NAVIGANT

# GMO Evaluation, Measurement, and Verification Report – FINAL

**Program Year 2018**

**Prepared for:**

**KCP&L – Greater Missouri Operations**


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Reference No.: 185775
December 11, 2019

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# HOW TO USE THIS REPORT

Navigant 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 Navigant 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 Navigant 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 2016-2018 (PY2016-PY2018), which corresponds to April 2016-March 2019. Note, a 9-month extension for MEEIA Cycle 2 has been issued.

**Cycle 3**
Refers to program implemented in the timeframe of program years 2020-2023 (PY2020-PY2023). The exact dates for MEEIA Cycle 3 have not yet been determined.

## *Savings Types*

**Gross Reported Savings**
Savings reported in the Greater Missouri Operations' (GMO's) annual reports prior to any EM&V ex-post gross adjustments and net-to-gross (NTG) adjustments. In previous Navigant EM&V reports, gross reported savings were referred to as ex-ante gross savings.

**Gross Verified Savings**

Savings verified through Navigant'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 Navigant'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 GMO'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 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 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 4 CSR 240-22.070 (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: GMO GMO 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 |
| 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 |

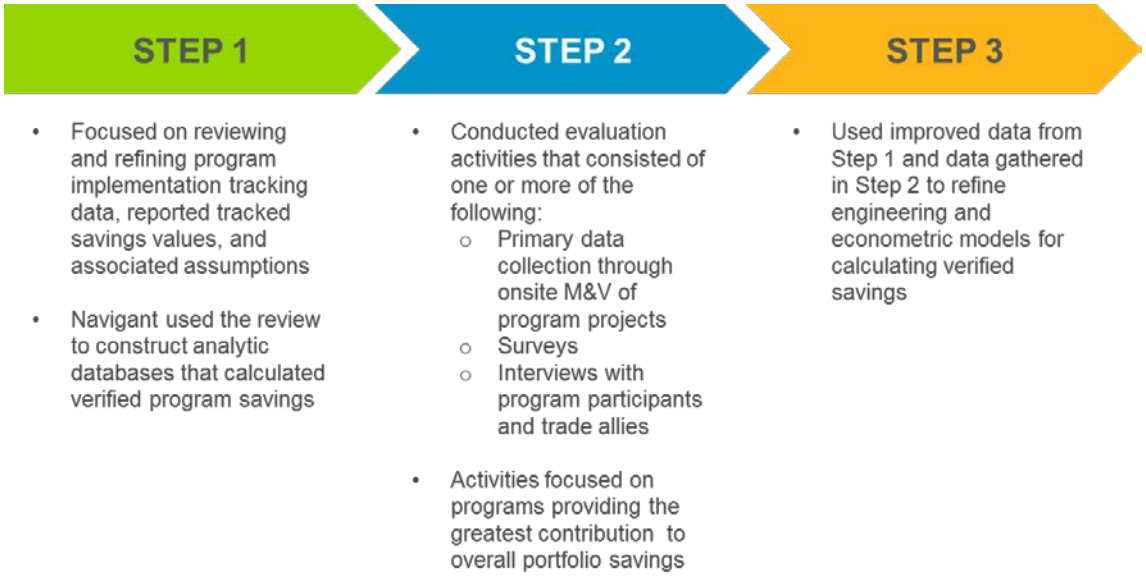
# EXECUTIVE SUMMARY

This evaluation report is provided by Great Plains Energy Services Incorporated (GPES) on behalf of its affiliate Kansas City Power and Light (KCP&L) – Greater Missouri Operations Company (GMO) 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 GMO for its portfolio of 16[1] demand-side management (DSM) programs for program year (PY) 2018.

The evaluation team consists of Navigant Consulting, Inc. (Navigant), Illume Advising LLC (Illume), and NMR Group, Inc. (NMR). As the primary contractor, Navigant is the main point of contact for GMO and the implementation contractors (ICs). Navigant 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 Navigant or the evaluation team.

The evaluation team employed a variety of methods to evaluate, measure, and verify the energy and demand savings achieved by each of GMO's DSM programs. The team summarizes the approach for gross impact, net savings analysis, and process evaluation below and describes the key methods in the following sections.

Navigant's **gross impact evaluation** strategy had three basic components:




[1] The Home Appliance Recycling Rebate program was discontinued by KCP&L—though it was part of the original filing—and is not counted in this number of active programs.

In PY2018, Navigant used three primary methods to develop net savings for each program:

- **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 and PY2018.

Navigant's **process evaluation** focused on (1) addressing the five required questions per the Missouri Code of State Regulations 4 CSR 240-22.070 (8) (Missouri regulations), and (2) identifying program process improvements to increase program participation and savings.

For each program, the process evaluation answered the following five questions on program design as set forth in the 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?

Additionally, the **process evaluation** documents program design and operations and provides GMO with actionable recommendations to improve its program processes. This includes recommendations about program design, program targeting, improving customer and trade ally satisfaction, reducing barriers to participation, and alternative promotion strategies. Additionally, through the documentation of the program design, Navigant developed process flow maps that show the major steps within each program, which are in Appendix B.

This executive summary summarizes the impact, NTG, cost-effectiveness, and process findings and recommendations that resulted from Navigant's PY2018 evaluation.

## OVERALL FINDINGS AND EVALUATION RESULTS

This section summarizes the gross and net savings achievements for the GMO portfolio to date and for PY2018. GMO's programs are performing well and are close to meeting their MEEIA 3-year targets or exceeding them. Table 1 and Table 2 indicate that, at the close of PY2018, the portfolio achieved 110% of its 3-year energy target and 90% of its 3-year demand target.

Continued progress toward and beyond the energy target can largely be attributed to the success of the commercial and industrial (C&I) portfolio of programs, which represent 61% of the verified net energy savings. KCP&L's C&I Product Manager has made a concerted effort in addressing previous years evaluation findings, particularly regarding the Business EER – Custom and Block Bidding programs. To illustrate the growth in these programs, the Custom program grew from 658,739 kWh gross savings in PY2016, to 16,584,681 kWh in PY2018. The Block Bidding program grew from 467,490 kWh in PY2016 to 6,124,084 kWh in PY2018. These two programs represent approximately 26% of verified gross savings in PY2018, compared to 6% in PY2017. Increased marketing, customer outreach and diversification of eligible end-uses have proven successful for the Custom and Block Bidding programs.

The residential suite of programs also contributed to the portfolios success, with energy and demand realization rates of 94% and 112%, respectively, and representing 27% of verified net energy savings and 16% of verified net demand savings. The Whole House Efficiency (WHE) and Home Lighting Rebate (HLR) programs have adapted through MEEIA 2 to meet program budgets and savings targets. The WHE program's 3-tiered offering has proven successful, with energy savings increasing from 5,536,777 kWh to 7,085,368 kWh between PY2016 and PY2018. The HLR program continues to contribute a significant portion of savings to the portfolio, representing 9% of gross energy savings in PY2018. The HLR program has proven to be adaptive to the GMO market, adjusting program offerings (A-line to Specialty bulb focus) throughout the Cycle to ensure the success of the program.

Demand savings are largely driven by the suite of demand response (DR) programs (i.e., the Residential and Business Programmable Thermostats and DR Incentive [DRI] programs), which contributed 60% of the total net verified savings. GMO increased efforts in PY2018 to recalculate estimated peak demand (EPD) values by using interval data during potential event hours as opposed to the monthly billing data previously used. During PY2018, GMO also redefined contracted curtailable load (CL) through onsite visits and customer engagement. The EPD and CL are primary factors in potential impacts and the reformulation of these numbers allow program performance to be assessed more accurately. Some customers' EPD and CL could not be adjusted, despite evidence that it should be changed, because some customers were engaged in multiyear contracts. The DRI program had a realization rate of 48% in PY2016, 52% in PY2017, and 62% in PY2018. This steady increase in realization rates shows that GMO's efforts to adjust the program mid-Cycle have been successful. The Cycle 2 extension presents the opportunity to readjust every customer's EPD and CL with new contracts, which will continue to improve the accuracy in calculating program potential and further progress GMO's ability to achieve the MEEIA Cycle 2 demand target.

The evaluator believes the above efforts will continue to increase program participation in the MEEIA Cycle 2 extension period and throughout MEEIA Cycle 3.

**Table 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 3-Year Target (kWh) | Verified 3 - Year Savings (kWh) | Percentage of MEEIA 3-Year Target Achieved |
| Commercial EE Programs | 160,881,584 | 135,170,519 | 84% | 102,092,113 | 122,538,109 | 120% |
| Residential EE Programs | 68,864,988 | 64,491,687 | 94% | 55,163,627 | 54,312,478 | 98% |
| Educational Programs | 18,651,728 | 19,894,420 | 107% | 21,070,772 | 19,894,420 | 94% |
| DR Programs | 9,227,988 | 5,760,037 | 62% | 6,223,140 | 5,760,037 | 93% |
| GMO TOTAL | 257,626,288 | 225,316,663 | 87% | 184,549,652 | 202,505,044 | 110% |

*Source: Navigant analysis*

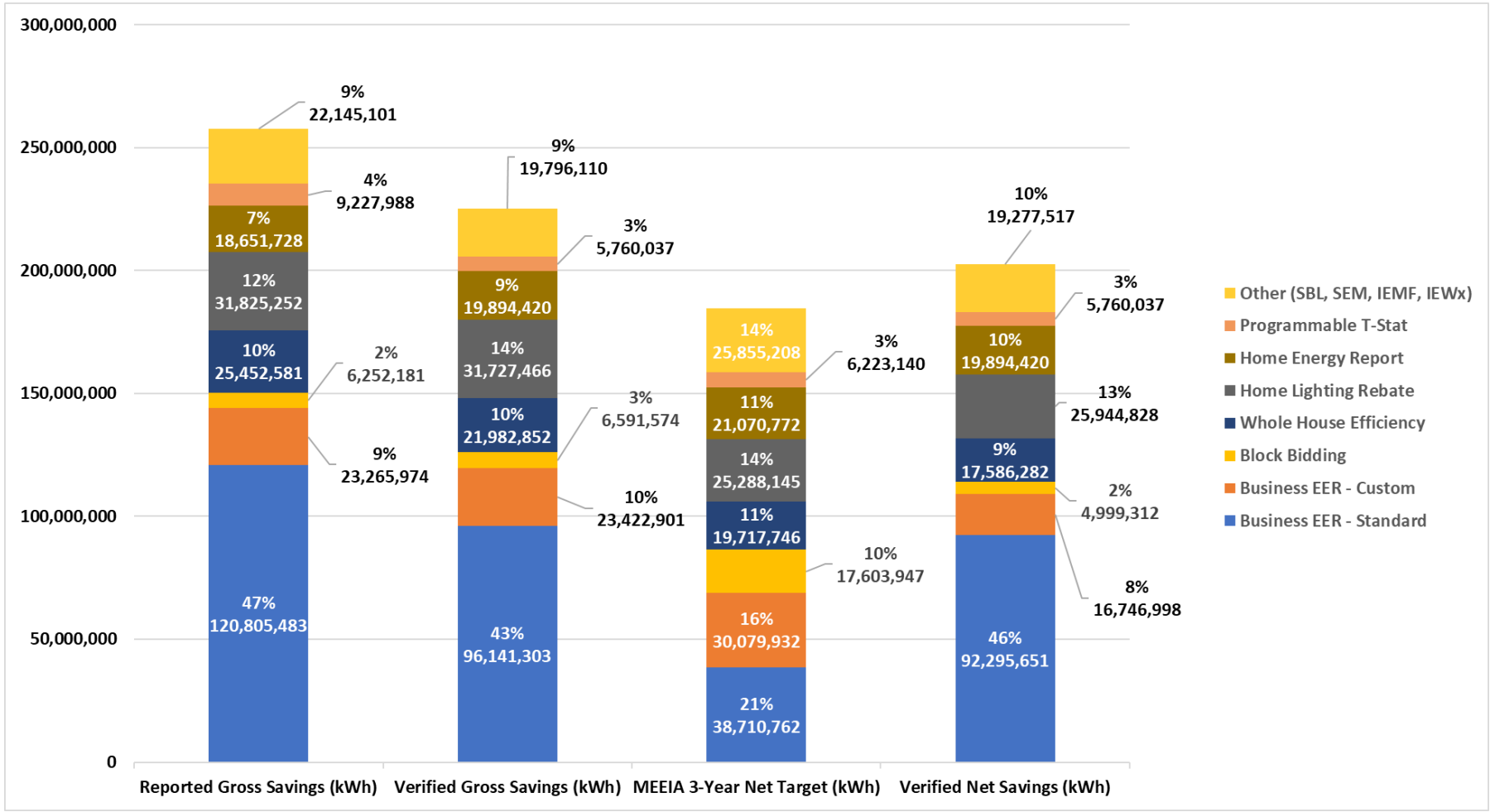
**Table 2. Program to Date Demand Savings at the Customer Meter by Sector**

| Sector | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings (kW) | Verified Savings (kW) | Realization Rate (%) | MEEIA Cycle 2 3-Year Target (kW) | Verified 3 - Year Savings (kW) | Percentage of MEEIA 3-Year Target Achieved |
| Commercial EE Programs | 27,515 | 22,352 | 81% | 20,629 | 20,010 | 97% |
| Residential EE Programs | 15,688 | 17,534 | 112% | 9,150 | 14,369 | 157% |
| Educational Programs | 3,107 | 3,413 | 110% | 4,215 | 3,413 | 81% |
| DR Programs | 76,438 | 57,409 | 75% | 71,972 | 57,409 | 80% |
| **GMO TOTAL** | 122,749 | 100,708 | 82% | 105,967 | 95,201 | 90% |

*Source: Navigant analysis*

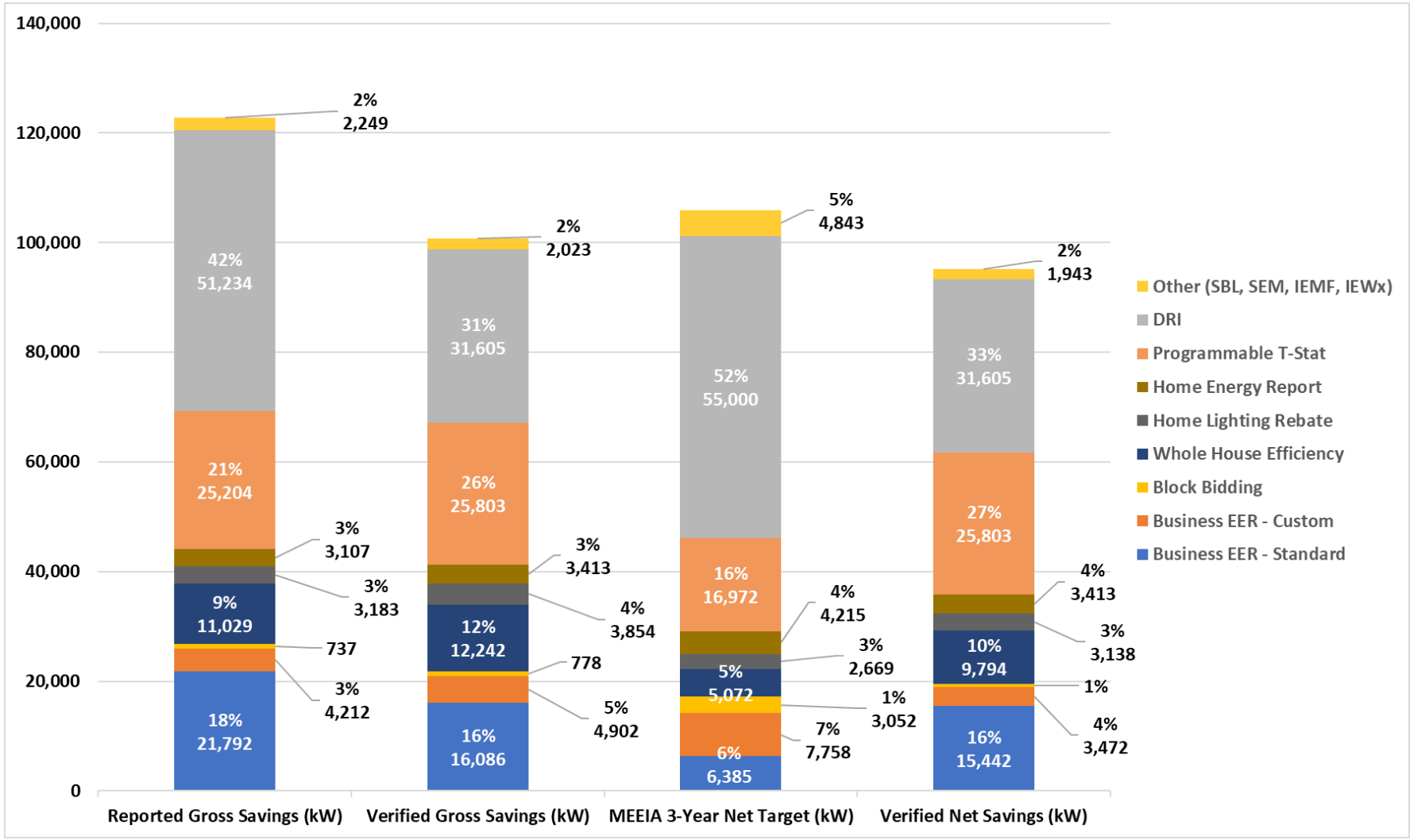
Figure 1 and Figure 2 show the program to date distribution of energy and demand by program by program.

**Figure 1. Program to Date Distribution of Energy Savings by Program**




*Source: Navigant analysis*

**Figure 2.** Program to Date Distribution of Demand Savings by Program




*Source: Navigant analysis*

Program to date, the portfolio has achieved 225,316,663 kWh and 100,708 kW in **gross energy and demand** savings at the customer meter. This corresponds to realization rates of 87% and 82%, respectively. To date, the portfolio has achieved 202,505,044 kWh and 95,201 kW in **verified net energy and demand savings**. This corresponds to the portfolio achieving approximately 110% and 90% of its cumulative 3-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:**
225,316,663 kWh

**GROSS DEMAND SAVINGS:**
100,708 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 238% and 242% of its 3-year MEEIA Cycle 2 target for energy and demand,** respectively, and it represented 43% and 16% of total verified net energy and demand savings, respectively.
- **The Business EER – Custom program achieved approximately 56% and 45% of its 3-year MEEIA Cycle 2 energy and demand targets, respectively**. Although light-emitting diodes (LED) lighting measures contributed approximately 50% of the overall verified savings, the Custom program increased participation within the New Construction, HVAC, Building Optimization and Motors measure categories. **KCP&L's product managers have made concerted efforts in PY2017 and PY2018 to increase participation in the Custom and Block Bidding programs.** These efforts are reflective in the increase in PY2018 participation and verified savings compared to the two previous program years.
- **The portfolio's suite of residential energy efficiency (EE) programs performed well, accounting for 29% and 18% of verified energy and demand savings, respectively.** The Home Lighting Rebate program achieved strong participation through the first two years of the cycle, and appropriately shifted to specialty bulbs to align with budget allocations. The Whole House Efficiency program continued to see strong participation within Early Retirement HVAC measures.

