NPSO):** The additional energy savings achieved when a nonparticipant implements EE measures or practices as a result of the program's influence (for example, through exposure to the program) but is not accounted for in program savings.

Using these definitions, the NTG ratio is calculated as follows in Equation 2-1:

Equation 2-1. 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

[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.

NPSO rate = Nonparticipant spillover rate

As discussed in prior stakeholder meetings and evaluation reports, the direct savings approach is applied to the Demand Response Incentive (DRI), Strategic Energy Management (SEM) and Home Energy Report (HER/IEHER) programs. These programs directly estimate net impacts through a billing analysis that utilizes controls. Additionally, the evaluation team applied a deemed NTG ratio of 1.0 for the following programs:

- Home Online Energy Audit (HOEA) and the Business Online Energy Audit (BOEA) programs, which did not claim any savings.
- Income-Eligible Multifamily, as the cost of assessing net savings for this program is judged to exceed the value given the program's small contribution to total energy savings targeted for this program year.

2.2 Cost-Effectiveness Approach

Guidehouse calculated benefit-cost ratios and total net benefits at the program and portfolio level 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 as 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 Evergy Metro's DSMore model in conjunction with Guidehouse-verified EM&V findings, including: energy and demand impacts, incremental costs, NTG ratios, participation numbers, and measure lifetimes. All program and avoided cost data, and discount rates, are consistent with those used by Evergy Metro in calculating cost-effectiveness as part of its annual filing. Guidehouse will provide Evergy Metro with the evaluated savings included in this analysis to support its performance incentive calculation.

Consistent with previous years evaluations, the process used for calculating cost-effectiveness in PY2019 involved the following steps:[3]

1. Evergy Metro provided a template to Guidehouse which contained all the measures available in the Plan Year along with the associated Technical Reference Manual (TRM) values.
2. Guidehouse updated any measure value that changed as a result of the EM&V process (i.e., energy savings, demand savings, NTG, measure life, and incremental measure cost).
3. The template was sent back to Evergy Metro where it was loaded into the DSMore batch tool. The tool was then executed by Evergy Metro with the new measure values and the cost effectiveness was calculated.

[3] This approach was agreed upon by Evergy Metro , MPSC Staff, and Guidehouse on January 22, 2018 to ensure consistency in the avoided cost values and cost-effectiveness methodology used in Evergy Metro's annual reports and Guidehouse's EM&V reports.

4. The results were sent to Guidehouse for inclusion in the EM&V report.

Guidehouse analyzed early retirement measures in the Whole House Efficiency (WHE) program using a two-part savings stream (i.e., a dual baseline approach) and accounting for the adjustments in equipment investment timing due to the early retirement of functional equipment. This approach was necessary to ensure that early retirement measures were fairly burdened with the full cost of the efficient equipment, and to ensure the savings stream correctly accounted for differences in baseline assumptions over the lifetime of the measure.

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

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

Item	TRC Test	SCT	UCT	PCT	RIM Test
Avoided Costs	Benefit	Benefit	Benefit	N/A	Benefit
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

TRC = total resource cost, SCT = societal cost test, UCT = utility cost test, PCT = participant cost test, RIM = ratepayer impact measurement
Source: Guidehouse analysis

2.2.1 Source of Benefit and Cost Assumptions

The sources of data used in the benefit-cost analysis are summarized in Table 2-3.. Many of the input assumptions used in Guidehouse's analysis came directly from Evergy Metro. 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, effective useful life (EUL) and remaining useful life (RUL) values, and participant equipment costs. Reference Appendix R for inputs to Guidehouse's benefit-cost model.

Table 2-3. Sources of Benefit and Cost Data

Data[4]	Source
Avoided energy costs	Provided by Evergy Metro
Avoided capacity costs	Provided by Evergy Metro
Retail rates	Provided by Evergy Metro
Load shapes	Provided by Evergy Metro
Discount rates	Provided by Evergy Metro and classified by Evergy Metro as highly confidential

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

Data[4]	Source
Participant equipment costs	Illinois Technical Reference Manual (TRM), Evergy Metro prescribed values.
Energy and peak demand savings	Guidehouse engineering analyses
EUL	Illinois TRM, program tracking data, Evergy Metro 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 Metro
Incentives	Program tracking database
Participation	Program tracking database
Administrative costs	Provided by Evergy Metro

Source: Guidehouse analysis

2.3 Process Evaluation Approach

Guidehouse's process evaluation focused on the following: (1) addressing the five required questions per the Missouri Code of State Regulations 20 CSR 4240-22.070 (8) (Missouri regulations) as shown below, and (2) identifying program process improvements to increase program participation and savings.

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?

Guidehouse performed the following process activities to inform its evaluation:

Guidehouse summarized findings for the Missouri-required process evaluation questions across all program years, regardless of when the research was conducted during MEEIA Cycle 2, to help Evergy Metro understand the overall progress of the Company's portfolio of programs toward meeting its 4-year MEEIA targets and improving overall customer engagement. PY2019 Program specific process findings and recommendations are provided in Appendix Q.

2.4 PY2019 Evaluation Research Summary

This section presents Guidehouse's evaluation approach for the impact evaluation, process evaluation and NTG research in PY2019.

2.4.1 Gross Impact Evaluation Summary

The evaluation team employed a variety of methods to evaluate, measure, and verify energy and demand savings achieved by each of Evergy's DSM programs in PY2019.

2.4.1.1 Impact Evaluation Methods

Guidehouse followed impact evaluation and data collection methods as required by Missouri Regulations (MO Regulations).

Guidehouse employed the evaluation methods shown in Table 2-4 below with varying levels of rigor and different objectives for evaluating impacts of Evergy's DSM programs.

Table 2-4 Summary of Impact Evaluation Activities

	Program	Tracking System & Database Review	Deemed Savings Review	Analytic Database Development & Engineering Analysis	Desk/Phone Review	Billing Analysis	On-site EM&V
C&I EE Programs	BEER Custom Program	All Programs	All Prescriptive Programs		X		X
	BEER Standard Program			X			
	Block Bidding				X		
	Strategic Energy Management			No Program Activity Reported			
	Small Business Lighting						
Residential EE Programs	Whole House Efficiency			X			
	Income-Eligible Multi-Family			X	X		
	Home Lighting Rebate			X			
Demand Response Programs	Business & Residential Programmable Thermostat			X			
	Demand Response Incentive			X		X	
Educational/ Behavioral Programs	Income-Eligible Home Energy Report / Home Energy Report			X			
	Online Home & Business Energy Audit			X			

Source: Guidehouse analysis

1. **Tracking System and Database Review**

   Guidehouse reviewed program implementation databases and identified additional data required for calculating gross energy and demand savings.