**NET ENERGY SAVINGS:**
202,505,044 kWh

**NET DEMAND SAVINGS:**
95,201 kW

- **The Programmable Thermostat programs represents 26% of total portfolio verified net demand savings while the DRI program represented approximately 31% of total portfolio verified net demand savings, for a combined contribution of 57% 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 GMO considers Time-of-Use (TOU) rates.

In PY2018, the portfolio achieved 85,856,738 kWh and 53,335 kW in **gross energy and demand** savings at the customer meter. This corresponds to gross realization rates of 102% and 75%, respectively. The portfolio achieved 75,590,341 kWh and 51,113 kW in verified net energy and demand savings. This corresponds to the portfolio achieving approximately 41% and 48% of its cumulative 3-year MEEIA Cycle 2 energy and demand targets, respectively, in PY2018. Table 3 through Table 6 provide energy and demand evaluation findings. **The points below highlight key PY2018 impact findings.**

**GROSS ENERGY SAVINGS:**
85,856,738 kWh

**GROSS DEMAND SAVINGS:**
53,335 kW

- **In PY2018, the Standard program achieved 58% and 66% of its 3-year MEEIA Cycle 2 target for energy and demand, respectively.** This program represented approximately 27% of verified gross energy savings and approximately 8% of verified gross demand savings. Realization rates for the Standard program were by adjustments to baseline fixture wattages for the largest total savings measure (high bay lighting).
- **The Business EER – Custom program has grown in participation and verified energy and demand year over year, largely attributable to GMO's increased marketing and outreach efforts to customers.** The program achieved approximately 41% and 32% of its 3-year MEEIA Cycle 2 energy and demand targets, respectively.
- **The portfolio's suite of residential energy efficiency (EE) programs performed well, accounting for 23% and 10% of verified energy and demand savings, respectively.** Strong participation in lighting and early retirement HVAC measures continue to contribute the majority of savings to the residential portfolio of programs.
- **The DRI program achieved approximately 57% of its 3-year MEEIA Cycle 2 target and represented approximately 59% of total portfolio verified net demand savings.**

**NET ENERGY SAVINGS:**
75,590,341 kWh

**NET DEMAND SAVINGS:**
51,113 kW

### *Gross and Net Savings Summary*

Navigant's PY2018 impact evaluation verified savings for all programs, with evaluation, measurement, and verification (EM&V) resources focused on high impact measures and programs. All savings calculations are based on industry-standard algorithms and region-specific input assumptions informed by past EM&V research activities associated with GMO. In PY2018, the evaluation team conducted telephone surveys for select programs, including the Business EER – Custom and Block Bidding programs. The evaluation team also conducted a regression analysis of participant usage data to support evaluation of the HER and DRI programs. A complete description of the findings and recommendations from Navigant's impact evaluation is presented in each program's respective section later in this document.

Table 3 and Table 4 summarize the program to date gross and net verified energy and demand savings at the customer meter for GMO's programs. Table 5 and Table 6 summarize the gross and net verified energy and demand savings at the customer meter for GMO's programs and the overall portfolio for PY2018. Each table presents the following data:

- **Gross Reported Savings:** Savings reported in GMO's annual reports prior to NTG adjustments
- **Gross Verified Savings:** Savings verified through Navigant's impact evaluation methods prior to NTG adjustments
- **Gross Realization Rates:** The ratio of gross verified savings to gross reported savings, indicating the accuracy of reported savings tracked by GMO
- **MEEIA Target:** Three-year savings target for a given program exclusive of any NTG adjustments
- **Net Verified Savings:** Savings verified through Navigant's impact evaluation methods and inclusive of NTG adjustments
- **Percentage of MEEIA Target Achieved:** The ratio of net verified savings to the MEEIA savings target, reflecting GMO's overall achievement toward the Cycle 2 goal

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

| Sector | Program | Gross | | | Net | | |
|---|---|---|---|---|---|---|---|
| | | Reported Savings (kWh) | Verified Savings (kWh) | Realization Rate (%) | MEEIA 3-Year Cycle 2 Target (kWh) | Verified 3-Year Savings (kWh) | Percentage of MEEIA 3-Year Target Achieved |
| **Commercial Energy Efficiency (EE) Programs** | ***Commercial EE Programs Subtotal*** | ***160,881,584*** | ***135,170,519*** | ***84%*** | ***102,092,113*** | ***122,538,109*** | ***120%*** |
| | Business EER - Standard | 120,805,483 | 96,141,303 | 80% | 38,710,762 | 92,295,651 | 238% |
| | Business EER - Custom | 23,265,974 | 23,422,901 | 101% | 30,079,932 | 16,746,998 | 56% |
| | Block Bidding | 6,252,181 | 6,591,574 | 105% | 17,603,947 | 4,999,312 | 28% |
| | Strategic Energy Management | 6,011,417 | 4,963,232 | 83% | 12,127,508 | 4,963,232 | 41% |
| | Small Bus. Lighting | 4,546,529 | 4,051,509 | 89% | 3,569,963 | 3,532,916 | 99% |
| **Residential EE Programs** | ***Residential EE Programs Subtotal*** | ***68,864,988*** | ***64,491,687*** | ***94%*** | ***55,163,627*** | ***54,312,478*** | ***98%*** |
| | Income-Eligible Weatherization | 304,972 | 309,812 | 102% | 143,458 | 309,812 | 216% |
| | Whole House Efficiency | 25,452,581 | 21,982,852 | 86% | 19,717,746 | 17,586,282 | 89% |
| | Income-Eligible Multifamily | 11,282,183 | 10,471,557 | 93% | 10,014,278 | 10,471,557 | 105% |
| | Home Lighting Rebate | 31,825,252 | 31,727,466 | 100% | 25,288,145 | 25,944,828 | 103% |
| **Educational Programs** | ***Educational Programs Subtotal*** | ***18,651,728*** | ***19,894,420*** | ***107%*** | ***21,070,772*** | ***19,894,420*** | ***94%*** |
| | Home Energy Report | 18,651,728 | 19,894,420 | 107% | 21,070,772 | 19,894,420 | 94% |
| | Home Online Energy Audit | Educational programs are not part of MEEIA Targets for Energy or Demand Savings | | | | | |
| | Business Online Energy Audit | | | | | | |
| **Demand Response (DR) Programs** | ***DR Programs Subtotal*** | ***9,227,988*** | ***5,760,037*** | ***62%*** | ***6,223,140*** | ***5,760,037*** | ***93%*** |
| | Business Programmable Thermostat | 239,316 | 128,868 | 54% | 79,002 | 128,868 | 163% |
| | Residential Programmable Thermostat | 8,988,672 | 5,631,169 | 63% | 6,144,138 | 5,631,169 | 92% |
| | Demand Response Incentive | The Demand Response Incentive Program did not claim any energy savings. | | | | | |
| | **GMO TOTAL** | **257,626,288** | **225,316,663** | **87%** | **184,549,652** | **202,505,044** | **110%** |

*Source: Navigant analysis*

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

| Sector | Program | Gross | | | Net | | |
|---|---|---|---|---|---|---|---|
| | | Reported Savings (kW) | Verified Savings (kW) | Realization Rate (%) | MEEIA 3-Year Cycle 2 Target (kW) | Verified 3-Year Savings (kW) | Percentage of MEEIA 3-Year Target Achieved |
| Commercial Energy Efficiency (EE) Programs | ***Commercial EE Programs Subtotal*** | ***27,515*** | ***22,352*** | ***81%*** | ***20,629*** | ***20,010*** | ***97%*** |
| | Business EER - Standard | 21,792 | 16,086 | 74% | 6,385 | 15,442 | 242% |
| | Business EER - Custom | 4,212 | 4,902 | 116% | 7,758 | 3,472 | 45% |
| | Block Bidding | 737 | 778 | 106% | 3,052 | 590 | 19% |
| | Strategic Energy Management | 0 | -45 | N/A | 2,842 | -45 | -2% |
| | Small Bus. Lighting | 773 | 631 | 82% | 592 | 551 | 93% |
| Residential EE Programs | ***Residential EE Programs Subtotal*** | ***15,688*** | ***17,534*** | ***112%*** | ***9,150*** | ***14,369*** | ***157%*** |
| | Income-Eligible Weatherization | 226 | 128 | 57% | 53 | 128 | 244% |
| | Whole House Efficiency | 11,029 | 12,242 | 111% | 5,072 | 9,794 | 193% |
| | Income-Eligible Multifamily | 1,250 | 1,309 | 105% | 1,357 | 1,309 | 96% |
| | Home Lighting Rebate | 3,183 | 3,854 | 121% | 2,669 | 3,138 | 118% |
| Educational Programs | ***Educational Programs Subtotal*** | ***3,107*** | ***3,413*** | ***110%*** | ***4,215*** | ***3,413*** | ***81%*** |
| | Home Energy Report | 3,107 | 3,413 | 110% | 4,215 | 3,413 | 81% |
| | Home Online Energy Audit | Educational programs are not part of MEEIA Targets for Energy or Demand Savings | | | | | |
| | Business Online Energy Audit | | | | | | |
| Demand Response (DR) Programs | ***DR Programs Subtotal*** | ***76,438*** | ***57,409*** | ***75%*** | ***71,972*** | ***57,409*** | ***80%*** |
| | Business Programmable Thermostat | 655 | 748 | 114% | 215 | 748 | 347% |
| | Residential Programmable Thermostat | 24,549 | 25,056 | 102% | 16,757 | 25,056 | 150% |
| | Demand Response Incentive | 51,234 | 31,605 | 62% | 55,000 | 31,605 | 57% |
| **GMO TOTAL** | | **122,749** | **100,708** | **82%** | **105,967** | **95,201** | **90%** |

*Source: Navigant analysis*

**Table 5. Energy Savings at the Customer Meter: PY2018**

| Sector | Program | Gross | | | Net | | |
|---|---|---|---|---|---|---|---|
| | | Reported Savings (kWh) | Verified Savings (kWh) | Realization Rate (%) | MEEIA 3-Year Cycle 2 Target (kWh) | Verified Savings (kWh) | Percentage of MEEIA 3-Year Target Achieved |
| Commercial Energy Efficiency (EE) Programs | ***Commercial EE Programs Subtotal*** | ***44,705,501*** | ***45,887,945*** | ***103%*** | ***102,092,113*** | ***39,039,200*** | ***38%*** |
| | Business EER - Standard | 21,946,830 | 23,212,017 | 106% | 38,710,762 | 22,283,536 | 58% |
| | Business EER - Custom | 16,658,609 | 16,584,681 | 100% | 30,079,932 | 12,272,664 | 41% |
| | Block Bidding | 5,815,858 | 6,124,084 | 105% | 17,603,947 | 4,531,822 | 26% |
| | Strategic Energy Management | 147,872 | -157,729 | N/A | 12,127,508 | -157,729 | -1% |
| | Small Bus. Lighting | 136,332 | 124,891 | 92% | 3,569,963 | 108,905 | 3% |
| Residential EE Programs | ***Residential EE Programs Subtotal*** | ***20,214,192*** | ***19,502,815*** | ***96%*** | ***55,020,169*** | ***16,085,163*** | ***29%*** |
| | Whole House Efficiency | 10,465,375 | 7,085,368 | 68% | 19,717,746 | 5,668,294 | 29% |
| | Income-Eligible Multifamily | 3,824,584 | 4,337,457 | 113% | 10,014,278 | 4,337,457 | 43% |
| | Home Lighting Rebate | 5,924,233 | 8,079,990 | 136% | 25,288,145 | 6,079,412 | 24% |
| Educational Programs | ***Educational Programs Subtotal*** | ***18,651,728*** | ***19,894,420*** | ***107%*** | ***21,070,772*** | ***19,894,420*** | ***94%*** |
| | Home Energy Report | 18,651,728 | 19,894,420 | 107% | 21,070,772 | 19,894,420 | 94% |
| | Home Online Energy Audit | Educational programs are not part of MEEIA Targets for Energy or Demand Savings | | | | | |
| | Business Online Energy Audit | | | | | | |
| Demand Response (DR) Programs | ***DR Programs Subtotal*** | ***1,221,528*** | ***571,558*** | ***47%*** | ***6,223,140*** | ***571,558*** | ***9%*** |
| | Business Programmable Thermostat | 69,300 | 30,791 | 44% | 79,002 | 30,791 | 39% |
| | Residential Programmable Thermostat | 1,152,228 | 540,767 | 47% | 6,144,138 | 540,767 | 9% |
| | Demand Response Incentive | The Demand Response Incentive Program did not claim any energy savings. | | | | | |
| **GMO TOTAL** | | **84,792,950** | **85,856,738** | **101%** | **184,406,194** | **75,590,341** | **41%** |

*Source: Navigant analysis*

**Table 6. Coincident Demand Savings at the Customer Meter: PY2018**

| Sector | Program | Gross | | | Net | | |
|---|---|---|---|---|---|---|---|
| | | Reported Savings (kW) | Verified Savings (kW) | Realization Rate (%) | MEEIA 3-Year Cycle 2 Target (kW) | Verified Savings (kW) | Percentage of MEEIA 3-Year Target Achieved |
| Commercial Energy Efficiency (EE) Programs | ***Commercial EE Programs Subtotal*** | ***8,129*** | ***8,469*** | ***104%*** | ***20,629*** | ***7,224*** | ***35%*** |
| | Business EER - Standard | 4,315 | 4,392 | 102% | 6,385 | 4,217 | 66% |
| | Business EER - Custom | 3,106 | 3,377 | 109% | 7,758 | 2,499 | 32% |
| | Block Bidding | 682 | 723 | 106% | 3,052 | 535 | 18% |
| | Strategic Energy Management | 0 | -45 | N/A | 2,842 | -45 | -2% |
| | Small Bus. Lighting | 27 | 22 | 82% | 592 | 19 | 3% |
| Residential EE Programs | ***Residential EE Programs Subtotal*** | ***6,063*** | ***5,162*** | ***85%*** | ***9,098*** | ***4,184*** | ***46%*** |
| | Whole House Efficiency | 4,981 | 3,453 | 69% | 5,072 | 2,763 | 54% |
| | Income-Eligible Multifamily | 494 | 572 | 116% | 1,357 | 572 | 42% |
| | Home Lighting Rebate | 589 | 1,137 | 193% | 2,669 | 850 | 32% |
| Educational Programs | ***Educational Programs Subtotal*** | ***3,107*** | ***3,413*** | ***110%*** | ***4,215*** | ***3,413*** | ***81%*** |
| | Home Energy Report | 3,107 | 3,413 | 110% | 4,215 | 3,413 | 81% |
| | Home Online Energy Audit | Educational programs are not part of MEEIA Targets for Energy or Demand Savings | | | | | |
| | Business Online Energy Audit | | | | | | |
| Demand Response (DR) Programs | ***DR Programs Subtotal*** | ***54,569*** | ***36,291*** | ***67%*** | ***71,972*** | ***36,291*** | ***50%*** |
| | Business Programmable Thermostat | 189 | 214 | 113% | 215 | 214 | 99% |
| | Residential Programmable Thermostat | 3,146 | 4,472 | 142% | 16,757 | 4,472 | 27% |
| | Demand Response Incentive | 51,234 | 31,605 | 62% | 55,000 | 31,605 | 57% |
| **GMO TOTAL** | | **71,869** | **53,335** | **74%** | **105,914** | **51,113** | **48%** |

*Source: Navigant analysis*

**Net Savings**

Table 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 Navigant to inform the NTG analysis.

Navigant 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:

- Programs 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).
- Navigant 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).
- 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, though the team notes this will not necessarily be the case for the future program years.

Please refer to section 1.1.2 for further details on the NTG approach.

**Table 7. PY2018 NTG Components by Program**

| Program Name* | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| Business EER – Standard | 0.05 | 0.002 | 0.004 | 96% |
| Business EER – Custom | 0.31 | 0.002 | 0.05 | 74% |
| Block Bidding | Projects Originating from the Custom Program | | | 74% |
| | Projects Originating from the Standard Program | | | 96% |
| Strategic Energy Management | Navigant 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 | 0.35 | 0.01 | 0.14 | 80% |
| Income-Eligible Multifamily | Deemed 1.0 pending future research. | | | 100% |
| Home Lighting Rebate | 0.41 | 0.17 | 0.00 | 76% |
| Home Energy Report | Navigant assumed a NTG value of 1.0 for the HER program | | | |
| Home Online Energy Audit | N/A – Savings not claimed in PY2018 | | | |
| Business Online Energy Audit | N/A – Savings not claimed in PY2018 | | | |
| Residential Programmable Thermostat | Navigant 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 (Energy/Demand)** | **N/A** | **N/A** | **N/A** | **95%/90%[2]** |

*NTG Ratios are rounded to the nearest whole number
*Source: Navigant analysis*

[2] 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.

### *Cost-Effectiveness Summary*

Navigant 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 GMO's DSMore model in conjunction with Navigant-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 GMO in calculating cost-effectiveness as part of its annual filing.

The following tables present the cost-effectiveness results. Table 8 through Table 10 present program to date results for PY2016 through PY2018. Tables 11 through Table 13 present results for PY2018 alone. At the program group level, presented in Table 9 and Table 12, all sectors are cost-effective in the TRC, SCT, and UCT tests, with the DR program passing the RIM test. GMO's portfolio of programs have achieved $61,382,317 in net benefits to date. For program level details, refer to the "Overall Results" sheet within the GMO databook.

Navigant 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 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. For a complete description of the approach used, reference Section 7, "Whole House Efficiency."

The Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the HLR, WHE, Income-Eligible Multifamily, and Business EER – Standard programs. This adjustment reflected a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA). The Illinois Technical Reference Manual (IL TRM) v7 guided this adjustment, and it assumes that CFLs will become the baseline in 2021 for standard bulbs and 2024 for specialty bulbs. The annual savings claimed were reduced within the life of the measure to account for this baseline shift and were incorporated into cost effectiveness screening calculations. Although recent final and draft rulemakings by the Department of Energy (DOE)[3] now make it unlikely that these changes in efficiency standards will occur as assumed in the IL TRM v7, the Navigant team has retained the mid-life adjustment for the PY2018 evaluation because the program sales and verification efforts occurred prior to the September 2019 release of the DOE rulings. This decision results in conservative estimates of the cost-effectiveness for standard and specialty lamps in these programs.

The program-to-date cost effectiveness results for the Strategic Energy Management (SEM) program include demand benefits that occurred as part of behavioral changes made in PY2017 but could not be verified until PY2018. As shown above and in the main body of the report, the SEM program shows that the verified incremental kWh energy impact in PY2018 was negative.. This negative impact is attributed to customers no longer taking part in behaviors that would reduce energy consumption as the program

[3] https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps
https://www.federalregister.gov/documents/2019/09/05/2019-18941/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps

ceased support in July of 2018. The cost effectiveness results from PY2017 account for this expected decrement of energy savings.

Navigant accounts for the benefits and costs associated with the Small Business Lighting program in the sector level results presented in Table 9 below. Navigant does not report program-specific results for this program for PY2018 because of limited participation. The Small Business Lighting program had a few projects that were initiated at the end of PY2017 and finalized in the first quarter of PY2018

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

| Sector | Program | TRC Test[4] | TRC | SCT | UCT | PCT | RIM |
|---|---|---|---|---|---|---|---|
| | | GMO | Navigant | | | | |
| Commercial EE Programs | Business EER – Standard | N/A | 1.40 | 1.66 | 3.23 | 1.54 | 0.84 |
| | Business EER – Custom | N/A | 1.07 | 1.34 | 2.05 | 1.27 | 0.77 |
| | Block Bidding | N/A | 1.06 | 1.26 | 1.45 | 2.26 | 0.57 |
| | Strategic Energy Management | N/A | 1.29 | 1.36 | 1.28 | 12.13 | 0.48 |
| | Small Business Lighting | N/A | 0.92 | 1.09 | 1.37 | 1.46 | 0.63 |
| Residential EE Programs | Income-Eligible Weatherization | N/A | 1.15 | 1.45 | 1.15 | INF* | 0.59 |
| | Whole House Efficiency | N/A | 0.95 | 1.13 | 1.77 | 1.39 | 0.64 |
| | Income-Eligible Multifamily | N/A | 1.37 | 1.59 | 1.38 | 13.75 | 0.41 |
| | Home Lighting Rebate*** | N/A | 1.60 | 1.83 | 2.04 | 4.60 | 0.48 |
| Educational/ Behavioral Programs | Home Energy Report | N/A | 0.93 | 0.94 | 0.93 | INF* | 0.35 |
| | Home Online Energy Audit | N/A | N/A | N/A | N/A | N/A | N/A |
| | Business Online Energy Audit | N/A | N/A | N/A | N/A | N/A | N/A |
| DR Programs | Business Programmable Thermostat | N/A | 1.61 | 1.86 | 2.39 | 0.37 | 2.03 |
| | Residential Programmable Thermostat | N/A | 1.97 | 2.29 | 3.15 | 0.87 | 1.99 |
| | Demand Response Incentive | N/A | 3.42 | 3.43 | 1.39 | 1024.21 | 1.39 |

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

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

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

*Source: Navigant analysis*

[4] The TRC Test GMO column provides the total resource cost test results based on reported values that was provided by KCP&L staff. KCP&L does not calculate a program-to-date TRC, therefore it is not included in the above table.

**Table 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** | 1.39 | 1.62 | 2.27 | 1.78 | 0.83 |
| **EE Programs*** | 1.25 | 1.49 | 2.34 | 1.75 | 0.70 |
| **Residential EE Programs** | 1.14 | 1.35 | 1.78 | 2.34 | 0.55 |
| **C&I EE Programs** | 1.30 | 1.55 | 2.71 | 1.52 | 0.80 |
| **DR Programs**** | 2.14 | 2.42 | 2.50 | 1.30 | 1.83 |

*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: Navigant analysis*

**Table 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** | $ 22,813,760 | $ 30,416,290 | $ 53,230,049 | $ 114,859,868 | $ 114,859,868 | $ 61,629,819 |

*Source: Navigant analysis*

**Table 11. Benefit-Cost Ratios by Program and Cost Test: PY2018****

| Sector | Program | TRC Test[5] | TRC | SCT | UCT | PCT | RIM |
|---|---|---|---|---|---|---|---|
| | | GMO | Navigant | | | | |
| Commercial EE Programs | Business EER – Standard | 1.22 | 1.23 | 1.47 | 4.43 | 1.25 | 0.89 |
| | Business EER – Custom | 1.15 | 1.30 | 1.62 | 2.94 | 1.37 | 0.84 |
| | Block Bidding | 1.38 | 1.52 | 1.78 | 2.63 | 2.16 | 0.69 |
| | Strategic Energy Management | N/A | N/A | N/A | N/A | N/A | N/A |
| | Small Business Lighting | N/A | N/A | N/A | N/A | N/A | N/A |
| Residential EE Programs | Income-Eligible Weatherization | N/A | N/A | N/A | N/A | N/A | N/A |
| | Whole House Efficiency | 0.79 | 0.88 | 1.06 | 1.52 | 1.73 | 0.53 |
| | Income-Eligible Multifamily | 0.72 | 1.37 | 1.65 | 1.37 | 6.84 | 0.39 |
| | Home Lighting Rebate*** | 1.39 | 2.37 | 2.64 | 2.11 | 14.03 | 0.43 |
| Educational/ Behavioral Programs | Home Energy Report | 1.16 | 1.25 | 1.25 | 1.25 | INF* | 0.35 |
| | Home Online Energy Audit | N/A | N/A | N/A | N/A | N/A | N/A |
| | Business Online Energy Audit | N/A | N/A | N/A | N/A | N/A | N/A |
| DR Programs | Business Programmable Thermostat | 1.11 | 1.18 | 1.37 | 1.63 | 0.29 | 1.46 |
| | Residential Programmable Thermostat | 1.24 | 1.64 | 1.90 | 2.13 | 0.86 | 1.67 |
| | Demand Response Incentive | 5.73 | 3.71 | 3.71 | 1.28 | 701.23 | 1.38 |

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

**Navigant did not perform benefit-cost calculations for the Home Online Energy Audit, or Business Online Energy Audit because GMO does not claim savings for these programs; therefore, Navigant did not verify savings. Benefit cost results for the Small Business Lighting and SEM programs for PY2018 are captured in the program to date values. The Small Business Lighting program had limited participation in 2018, and benefits for SEM achieved in 2018 were accounted for in the 2017 analysis.

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

*Source: Navigant analysis*

[5] The TRC Test GMO column provides the total resource cost test results based on reported values that was provided by KCP&L staff.

**Table 12. Benefit -Cost Ratios by Program Groups and Cost Test – PY2018**

| | Total Resource Cost Test | Societal Cost Test | Utility Cost Test | Participant Cost Test | Rate Impact Measure Test |
|---|---|---|---|---|---|
| **Portfolio** | 1.33 | 1.56 | 2.22 | 1.84 | 0.77 |
| **EE Programs*** | 1.21 | 1.46 | 2.60 | 1.71 | 0.70 |
| **Residential EE Programs** | 1.12 | 1.33 | 1.59 | 2.98 | 0.47 |
| **C&I EE Programs** | 1.25 | 1.51 | 3.33 | 1.37 | 0.84 |
| **DR Programs**** | 2.14 | 2.33 | 1.71 | 2.62 | 1.53 |

*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: Navigant analysis*

**Table 13. Portfolio Level Costs and Benefits Summary (USD) – PY2018**

| Sector | Rebate Costs | Direct Program Admin Costs | Total Costs | Benefits from Energy and Demand Savings | Total Benefits | Total Net Benefits |
|---|---|---|---|---|---|---|
| **Portfolio** | $ 6,969,236 | $ 9,364,096 | $16,333,332 | $ 30,563,418 | $ 30,563,418 | $ 14,230,086 |

*Source: Navigant analysis*

### *Process Evaluation Summary*

The following section summarizes the evaluation team's process findings. The team provides its key recommendations in the following section.

Navigant performed the following process activities to inform its evaluation:


This section provides an overview of the process evaluation activities and results, focusing on the general approach and broader findings that apply to the most impactful programs in GMO's portfolio. These include the Business EER – Standard, Business EER – Custom, HLR, HER, DRI, and Programmable Thermostat programs. These programs represent verified energy savings of approximately 80% of the total portfolio energy savings and 91% of total verified portfolio demand savings. For detailed results of the team's process evaluation, please refer to the program-specific sections.

Navigant summarized the five Missouri-required questions for the process evaluation. The findings are provided to help KCP&L GMO revise program marketing, outreach, and delivery strategies to progress the portfolio of programs toward meeting its 3-year MEEIA targets and improving overall customer engagement.

**Business EER – Standard Program**

The Business EER – Standard program is an important component of GMO portfolio of C&I programs, as it represents approximately 27% of verified gross energy savings in PY2018. Based on the implementer administered participant surveys, customers were very satisfied with the program overall. The process evaluation revealed these findings.

**FINDING 1: The target market faces a high barrier to make an energy efficiency upgrade due to the first cost and a lack of understanding of lifetime value for energy efficient products. GMO addresses the barrier by providing incentives which reduce the incremental cost. In addition, there are many smaller C&I customers that have limited resources for researching energy conservation, leading to imperfect or incomplete information about the market. GMO has developed targeted marketing materials to increase participation of smaller C&I customers in implementing energy conservation measures.**

- GMO has focused on developing targeted marketing materials for certain segments to help

explain the benefits of implementing energy conservation. In PY2016 the majority of energy savings came from industrial and warehouse building types. In contrast, more than 80% of energy savings came from measures installed in “Retail”, “School”, “Office”, and “Other” building types in PY2018. This indicates that marketing materials and campaigns may have increased the participation of various types and sizes of facilities.

- A customer forum was heavily attended in PY3 which had many presentations targeting specific market sectors. This forum was highly effective in marketing to all potential participants.

**FINDING 2: GMO has a well-defined target market (C&I) for the Standard program. No further subdivisions appear necessary given current program participation.**

- GMO actively tracks the sales cycle to understand sales conversion from prospective to completed projects in the targeted market. They are working to identify areas to improve sales conversions of all customer types.

**FINDING 3: While the Standard program includes many measures that address a participant’s water heating, refrigeration, and HVAC energy end-uses, 97% of the projects in PY2018 were for lighting measures. The other GMO Business EER programs primarily address the other end-uses.**

- The Standard program complements the other Business EER programs, specifically the Custom program, by providing rebates for common energy efficiency upgrades which are primarily lighting measures. GMO is working toward further aligning the Standard and Custom programs, so that multiple end-use energy saving projects can be easily served across the entire portfolio.

**FINDING 4: The IC for the Standard program works one on one with the larger customers. The trade-ally network addresses medium and smaller customers. In addition, there is also targeted marketing for sectors with historically lower participation such as datacenters and property managers. GMO’s marketing activities meet the programs needs as evidenced by them exceeding their savings and participation goals.**

- GMO developed additional channels for communication by creating high quality targeted videos for property managers and special energy conservation coffee for schools and universities in PY2017. In addition, the implementer hosted sector specific webinars in PY2018 that mostly focused on lighting, since the other C&I programs address the other non-lighting end-uses.
- Customers also noted that receiving information from GMO was another contributing factor that led to the consideration of energy efficient equipment that consistently increased from PY2016 to PY2018. This indicates that continued communications about GMO programs is increasingly leading to participation in these programs.

**FINDING 5: In PY2018, GMO continued to have strong success with the efficient lighting measures in the Standard program. The effect from other end uses was less than 1%, but other programs such as the Custom program covers many of those non-lighting measures.**

GMO has had great success with the lighting rebates. Even after lowering rebate amounts in PY2017 the participation remained strong in the Standard program throughout PY2018.

**Business EER – Custom Program**

The Custom program saw a significant increase in participation and claimed savings in PY2018 compared to the previous two program years. This reflects GMO's increased outreach and marketing efforts in response to previous and on-going EM&V findings. The Custom program represents approximately 19% of verified gross energy savings for PY2018, a significant increase compared to PY2017, which represented approximately 6% of verified gross energy savings. Navigant conducted the PY2018 process evaluation by reviewing program materials, conducting interviews with program staff, including the KCP&L program manager and implementation staff at CLEAResult and Lockheed Martin, and fielding surveys to customers and program trade allies. The process evaluation revealed the following findings:

**FINDING 1: GMO has continued its strategy of targeted marketing campaigns toward specific market segments and successfully expanded its network of participating trade allies.**

- GMO conducted targeted marketing campaigns for specific market segments: health care, data centers, new construction, and industrials. However, other than the industrial sector, few of the participating trade allies reported that they market high efficiency to these sectors.
    - Over one-half (52%) of surveyed trade allies reported that they market high efficiency to large and medium industrial customers.
    - Just two surveyed trade allies (4%) indicated that they market high efficiency specifically to data centers, and one mentioned the health care segment.
- KCP&L increased the amount of outreach and education offered to trade allies, particularly with regard to non-lighting measures. These outreach efforts included webinars focused on chillers and data centers, a trade ally newsletter, and sales training.

**FINDING 2: The measures targeted by the custom program are more complex and have more uncertainty in energy savings than those in the standard program, which makes customers less likely to install them without the education and financial incentives offered by the program.**

- The types of measures targeted by the Custom program are more complex than the types of measures offered by the Standard programs. Specifying and selling these types of efficiency measures requires more technical knowledge on the part of the trade ally, meaning that a lack of trade ally awareness and knowledge can inhibit widespread market adoption.

Most trade allies view the direct financial benefits of EE as the primary motivation for customers and thus do not focus on non-energy or non-financial benefits in their sales pitches.

**FINDING 3: Between the Custom program and GMO's other C&I offerings, trade allies and customers are able to receive rebates for all of the measures they are interested in, with the exception of exterior lighting, which has been added back into the program for PY4.**

- When asked if there were any measures that they wanted the program to start offering, the surveyed trade allies most often answered "exterior lighting."
    - GMO added exterior lighting back into their program for PY4 of Cycle 2.

**FINDING 4: The program's efforts to educate and engage trade allies have been effective, but program staff would like more support from Customer Service Managers (CSMs) to better reach Tier 1 customers. Trade allies and customers value consistency in incentive levels and calculation methods.**

- The program relies heavily on trade allies to market to customers. The program's efforts to increase engagement with existing trade allies and recruit new trade allies appear to be working.

- Over three-quarters (82%) of surveyed trade allies indicated that they had participated in program webinars and trainings or received educational materials from the program.
- Of surveyed trade allies, just over one quarter (27%) have brought a program staff member on a sales call with them, and they describe these joint sales calls as very effective.

**FINDING 5: Simplifying the program application process when possible would encourage more customers to complete high efficiency projects, particularly when equipment needs to be specified and installed urgently.**

- The program has attempted to simplify the application process, but room for improvement remains. Some trade allies indicate that the incentive levels are too low to justify the administrative burden of participating in the program.
  - Trade allies indicate that the level of technical expertise required to complete the preapproval process may be causing the program to miss out on significant opportunities. One trade ally stated *"Some customers may not have the resources for the custom program. If you are not an expert in the field/have an engineering team behind you, custom rebate programs are practically impossible."*
- Developing a separate program offering for new construction will address the barriers facing the new construction market. Early outreach and incentives for design professionals may be effective interventions for new construction programs.

**Home Lighting Rebate Program**

The HLR program represented approximately 9% of verified gross energy savings. The HLR program's process evaluation activities in PY2018 reflected the reduced program scope by limiting evaluation activities to conducting in-depth interviews with program and IC staff members. This stands in contrast to prior program years, in which the evaluation team had conducted a series of studies that gathered input from participating manufacturers and retailers, GMO residential customers, and light bulb shoppers in retail settings. The Navigant team had also reviewed program marketing and outreach materials. The process evaluation revealed the following findings.

**FINDING 1: The program seeks to address imperfections of price, availability, and consumer knowledge of efficient lighting choices. The program has 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 great success of the program in PY2016 and PY2017 led the program to focus primarily on reducing the shelf price of specialty LEDs for most of PY2018.**

- The HLR program reduced the shelf price of standard LEDs by $1.41 from $2.67 to $1.26. For specialty LEDs, the program reduced the price by $1.63 from $4.58 to $2.95. Manufacturers and retailers sometimes added their own discounts to reduce the shelf price further.

**FINDING 2: The program appropriately defines the target market as all residential customers. In PY2018, GMO retained standard incentives in the Discount channel in Q2 even as they removed**

**standard incentives in most other channels during Q2 and Q3. The continued support in the Discount channel was designed to make these bulbs available to hard-to-reach customers.**

- Although the Discount channel accounted for only 8% of the 112,249 standard bulb sales in the GMO service territory in PY2018, the channel accounted for 100% of Q2 standard sales and 56% of Q3 standard sales. In contrast, discount stores only sold 9% of standard bulbs in Q1 (likely holdover sales from PY2017)[6] and zero standard bulbs in Q4.

**FINDING 3: The program focused incentives on specialty LEDs for most of PY2018 to allow GMO to move resources from the high-performing HLR to other programs in the GMO portfolio, the reintroduction of standard LEDs in Q4 of PY2018 caused standard bulb sales to outpace specialty sales for the year. This means that the program offered technologies to meet many of the end-use energy service lighting needs of the target market.**

- GMO will continue to offer standard LED incentives to the program in PY2019; thereby, continuing its efforts to meets the end-use energy service needs of the target population.
- Suppliers interviewed in PY2016 suggested that the program add LED downlight and retrofit kits and integrated LED fixtures. In-depth interviews with program and IC staff in PY2018 suggest that they are considering these additions for MEEIA Cycle 3.

**FINDING 4: GMO and the IC reduced marketing and outreach in PY2018, in keeping with the reduced program scope for the program year. They also decided to delay creation of new point-of-purchase or outreach materials until the GMO to Evergy rebranding was complete.**

- The program has met and exceeded the PY2018 sales and savings targets with the reduced level of HLR marketing efforts.
- Redesigning marketing materials for PY2018 would have wasted valuable ratepayer funds, given the limited scope of the HLR in PY2018 and the in-progress rebranding effort.

**FINDING 5: Navigant verified that the GMO HLR program has achieved 100% of reported savings and 101% of its MEEIA Cycle 2 net savings targets cumulatively between PY2016 and PY2018.**

- Given strong realization rates and progress toward net savings goals, the HLR program has shown great success in increasing consumer acceptance and implementation of ENERGY STAR qualified LED bulbs.

**Home Energy Report Program**

The HER program represents 24% of total verified gross energy savings. Navigant addressed five process evaluation research questions and the five Missouri-required questions for process evaluation through staff interviews and program materials review. The process evaluation revealed the following findings.

[6] Retailers submit invoices that typically span weeks, but can sometimes span months, depending on their sales volumes and accounting practices. The Navigant team can attest that this overlap of sales between program years is a common practice for retail-based utility programs across the nation.

**FINDING 1: Some residential customers do not understand how their behaviors, appliances, and electronic devices can affect their energy use and contribute to their monthly bills. Customers are also unaware of cost-effective strategies to reduce energy in their home.**

- The PY2018 program targeted over 123,000 customers to receive four HERs. An additional 41,000 customers served as a control group.
- Based on responses to the Customer Engagement Tracker (CET), 81% of treatment customers agree that GMO provides tools to help customers learn about energy use. Furthermore, 66% of treatment customers report that the EE tips on the report are useful, while 55% report that the HERs help the customer make better decisions to use and save energy.

**FINDING 2: The target market segment is appropriately defined as residential customers in single-family homes.**

- The initial waves included the highest energy users.
- As the program adds waves, the new waves should continue to include customers beyond the highest energy users. For example, the 2016 Expansion wave and the 2017 wave include customers that have lower baseline energy use.

**FINDING 3: HERs provide a diverse set of suggestions that target all residential end uses. The focus of the report is to modify behaviors; therefore, the program does not offer rebates for specific measures, but does promote rebates provided through other GMO programs.**

- These tips include many low cost and no cost actions and suggestions to buy efficient equipment and appliances.
- The tips cover the main residential electricity end uses: lighting, HVAC, electronics, water heating, appliances, and pools. New tips include EV charging, smart device usage, and load shifting.
- The print reports also cross-promoted rebates on new cooling equipment, heating and cooling system tune-ups. The email reports included messaging on the Online Energy Audit, heating and cooling tune-ups, rebates on new air conditioners or heat pumps, EVs, and solar subscription.