2. **Deemed Savings Review and Memo**

   Guidehouse reviewed the algorithms and assumptions supporting current reported savings for all programs and measures. We leveraged recent EM&V reports and other secondary sources for similar programs and measures to identify the operating characteristics that best reflect Evergy's service territories and program designs. These operating characteristics include operation hours, coincidence factors, installation rates, and leakage rates.

3. **Analytic Database Updating**

   Guidehouse updated the analysis tools that calculate savings based on engineering algorithms and project-specific equipment specifications and performance data provided in the implementation databases. Guidehouse's research from the MEEIA 2 PY2016 through PY2019 period was used to update these analytic databases.

   These savings verification tools will provide Evergy with an indication of how reported savings are tracking against verified values.

4. **Desk/Phone Review**

   For some custom measures without deemed savings, field metering was not warranted. In those cases, we conducted a thorough review of the reported savings models used to estimate impacts. The results of this review resulted in refinements to the algorithm, the inputs to the algorithm, or an entirely new engineering model. We reviewed the algorithms and assumptions supporting reported savings for all programs and leverage recent EM&V reports and other secondary sources for similar programs and measures to identify the operating characteristics that best reflect the Evergy service territories and program designs. These operating characteristics include operation hours, coincidence factors, installation rates, and leakage rates.

   Additionally, Guidehouse conducted telephone surveys with program participants with the primary objective of verifying the installation and operation of measures rebated through the programs or the delivery of a service rebated through the programs. This evaluation activity was leveraged for both the impact and process evaluations.

5. **Billing Analysis**

   Guidehouse used a billing analysis approach to estimate gross savings for the Demand Response Incentive (DRI) program using the following approaches:

   1. Within-subject regression: Uses loads of participating customers on non-event days to estimate the reference load. Demand is specified as a function of temperature and other variables that influence usage in the regression equation.

2. Day averaging (CBL): Reference load calculation, which is the simple arithmetic mean of loads from the same hour on preceding non-event days.

6. On-site EM&V

Guidehouse conducted on-site verification of non-lighting projects to support the PY2019 impact evaluation. The objectives of the on-site verification included the following.

- Support the impact evaluation of non-lighting projects:
  - Guidehouse verified that the measures listed in the project tracking data were successfully installed and implemented. Guidehouse reviewed the HVAC system, control strategies and building energy management system (EMS) to verify that the assumptions used for calculating savings are accurate reflections of the site conditions. Finally, Guidehouse requested trend data for all non-lighting measures[5].
  - On-site verification helped Guidehouse to understand how Custom measures were being implemented, the customers' experiences, and their expectations.
  - Whenever possible, Guidehouse determined verified savings using the actual performance data collected during the site visit.
  - The on-site verification improved the accuracy of the verified savings analysis.
- Support the participant NTG research in PY2019:
  - The objective of the NTG research was to understand customer's experience with the Custom program, quantify the free ridership and spillover, and identify areas for improvement. While on-site, Guidehouse asked customers if they would be willing to participate in the NTG survey distributed in early February 2020. During this time, Guidehouse made sure that the customers had access to the survey.
- Update demand factors for non-lighting end uses:
  - The verified savings calculated by leveraging the actual performance data was used to update the demand factors for non-lighting end uses, including unitary AC, HVAC control, motors and drive, and refrigeration. These updated demand factors will be intended for use in Cycle 3 PY2.

2.4.2 Process Evaluation Summary

Guidehouse conducted limited process evaluation in PY2019 that provided updates to the previous year (i.e. PY2018) process findings and recommendations as they related to the five required questions per the Missouri Code of State Regulations.

For each program, our process evaluation activities for 2019 consisted of (1) program manager/implementation contractor interviews, and (2) a review of new program material and

[5] Guidehouse has had limited success with collecting trend data as part of customer phone interviews. Guidehouse has generally had more success overall collecting trend data as part of on-site verification efforts.

information. Customer and trade ally surveys were conducted for the Business EER – Custom program.

1. **Program Manager/Implementer Interviews**

   The process evaluation for each program included an in-depth, qualitative interview with Evergy program staff and implementers. The Guidehouse team used these interviews to develop a thorough understanding of the final program design, procedures, and implementation strategies for each program and to gain a deeper understanding of current issues for each continuing program. The team also used the interviews to identify research topics to include in future trade ally interviews and customer surveys and to discuss available program materials (e.g., marketing and outreach materials, print and radio advertising copy) that can be used to support the evaluation.

2. **Review of Program Information**

   The Guidehouse team also reviewed new or updated program materials including application forms, marketing and outreach materials, web-based promotional content, point of purchase materials, print and radio advertising copy, and any cooperative marketing materials. This review helped us to understand how the programs are being marketed, determine whether the materials are complete, and begin to explore other efforts that could improve program participation and manage levels of free ridership to the extent these issues are observed.

3. **Customer and Trade Ally Surveys**

   For the Custom program, Guidehouse conducted customer and trade ally surveys. Guidehouse leveraged the surveys developed in PY2017 and PY2018 to survey participants in PY2019 to develop a net-to-gross ratio for the program.

2.4.3 Net-to-Gross PY2019 Research Summary

Guidehouse applied net-to-gross (NTG) ratios developed over the course of the MEEIA Cycle 2 for all programs in PY2019, with the exception of the Custom program which was the only program in PY2019 to receive primary research. This program received additional evaluation focus because a new implementation contractor had assumed the C&I Business Custom program for PY2019.

3. Portfolio Findings and Evaluation Results

3.1 Gross and Net Savings Summary

This section summarizes the gross and net savings achievements for the Evergy Metro portfolio to date and for PY2019. PY2019 represented a 9-month extension period of MEEIA Cycle 2 and presents the conclusion of an overall successful cycle. Evergy Metro's portfolio performed well and exceeded their MEEIA Cycle 2 4-year targets. Table 3-1. and Table 3-2. indicate that, at the close of PY2019, the portfolio achieved 116% of its 4-year energy target and 124% of its 4-year demand target. At the close of MEEIA Cycle 2, all sectors but the Educational programs achieved their 4-year energy targets and all but the Commercial and Educational programs achieved their 4-year demand targets, noting that the Commercial and Educational programs fell short of their targets by 8% and 5%, respectively.

Table 3-1. Program to Date Energy Savings at the Customer Meter by Sector

Sector	Gross			Net		
	Reported Savings (kWh)	Verified Savings (kWh)	Realization Rate (%)	MEEIA Cycle 2 4-Year Target (kWh)	Verified 4 - Year Savings (kWh)	Percentage of MEEIA 4-Year Target Achieved
Commercial EE Programs	247,342,341	216,435,160	88%	156,660,544	196,249,370	125%
Residential EE Programs	83,537,019	85,643,346	103%	65,922,822	71,354,802	108%
Educational Programs	10,627,891	9,845,155	93%	15,544,697	9,845,155	63%
DR Programs	7,822,548	5,807,731	74%	5,608,103	5,807,731	104%
Evergy Metro TOTAL	**349,329,799**	**317,731,392**	**91%**	**243,736,165**	**283,257,058**	**116%**

Source: Guidehouse analysis

Table 3-2. Program to Date Demand Savings at the Customer Meter by Sector

Sector	Gross			Net		
	Reported Savings (kW)	Verified Savings (kW)	Realization Rate (%)	MEEIA Cycle 2 4-Year Target (kW)	Verified 4 - Year Savings (kW)	Percentage of MEEIA 4-Year Target Achieved
Commercial EE Programs	42,309	35,436	84%	34,236	31,607	92%
Residential EE Programs	14,613	19,432	133%	10,453	16,014	153%
Educational Programs	3,267	3,176	97%	3,341	3,176	95%
DR Programs	40,823	46,144	113%	30,295	46,144	152%
Evergy Metro TOTAL	**101,013**	**104,188**	**103%**	**78,325**	**96,941**	**124%**

Source: Guidehouse analysis

Table 3-3 and Table 3-4 summarize the program to date gross and net verified energy and demand savings at the customer meter for Evergy Metro's programs. Table 3-5. and Table 3-6. summarize the gross and net verified energy and demand savings at the customer meter for Evergy Metro's programs and the overall portfolio for PY2019. Portfolio to date results are presented first, followed by PY2019 results. Guidehouse has highlighted key metrics of the portfolio performance and findings of the most impactful programs.

Evergy Metro Program-to-Date Results

Program to date, the portfolio has achieved 317,731,392 kWh and kW in **gross energy and demand** savings at the customer meter. This corresponds to realization rates of 91% and 103%, respectively. To date, the portfolio has achieved 283,257,058 kWh and 96,941 kW in **verified net energy and demand savings**. **This corresponds to the portfolio achieving approximately 116% and 124% of its cumulative 4-year MEEIA Cycle 2 energy and demand targets, respectively.** Table 3 through Table 6 provide energy and demand evaluation findings. **The points below highlight key program impact findings to date.**

GROSS ENERGY SAVINGS:
317,731,392 kWh

GROSS DEMAND SAVINGS:
104,188 kW

- **The portfolio's energy and demand realization rates were driven primarily by the realized savings for the Business Energy Efficiency Rebate (EER) – Standard program**, driven largely by corrections to baseline fixture wattages for high bay lighting. Program to date, the **Standard program achieved 190% and 174% of its 4-year MEEIA Cycle 2 target for energy and demand,** respectively, and it represented 49% and 25% of total verified net energy and demand savings, respectively.

- **The Business EER – Custom program achieved approximately 62% (and increase from 57% in PY2018) and 45% (an increase from 40%) of its 4-year MEEIA Cycle 2 energy and demand targets, respectively**. Although the Custom program did not achieve its 4-year MEEIA Cycle 2 target, the program has consistently grown in program participation year-over-year (representing 4% of portfolio energy savings in PY2016 to 18% of savings in PY2019). In addition to increasing participation, the program has also diversified participation in end-use types beyond lighting measures, targeting more complex HVAC, motor, process and refrigeration projects.

NET ENERGY SAVINGS:
283,257,058 kWh

NET DEMAND SAVINGS:
96,941 kW

- **The portfolio's suite of residential energy efficiency (EE) programs performed well, accounting for 27% and 19% of verified gross energy and demand savings, respectively.** Continued strong performance from the WHE program (representing 6% and 10% of verified PTD gross savings) and an increase in participation in the HLR program (representing 17% and 7% of verified PTD gross savings) contributed to the suite of residential programs **achieving 108% and 153% of their MEEIA Cycle 2 4-year target for energy and demand, respectively.**

- **The Programmable Thermostat programs represents 26% of total portfolio verified net demand savings while the DRI program represented approximately 22% of total portfolio verified net demand savings, for a combined contribution of 48% of net demand savings.** Together, the thermostat programs and the DRI program deliver strong demand reductions and demonstrate the value they provide as a flexible capacity

resource. Further, the Programmable Thermostats programs provides an opportunity for customer bill savings as Evergy Metro considers Time-of-Use (TOU) rates.

Table 3-3. Energy Savings at the Customer Meter: Program to Date

Sector	Program	Gross			Net		
		Reported Savings (kWh)	Verified Savings (kWh)	Realization Rate (%)	MEEIA 4-Year Cycle 2 Target (kWh)	Verified 4-Year Savings (kWh)	Percentage of MEEIA 4-Year Target Achieved
Commercial Energy Efficiency (EE) Programs	***Commercial EE Programs Subtotal***	***247,342,341***	***216,435,160***	***88%***	***156,660,544***	***196,249,370***	***125%***
	Business EER - Standard	175,389,392	144,429,129	82%	72,963,363	138,651,964	190%
	Business EER - Custom	50,025,843	48,195,529	96%	55,451,825	34,470,067	62%
	Block Bidding	965,962	767,131	79%	12,574,248	538,918	4%
	Strategic Energy Management	16,143,524	19,489,068	121%	11,284,066	19,489,068	173%
	Small Bus. Lighting	4,817,621	3,554,303	74%	4,387,042	3,099,352	71%
Residential EE Programs	***Residential EE Programs Subtotal***	***83,537,019***	***85,643,346***	***103%***	***65,922,822***	***71,354,802***	***108%***
	Whole House Efficiency	19,953,439	18,446,535	92%	21,835,320	15,126,159	69%
	Income-Eligible Multifamily	14,302,933	13,193,884	92%	13,221,415	13,193,885	100%
	Home Lighting Rebate	49,280,647	54,002,927	110%	30,866,088	43,034,759	139%
Educational Programs	***Educational Programs Subtotal***	***10,627,891***	***9,845,155***	***93%***	***15,544,697***	***9,845,155***	***63%***
	Income-Eligible Home Energy Report	589,881	426,596	72%	1,682,756	426,596	25%
	Home Energy Report	10,038,010	9,418,559	94%	13,861,941	9,418,559	68%
	Home Online Energy Audit	Online Energy Audit programs are not part of MEEIA Targets for Energy or Demand Savings					
	Business Online Energy Audit						
Demand Response (DR) Programs	***DR Programs Subtotal***	***7,822,548***	***5,807,731***	***74%***	***5,608,103***	***5,807,731***	***104%***
	Business Programmable Thermostat	154,965	105,228	68%	123,008	105,228	86%
	Residential Programmable Thermostat	7,667,583	5,702,503	74%	5,485,095	5,702,503	104%
	Demand Response Incentive	The Demand Response Incentive Program did not claim any energy savings.					
Evergy Metro TOTAL		**349,329,799**	**317,731,392**	**91%**	**243,736,165**	**283,257,058**	**116%**