**FINDING 4: The HER program uses two primary communication channels: paper mailed reports and emails.**

- All treatment customers received four paper reports in PY2018.
- Customers with email addresses on file (about 8%) also received monthly email reports.
- Customers could also access an online portal to monitor energy use through the Home Online Energy Audit.
- The timing and frequency of messaging through these channels is appropriate given the need to provide information through multiple mediums over time so participants can monitor the effect of any efficiency and consumption changes they make.

**FINDING 5: Most treatment customers read or look at the report, and many talk about the report with others. Readership rates are consistent with Oracle-reported utility averages.[7] However, there may be an opportunity to engage the 9% of customers who either did not look at the report and the 22% who did not recall receiving the report at all.**

- Of CET respondents, 9% who recalled receiving the reports did not read or did not remember reading the report; 22% of all CET respondents did not recall receiving the report at all.
- Of CET respondents who recall the reports, 77% like the reports and 66% talk to other people about the reports.

**Residential and Business Programmable Thermostat Programs**

Navigant addressed two process evaluation research questions and the five Missouri-required questions for process evaluation through the staff interviews, IC interviews, and program materials review. The Residential and Business Programmable Thermostat programs represent a combined verified demand savings of 9%. The process evaluation revealed the following findings.

**FINDING 1: Utilities use residential and small commercial thermostat DR programs to obtain needed demand reductions. The programs address the fact that traditional rate structures do not provide customers appropriate incentives to reduce electricity usage during peak periods.**

- GMO calls curtailment events during which Nest increases the set point of a customer's thermostat by three degrees in order for the HVAC system to achieve aggregate demand reductions. If DR resources are large enough, they can offset enough demand to delay or avoid the need to purchase power at spot market prices or invest in new sources of generation to meet peak summer demand. DR is a form of negative generation and can be called on during periods of high demand in the same manner as a peaking power plant might be built and brought online to serve the same end, but at a lower cost.
- In addition, the Nest learning thermostat adjusts to customer behavior year-round; this enables energy savings throughout the year, not only during event hours. Unlike the previous Honeywell thermostats, customers can remotely control their Nest devices, which also enables year-round energy savings.

**FINDING 2: The target market appropriately addresses residential and small commercial customers. The DRI program provides DR opportunities for large C&I customers.**

**FINDING 3: The program aligns with the overall diversity of end-use energy service needs and existing technologies by using the cooling end-use for DR purposes. This is appropriate because it is the highest contributor to peak demand in the residential and small C&I sector. This was noted in the PY2016 and PY2017 evaluation reports and found to be consistent in PY2018.**

- Competition among PT vendors and evolving technological developments could lead to the market shifting from one vendor toward another. Navigant suggests GMO monitor the market to avoid missing market trends. The Bring Your Own Device (BYOD) segment of the RHR population is small. GMO could consider expanding the BYOD customer segment through

[7] See slide 45 of "Oracle Opower + Evergy: Program Review & Customer Engagement Tracker Results", presented February 4, 2019.

targeted marketing in MEEIA Cycle 3. BYOD programs are comparatively inexpensive to operate and a way that many utilities run thermostat programs successfully.

**FINDING 4: GMO successfully reached enrollment targets and decreased marketing in PY2018.**

- Communication channels including email, cross-program promotion, social media, and participant promotion through peer-to-peer word-of-mouth have proved successful in meeting enrollment targets.

**FINDING 5: GMO reached enrollment goals for Cycle 2 but will resume customer acquisition efforts to meet the new enrollment targets set for the Cycle 2 extension.**

- As part of this effort, GMO is developing a customer-facing portal to increase program understanding and participation.
- GMO is required to call five RHR events in the summer of 2019. This requirement provides the opportunity to test DR impacts under a variety of conditions.

**Demand Response Incentive Program**

The DRI program represents approximately 57% of verified demand savings in PY2018. Through in-depth interviews with the program's product manager and IC, the evaluation team found the following:

**FINDING 1: The PY2017 report cited two main barriers for participating in the DRI program: (1) businesses do not have automatic load curtailment; and (2) for some customers, the point of contact (as indicated on the contract) neglected to pass the event notification onto the individual who can manually curtail load at the customer site. PY2018 revealed the importance of one additional barrier: (3) lack of real-time feedback following DR events.**

- Manual load shedding limits the ability of customers to participate in DR programs that require them to reduce a significant amount of load with minimal notice. Securing automated load reduction technologies is not cost-effective for many customers and cannot be accomplished using the financial incentives provided by the DRI program alone. As such, a subset of businesses is not able to participate in this program. The product manager plans to target a segment of customers with automated curtailment capabilities beginning in Cycle 3.

**FINDING 2: The target market segment is defined as all commercial customers that can reduce their demand to at least 25 kW below estimated peak usage when a curtailment event is called between June 1 and September 30 of a given year.**

- The program has continued to focus on customers with the highest savings potential to maintain cost-effectiveness. The DRI program product manager used a propensity model to identify high usage customers, redirecting the program recruitment process to be data-driven. The program implementer built this propensity model and continues to refine it through PY2018. The DRI product manager emphasized the improving accuracy of EPD and firm power level (FPL) calculations. Much of these efforts went into redefining EPD values and FPLs for existing customer contracts.
- Through these recruitment efforts, GMO achieved an increase in program enrollment in PY2018. With the Cycle 2 extension, all customer contracts will be eligible for renewal, and some customers who have underperformed in the previous program years will not be invited back to the

program. To maintain program growth, the product manager intends to continue using the propensity model and focusing on the top customers with the largest potential for curtailment. The program will aim to enroll more national accounts with third-party management, which may provide opportunities for automated load curtailment in Cycle 3.

**FINDING 3: The mix of end-use measures included in the program appropriately reflects the diversity of end-use energy service needs and existing end-use technologies within the target segment.**

- In PY2018, the energy consultants (ECs) and CLEAResult representatives worked with many existing customers to confirm that their end-use technologies were in fact curtailable before the event season to ensure surprises did not occur during event season.

**FINDING 4: KCP&L's product manager has taken great efforts to improve communication channels and ensure delivery mechanisms are appropriate for the DRI program. Customers in PY2018 have recognized improvements in program communication.**

- The following topics were identified in the product manager interview as the primary areas that were improved in PY2018:
    - The product manager continued to provide phone and email notifications 24 hours and 4 hours before events started in which customers needed to confirm notification receipt. A2A sent these notifications.
    - Targeted email marketing was executed in PY2018. High usage customers were identified through CLEAResult's propensity modeling and received marketing materials including email, flyers, personalized marketing packets, individual field visits, and in-person DR forums.
    - KCP&L's product manager reworked communication channels and delivery mechanisms for PY2018 that have improved program recruitment.

**FINDING 5: GMO has implemented targeted marketing to recruit new customers. In addition, GMO has refined curtailment plans and expectations (i.e., the EPD values and FPLs) with current customers. Looking ahead to Cycle 3, GMO is aiming to implement a "pay-for-performance" incentive model and enroll more automated curtailment customers to increase program impacts.**

- As noted in the PY2017 EM&V report, GMO began recruiting smaller customers in PY2017. GMO is updating the EPD and FPL calculation for existing customers for the Cycle 2 extension. CLEAResult will use interval data during potential peak hours during weekdays to identify a more accurate EPD value. During PY2017 and PY2018, GMO also redefined contracted CL for many existing customers through thorough onsite visits.
- Changes to the fundamental program design cannot be made until Cycle 3. In preparation for a "pay-for-performance" incentive structure, GMO continues to focus on real-time data analysis following each DR event and report back to customers with their findings. This ability to measure customers event performance will be crucial in calculating performance incentive payments in the program design under consideration for Cycle 3.

# SUMMARY OF RECOMMENDATIONS

The following section provides a high-level summary of Navigant's impact and process evaluation recommendations. The evaluation team focused on the most impactful recommendations for those programs which represent the majority of the portfolio's verified energy and demand savings. For additional program-specific recommendations, reference the appropriate program section.

## *Impact Evaluation Recommendations*

Navigant's impact recommendations are based on the team's review of the program tracking database and other impact analysis activities. These recommendations are a summary of the key recommendations documented in the program-specific sections that follow and focus on improving program tracking records to facilitate evaluation efforts and to better align reported and verified savings.

**Business EER – Standard Program**

Navigant provides the following recommendations based on the evaluation of the program tracking database and completion of the impact analysis activities detailed in the preceding sections. The evaluation team intends for these comments to improve program tracking records to facilitate evaluation efforts and to better align reported and verified savings. However, the IC transitioned to Lockheed Martin for PY4 and some of the following findings and recommendations may not be applicable to them.

**RECOMMENDATION 1:** Navigant recommends that the IC perform additional quality checks of the efficient wattage versus the baseline wattage to ensure that the efficient lamp has a lower wattage than the baseline wattage.

- The evaluation team found that less than 2% of the reported efficient measures were miscategorized, such as in the case of linear fixtures listed as LED replacement lamps, and that the higher actual efficient wattage compared to the assumed deemed wattage decreased realization rates. The model number identified some of these miscategorized fixtures as linear strip fixtures that are very narrow but are intended to replace multiple linear lamps. Navigant reviewed such instances and suggests providing more support to trade allies to understand the nuances between measures. This way the efficient equipment is categorized under the correct measure and that the deemed baseline and efficient condition is most reflective of the actual baseline and efficient condition.

**RECOMMENDATION 2:** Navigant recommends that for instances when more than one lamp or fixture is replaced, the "Quantity Removed" field be updated to reflect the quantity replaced.

- Navigant noted that the "Quantity Removed" field was always "Null". However, some of the LED fixtures or lamps installed to replace linear lamps replace more than one linear lamp and have higher wattages to account for this.

**RECOMMENDATION 3:** Navigant recommends providing further guidelines, such as a lumen equivalency range, around what qualifies for the LED High/Low Bay measures.

- Currently, this measure category tends to be used as a catch-all with a wide range of efficient measures categorized together. For example, in PY2018 efficient equipment wattages ranged from 25 W to 293 W for the measure LED High/Low Bay Fixture replacing 301 W-450

W fixture. The LED Low/High Bay market is under transformation and the number of products available is increasing rapidly, which has also increased the mis-categorization of new efficient products.

**RECOMMENDATION 4:** Navigant recommends that there is an additional field for the size of the unit installed for non-lighting measures.

- For example, in PY2018's tracking data the tonnage for advanced rooftop controls was either in the measure name or missing which forced the evaluation team to manually extract the tonnage value from the measure name or assume a size based on similar measures installed.

**RECOMMENDATION 5:** Navigant recommends they use 4,700 hours for hours of use (HOU) and 0.7 for coincidence factor (CF) based on weighting the verified building specific values determined from the lighting logger study.

**Business EER – Custom Program**

Navigant provides the following recommendations based on its analysis of the program tracking database and completion of the impact analysis activities. The evaluation team provides these comments to improve program tracking records and to facilitate evaluation efforts to better align reported and verified savings.

**RECOMMENDATION 1:** The implementation contractor should align the peak demand calculations with the GMO peak period, particularly for non-lighting projects. If zero peak demand savings are claimed, indicate reasons why.

**RECOMMENDATION 2:** For Custom lighting operating hours, the implementation contractor should collect detailed operating schedules (8:00 a.m.-7:00 p.m. on weekdays, etc.). This helps determine the CFs and creation of lighting operating hours.

**RECOMMENDATION 3:** For projects where lighting fixtures operate 24/7 annually, the implementation contractor should use 1.0 as the coincidence factor. If occupancy sensors or special lighting controls are installed as part of the lighting upgrade, claim additional savings for the installation of lighting controls.

**Home Lighting Rebate Program**

Overall, the HLR program functions smoothly, its marketing materials are adequate, and the evaluation team encourages the program to continue supporting ENERGY STAR LEDs. The Navigant team concurs with GMO's decision to reinstitute support for standard LEDs in Q4 of PY2018 and to retain standard LEDs in PY2019 to avoid consumer backsliding to standard halogen bulbs.

**RECOMMENDATION 1**: The Navigant team suggests revising energy and demand savings calculations to reflect the following:

- Account for leakage, assumed to be 14% of HLR LED bulb sales (GMO currently makes no adjustment for leakage)
- Align the standard and specialty LED savings assumptions listed below with the IL TRM V7 as outlined in the residential savings assumptions in Appendix L.1:
    - Annual HOU (weighted by program sales and interior and exterior installation)
    - Baseline wattages (weighted by program sales in each lumen bin)
    - Coincident Factors
    - Waste heat factors
- Account for the **C&I cross-sector sales** contribution of HLR LED bulb sales by applying HOU and CF values of 3,306 and 0.6, respectively, to 4% of the bulbs sold through the program
- Assume a NTG ratio of 85% for standard LEDs and 66% for specialty LEDs

**Home Energy Report Program**

The tracking data and savings calculations provided by Oracle are appropriate for billing analysis of a randomized control trial. While the evaluated savings differed from the implementer-reported savings, the implementer-reported savings fell within the 90% confidence interval of the evaluated savings.

**RECOMMENDATION 1:** Navigant makes the following recommendations related to the impact evaluation:

- Continue to use Oracle-reported savings for tracking purposes.
- Evaluate the reported savings every 2 years to monitor continued consistency between evaluated savings and implementer-reported savings.
- Evaluate the performance of the 2016 expansion after the implementation of the new report design with disaggregated feedback and additional features.
- After the program integrates advanced metering infrastructure (AMI) data, consider evaluating demand impacts using AMI data from a sample of treatment and control customers. Navigant suggests using a post-only difference approach as most customers will not have AMI data available for the pre-period.

**Residential and Business Programmable Thermostat Programs**

Navigant's impact recommendations in PY2017 centered around further areas for analytical investigation and customer education, some of which are still valid recommendations in PY2018. The program recommendations listed in Section 12.3 could help program processes in the Cycle 2 extension and in MEEIA Cycle 3.

**RECOMMENDATION 1:** Navigant recommends that GMO test the impacts of RHR events under a variety of conditions. For example, using different event dispatch strategies (i.e. uniform load shape) or calling back to back series of events.

**RECOMMENDATION 2:** In PY2017, Navigant recommended conducting an analysis to identify non-participating thermostats. As thermostats age or customers move in or out, a number of thermostats may experience issues preventing full participation.

**RECOMMENDATION 3:** The PY2017 process evaluation identified that some customers took additional energy saving actions during events. GMO should consider using AMI data to identify non-thermostat related impacts during event hours.

**Demand Response Incentive Program**

Overall, Navigant found that the DRI program is limited by the fundamental program design, making it difficult to reach the 3-year program target. The GMO product manager has implemented many process improvements during PY2018, but there are still many customers who continue to miss their contracted CL but still receive participation incentive payments.

**RECOMMENDATION 1:** The limitations to relying on EPD values and CLs to report savings. Navigant recommends the program move toward a "pay-for-performance" incentive structure that calculates customer performance and corresponding payment following each event.

**RECOMMENDATION 2:** The KCP&L and CLEAResult teams provided reports on customers with data issues that were to be excluded from the analysis. Navigant recommends continuing this collaboration process to be upfront about what data limitations exist and how to handle them.

### *Process Evaluation Recommendations*

This section presents the most important recommendations resulting from Navigant's process evaluation activities for PY2018. Navigant addressed the five required process evaluation questions set forth in the MO regulations[8] and has aligned the recommendations below with the questions presented above. A complete description of the findings and recommendations of Navigant's process evaluation is presented in the program-specific sections that follow.

**Business EER – Standard Program**

The Standard program has surpassed its 3-year MEEIA target, primarily through significant participation in efficient lighting measures. The program also continues to have high participant satisfaction based on the information available. Overall, Navigant found that GMO could increase marketing for some targeted market sectors and make participation in multiple C&I programs more straightforward.

**RECOMMENDATION 1:** GMO could continue to develop targeted marketing materials that clearly outline the benefits of energy conservation specific to sector. GMO could also focus on marketing to smaller C&I customers that have the least amount of resources to devote to researching energy conservation through

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

routinely scheduled webinars. These webinars could be recorded and saved for those customers that aren't able to attend.

**RECOMMENDATION 2:** In general, the target market is well defined and appropriate. However, GMO could continue to target specific sectors of interest within the target market such as data centers and grocery stores.

**RECOMMENDATION 3:** While GMO does offer a wide array of measure end-uses, lighting continues to dominate in both total measures installed and claimed energy and demand savings. To address this issue, GMO could increase HVAC contractor involvement and consider opportunities for co-promotion of measures across programs.

**RECOMMENDATION 4:** The following recommendations are provided to improve the communication channels and delivery mechanisms of the program:

- Continue education and training of new trade allies to reduce rebate application errors.
- The Standard program webpage could advertise eligible measures for rebates based on end-use rather than program type. Also, the targeted marketing materials online could be more accessible.
- When sending out the rebate check, GMO could consider including customer service contact information for further assistance.

**RECOMMENDATION 5:** Since many non-lighting end uses were moved to the Custom program, GMO should find ways to increase participation in the Custom program by leveraging participation in the Standard program. This could be done through trade ally training, combined marketing, and follow ups with previous participants could accomplish this. Another option is to add bonus or bundled incentives for participating in more than one program or end-use category.

**Business EER – Custom Program**

The recommendations that correspond to Navigant's findings on the process evaluation are provided to improve the Custom program. These recommendations are based on the findings outlined above and are informed by the customer and trade ally surveys conducted in PY2018.

**RECOMMENDATION 1:** Some customers do not have the in-house engineering expertise to pursue complex custom projects. The program should continue their efforts to develop industry-specific outreach campaigns, which help customers see how custom projects benefit customers like them and offer additional technical support during the preapproval phase to help guide customers through the project process.

**RECOMMENDATION 2:** GMO should prioritize the implementation of targeted trainings for Customer Service Managers to ensure that Customer Service Managers (CSMs) are well-equipped to promote the program to the Tier One accounts.

**RECOMMENDATION 3:** GMO has already decided to bring exterior lighting measures back into the program, which trade allies and customers both requested. GMO should be sure to promote this change

to lighting trade allies to avoid any missed opportunities for exterior lighting projects from trade allies who may not be aware of the change in eligibility.

**RECOMMENDATION 4:** GMO has made significant progress in implementing industry-specific outreach campaigns and should build upon these efforts by adding industry-specific content (such as case studies) to the program website, so that the website reflects their outreach approach.

**RECOMMENDATION 5:** GMO should continue efforts to simplify the application process and offer additional technical support to customers during the application process to ensure that adequate technical information is captured during the preapproval phase. A tablet-based data entry tool would allow trade allies or program outreach staff to collect data during a site visit. Additionally, given the unique barriers facing new construction projects, GMO should develop a separate program for new construction projects, prioritizing early outreach and incentives for design professionals.

**Home Lighting Rebate Program**

Drawing on the findings from interviews with program and IC staff and suppliers, and a review of program sales information, Navigant developed the following recommendations to enhance the success of the program.

**RECOMMENDATION 1:** Navigant concurs with GMO's decision to focus on specialty LEDs for most of PY2018 in an effort to assist meeting overall portfolio needs, but the team also supports the reintroduction of standard LED incentives in Q3 PY2018 and continued support in PY2019, given the observed backsliding to halogens in PY2018.