Source: Guidehouse analysis

Table 3-4. Coincident Demand Savings at the Customer Meter: Program to Date

Sector	Program	Gross			Net		
		Reported Savings (kW)	Verified Savings (kW)	Realization Rate (%)	MEEIA 4-Year Cycle 2 Target (kW)	Verified 4-Year Savings (kW)	Percentage of MEEIA 4-Year Target Achieved
Commercial Energy Efficiency (EE) Programs	***Commercial EE Programs Subtotal***	***42,309***	***35,436***	***84%***	***34,236***	***31,607***	***92%***
	Business EER - Standard	31,683	24,799	78%	13,667	23,807	174%
	Business EER - Custom	9,501	9,510	100%	15,160	6,797	45%
	Block Bidding	311	174	56%	2,180	123	6%
	Strategic Energy Management	0	382	N/A	2,527	382	15%
	Small Bus. Lighting	814	571	70%	702	498	71%
Residential EE Programs	***Residential EE Programs Subtotal***	***14,613***	***19,432***	***133%***	***10,453***	***16,014***	***153%***
	Whole House Efficiency	8,212	10,937	133%	5,403	8,969	166%
	Income-Eligible Multifamily	1,571	1,528	97%	1,929	1,528	79%
	Home Lighting Rebate	4,831	6,966	144%	3,122	5,517	177%
Educational Programs	***Educational Programs Subtotal***	***3,267***	***3,176***	***97%***	***3,341***	***3,176***	***95%***
	Income-Eligible Home Energy Report	232	171	74%	474	171	36%
	Home Energy Report	3,035	3,005	99%	2,866	3,005	105%
	Home Online Energy Audit	Online Energy Audit programs are not part of MEEIA Targets for Energy or Demand Savings					
	Business Online Energy Audit						
Demand Response (DR) Programs	***DR Programs Subtotal***	***40,823***	***46,144***	***113%***	***30,295***	***46,144***	***152%***
	Business Programmable Thermostat	483	521	108%	335	521	155%
	Residential Programmable Thermostat	23,940	24,588	103%	14,959	24,588	164%
	Demand Response Incentive	16,400	21,035	128%	15,000	21,035	140%
Evergy Metro TOTAL		**101,013**	**104,188**	**103%**	**78,325**	**96,941**	**124%**

Source: Guidehouse analysis

Evergy Metro PY2019 Results

In PY2019, the portfolio achieved 73,835,563 kWh and 41,403 kW in **gross energy and demand** savings at the customer meter. This corresponds to gross realization rates of 104% and 120%, respectively. The portfolio achieved 63,113,393 kWh and 39,243 kW in verified net energy and demand savings. This corresponds to the portfolio achieving approximately 26% and 50% of its cumulative 4-year MEEIA Cycle 2 energy and demand targets, respectively, in PY2019. Table 3 through Table 6 provide energy and demand evaluation findings. **The points below highlight key PY2019 impact findings.**

GROSS ENERGY SAVINGS:
73,835,563 kWh

GROSS DEMAND SAVINGS:
41,403 kW

- **The Standard program achieved 25% and 27% of its 4-year MEEIA Cycle 2 target for energy and demand, respectively.** This program represented approximately 26% of verified gross energy savings and approximately 9% of verified gross demand savings. Realization rates for the Standard program were driven by adjustments to baseline fixture wattages for the largest total savings measure (high bay lighting).

- **The Business EER – Custom program grew in participation and verified energy and demand year over year, largely attributable to Evergy Metro's increased marketing and outreach efforts to customers.** The program achieved approximately 17% and 12% of its 4-year MEEIA Cycle 2 energy and demand targets, respectively. LED lighting measures contributed approximately 46% of the overall verified savings. The Custom program increased participation within the HVAC measure in PY2019, contributing 40% and 52% to the verified gross energy and demand savings, respectively. In PY2018, HVAC measures represented 10% and 19% of verified gross energy and demand, respectively.

NET ENERGY SAVINGS:
63,113,393 kWh

NET DEMAND SAVINGS:
39,243kW

- .**The portfolio's suite of residential energy efficiency (EE) programs performed well, accounting for 42% (an increase from 20% in PY2018) and 15% (an increase from 12% in PY2018) of verified gross energy and demand savings, respectively.** The HLR program contributed 33% of energy and 8% of demand portfolio savings in PY2019. The HLR program continued addressing imperfections of price, product availability, and consumer knowledge of efficient lighting choices. The program made strong progress on each, offering incentives that reduce the shelf price of LEDs, diversifying the retail channels and venues through which consumers can buy supported LEDs, and engaging in marketing and educational campaigns that explain the benefits of energy efficient lighting. The program also expanded offerings to an online popup store through which consumers could purchase multipacks of both standard and specialty bulbs during the holiday season.

- **The DRI program achieved approximately 140% of its 4-year MEEIA Cycle 2 target and represented approximately 54% of total portfolio verified net demand savings.** The Cycle 2 extension presented the Evergy Product Manager and the DRI Implementation Contractor, CLEAResult, the opportunity to readjust customer's EPD and CL with new contracts, which improved the accuracy in calculating program potential and further progress Evergy's ability to achieve the MEEIA Cycle 2 demand target. The DRI program had a realization rate of 128% for demand savings, an increase from 82% in PY2018.