**RECOMMENDATION 2:** Navigant believes the target market is appropriately defined as residential customers and currently has no recommendations for improvement.

**RECOMMENDATION 3:** Navigant supports GMO's decision to reintroduce standard LEDs in Q3 of PY2018 and retain support in PY2019. Navigant also encourages GMO and the IC to continue to explore the strengths and weaknesses of including fixtures, downlight kits, and emerging lighting products in the MEEIA Cycle 3 programs.

**RECOMMENDATION 4:** Current promotional efforts have contributed to the great success of the HLR program in MEEIA Cycle 2.

**RECOMMENDATION 5:** Given the strong program success, Navigant concludes that GMO's current efforts meet identified market imperfections. As noted above, GMO and the IC should continue exploring the possibility of adding fixtures, downlight kits, and emerging lighting technologies to the program in MEEIA Cycle 3. They should also consider the most appropriate ways to market the program in MEEIA Cycle 3 once the Evergy rebranding is complete.

**Home Energy Report Program**

Drawing on the billing analysis results combined with a materials review, staff interviews, and a review of the Oracle CET survey results, the Navigant team developed the following recommendations to enhance the success of the program.

**RECOMMENDATION 1:** GMO should continue providing reports and encouraging customers to log into the Online Energy Audit to help customers understand how to manage their energy use.

**RECOMMENDATION 2:** The target market segment is appropriately defined as residential single-family homes. As the program modifies the reports and adds features, GMO should consider assessing the effectiveness of the program with customers in multifamily homes to expand the target market.

**RECOMMENDATION 3:** The program should continue to keep abreast of new ways to use and save energy to provide up-to-date tips, including tips for load-shifting, tips for using smart home devices, and EV charging.

**RECOMMENDATION 4:** With launch of the new process that will enable more customers to receive email reports, high bill alerts, and other communications, GMO should consider additional research on the effectiveness of and the customer experience with these touchpoints.

**RECOMMENDATION 5:** With upcoming changes to access to email reports and data granularity, GMO should consider tracking participation and additional research on effectiveness after the new program elements have been in place for a program year.

**Residential and Business Programmable Thermostat Programs**

The evaluation team interviewed the product manager and conducted a program materials review. The team provides the following process recommendations based on findings from these activities.

**RECOMMENDATION 1:** As noted in the PY2017 evaluation, the program addresses market imperfections by providing customers with an ability to reduce electricity usage during hours of peak demand. Continuing to monitor the market for how the Nest solution compares to competition can help ensure the program is matching the market.

**RECOMMENDATION 2:** GMO no longer targeted or actively recruited customers in PY2018 because it has met enrollment targets. Navigant agrees this was an appropriate approach after reaching the enrollment target.

In the Cycle 2 extension, GMO will resume marketing to meet the new enrollment targets. Navigant recommends focusing on BYOD customers. In MEEIA Cycle 3, GMO may consider targeting a more staggered program enrollment over the cycle's duration.

**RECOMMENDATION 3:** The mix of end-use measures included in the program (i.e., PTs) meets the needs of the existing market. GMO could consider expanding the program to include customers that have already purchased other brands of smart/connected thermostats. In addition, GMO could consider expanding the BYOD customer segment through targeted marketing in MEEIA Cycle 3. BYOD programs are comparatively inexpensive to operate and a way that many utilities run thermostat programs successfully.

**RECOMMENDATION 4:** GMO should consider further educating customers on event notification options and the purpose of DR events to reduce customer confusion and increase program satisfaction. The program should continue to focus communication channels around activating DIY thermostats that have yet to be activated.

**RECOMMENDATION 5:** As noted in PY2017, GMO should monitor program savings targets in addition to enrollment goals to ensure that program cost-effectiveness remains high. Navigant acknowledges GMO addressed this issue in PY2018, identifying the need to limit program enrollment in PY2017 and PY2018.

**Demand Response Incentive Program**

Navigant addressed the five required process evaluation questions set forth in the Missouri regulations for the DRI program and developed the following recommendations based on our research:

**RECOMMENDATION 1:** CLEAResult continued using propensity modeling in PY2018 to select customers to recruit. GMO should continue to refine propensity modeling to select customers for the program and begin to target customers with automated curtailment capabilities.

**RECOMMENDATION 2:** The target market is appropriately defined and the evaluation team does not have any recommendations at this time.

**RECOMMENDATION 3:** GMO was able to include net power in PY2017 and PY2018 data, which was a recommendation in the PY2016 report. GMO should continue to provide net power.

**RECOMMENDATION 4:** As AMI becomes more prevalent, GMO has made a concerted effort to provide more consistent updates to participants regarding their program performance. Navigant recommends continuing this effort in preparation for a “pay-for-performance” incentive structure in which immediate event feedback in required. Such capabilities would also allow for more periodic updates of participants’ event target values (FPLs), as recommended in PY2017.

**RECOMMENDATION 5:** In PY2018, the DRI product manager made progress to better manage participants’ event behavior. The results of the PY2018 impact evaluation reveal limitations in what performance improvements are achievable through behavior management due to the fundamental program design. Navigant recommends moving to a “pay-for-performance” incentive structure to increase event participation in Cycle 3.

# 1. INTRODUCTION

This evaluation report is provided by Great Plains Energy Services Incorporated (GPES) on behalf of its affiliate Kansas City Power and Light (KCP&L) – Greater Missouri Operations Company (GMO) 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 GMO for its portfolio of 15 demand side management (DSM) programs for program year (PY) 2018.

Navigant conducted the following tasks as part of its impact evaluation, process evaluation, and cost-effectiveness analysis for PY2018:

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

Navigant developed a multiyear evaluation strategy to provide GMO and its stakeholders with the best information possible over the course of the program cycle within the available evaluation financial resources. This approach is documented in the 3-year evaluation, measurement, and verification (EM&V) plan.[9] Navigant's plan concentrates on those programs with the greatest contribution to overall portfolio savings.[10]

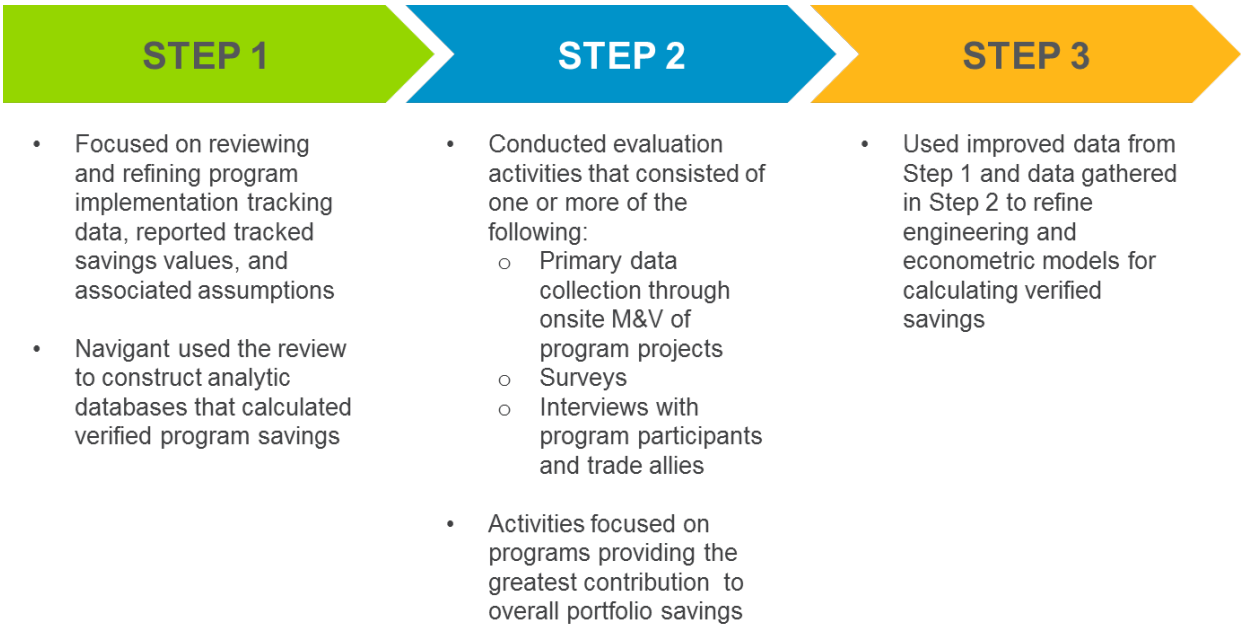
## 1.1 Impact Evaluation Approach

The evaluation team employed a variety of methods to evaluate, measure, and verify the energy and demand savings achieved by each of GMO's DSM programs. The team summarizes the approach for gross impact, net savings analysis, and process evaluation in the following figure and describes the key methods in the following sections.

[9] *Evaluation, Measurement, and Verification Plan: KCP&L GMO Energy Efficiency and Demand Response Program 2016.* Prepared by Navigant. April 2016.

[10] Navigant did not plan evaluation activities for programs with no claimed savings (Strategic Energy Management and both Online Energy Audit programs).

Navigant's **gross impact** evaluation strategy had three basic components:




In accordance with Missouri regulations,[11] GMO 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:
    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

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.

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

[11] Missouri Code of State Regulations 4 CSR-240-22-070 (8)

**Table 1-1. 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 PY2018.

**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: Navigant analysis*

### *1.1.1 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 GMO agree, these research findings are applied to the following program years. For example, in PY2017, Navigant conducted NTG research for the Home Lighting Rebate (HLR) program. The results from this research were applied to PY2018 gross savings.

The evaluation team uses primary in-state data when possible and agrees with the applicability to the GMO 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.

### *1.1.2 Net-to-Gross*

The NTG components are either based on data collected in PY2016, PY2017 and PY2018 from participants and—where appropriate—from trade allies, or they use NTG research from Cycle 1 for

programs that have similar program designs. Navigant used the following definitions, provided by the Uniform Methods Project,[12] 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—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 1-1:

**Equation 1-1. 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 |

Table 1-2 provides a summary of the final FR, PSO, and NPSO estimates for each program. The bolded items in the table represent programs' primary data collected by Navigant to inform the NTG analysis. More detail on the survey results and reconciliation of NTG components can be found in the program-specific sections.

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

- Programs inherently have no FR (e.g., Demand Response Incentive [DRI], Home Energy Report [HER])
- Programs did not claim any savings (e.g., Home Online Energy Audit [HOEA], Business Online Energy Audit [BOEA])
- Impact evaluation methods directly estimate net impacts through a billing analysis that utilizes controls (e.g., HERs, Strategic Energy Management [SEM])
- 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 (e.g., Block Bidding, Income-Eligible Multifamily [IEMF])

[12] 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.

**Table 1-2. NTG Components by Program**

| Program Name* | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| Business EER – Standard | 0.05 | 0.002 | 0.004 | 96% |
| Business EER – Custom | 0.31 | 0.00 | 0.05 | 74% |
| Block Bidding | Projects Originating from the Custom Program | | | 74% |
| | Projects Originating from the Standard Program | | | 96% |
| Strategic Energy Management | Navigant 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 | 0.35 | 0.01 | 0.14 | 80% |
| Income-Eligible Multifamily | Deemed 1.0 pending future research. | | | 100% |
| Home Lighting Rebate | 0.41 | 0.17 | 0.00 | 76% |
| Home Energy Report | Navigant assumed a NTG value of 1.0 for the HER program | | | |
| Home Online Energy Audit | N/A – Savings not claimed in PY2018 | | | |
| Business Online Energy Audit | N/A – Savings not claimed in PY2018 | | | |
| Residential Programmable Thermostat | Navigant 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 (Energy/Demand)** | **N/A** | **N/A** | **N/A** | **95% / 90%[13]** |

FR = free ridership, PSO = participant spillover, NPSO = nonparticipant spillover, NTG = net-to-gross
*Source: Navigant analysis*

## 1.2 Cost-Effectiveness Approach

Navigant 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. 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 KCP&L's DSMore model in conjunction with Navigant-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 KCP&L

[13] 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.

in calculating cost-effectiveness as part of its annual filing. KCP&L's DSMore formulation of the benefit-cost tests followed the 2001 California Standard Practice Manual (SPM)[14] and does not account for the subsequent 2007 SPM Clarification Memo.[15] Navigant will provide KCP&L with the evaluated savings included in this analysis to support its performance incentive calculation.

The process used for calculating cost-effectiveness in PY2018 involved the following. KCP&L provided a template to Navigant which contained all the measures available in the Plan Year along with the associated Technical Reference Manual (TRM) values. Navigant 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). The template was sent back to KCP&L where it was loaded into the DSMore batch tool. The tool was then executed by KCP&L with the new measure values and the cost effectiveness was calculated. The results were sent to Navigant for inclusion in the EM&V report. This approach was agreed upon by KCP&L, MPSC Staff, and Navigant on January 22, 2018 to ensure consistency in the avoided cost values and cost-effectiveness methodology used in KCP&L's annual reports and Navigant's EM&V reports.

Navigant 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. For a complete description of the approach used, reference Section 7, "Whole House Efficiency."

The Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the HLR, WHE, IEMF, and Business Energy Efficiency Rebate (EER) – Standard programs. This adjustment reflected a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA). The Illinois Technical Reference Manual (IL TRM) v7 guided this adjustment, and it assumes that CFLs will become the baseline in 2021 for standard bulbs and 2024 for specialty bulbs. The annual savings claimed were reduced within the life of the measure to account for this baseline shift and were incorporated into cost effectiveness screening calculations. Although recent final and draft rulemakings by the Department of Energy (DOE)[16] now make it unlikely that these changes in efficiency standards will occur as assumed in the IL TRM v7, the Navigant team has retained the mid-life adjustment for the PY2018 evaluation because the program sales and verification efforts occurred prior to the September 2019 release of the DOE rulings. This decision results in conservative estimates of the cost-effectiveness for standard and specialty lamps in these programs.

[14] 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.

[15] 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.

[16] https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps
https://www.federalregister.gov/documents/2019/09/05/2019-18941/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps

The Strategic Energy Management (SEM) program did not have energy benefits in PY2018. Demand benefits were claimed in PY2018 for the same period that coincided with the energy impacts of PY2017. These demand savings were incorporated into the program-to-date cost effectiveness results of the SEM program. As shown above and in the main body of the report, the SEM program had negative verified incremental energy savings in PY2018. This negative energy impact can be attributed to customers no longer taking part in behaviors that would reduce energy savings as the program ceased support in July of 2018. The negative energy impact is not included in the cost effectiveness program-to-date results.

In PY2018, program participation was limited in the Small Business Lighting program to projects that were initiated at the end of PY2017 and finalized in the first quarter of PY2018. As such, benefits and costs for this limited participation have been included in the sector level results presented above in the Executive Summary.

Table 1-3 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 test only differ in the discount rate assumed (i.e., externalities are not included in this SCT analysis). Refer to Table 1-4 for sources of assumptions regarding discount rates. For comparison with GMO-reported benefit-cost ratios, this report provides TRC and SCT results without including incentives paid to free riders as required by the 2007 Clarification Memo.

**Table 1-3. 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: Navigant analysis*

### *1.2.1 Source of Benefit and Cost Assumptions*

The sources of data used in the benefit-cost analysis are summarized in Table 1-4. Many of the input assumptions used in Navigant's analysis came directly from GMO. 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 Navigant's benefit-cost model.

**Table 1-4. Sources of Benefit and Cost Data**

| Data[17] | Source |
|---|---|
| Avoided energy costs | Provided by GMO |

[17] Navigant did not provide the avoided energy and capacity costs in this report as they are confidential to GMO.

| Data[17] | Source |
|---|---|
| Avoided capacity costs | Provided by GMO |
| Retail rates | Provided by GMO |
| Load shapes | Provided by GMO |
| Discount rates | Provided by GMO and classified by GMO as highly confidential |
| Participant equipment costs | Illinois Technical Reference Manual (TRM), KCP&L GMO assumptions |
| Energy and peak demand savings | Navigant engineering analyses |
| EUL | Illinois TRM, program tracking data, GMO Assumptions |
| RUL | Navigant analysis based on lifetime of replaced equipment and related mortality analysis techniques. |
| NTG | Navigant NTG analysis |
| Line loss factors | Provided by GMO |
| Incentives | Program tracking database |
| Participation | Program tracking database |
| Administrative costs | Provided by GMO |

*Source: Navigant analysis*

## 1.3 Process Evaluation Approach

Navigant's process evaluation focused on the following: (1) addressing the five required questions per the Missouri Code of State Regulations 4 CSR 240-22.070 (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?

Navigant performed the following process activities to inform its evaluation:

**Program Staff and IC Interviews**

- All Programs

**Materials Review**

- All Programs

**Trade Ally Surveys**

- Business EER – Custom, Block Bidding

**Participant Surveys**

- Business EER – Custom, Block Bidding

## 1.4 Document Structure

Navigant divided the remainder of this document into program-specific sections detailing the impact evaluation (including NTG analysis), cost-effectiveness, and process evaluation for GMO's portfolio of EE and DR programs. Each section includes the following:

- **Program Description:** Presents the program description and summary tables detailing program-level energy savings targets.
- **Evaluation Findings:** Presents the verified energy and peak demand savings calculations as well as the NTG analysis and recommendations. It also includes the results of Navigant's benefit-cost analysis for PY2018 and the process evaluation.

- **Recommendations:** Includes Navigant's key impact and process recommendations. It includes answers to the five process evaluation questions from the MO regulations as well as any additional process evaluation research questions.

Several appendices accompany this document, including:

- **Appendix A. Survey Instruments:** Provides detailed survey guides, including participant, trade ally, and supplier interview guides.
- **Appendix B. Process Flow Diagrams:** Includes high level process flow diagrams that provide an overview of how each program operates from start/entrance to the program through incentive payment.
- **Appendix C. Standard Methodologies:** Covers Navigant's overall approach toward cross-cutting methodologies, namely determining cost-effectiveness and NTG savings.
- **Appendix D. Missouri Requirements for Impact Evaluation:** Provides an overview of MO regulation requirements for conducting an impact evaluation.
- **Appendix E – Q. Program-Specific Methodologies:** Details program-specific methodologies, including any differences between the standard methodologies and those the evaluation team used for each program.
- **Appendix R. Cost-Effectiveness Data** – HIGHLY CONFIDENTIAL: An Excel databook containing the following:
    a. All measure-specific input assumptions.
    b. Program-level administrative costs incurred by the program administrator.
    c. Detailed benefit and cost breakdowns by cost test and program/portfolio.
- **Excel Databook:** Provides additional analytical data and figures for each program in addition to summary results tables for the portfolio.

# 2. BUSINESS ENERGY EFFICIENCY REBATE – STANDARD PROGRAM

## 2.1 Program Description

The Business Energy Efficiency Rebate (EER) – Standard program offers a diverse set of measures that have standardized measure savings and an incentive process that improves accessibility to the customer. This helps increase the number of participants in the program for a broad segment of Kansas City Power and Light's (KCP&L's) customers, with more complex projects using the Business EER – Custom program to tailor the upgrades to a customer's needs. Any KCP&L Greater Missouri Operations Company (GMO) commercial and industrial (C&I) customer is eligible to participate in the program. Program measures include the more typical EE projects such as lighting, motors, and HVAC. Table 2-1 provides more detail on the Standard program.