Table 3-5. Energy Savings at the Customer Meter: PY2019

Sector	Program	Gross			Net		
		Reported Savings (kWh)	Verified Savings (kWh)	Realization Rate (%)	MEEIA 4-Year Cycle 2 Target (kWh)	Verified Savings (kWh)	Percentage of MEEIA 4-Year Target Achieved
Commercial Energy Efficiency (EE) Programs	***Commercial EE Programs Subtotal***	***32,868,998***	***32,380,956***	***99%***	***156,660,544***	***27,426,313***	***18%***
	Business EER - Standard	17,339,531	18,827,606	109%	72,963,363	18,074,502	25%
	Business EER - Custom	15,529,467	13,553,350	87%	55,451,825	9,351,811	17%
	Block Bidding	0	0	N/A	12,574,248	0	N/A
	Strategic Energy Management	0	0	N/A	11,284,066	0	N/A
	Small Bus. Lighting	0	0	N/A	4,387,042	0	N/A
Residential EE Programs	***Residential EE Programs Subtotal***	***26,602,450***	***30,966,287***	***116%***	***65,922,822***	***25,198,760***	***38%***
	Whole House Efficiency	4,308,852	4,513,848	105%	21,835,320	3,701,355	17%
	Income-Eligible Multifamily	1,949,095	1,902,468	98%	13,221,415	1,902,468	14%
	Home Lighting Rebate	20,344,503	24,549,972	121%	30,866,088	19,594,937	63%
Educational Programs	***Educational Programs Subtotal***	***10,627,891***	***9,845,155***	***93%***	***15,544,697***	***9,845,155***	***63%***
	Income-Eligible Home Energy Report	589,881	426,596	72%	1,682,756	426,596	25%
	Home Energy Report	10,038,010	9,418,559	94%	13,861,941	9,418,559	68%
	Home Online Energy Audit	Online Energy Audit programs are not part of MEEIA Targets for Energy or Demand Savings					
	Business Online Energy Audit						
Demand Response (DR) Programs	***DR Programs Subtotal***	***605,184***	***643,165***	***N/A***	***5,608,103***	***643,165***	***11%***
	Business Programmable Thermostat	13,593	16,331	120%	123,008	16,331	13%
	Residential Programmable Thermostat	591,591	626,834	N/A	5,485,095	626,834	11%
	Demand Response Incentive	The Demand Response Incentive Program did not claim any energy savings.					
Evergy Metro TOTAL		**70,704,523**	**73,835,563**	**104%**	**243,736,165**	**63,113,393**	**26%**

Source: Guidehouse analysis

Table 3-6. Coincident Demand Savings at the Customer Meter: PY2019

Sector	Program	Gross			Net		
		Reported Savings (kW)	Verified Savings (kW)	Realization Rate (%)	MEEIA 4-Year Cycle 2 Target (kW)	Verified Savings (kW)	Percentage of MEEIA 4-Year Target Achieved
Commercial Energy Efficiency (EE) Programs	***Commercial EE Programs Subtotal***	***6,534***	***6,627***	***101%***	***34,236***	***5,623***	***16%***
	Business EER - Standard	3,277	3,889	119%	13,667	3,734	27%
	Business EER - Custom	3,257	2,738	84%	15,160	1,889	12%
	Block Bidding	0	0	N/A	2,180	0	N/A
	Strategic Energy Management	0	0	N/A	2,527	0	N/A
	Small Bus. Lighting	0	0	N/A	702	0	N/A
Residential EE Programs	***Residential EE Programs Subtotal***	***3,652***	***6,154***	***169%***	***10,453***	***4,998***	***48%***
	Whole House Efficiency	1,477	2,533	171%	5,403	2,077	38%
	Income-Eligible Multifamily	240	231	96%	1,929	231	12%
	Home Lighting Rebate	1,935	3,391	175%	3,122	2,690	86%
Educational Programs	***Educational Programs Subtotal***	***3,267***	***3,176***	***97%***	***3,341***	***3,176***	***95%***
	Income-Eligible Home Energy Report	232	171	74%	474	171	36%
	Home Energy Report	3,035	3,005	99%	2,866	3,005	105%
	Home Online Energy Audit	Online Energy Audit programs are not part of MEEIA Targets for Energy or Demand Savings					
	Business Online Energy Audit						
Demand Response (DR) Programs	***DR Programs Subtotal***	***21,081***	***25,446***	***121%***	***30,295***	***25,446***	***84%***
	Business Programmable Thermostat	97	97	100%	335	97	29%
	Residential Programmable Thermostat	4,584	4,315	N/A	14,959	4,315	29%
	Demand Response Incentive	16,400	21,035	128%	15,000	21,035	140%
Evergy Metro TOTAL		**34,534**	**41,403**	**120%**	**78,325**	**39,243**	**50%**

Source: Guidehouse analysis

Net Savings

Table 3-7. provides a summary of the final FR, participant spillover (PSO), and nonparticipant spillover (NPSO) estimates for each applicable program. The bolded items in the table represent programs' primary data collected by Guidehouse to inform the NTG analysis.

Guidehouse did not collect primary data for the remaining programs due to one or more of the following reasons. As discussed in prior stakeholder meetings, the evaluation team applied a NTG ratio of 1.0 when necessary, including:

- Programs that did not claim any savings (e.g., Home Online Energy Audit, Business Online Energy Audit).
- For the DRI program, the billing analysis generates net results rather than gross results because FR is zero for curtailment programs, as customers have no incentive to reduce peak demand in the absence of the program.
- Impact evaluation methods directly estimate net impacts through a billing analysis that uses controls (e.g., HER).
- Guidehouse applied a NTG value of 1.0 for the SEM program. SEM programs are delivered in a series of training sessions that educate the customer/participant to identify and address potential EE opportunities that are above their current practice (i.e., baseline activity).
- For the Income-Eligible Multifamily (IEMF) program, the cost of assessing net savings for this program was judged to exceed the value given the program's small contribution to total energy savings targeted for this program year, though the team notes this will not necessarily be the case for the future program years.

Please refer to section 2.1.2 for further details on the NTG approach.