**Table 2-1. Business EER – Standard Program Description**

| Business EER – Standard Program Key Details | |
|---|---|
| **Sector** | Commercial and industrial (C&I) |
| **Implementation Contractor** | CLEAResult |
| **Program Description** | The Standard program is based on a per-measure installation, with fixed costs, rebate, and savings amounts. The program provides rebates for replacement and retrofits for the following categories of measures:<br>• Energy efficient lighting and controls<br>• Refrigeration<br>• Water heating<br>• Compressed Air<br>• Pool pumps<br>• HVAC |
| **Application Process** | Participants or trade allies can email, submit via online portal, mail, or fax completed applications. Customers are required to submit their application within 90 days of project installation. Preapproval is not required for Standard projects. |
| **Verification of Purchase/Project** | The implementation contractor (IC) reviews applications and supporting documents, including cut sheets, certificates, and invoices. The project review is primarily a desk review. CLEAResult has established an onsite review process for the Standard program. Projects for onsite verification are selected based on the size and perceived variability of the project. |
| **Rebate Process** | The rebate amount is established on a per-measure basis. The customer can assign the check to a trade ally. The total amount a participant can receive is limited to $400,000 per tax ID and per territory. |
| **Disputes, Rejected Applications** | Measures that do not meet minimum efficiency requirements do not qualify for rebates. Disputes are escalated from the IC's outreach and administration teams to program management. Final resolutions are documented in the IC database. |

| Business EER – Standard Program Key Details | |
|---|---|
| **Project Reporting** | The IC populates the database as projects are completed. There is a monthly upload from the IC to the Greater Missouri Operation (GMO) data warehouse for reconciliation. |

*Source: Evaluation team analysis*

## 2.2 Evaluation Findings

Navigant found that the program is consistently performing well in the territory, meeting 238% and 242% of its 3-year energy and demand savings targets, respectively.

For the Standard program's impact evaluation, Navigant performed a deemed measure savings review, tracking database review, and applied the results of the on-site lighting study completed in PY2017 to capture improved primary inputs for the engineering analysis equations described in Appendix E. Navigant reviewed the tracking database to verify its validity and ensure that it contains all necessary information to evaluate the program (see Appendix E.1). The evaluation team reviewed the deemed measure savings that the KCP&L team developed and assessed the reasonability of the algorithms and assumptions used (see Appendix E.2). GMO provided rebates for 1,017 projects in the Business EER – Standard program, with 534 of them in GMO territory.

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

The following sections summarize Navigant's PY2018 findings for the Business EER – Standard program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

- Impact evaluation findings (Section 2.2.1)
- Cost-effectiveness analysis (Section 2.2.2)
- Process evaluation findings (Section 2.2.3)

### *2.2.1 Impact*

This section provides Navigant's findings from the Standard program impact evaluation, shown in Table 2-2. Overall, the Standard program achieved a 106% realization rate for gross energy savings and a 102% realization rate for gross demand savings. Navigant calculated savings using data from the tracking database, onsite metering, and secondary sources (i.e. the IL TRM). Like previous years of this program, lighting measures accounted for more than 99% 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. Some key factors influenced the verified savings the most. Navigant also included these key factors in the PY2017 impact evaluation. First, similar to PY2017, Navigant aligned the baseline wattage for the verified savings 1) with the midpoint of the baseline wattage range listed in the measure name, 2) based on the onsite lighting research conducted in PY2017, or 3) with secondary sources on baseline fixture wattage. Second, Navigant leveraged the recorded efficient wattage for the lamp or fixture in the verified lighting savings calculation for each measure incentivized. Finally, Navigant included the results of the long-term onsite verification lighting study concluded in PY2017 in the verified

lighting savings calculation. The results of the long-term lighting study led to adjustments to the in-service rate (ISR), hours of use (HOU), and coincidence factors (CF) for lighting measures.

Navigant identified that the primary factor that led to a realization rate greater than 100% was the use of the reported efficient lamp or fixture wattage in the savings calculation. Among all measures, the "light-emitting diode (LED) linear lamp replacing a 4' T8, T12, or T5" measure had the greatest positive impact on the realization rate. For this measure, the average efficient wattage of the installed lamps was 15W, much lower than the deemed efficient wattage of 18 watts. This drop in efficient wattage alone led to more than a 27% increase in annual energy savings for this measure. In addition, this measure accounted for more than a quarter of total energy savings, leading to its large influence on program level realization rate. While GMO is constantly updating the deemed efficient wattage values before the program year begins to address this issue, these values naturally lag behind the market trend of increasing lighting efficiency. Hence, the deemed values underestimate the installed efficiency, leading to an assumed higher efficient wattage. One method to address this difference would be to include forecasts of lighting efficiency in the TRM. However, this method would lead to some risk to the program savings if the market does not follow the forecasted trends.

It is important to mention that not every factor necessarily increased the verified savings for each measure. For example, in some cases the HOU by building type verified by the lighting study are lower than the deemed HOU by measure included in the TRM. Close to two thirds of the available interior lighting measures including both lamps and fixtures have deemed HOU greater than the verified HOU for Office, Schools, and Warehouses. These three building types made up close to 30% of all program level reported savings.

Similar to previous years of this program, to determine the net savings, Navigant used the net-to-gross (NTG) analysis conducted in PY2016 which indicated limited instances of free ridership (FR) at 5% and spillover (SO) at 0.5%. Based on these findings, Navigant applied an NTG ratio of 0.96.

Table 2-2 presents the gross and net energy and demand savings.

**Table 2-2. Business EER – Standard PY2018 Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 21,946,830 | 23,212,017 | 106% | 38,710,762 | 22,283,536 | 58% |
| Coinc Demand at Customer Meter (kW) | 4,315 | 4,392 | 102% | 6,385 | 4,217 | 66% |

*Based on PY2016 research, a NTG ratio of 0.96 to the Standard program.

*Source: Navigant analysis*

Table 2-3 presents the Standard program-to date-realization rate, energy, and demand savings. The program achieved almost 2.5 times the MEEIA target for both energy and demand.

**Table 2-3. Business EER – Standard Program to Date Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA 3-Year Cycle 2 Target | Verified 3-Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 120,805,483 | 96,141,303 | 80% | 38,710,762 | 92,295,650 | 238% |
| Coinc Demand at Customer Meter (kW) | 21,792 | 16,085 | 74% | 6,385 | 15,443 | 242% |

* Based on PY2016 research, a NTG ratio of 0.96 to the Standard program.

*Source: Navigant analysis*

The following sections present results of the database review, deemed savings review, and a summary of the variable updates from the measurement and verification (M&V) activities concluded in PY2017.

#### *2.2.1.1 Tracking Database Review*

The program tracking database review ensures data is sufficient regarding the installed projects (i.e., quantity, size, capacity, efficiency, building type, etc.) to support the engineering analysis used to calculate verified savings. Table 2-4 shows the disaggregation of total reported energy savings by end use for the 534 projects completed in the GMO territory in PY2018. As mentioned previously, lighting projects accounted for the majority of reported savings, with approximately 99% of the total reported program savings.

**Table 2-4. Business EER – Standard PY2018 Summary by Measure Type**

| Measure Type | Total No. of Projects | Reported Energy Savings (kWh) | Percentage of Total | Reported Demand Savings (kW) | Percentage of Total |
|---|---|---|---|---|---|
| Lighting | 517 | 21,787,490 | 99.3% | 4,283 | 99.3% |
| Pumps/Fans | 15 | 55,150 | 0.2% | 9 | 0.2% |
| HVAC | 1 | 89,250 | 0.4% | 19 | 0.4% |
| Hot Water | 1 | 14,940 | 0.1% | 4 | 0.1% |
| Refrigeration | 0 | 0 | 0.0% | 0 | 0.0% |
| **Total** | **534** | **21,946,830** | **100%** | **4,315** | **100%** |

*Source: C&I Standard Rebate Program Tracking Database and Navigant analysis*

The program tracking database lists projects completed during the program year and includes measure details, energy and demand savings, application dates, and unique project numbers assigned by the IC. Project files include all project-specific documents submitted by the customer or contractor and project applications, invoices, site visit notes, and savings calculation files. Savings calculations include spreadsheets used by the implementation contractor (IC) or the site's personnel to calculate the energy and peak demand savings.

Major findings from the tracking database review included the following:

- **Database contains sufficient information:** Navigant found that the database contains sufficient information to support the impact evaluation.
- **The tracking database contains efficient measure information:** Inclusion of the efficient measure information first added in PY2017 allowed Navigant to use the recorded efficient wattage instead of the deemed efficient wattage. This increased the realization rate such that for many measures the realization rate was greater than 100%.
- **In less than 2% of cases efficient measures were miscategorized:** This happened most often when efficient linear fixture measures were miscategorized as single linear lamp replacement measures. Linear fixtures often provide greater light output than a single lamp and as a result have a higher efficient wattage than a single lamp. In most cases when this miscategorization occurred, the reported efficient wattage was either similar to or greater than the assumed baseline wattage, resulting in low or negative verified savings for that specific measure. While this happened infrequently and did not have a significant impact on overall realization rate, Navigant thinks it is important to point out as part of the database review.

#### *2.2.1.2 Deemed Measure Savings Review*

Navigant reviewed the deemed savings to verify the validity of the engineering algorithms used and the inputs to those algorithms. The evaluation team adjusted algorithms and inputs with data that best reflects performance of equipment in GMO's service territory. Navigant's review found the following:

- GMO uses industry-standard algorithms for all lighting and non-lighting measures.
- Navigant identified that GMO uses a single set of blended assumptions for WHFs, CFs, and HOU that vary by measure and applies these assumed values for all building types in the C&I sector. GMO leverages these blended values to develop the TRM, analyze cost effectiveness, and facilitate GMO program planning. These blended values come from four key industry sources as well results of impact analysis from previous years. While these blended assumptions are reasonable for program planning, Navigant conducts a more granular analysis incorporating building type information included in the program tracking database to verify the program savings. This captures the effects of variation in program participation across different building types on verified program savings. For example, if GMO targets customers with higher hours of use such as grocery stores, this effort could lead to more verified savings and higher realization rates.
- The deemed savings relies on an efficient wattage of the replacement fixture or lamp based on efficacies at the beginning of the cycle or the most recent TRM update. As the program matures, fixture and lamp efficacies have increased, leading to greater savings. To account for increased efficacy, Navigant used the reported efficient wattage of the replacement lamp or fixture for the calculation of verified savings. Navigant also verified the wattage in many cases through comparison with the model number or by looking up the model number in the manufacturer's online product catalog.
- The deemed savings also relies on an assumed baseline wattage of the replaced fixture or lamp. The PY2018 tracking database did not include information on the actual baseline wattage for the Standard program. As part of the impact evaluation, Navigant updated the assumed baseline wattage used for the deemed savings analysis based on three other sources: 1) the baseline wattage name listed in the measure name, 2) onsite verification, and 3) secondary sources on

baseline fixture types. Appendix E outlines these three methods for updating the baseline wattage in more detail.

For reference, Table 2-5 summarizes the top ten contributing measures and their corresponding baseline wattage assumptions and the different methods and sources used to develop the baseline wattage as part of the deemed measure savings review.

**Table 2-5. Business EER - Baseline Wattage for High Impact Measures**

| Measure Name | % of Estimated Energy Savings | Baseline Wattage (Watts) | Baseline Wattage Source |
|---|---|---|---|
| LED Linear Lamp Replacing 4ft T8, T12, or T5 Lamp | 28% | 29 | Average of 25W, 28W, and 32W T8 |
| LED Low/High Bay Fixture replacing 301W-450W fixture | 13% | 375 | Midpoint of listed wattage range |
| LED 2X4 Troffer or Linear Ambient replacing T8, T12 or T5/T5HO fixture | 10% | 98 | Average of 3 lamp T8 and T5 fixtures, and 2 lamp T5HO fixtures |
| LED 2X4 Retrofit Kit replacing T8, T12 or T5/T5HO fixture | 10% | 98 | Average of 3 lamp T8 and T5 fixtures, and 2 lamp T5HO fixtures |
| LED Low Bay Fixture replacing 150W-300W fixture | 7% | 225 | Midpoint of listed wattage range |
| Occupancy or Vacancy Sensor Replacing No Controls | 4% | N/A | No Controls |
| Remove 4ft Lamp from T8 or T12 system | 4% | 28 | Average of 25W, 28W, and 32W T8 |
| Parking Garage LED replacing 101W-175W Fixture or Mogul Screw-Base Lamp | 3% | 137 | Midpoint of listed wattage range |
| Interior Omnidirectional LED Lamp replacing 40-60W Lamp | 3% | 50 | Midpoint of listed wattage range |
| Interior Omnidirectional LED Lamp replacing 61-100W Lamp | 2% | 80 | Midpoint of listed wattage range |

*Source: Navigant Analysis*

#### *2.2.1.3 Variable Updates from Onsite Verification*

For the verified lighting savings for PY2018, Navigant leveraged the results of the long-term lighting logger study started in PY2016 and completed in PY2017 to capture region specific primary inputs for the engineering analysis equations. The information captured during the onsite visits included:

- Observed building type
- Actual installed quantity

- Typical operating schedules from onsite interview
- Installed lighting loggers to capture data for lighting measures.

This section summarizes the differences in operational variables such as CF and HOU for lighting measures based on the on-site metering concluded in PY2017 and used for both PY2017 and PY2018 evaluation. Overall, Navigant's analysis of the long-term lighting study data showed a change in HOU that ranged from -19% for "Office" to -7% for "Retail" and a change in CF between -15% for "Warehouse" to +9% for "Other" building types compared to PY2016.

- Table 2-6 shows a comparison of PY2016 inputs to the inputs used in the PY2017 and PY2018 evaluation. Inputs did not change between PY2017 and PY2018.
- Navigant also used the WHF energy (WHFe) and WHF demand (WHFd) based on actual building types from the IL TRM v5, similar to the analysis in PY2016 and PY2017. Table 2-7 shows the WHFs by business type used for the PY2018 evaluation.
- Table 2-8 shows the input assumptions used to develop reported savings.
- During the onsite verification completed in PY2016, Navigant verified 2.5% of the total lights were in storage and not connected to any electricity circuit. Navigant used this information to update the in-service rate (ISR) in the lighting savings calculation to be 0.99 for Interior measures and 0.97 for Exterior measures.

**Table 2-6. Business EER – Standard Updated Calculation Parameters from Long-Term Logger Analysis**

| Building Type | PY2016 CF | PY2017 & PY2018 CF | PY2016 HOU | PY2017 & PY2018 HOU |
|---|---|---|---|---|
| Industrial | 0.62 | ▲ 0.64 | 5,144 | ▼ 4,584 |
| Office | 0.75 | ▼ 0.69 | 4,484 | ▼ 3,636 |
| Other | 0.67 | ▲ 0.73 | 5,280 | ▼ 4,925 |
| Retail | 0.83 | ▼0.74 | 5,662 | ▼ 4,921 |
| School | 0.59 | ▲0.63 | 4,074 | ▼ 3,642 |
| Warehouse | 0.64 | ▼0.55 | 4,110 | ▼ 3,611 |

*Source: Navigant analysis*

**Table 2-7. Business EER - Standard Waste Heat Factor by Business Type**

| Building Type | PY2018 WHFe | PY2018 WHFd |
|---|---|---|
| Industrial | 1.02 | 1.04 |
| Office | 1.25 | 1.39 |
| Other | 1.09 | 1.36 |
| Retail | 1.12 | 1.29 |
| School | 1.17 | 1.33 |
| Warehouse | 1.00 | 1.22 |

*Source: Navigant analysis*

**Table 2-8. Business EER – Standard Reported Savings Assumptions and Sources**

| Source | Measure | WHFe | WHFd | CF | Hours |
|---|---|---|---|---|---|
| AEG GMO Program Plan 2016-2018 | All Interior | 1.34 | 1.41 | 0.66 | 3,088 |
| AEG GMO Program Plan 2016-2018 | Low/High Bay | 1.34 | 1.41 | 0.83 | 4,367 |
| Weighted Averages Using in TRM | Linear LEDs | 1.2 | 1.5 | 0.75 | 4,128 |

WHFe = waste heat factor energy, WHFd = waste heat factor demand, CF = coincidence factor
*Source: KCP&L TRM*

#### *2.2.1.4 Engineering Review*

The engineering review step included two steps. First, Navigant calculated the deemed savings for all lighting measures based on the algorithms and assumptions used in the MEEIA TRM and the quantity of each installed measure. Navigant compared these savings to the reported savings and found an exact match.

Second, for the engineering review for the non-lighting measures, Navigant verified the key inputs to the measure savings such as horsepower, size, and tonnage with product specifications for the specific model number reported. Next, Navigant calculated each measure's savings using the MEEIA deemed assumptions and the verified information. Navigant found only one instance for non-lighting measures where the reported savings in the tracking database did not 100% align with the verified savings due to the reported savings only accounting for one of the two units installed and incentivized.

#### *2.2.1.5 Net-to-Gross*

Table 2-9 summarizes the components of the NTG ratio determined in PY2016 and used for PY2016 through PY2018. The limited FR found in the participant survey conducted in PY2016 primarily drove the NTG ratio of 96%. The high reported program influence limits FR: 76% of survey respondents were not originally planning to implement some program energy efficient measures, and 87% indicated that without the program they would have chosen less efficient options. Low SO may reflect the wide variety of commercial measure rebates available through the program as well as the participant and trade ally overall satisfaction with the ease of participation in the program.

**Table 2-9. Business EER – Standard NTG Components and Ratio: PY2018**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| 2018 | 0.05 | 0.002 | 0.004 | 96% |

FR = free ridership, PSO = participant spillover, NPSO = nonparticipant spillover, NTG = net-to-gross
*Source: Navigant analysis*

### *2.2.2 Cost-Effectiveness*

This section presents Navigant's cost-effectiveness evaluation for the Business EER – Standard program for each of the five-standard benefit-cost tests. Please refer to Section 1.2 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 Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the Business EER – Standard program. This adjustment reflected a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA). The IL TRM v7 guided this adjustment, and it assumes that CFLs will become the baseline in 2021 for standard bulbs and 2024 for specialty bulbs. The annual savings claimed were reduced within the life of the measure to account for this baseline shift and were incorporated into cost effectiveness screening calculations. Although recent final and draft rulemakings by the Department of Energy (DOE)[18] now make it unlikely that these changes in efficiency standards will occur as assumed in the IL TRM v7, the Navigant team has retained the mid-life adjustment for the PY2018 evaluation because the program sales and verification efforts occurred prior to the September 2019 release of the DOE rulings. This decision results in conservative estimates of the cost-effectiveness for standard and specialty lamps in these programs.

Table 2-10 presents the benefit-cost ratios for the five-standard benefit-cost tests for PY2016, PY2017, PY2018, and program to date, and the total resource cost (TRC) test filed by GMO. Based on Navigant's benefit-cost analysis, the program achieves a cost test ratio greater than 1.0 in the TRC, societal cost test (SCT), utility cost test (UCT), and participant cost test (PCT). Navigant's 2018 analysis resulted in a TRC ratio higher than that filed by GMO due to an energy realization rate of 106% and a coincident demand realization rate of 102%.

An additional note regarding the application of mid-life adjustments, Navigant found that for Troffers, the IL TRM makes mid-life adjustments only when the baseline wattage calculation includes T12's. Navigant did not include T12's as part of our baseline wattage assumptions, instead we used a weighted wattage of T8/T5/T5HO. Additionally, Troffers and Retrofit Kits represent a smaller portion of the overall program savings, at approximately 22% of combined verified energy savings for GMO and KCP&L-MO. Around half of the program verified savings were LED Linear Lamp and High & Low Bay Fixtures, for which the IL TRM does not make any mid-life adjustment.

[18] https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps
https://www.federalregister.gov/documents/2019/09/05/2019-18941/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps

**Table 2-10. Business EER – Standard Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[19] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 2.49 | 1.37 | 1.58 | 2.29 | 1.86 | 0.69 |
| 2017 | 1.91 | 1.52 | 1.82 | 3.72 | 1.46 | 0.95 |
| 2018 | 1.22 | 1.23 | 1.47 | 4.43 | 1.25 | 0.89 |
| **Program Overall** | **N/A** | **1.40** | **1.66** | **3.23** | **1.54** | **0.84** |

*Source: Navigant analysis*

### *2.2.3 Process*

The relatively high level of energy and demand savings makes the Standard program an important component of GMO's portfolio of C&I programs. Navigant addressed three process evaluation research questions and the five Missouri-required questions for process evaluation through program staff interviews, program material review, and review of surveys conducted by the implementer in PY2018 for the Standard program. Table 2-11 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

[19] The TRC Test GMO column provides the total resource cost test results provided by GMO staff developed using DSMore

**Table 2-11. Business EER – Standard Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. Are participants satisfied with the program? | • Program staff interviews<br>• Implementer administered participant surveys |
| 2. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | • Program staff interviews |
| 3. What changes have been made to the program in PY2018? | • Program staff interviews |
| **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<br>• Implementer administered 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<br>• Implementer administered participant surveys |

*Source: Navigant analysis*

The team's findings are provided in the sections that follow. Recommendations for consideration in relation to these findings are provided in Section 2.3.

#### *2.2.3.1 General Process Evaluation Questions*

To conduct the process evaluation, Navigant interviewed the Standard program's key staff, reviewed the program materials, and reviewed the IC administered participant surveys as part of the process evaluation. The process evaluation also included a review of GMO's progress on previous recommendations. While, the IC transitioned to Lockheed Martin for PY4, the discussion that follows is specific to PY3 and should be considered by GMO and LM for the extension of the MEEIA Cycle 2.

**QUESTION 1: Are participants satisfied with the program?**

**FINDING 1: Based on the implementer administered participant surveys, overall customers were satisfied with the program.**

- The surveys collected more than 50 responses for participants in PY2018 in the Standard program. One question asked related to the overall satisfaction with the contractor. This value has consistently increased since PY2016 and scored an average value of 9.4, on a scale of 1 to 10 with 10 indicating extremely satisfied. A second question specifically asked about overall satisfaction with the business EER program. On the same scale, participants responded with an average rating of 8.8 which has decreased from 9.4 in PY2016 and PY2017. This decline in satisfaction could be a result of reduced incentives from PY2016 to PY2018.
- Another question reported that 73% of PY2018 respondents had experiences with the business EER program that positively impacted their impression of GMO.
- Two comments stood out as an area for improvement. Two customers mentioned different situations where they desired to communicate with GMO after receiving the rebate but were unsuccessful in doing so. This resulted in frustration, a lack of direction on how to contact GMO, and ultimately a less favorable impression of GMO according to the survey responses. Based on this, it may be warranted to send a follow-up email with specific contact information to see if any customers require additional support after receiving the rebate, which is usually multiple weeks after project completion.

**QUESTION 2: What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?**

**FINDING 2: In the PY2017 GMO report, there were three findings and recommendations for the Standard programs. Below is a restatement of the PY2017 process evaluation recommendations along with status updates of those findings:**

- Leverage participation in the Standard program to increase participation in other C&I programs.

  **STATUS:** The implementer leverages participation in the Standard program to increase other programs' participation by doing reach-back marketing. This means they contact past Standard program participants that would potentially be eligible for additional measures in other programs.

- Improve ease of access to targeted case studies on the webpage.

  **STATUS:** Case studies were accessible through the means of webinars and forums rather than webpages. The implementer created and promoted webinars and customer forums in PY2018 that were well attended and considered by the IC to be a cost-effective method to target specific market sectors. For example, one webinar focused specifically on datacenter space types.

- To reduce confusion, provide documentation with the rebate check noting what measure the check is for. Also, include materials on other C&I programs the customer could participate in as a way to increase savings.

  **STATUS:** Participant surveys in PY2018 only reported positive reviews regarding receiving the rebate in a quick and timely fashion. Receiving the rebate quickly resolves the identified confusion of misunderstanding what the rebate check is for. However, it is still recommended that supplemental information or documentation is provided with the rebate check to further prevent confusion.

**QUESTION 3: What changes have been made to the program in PY2018?**

**FINDING 3: In late PY2017, GMO adjusted the incentive levels to lower the $/kW saved and help achieve kW savings goals.**

- Near the end of PY2017, incentive values changed to lower the $/kW with a goal of costing less than or equal to $550/kW saved, to increase the kW/kWh ratio, and to help achieve kW saving goals. The implementer tracked the average cost to save one kW and self-reported that the average cost for PY3 was around $435/kW saved, less than the goal.
- These incentive level changes impacted the high bay measures and caused tensions with Trade Allies (TAs) because they were hoping for a supplemental promotion after the reduction of the rebate. Despite the tension, GMO didn't see a huge dip in participation that affected savings goals in PY2018. There were no further incentive adjustments in PY2018.
- The application process remained relatively the same between PY2017 and PY2018. Even though the application process didn't change much, the number of not in good order applications decreased from PY2017 to PY2018. In addition, as reported by the implementer, the amount of time it took an application to move from not in good order to in-good-order and ultimately to paid decreased between PY2017 and PY2018

#### *2.2.3.2 Missouri-Required Questions for Process Evaluation*

In answering the Missouri (MO) requirements for process evaluation, Navigant interviewed the Standard program's key staff, reviewed program materials, and reviewed the IC that administered participant surveys. The evaluation team found that GMO's Standard program continues to have a well-defined customer base and these customers continue to benefit from greater awareness of energy efficient lighting opportunities.

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: The target market faces a high barrier to make an energy efficiency upgrade due to the first cost and a lack of understanding of lifetime value for energy efficient products. GMO addresses the barrier by providing incentives which reduce the incremental cost. In addition, there are many smaller C&I customers that have limited resources for researching energy conservation, leading to imperfect or incomplete information about the market. GMO has developed targeted marketing materials to increase participation of smaller C&I customers in implementing energy conservation measures.**

- GMO has focused on developing targeted marketing materials for certain segments to help explain the benefits of implementing energy conservation. In PY2016 the majority of energy savings came from industrial and warehouse building types. In contrast, more than 80% of energy savings came from measures installed in "Retail", "School", "Office", and "Other" building types in PY2018. This indicates that marketing materials and campaigns may have increased the participation of various types and sizes of facilities.
- A customer forum was heavily attended in PY3 which had many presentations targeting specific market sectors. This forum was highly effective in marketing to all potential

participants.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: GMO has a well-defined target market (C&I) for the Standard program. No further subdivisions appear necessary given current program participation.**

- GMO and their implementer track which trade allies are most active and routinely consider how they could improve their program by increasing their breadth of trade allies that have different niches or cater toward different types of customers.
- GMO actively tracks the sales cycle to understand sales conversion from prospective to completed projects in the targeted market. They are working to identify areas to improve sales conversions of all customer types.

**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?**

**FINDING 3: While the Standard program includes many measures that address a participant's water heating, refrigeration, and HVAC energy end-uses, 97% of the projects in PY2018 were for lighting measures. The other GMO Business EER programs primarily address the other end-uses.**

- The Standard program complements the other Business EER programs, specifically the Custom program, by providing rebates for common energy efficiency upgrades which are primarily lighting measures. GMO is working toward further aligning the Standard and Custom programs, so that multiple end-use energy saving projects can be easily served across the entire portfolio.
- From the customer perspective, the Standard program and the Custom program are one program, not two. Most of the measures not covered by Standard are covered by another program. The intention of the Standard program is not to be a standalone program, rather considered as an integrated part of the C&I portfolio.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: The IC for the Standard program works one on one with the larger customers. The trade-ally network addresses medium and smaller customers. In addition, there is also targeted marketing for sectors with historically lower participation such as datacenters and property managers. GMO's marketing activities meet the programs needs as evidenced by them exceeding their savings and participation goals.**

- GMO developed additional channels for communication by creating high quality targeted videos for property managers and special energy conservation coffee for schools and universities in PY2017. In addition, the implementer hosted sector specific webinars in PY2018 that mostly focused on lighting, since the other C&I programs address the other non-lighting end-uses.
- Based on responses from the implementer administered survey, the available rebate influenced the consideration of energy efficiency upgrades most greatly, from PY2016 to PY2018. This is in line with the low free ridership found in the PY2016 survey. High energy bills represented the next most influential factor. This reinforces the fact that saving money is the driving force behind

implementing energy efficient equipment, either through a reduction in energy bills or a reduction in equipment costs via a rebate.

- Customers also noted that receiving information from GMO was another contributing factor that led to the consideration of energy efficient equipment that consistently increased from PY2016 to PY2018. This indicates that continued communications about GMO programs is increasingly leading to participation in these programs.
- GMO worked with trade ally's new to the program account to reduce rebate application errors.

**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?**

**FINDING 5: In PY2018, GMO continued to have strong success with the efficient lighting measures in the Standard program. The effect from other end uses was less than 1%, but other programs such as the Custom program covers many of those non-lighting measures.**

GMO has had great success with the lighting rebates. Even after lowering rebate amounts in PY2017 the participation remained strong in the Standard program throughout PY2018.

## 2.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to improve the performance of the GMO Business EER – Standard program. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 2.3.1)
- Recommendations from the process evaluation (Section 2.3.2)

### *2.3.1 Impact*

Navigant provides the following recommendations based on the evaluation of the program tracking database and completion of the impact analysis activities detailed in the preceding sections. The evaluation team intends for these comments to improve program tracking records to facilitate evaluation efforts and to better align reported and verified savings. However, similarly noted in the process section, the IC transitioned to Lockheed Martin for PY4 and the discussion that follows is specific to PY3 and should be considered by GMO and LM for the extension of the MEEIA Cycle 2.

**Tracking Data:**

- Navigant recommends that the IC perform additional quality checks of the efficient wattage versus the baseline wattage to ensure that the efficient lamp has a lower wattage than the baseline wattage. The evaluation team found that less than 2% of the reported efficient measures were miscategorized, such as in the case of linear fixtures listed as LED replacement lamps, and that the higher actual efficient wattage compared to the assumed deemed wattage decreased realization rates. The model number identified some of these miscategorized fixtures as linear strip fixtures that are very narrow but are intended to replace multiple linear lamps. Navigant reviewed such instances and suggests providing more support to trade allies to understand the

nuances between measures. This way the efficient equipment is categorized under the correct measure and that the deemed baseline and efficient condition is most reflective of the actual baseline and efficient condition.

- Navigant recommends providing further guidelines, such as a lumen equivalency range, around what qualifies for the LED High/Low Bay measures. Currently, this measure category tends to be used as a catch-all category with a wide range of efficient measures being categorized together. For example, in PY2018 efficient equipment wattages ranged from 25 watts to 293 watts for the measure LED High/Low Bay Fixture replacing 301W-450W fixture. The LED High/Low Bay market is under transformation and the number of products available is increasing rapidly, which has also increased the mis-categorization of new efficient products.
- Navigant recommends that for non-lighting measures there is an additional field for the size of the unit installed. For example, in PY2018's tracking data the tonnage for advanced rooftop controls was either in the measure name or missing which forced the evaluation team to manually extract the tonnage value from the measure name or assume a size based on similar measures installed.

**Deemed Measure Savings:**

- Navigant recommends that GMO use the values based on weighting the verified building specific values determined from the lighting logger study for the blended baseline for HOU and CF. These weighted values are 4,700 hours for HOU and 0.7 for CF.

**Savings Calculation:**

- Navigant recommends that to improve the accuracy of total savings by program, GMO updates the baseline wattage as soon as any potential new regulations on available lighting products come into effect even if that timing does not align with the program year.

Figure 2-1. details Navigant's recommendations from its impact evaluation.

**Figure 2-1. Business EER – Standard Program Impact Recommendations: PY2018**

| Tracking Data | Deemed Measure Savings | Savings Calculations |
|---|---|---|
| • Include additional quality control of reported efficient wattage to check if it aligns closely with deemed savings assumed wattage.<br>• Include a value in the "Quantity Removed" field for any instances where the quantity replaced is more than one such that the efficient wattage represents the number of baseline lamps replaced.<br>• For all non-lighting measures, include the size in tons, horsepower or other unit of the product installed to ease calculation of the verified savings. | • Calculate deemed savings by building type.<br>• Use results of onsite logger analysis for lighting measures for HOU, CF, and WHF. | • Update the baseline wattage as soon as any potential new regulations on available lighting products come into effect even if that timing does not align with the program year. |

*Source: Navigant analysis*

### *2.3.2 Process*

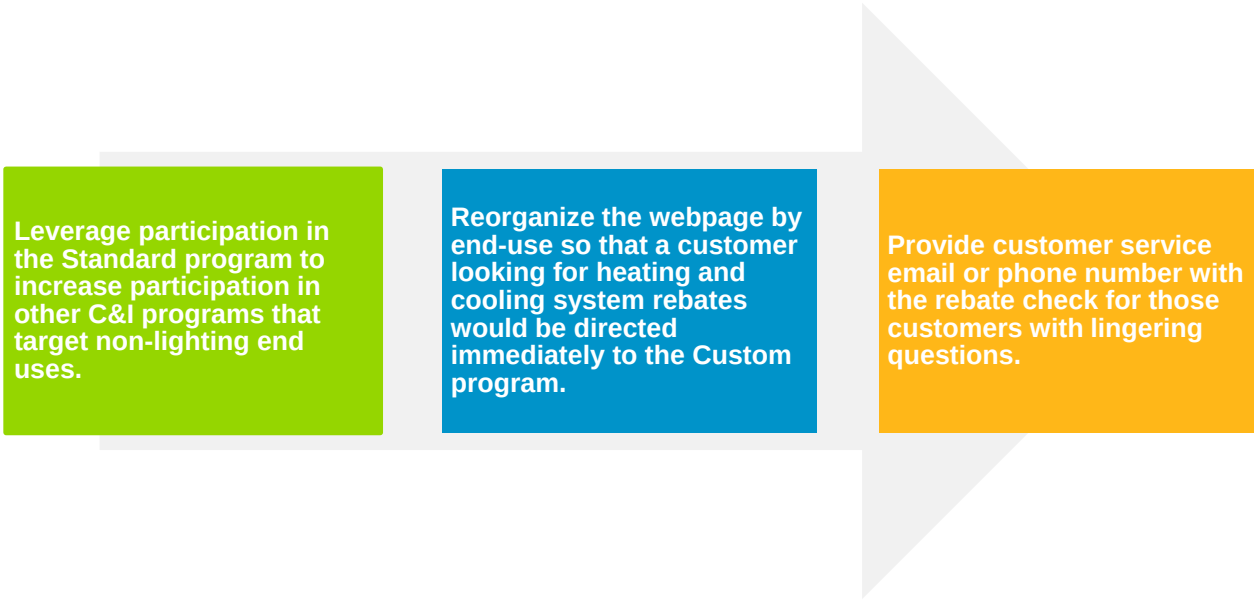
The Standard program more than doubled its 3-year MEEIA target, primarily through significant participation in efficient lighting measures. The program also continues to have high participant satisfaction based on the information available.

First, the Standard program should continue to help increase participation in other C&I programs. Instead of organizing the business sector rebates webpage by program, the webpage could also be organized by end-use so that a customer looking for heating and cooling system rebates would be directed immediately to the Custom program. Currently, customers must first identify that they are not included in the Standard program. This is similar to the structure of the residential program webpage.

In addition, the webpage could improve by making it easier to find the reference materials that GMO has developed detailing certain building types participation in the program or other targeted marketing materials. The only resource available on the Standard program webpage at the time of review was for New Construction, Industrial, Data Center, or Healthcare. This material may not be relevant to all customers many of which are in office or retail spaces.

The rebate check could include an email or URL for participants to contact customer service concerning their involvement post-rebate. This would help decrease customer frustration with any lingering confusion and potentially increase participants' favorability toward GMO, leading to continued participation in the rebate programs. Figure 2-2. Business details Navigant's recommendations from the process evaluation.

**Figure 2-2. Business EER – Standard Program Process Recommendations: PY2018**




*Source: Navigant analysis*

#### *2.3.2.1 Recommendations Based on the Research Questions*

The evaluation team examined three research questions in addition to the five Missouri-required questions.

Overall, Navigant found that many participants are satisfied with the current program. However, there are still some recommendations for process improvement to target underperforming market segments that were identified as part of this analysis.

**Table 2-12. Business EER – Standard Program Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. Are participants satisfied with the program? | Based on survey responses, GMO could provide a customer service email address or phone number for program participants to contact GMO with and possibly display this with the rebate check. In addition, GMO could reach out to customers via email to see if they have questions regarding the rebate and/or program. |
| 2. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | Based on last year's recommendations, GMO and the implementer have leveraged participation in the Standard program to increase other programs' participation by doing reach-back marketing. They have also developed targeted sector marketing materials such as webinars. In addition, they have likely increased the speed at which they deliver rebate checks. Moving forward, they could provide supplemental documentation regarding what the rebate check is for and provide additional information on other applicable rebate programs. |
| 3. What changes have been made to the program in PY2018? | During the beginning of PY2018, GMO decreased the incentive for high bays and prioritized kW savings by modifying other incentive levels. Moving forward in PY2019, GMO could incorporate rebate marketing on energy bills. This could be effective as high energy bills are the second greatest factor when considering energy efficiency equipment. GMO could also focus on additional benefits of upgrades beyond energy efficiency savings such as improved comfort and increased productivity while increasing involvement with contractors that focus on marketing these additional benefits. |

*Source: Navigant analysis*

#### *2.3.2.2 Recommendations Based on Missouri's Requirements for Process Evaluation*

Navigant addressed the five required process evaluation questions set forth in the MO regulations[20] for the Standard program. Table 2-13 describes Navigant's recommendations based on each question. Overall, Navigant found that GMO could increase marketing for some targeted market sectors and make participation in multiple C&I programs more straightforward.