Table 3-7. PY2019 NTG Components by Program

Program Name*	FR	PSO	NPSO	NTG Ratio
Business EER – Standard	0.05	0.002	0.004	96%
Business EER – Custom	**0.32**	**0.01**	**0**	**69%**
Block Bidding	Projects Originating from the Custom Program			69%
	Projects Originating from the Standard Program			96%
Strategic Energy Management	Guidehouse assumed a NTG value of 1.0 for the SEM program			
Small Business Lighting	0.14	0.002	0.01	87%
Income-Eligible Weatherization	Deemed 1.0			100%
Whole House Efficiency	0.33	0.02	0.14	82%
Income-Eligible Multifamily	Deemed 1.0 pending future research.			100%
Home Lighting Rebate	0.37	0.18	0.00	80%

Program Name*	FR	PSO	NPSO	NTG Ratio
Home Energy Report	Guidehouse assumed a NTG value of 1.0 for the HER program			
Home Online Energy Audit	N/A – Savings not claimed in PY2019			
Business Online Energy Audit	N/A – Savings not claimed in PY2019			
Residential Programmable Thermostat	Guidehouse assumed a NTG value of 1.0 for the Programmable Thermostats programs and Demand Response Incentive program			
Business Programmable Thermostat				
Demand Response Incentive				
Portfolio Level NTG (Demand/Energy)	**N/A**	**N/A**	**N/A**	**93%/89%[6]**

*NTG Ratios are rounded to the nearest whole number

Source: Guidehouse analysis

3.2 Cost-Effectiveness Summary

Guidehouse calculated benefit cost ratios and total net benefits at the program and portfolio level 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. Cost-effectiveness values were calculated using Evergy Metro's DSMore model in conjunction with Guidehouse-verified EM&V findings including: energy and demand impacts, incremental costs, NTG ratios, participation numbers, and measure lifetimes. All program and avoided cost data, and discount rates are consistent with those used by Evergy Metro in calculating cost-effectiveness as part of its annual filing. The following tables present the cost-effectiveness results. Table 3-8. through Table 3-10. present program to date results for PY2016 through PY2019. Table 3-11. through Table 3-13. present results for PY2019 alone. At the program group level, presented in Table 3-12., all sectors are cost-effective in the TRC, SCT, and UCT tests, with the DR program passing the RIM test. Evergy Metro's portfolio of programs have achieved $82,830,956 in net benefits to date. For program level details, refer to the "Overall Results PY 2019" sheet within the Evergy Metro databook.

[6] A portfolio level NTG of 95% for demand and 90% for energy was calculated by dividing the verified net savings by the verified gross savings.

Table 3-8. Benefit-Cost Ratios by Program and Cost Test: Program to Date**

Sector	Program	TRC	SCT	UCT	PCT	RIM
		Guidehouse				
Commercial EE Programs	Business EER – Standard	1.45	1.70	3.27	1.62	0.84
	Business EER – Custom	1.12	1.41	2.14	1.33	0.76
	Block Bidding	0.43	0.55	0.59	0.97	0.41
	Strategic Energy Management	4.08	4.34	4.00	14.15	0.64
	Small Business Lighting	0.85	1.01	1.18	1.46	0.59
Residential EE Programs	Whole House Efficiency	1.13	1.40	1.89	1.67	0.67
	Income-Eligible Multifamily	1.15	1.36	1.15	9.16	0.36
	Home Lighting Rebate***	1.96	2.30	2.66	5.08	0.49
Educational/ Behavioral Programs	Income-Eligible Home Energy Report	0.50	0.50	0.50	INF*	0.28
	Home Energy Report	1.77	1.76	1.77	INF*	0.48
	Home Online Energy Audit	N/A	N/A	N/A	N/A	N/A
	Business Online Energy Audit	N/A	N/A	N/A	N/A	N/A
DR Programs	Business Programmable Thermostat	1.57	1.80	2.21	0.58	1.84
	Residential Programmable Thermostat	1.92	2.23	2.92	0.93	1.88
	Demand Response Incentive	9.68	9.65	2.69	558.30	2.69

*Ratios are infinite because there are positive benefits and no participant costs.

**Guidehouse did not perform benefit-cost calculations for the Home Online Energy Audit or Business Online Energy Audit because Evergy Metro does not claim savings for these programs; therefore, Guidehouse did not verify savings.

***Includes the commercial segment of HLR in total.

Source: Guidehouse analysis

Table 3-9. Benefit-Cost Ratios by Program Groups and Cost Test – Program to Date

	Total Resource Cost Test	Societal Cost Test	Utility Cost Test	Participant Cost Test	Rate Impact Measure Test
Portfolio	1.48	1.74	2.51	1.94	0.80
EE Programs*	1.38	1.64	2.56	1.93	0.71
Residential EE Programs	1.42	1.70	2.00	3.29	0.52
C&I EE Programs	1.36	1.62	2.83	1.59	0.80
DR Programs**	2.27	2.57	2.86	1.21	2.00

*Includes only EE programs, inclusive of administrative costs for educational program costs, market research, software development, and EM&V.
**Includes only DR programs, inclusive of administrative costs for educational program costs, market research, software development, and EM&V.
Source: Guidehouse analysis

Table 3-10. Portfolio Level Costs and Benefits Summary (USD) – Program to Date

Sector	Rebate Costs	Direct Program Admin Costs	Total Costs	Benefits from Energy and Demand Savings	Total Benefits	Total Net Benefits
Portfolio	$31,941,599	$34,712,689	$66,654,289	$149,485,244	$149,485,244	$82,830,956

Source: Guidehouse analysis

Table 3-11. Benefit-Cost Ratios by Program and Cost Test: PY2019**

Sector	Program	TRC	SCT	UCT	PCT	RIM
		Guidehouse				
Commercial EE Programs	Business EER – Standard	1.27	1.49	3.07	1.44	0.84
	Business EER – Custom	1.02	1.28	1.91	1.19	0.73
	Block Bidding	0.00	0.00	0.00	N/A	0.00
	Strategic Energy Management	0.00	0.00	0.00	N/A	0.00
	Small Business Lighting	N/A	N/A	N/A	N/A	N/A
Residential EE Programs	Whole House Efficiency	1.45	1.83	2.38	2.28	0.65
	Income-Eligible Multifamily	0.90	1.11	0.90	5.24	0.33
	Home Lighting Rebate***	2.99	3.48	4.60	6.26	0.50
Educational/ Behavioral Programs	Income-Eligible Home Energy Report	0.23	0.23	0.23	N/A	0.18
	Home Energy Report	1.47	1.47	1.47	N/A	0.47
	Home Online Energy Audit	N/A	N/A	N/A	N/A	N/A
	Business Online Energy Audit	N/A	N/A	N/A	N/A	N/A
DR Programs	Business Programmable Thermostat	1.43	1.65	2.02	0.43	1.74
	Residential Programmable Thermostat	1.89	2.20	2.71	0.90	1.91
	Demand Response Incentive	12.51	12.51	3.39	338.27	3.39

*Ratios are infinite because there are positive benefits and no participant costs.

**Guidehouse did not perform benefit-cost calculations for the Home Online Energy Audit, or Business Online Energy Audit because Evergy Metro does not claim savings for these programs; therefore, Guidehouse did not verify savings. The Block Bidding, Strategic Energy Management and Small Business Lighting programs did not claim savings in PY2019.

***Includes the commercial segment of HLR in total.

Source: Guidehouse analysis

Table 3-12. Benefit-Cost Ratios by Program Groups and Cost Test – PY2019

	Total Resource Cost Test	Societal Cost Test	Utility Cost Test	Participant Cost Test	Rate Impact Measure Test
Portfolio	1.53	1.80	2.50	2.27	0.72
EE Programs*	1.43	1.72	2.61	2.26	0.63
Residential EE Programs	2.02	2.42	2.91	4.56	0.52
C&I EE Programs	1.14	1.39	2.40	1.31	0.79
DR Programs**	2.68	2.96	2.90	1.39	2.25

*Includes only EE programs, inclusive of administrative costs for educational program costs, market research, software development, and EM&V.
**Includes only DR programs, inclusive of administrative costs for educational program costs, market research, software development, and EM&V.
Source: Guidehouse analysis

Table 3-13. Portfolio Level Costs and Benefits Summary (USD) – PY2019

Sector	Rebate Costs	Direct Program Admin Costs	Total Costs	Benefits from Energy and Demand Savings	Total Benefits	Total Net Benefits
Portfolio	**$6,861,708**	**$7,095,671**	**$13,957,379**	**$28,212,676**	**$28,212,676**	**$14,255,297**

Source: Guidehouse analysis

3.3 Process Evaluation Summary

This section provides an overview of the portfolio MEEIA Cycle 2 process evaluation findings. Table 3-14 provides a summary of the 5 MO process questions and the overarching themes across Evergy Metro's portfolio of DSM programs. These findings are intended to provide the reader with a broad understanding of the portfolio and the progress made throughout the entirety of MEEIA Cycle 2. For specific program findings, please refer to Appendix Q.

Figure 3-1 and Figure 3-2 below summarize customer and trade ally program satisfaction analyzed over the MEEIA Cycle 2 period. Customers and trade allies were asked to rank their satisfaction with the respective programs in which they participated (on a scale of 1 through 5, 1 being the lowest, 5 being the highest). The predominant response provided by survey respondents ranked was a five, or highly satisfied. The average participant satisfaction score for nearly all programs surveyed by Guidehouse ranked above a four,[7] and the average trade ally satisfaction for all programs surveyed also ranked a score of four or above. The consistently high satisfaction scores among program participants and trade allies is indicative of Evergy's leadership and Product Managers focus on addressing their specific market needs, removing barriers to participation, offering an extensive and comprehensive array of measures and broadening means of communicating with customers and key market players.

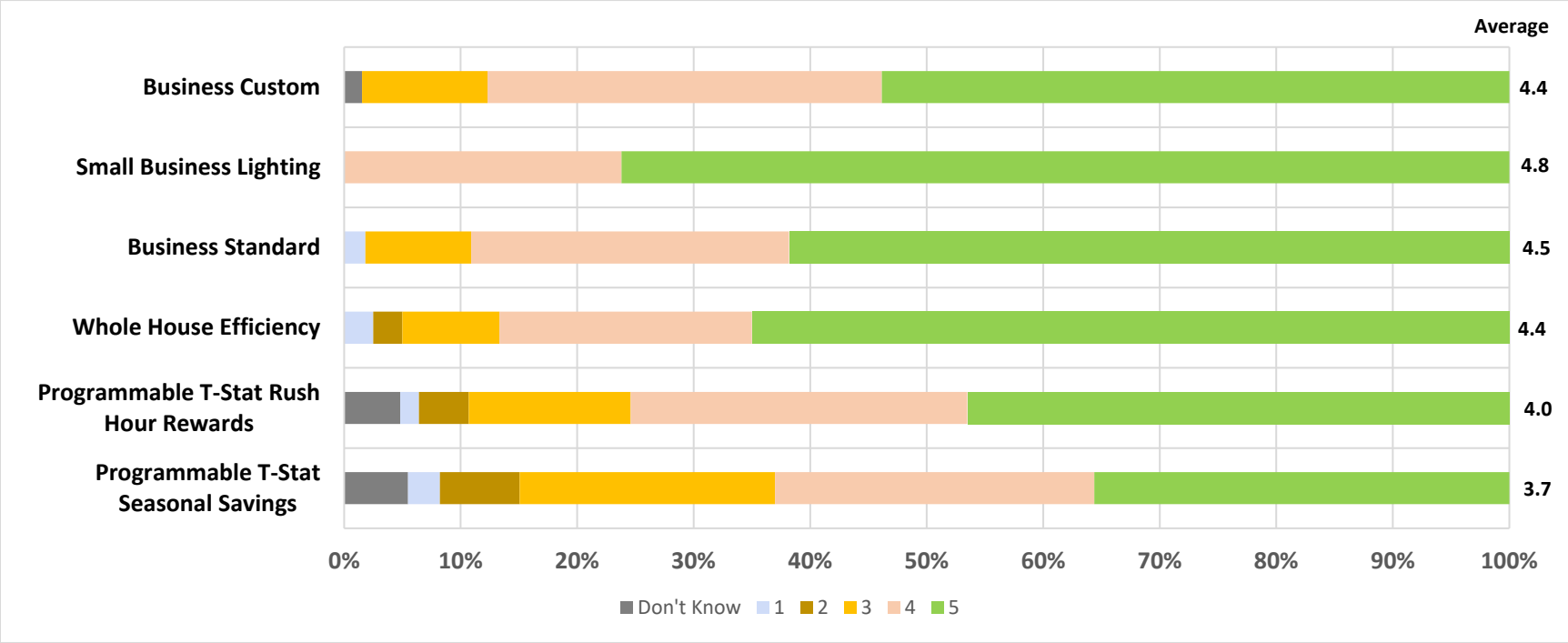
[7] The lone exception was the with the Programmable Thermostats Seasonal Savings program, which had a slightly lower overall satisfaction rate. When asked why they rated their overall experience as 1-2 or Don't Know, many customers indicated they were uninformed or had a misconception about program purpose and operation. For example, some customers suggested moving event hours to the first half of the day, demonstrating a lack of understanding the program's objective. This apparent confusion or lack of awareness of program purpose may also contribute to the sizable number of participants who rated their satisfaction as a neutral 3 (neither satisfied nor dissatisfied).

Table 3-14. Portfolio Missouri Requirement-Based Findings

Missouri Question	Guidehouse Findings
1. What are the primary market imperfections that are common to the target market segment?	Overall, Evergy addressed the market imperfections that are common to each of the programs, as is evident in the strong program-to-date performance of the portfolio when measured against the MEEIA Cycle 2 4-year target. A common barrier among energy efficiency programs at the conclusion of MEEIA Cycle 2 is the high upfront cost of equipment. Evergy Metro's portfolio of programs have continued to address this barrier by altering program incentive rates (i.e. Business Custom), offering new avenues to participate in the programs (e.g. HLR's online popup store) and providing customer with an ability to reduce electricity usage during hours of peak demand (i.e. residential programmable thermostat program).
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Evergy Metro's suite of program's target markets are largely well-defined. While all business customers are eligible to participate in the Custom program, as a segment, Tier One customers continue to provide the most energy savings to the program. Because these customers also have the option of opting out of Evergy's energy efficiency programs, they are a segment deserving of additional targeted focus. Residential programs continue to drive participation through their upstream and downstream delivery options, as seen in the increasing participation within the HLR and WHE programs throughout MEEIA Cycle 2.
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?	Yes, the mix of end-use measures within Evergy's portfolio address the needs of their target markets. Within the C&I sector, the Standard program focuses on predominantly lighting measures while the Custom program addresses lighting and non-lighting measures. The Whole House Efficiency, IEMF and HLR programs provide a wide range of energy efficiency solutions for the residential sector.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Guidehouse's process research throughout MEEIA Cycle 2 has indicated that both customers and trade allies are highly satisfied with communication from Evergy. Evergy Metro continues to evolve to the dynamic marketplace, including identifying and implementing new means of communicating with program participants. For example, in PY2019, Evergy released an online customer portal to better communicate with and educate customers about the programmable thermostats programs.
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?	Up-front costs continue to be an important barrier to many participants – especially prospective low-income participants. Evergy is looking at alternative financing mechanisms, including a Pay As You Save (PAYS) program to help offset the cost of large building envelope or HVAC measures.

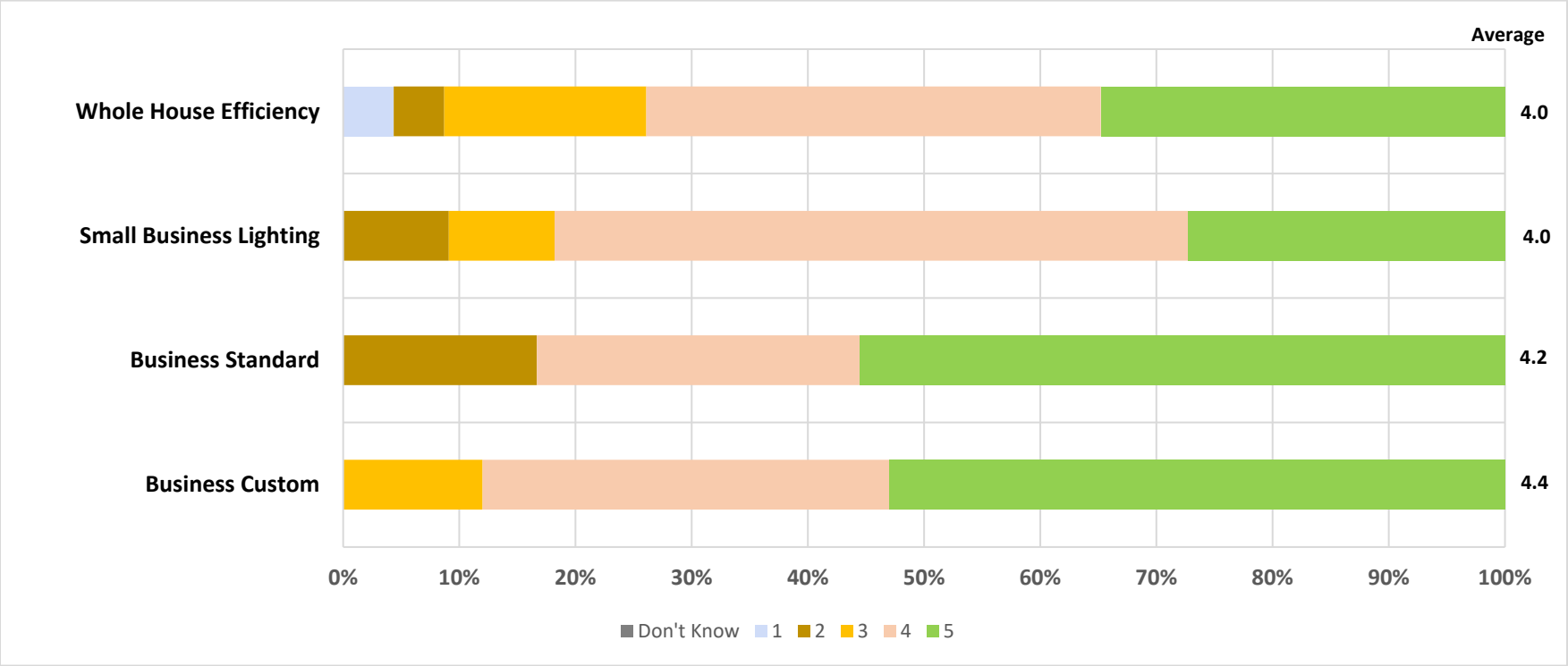
Source: Guidehouse analysis

Figure 3-1. Participant Satisfaction with Programs in MEEIA Cycle 2



Source: Guidehouse analysis

Figure 3-2. Trade Ally Satisfaction with Programs in MEEIA Cycle 2



Source: Guidehouse analysis