[20] 4 CFR- 240-22.070(8)

**Table 2-13. Business EER – Standard Program Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendations |
|---|---|
| 1. What are the primary market imperfections that are common to the target market segment? | GMO could continue to develop targeted marketing materials that clearly outline the benefits of energy conservation specific to sector. GMO could also focus on marketing to smaller C&I customers that have the least amount of resources to devote to researching energy conservation through routinely scheduled webinars. These webinars could be recorded and saved for those customers that aren't able to attend. Additionally, a low-interest loan program may be of interest for increasing participation from small businesses who have a lack of access to low cost capital. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | In general, the target market is well defined and appropriate. However, GMO could continue to target specific sectors of interest within the target market such as data centers and grocery stores. |
| 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? | While GMO does offer a wide array of measure end-uses, lighting continues to dominate in both total measures installed and claimed energy and demand savings. To address this issue, GMO could increase HVAC contractor involvement and consider opportunities for co-promotion of measures across programs. |
| 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:<br>• Continue education and training of new trade allies to reduce rebate application errors.<br>• The Standard program webpage could advertise eligible measures for rebates based on end-use rather than program type. Also, the targeted marketing materials online could be more accessible.<br>• When sending out the rebate check, GMO could consider including customer service contact information for further assistance. |
| 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? | Since many non-lighting end uses were moved to the Custom program, GMO should find ways to increase participation in the Custom program by leveraging participation in the Standard program. This could be done through trade ally training, combined marketing, and follow ups with previous participants could accomplish this. Another option is to add bonus or bundled incentives for participating in more than one program or end-use category. |

*Source: Navigant analysis*

# 3. BUSINESS ENERGY EFFICIENCY REBATE – CUSTOM PROGRAM

## 3.1 Program Description

The Greater Missouri Operations Company (GMO) Business Energy Efficiency Rebate (EER) – Custom program provides incentives for energy efficient upgrades for business customers. This program is available to all commercial and industrial (C&I) GMO customers and is designed to cover a broad range of projects that do not fit within the Business EER –Standard program. The GMO Custom program:

- Delivers rebates—available for both existing and new facilities—only to those projects that achieve a Societal Cost Test (SCT) score of 1.0 or higher.
- Calculates rebates in program year (PY) 2018 based on following:
    - The incentive is calculated at the $550/coincidence peak kW saved.
    - Custom participants get paid a maximum of $0.40 per first-year kWh saved and a minimum of $0.06 per first-year kWh-hour saved.
    - Custom incentives are capped at 75% of the incremental project costs.
    - Up to $100,000 of maximum annual cap per customer per service territory for Custom rebates
- Requires preapproval from the implementation contractor (IC) before participants purchase and install equipment

It is important to note that the Custom program saw a significant increase in participation and claimed savings in PY2018 compared to the two previous program years. This reflects GMO's increased outreach and marketing efforts in response to previous and on-going EM&V findings.

Table **3-1** provides a detailed description of the application process for the Business EER – Custom program. It also includes the project review, rebate, dispute, project tracking, and reporting processes.

**Table 3-1. Business EER – Custom Program Description**

| Business EER – Custom Program Key Detail | |
|---|---|
| **Sector** | Commercial and industrial (C&I) |
| **Implementation Contractor** | CLEAResult and Lockheed Martin |
| **Program Description** | Kansas City Power and Light (KCP&L) designed the Greater Missouri Operations (GMO) Business Energy Efficiency Rebate (EER) – Custom program for C&I customers in its service territory. Custom projects are those not rebated by the Standard program. Qualifying projects address all energy end uses including: building controls, compressed air upgrades, energy management systems, HVAC, refrigeration, and variable speed drives and pumps. The Custom program also serves new construction projects. Beginning in PY2016, light-emitting diode (LED) retrofit lighting projects were moved from the Custom program to the Standard program. The Custom program still serves new construction LED lighting projects and LED lighting projects with greater than 8,000 hours of annual use. |

| Business EER – Custom Program Key Detail | |
|---|---|
| **Application Process** | Participants or trade allies can email, submit via online portal, mail, or fax completed applications. Program trade allies are usually the primary contacts for these projects. While customers can apply to the program without the assistance of a trade ally, most applicants work with a trade ally. The implementation contractor (IC) then reviews the submitted application and makes a preapproval decision if the application meets the requirements. Projects must be preapproved prior to the purchase and installation of equipment. Program participants then have 90 days, unless otherwise noted, from the project application approval date to submit proof of project completion. A complete Custom final application must be received by the Program no later than 120 days from preapproval notice date. Waivers are granted for participants who cannot meet this deadline and show progress toward measure installations. |
| **Verification of Purchase/Project** | Projects must pass the SCT test with a benefit-cost ratio of at least 1.0. The IC provides a post-retrofit project review prior to incentive payment. CLEAResult establishes a threshold of savings to determine pre- and post-retrofit onsite visits. All projects receive a desk review and an additional review, including phone interview verification and onsite visits. |
| **Rebate Process** | GMO set rebate amounts to $550/coincidence peak kilowatt saved and up to 75% of the total project cost. In PY2018, the $500,000 maximum annual cap per customer per service territory was updated to $100,000 for Custom projects and $400,000 for Standard business projects. Rebates are issued to participants or trade allies depending on the application details. Participants can also opt for a bill credit. All Custom program rebates must be preapproved and funds are reserved according to the original submittal. Scope changes can impact the final rebate to be received, up to and including project ineligibility. |
| **Disputes, Rejected Applications** | Projects are rejected because they do not meet the Custom program requirements. Applicants may re-engineer and resubmit their projects for re-evaluation. Information about disputed and rejected applications is stored in the IC database. Disputes are escalated from the IC's outreach and administration teams to GMO program management. Final resolutions are documented in the IC database. |
| **Project Reporting** | The IC populates the database as participants complete projects. There is a weekly upload from CLEAResult to the GMO data warehouse for reconciliation. Beginning in PY2016, GMO transitioned to using Nexant's tracking database. |

*Source: Navigant interview of GMO and CLEAResult staff in PY2018*

## 3.2 Evaluation Findings

Navigant's impact evaluation found that the Custom program had a 100% realization rate for gross energy savings and a 109% realization rate for gross coincident demand savings in PY2018. The program achieved 41% of the 3-year Missouri Energy Efficiency Investment Act (MEEIA) target for net energy savings and 32% of the target for net coincident demand savings in PY2018. Between PY2016 and PY2018, the program achieved 56% and 45% of the 3-year MEEIA target for energy and demand savings, respectively.

In PY2018, Navigant conducted an impact evaluation, cost-effectiveness analysis, and process evaluation for the GMO Business EER – Custom program. For its impact evaluation, Navigant performed a tracking database review, sampling, telephone verification and an engineering review of sampled projects. The evaluation team conducted net-to-gross (NTG) research in PY2018 to help better understand the net impact of the Custom program. For its process evaluation, Navigant conducted

interviews with program staff, reviewed program materials, and surveyed customers and program trade allies to identify opportunities to improve the Custom program processes.

The following sections summarize Navigant's PY2018 findings for the GMO Business EER – Custom program. Additional details on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

- Impact evaluation findings (Section 3.2.1)
- Cost-effectiveness analysis (Section 3.2.2)
- Process evaluation findings (Section 3.2.3)

### *3.2.1 Impact*

Navigant completed the following impact evaluation tasks for the Custom program to develop project- and program-level realization rates.

- **Tracking system and database review** to verify the availability and accuracy of the data for evaluation purposes and to understand the variability of reported savings calculations among projects.
- **Engineering reviews for a representative sample of projects** to verify operating characteristics and determine gross energy and peak demand savings and develop a program-level realization rate at a confidence and precision level of 90/10.
- **Telephone verifications** were conducted to support the engineering review for a selection of sampled projects collecting additional project information.

Table 3-2 summarizes the energy and peak demand savings and the corresponding realization rates for the GMO Custom program in PY2018. Table 3-3 shows the program's savings to date for the GMO Custom program in Cycle 2. For PY2018, Navigant verified 16,584,681 kWh of energy savings and 3,377 kW of coincidence peak demand savings, which led to realization rates of 100% and 109%, respectively. PY2018 realized 41% of the MEEIA Cycle 2 target for energy savings and 32% for coincidence peak demand savings.

The GMO Custom program performed better in PY2018 and has achieved greater savings compared to achievements in PY2016 and PY2017. Kansas City Power and Light (KCP&L) product managers and the ICs made substantial efforts in PY2018 to move the GMO Custom program forward and aligning the program performance with the Cycle 2 target. The efforts include—but are not limited to—focusing on the new construction market, launching a midstream HVAC program, studying the benefits of retro-commissioning projects and working on a potential combined heat and power project. Additionally, the incentive for the program was restructured in PY2018 and KCP&L recruited a new IC (Lockheed Martin) to launch the non-lighting pilot program with a goal of increasing performance of non-lighting measures. As a result, the GMO Custom program implemented 171 projects in PY2018 compared to 47 projects in PY2017. To date, the GMO Custom program has achieved 56% and 45% of MEEIA Cycle 2 target energy and coincidence peak demand savings, respectively.

**Table 3-2. Business EER – Custom Program PY2018 Energy and Demand Savings Summary**

| | Gross | | | Net[21] | | |
|---|---|---|---|---|---|---|
| | Reported Savings[22] | Verified Savings[23] | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 16,658,609 | 16,584,681 | 100% | 30,079,932 | 12,272,664 | 41% |
| Coinc Demand at Customer Meter (kW) | 3,106 | 3,377 | 109% | 7,758 | 2,499 | 32% |

*Source: Navigant analysis*

**Table 3-3. Business EER – Custom Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net[24] | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA 3-Year Cycle 2 Target | Verified 3-Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 23,265,974 | 23,422,901 | 101% | 30,079,932 | 16,746,998 | 56% |
| Coinc Demand at Customer Meter (kW) | 4,212 | 4,902 | 116% | 7,758 | 3,472 | 45% |

*Source: Navigant analysis*

The following adjustments were made to the engineering calculations were the primary drivers of energy and coincidence peak demand realization rates in PY2018:

1) **For lighting measures:**
    a. Adjusted the coincidence factor (CF) for calculation of peak demand savings to align with lighting operating schedules verified through phone interviews
    b. Adjusted lighting hours of use to account for schedules verified through phone interviews
    c. Adjusted CF, hours of use (HOU), and waste heat factors as per Navigant long-term metering study results if these inputs cannot be verified through phone interviews, desk review, and research

[21] Navigant calculated net verified savings by multiplying gross verified savings by the NTG ratio.

[22] 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.

[23] Verified savings represent energy savings verified at the time of the evaluation.

[24] The to-date net program savings are calculated using the NTG ratio for each respective program year and are summed up.

d. Adjusted occupancy sensor control savings based on calculation formulas in the IL TRM v6

e. Applied engineering algorithms based on existing and efficient lighting wattages, coincidence factors, and waste heat factors for estimating the peak demand savings while the implementation contractor used the kW factor approach[25] for a few lighting projects

**2) For HVAC projects:**

a. Applied an 8,760 hourly data analysis approach[26] and did not use the 2°F degree temperature or other degree interval temperature bin data analysis approach

b. Adjusted baseline efficiency ratings based on building code requirements and installed equipment efficiency ratings based on manufacturer specifications

c. Aligned calculation of peak demand savings with utility peak period[27]

The following four sections provide more details on the tracking database review, the sampling approach, the engineering review, and the net-to-gross (NTG) findings.

#### *3.2.1.1 Tracking Database Review*

The program tracking database lists projects completed during the program year and includes site details, energy and demand savings, application dates, and unique project numbers assigned by the IC. Navigant reviewed the tracking system and found that the database and project files contain sufficient information to support the evaluation. Project files were well-organized, saving time and resources for the evaluation.

Overall, the GMO Custom program had 171 projects completed in PY2018, an increase of 124 projects compared to PY2017's 47 projects. Table 3-4 shows the disaggregation of total reported energy savings by end use. Lighting, HVAC, new construction, motors, drives and compressors, and building optimization projects accounted for the majority of reported savings, with approximately 96% of the total program savings. Lighting measures contribute 53% of the total program energy savings and 50% of the total

[25] In PY2018, at the request of GMO, Navigant developed a list of kW factors by end use for calculation of peak demand savings based on the historically implemented Custom projects in the GMO 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 implementation contractor would use the kW factor for calculation of peak demand savings which is called the "kW factor approach" and Navigant would continue using the engineering approach for estimate of peak demand savings. The engineering approach varies depending on the energy efficiency measures, summarized in the Custom program appendix.

[26] Both Navigant and the implementation contractors used the Typical Meteorological Year 3 (TMY3) weather data to estimate the pre- and post-retrofit power in calculation of project savings. The TMY3 weather data includes 8,760 hours' outdoor air dry-bulb temperatures and other weather parameters. The implementation contractor divided the 8,760 hourly temperatures to temperature bins in 2-degree, 5-degree, or other intervals and calculated the count of hours in each temperature bin. Then the implementation contractor predicted the pre- and post-retrofit power for each temperature bin. However, this approach does not estimate power corresponding to time and day. Alternatively, Navigant 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, Navigant was able to calculate the peak demand savings following the system peak period.

[27] The system peak period is the period during which demand savings are evaluated. The current GMO 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.

program coincidence peak demand savings. Compared to PY2017, lighting measures constitute a lower percentage of the GMO Custom program savings in PY2018.

**Table 3-4. Business EER – Custom PY2018 Summary by Measure Type**

| Measure Type | Total No. of Projects | Reported Energy Savings (kWh) | Percentage of Total | Reported Demand Savings (kW) | Percentage of Total |
|---|---|---|---|---|---|
| Building Optimization | 4 | 1,239,399 | 7% | 68.44 | 2% |
| Energy Management System | 2 | 104,825 | 1% | 5.07 | 0% |
| HVAC | 48 | 1,440,084 | 9% | 445.21 | 14% |
| Lighting | 84 | 8,772,509 | 53% | 1,563.65 | 50% |
| Misc. Custom | 3 | 475,354 | 3% | 90.60 | 3% |
| Motors, Drives & Compressors | 17 | 2,199,190 | 13% | 331.76 | 11% |
| New Construction | 11 | 2,386,850 | 14% | 596.05 | 19% |
| Refrigeration Upgrade | 2 | 40,398 | 0% | 4.90 | 0% |
| **Total** | **171** | **16,658,609** | **100%** | **3,105.68** | **100%** |

*Source: C&I Custom Rebate Program Tracking Database and Navigant analysis*

Navigant found the following through a review of the program tracking database.

1) **Although the program tracking database provides a solid foundation for verification activities, the team noted the following areas for improvement:**

    a. Navigant found that the tracking database only has general efficient measure categories, through which it is not easy to identify installed energy efficient measures for a project. For example, a new construction project in PY2018 had both efficient lighting and HVAC measures implemented. The tracking database showed an efficient measure category of new construction. Adding a column for a brief description of installed energy efficient measures in the tracking system also helps with further research of measure mix.

    b. The evaluation team found that incremental costs were missing for a few projects in the tracking database. Although this data is available in the project-specific files, including the incremental costs for all projects in the program tracking database would facilitate evaluation activities.

    c. Navigant found that two projects' measure life was missing in the tracking database.

2) **Efficient measure categories on the GMO Custom program website do not align with the tracking database**

    a. The evaluation team found that the efficient measure categories on GMO's Custom program website do not align with the measure categories in the tracking database. The Custom program website includes: new construction, chiller systems, variable speed

drives and pumps, heating and cooling systems, compressed air upgrades, building controls, energy management systems, and refrigeration projects. Lighting measures are not shown on the website. Chiller systems could be integrated into heating and cooling systems. Navigant suggests consolidating a list of Custom program measure categories for both tracking and marketing. Aligning the measure categories can help avoid customer and trade ally confusion and facilitate evaluation efforts.

3) **Both project-level and measure-level tracking database should be provided**

   a. Navigant found that one implementation contractor provided a project-level tracking database while the other implementation contractor provided a measure-level tracking database. The project-level tracking database is helpful for sampling since the evaluation team performs sampling at project level. Additionally, many projects contain multiple energy efficiency measures. The current project-level tracking database does not capture the performance of multiple measures. Therefore, a measure-level tracking database facilitates investigating the performance of implemented energy efficiency measures. Navigant recommends providing both a project-level and measure-level tracking database for evaluations moving forward.

#### *3.2.1.2 Sampling*

In PY2018, Navigant drew a sample of Custom projects for engineering review. For the PY2018 sample, Navigant segmented the existing population of projects within the Custom program into five primary strata of participants: certainty, large lighting, small lighting, large non-lighting, and small non-lighting projects. Navigant did not include very small projects for sampling. The total savings of very small projects consist of no more than 2% of the GMO Custom program savings in PY2018. Of the GMO projects, 67 very small projects were removed from the population and 104 projects remained for the final sampling. The certainty strata include the largest projects implemented in PY2018, each of which reported energy savings of 1.0 million kWh or greater. The evaluation team divided remaining lighting projects into large and small strata with a criteria that large projects constitute the top 50% of lighting project savings and small projects make up the bottom 50%. The same division approach was applied for the remaining non-lighting projects. More details about Navigant's sampling approach are summarized in the Custom program appendix.

A combined sampling approach was performed for GMO and KCP&L-MO. Table 3-5 shows the combined sample results for GMO and KCP&L-MO. The year-end population excluded the 67 very small GMO projects and 97 very small KCP&L-MO projects and 244 projects remained in the final sampling. Even though the 67 very small GMO projects and 97 very small KCP&L-MO projects were excluded in the sampling, they were included back in the small strata (lighting small strata and non-lighting small strata) for the final program evaluation results analysis in calculation of a program realization rate. Navigant sampled 32 projects during PY2018 evaluation, including 13 projects for GMO and 19 projects for KCP&L-MO. For the GMO Custom program, the 13 sampled projects include three certainty projects, three small lighting projects, two large non-lighting projects, and five small non-lighting projects.

Navigant applied the coefficients of variation (CV) for each stratum summarized in the **Table 3-5**. The CVs were determined based on the evaluated projects in PY2017 and mid-year evaluation results of PY2018.

**Table 3-5. Business EER – Custom Program Population and Sample Sizes: PY2018**

| Program | Stratum | Assumed CV | Year-End Population | Sample Size |
|---|---|---|---|---|
| Custom | Certainty | 0.32 | 4 | 4 |
| | Large Lighting | 0.26 | 13 | 4 |
| | Small Lighting | 0.66 | 102 | 6 |
| | Large Non-Lighting | 0.44 | 21 | 8 |
| | Small Non-Lighting | 0.54 | 104 | 10 |
| | **Total** | **N/A** | **244** | **32** |

*Source: GMO Business EER Program Tracking Database and Navigant analysis*

#### *3.2.1.3 Engineering Review*

The evaluation team researched the following areas to determine project impacts and realization rates via desk review and telephone verification:

- The appropriateness of the pre-installation technology performance baseline via project file and secondary literature review
- Installation and quantity of claimed EE measures
- Pre-retrofit and post-retrofit case performance characteristics of the measures installed and revision of performance variables (i.e., operating hours) as needed
- Peak demand savings (kW) and energy savings (kWh) impacts of the efficiency measures installed for the sampled projects

The evaluation team combined individual project realization rates of sampled GMO projects in the same stratum into an overall realization rate for the corresponding stratum. Navigant then used the overall realization rate of each stratum for calculating the realization rate for the entire GMO program. Navigant included the very small projects into the lighting small and non-lighting small strata.

Table 3-6 and Table 3-7 show the energy and peak demand impacts at the customer meter side for the population of each strata for the GMO Business EER – Custom program. The lighting large strata was not included in Table 3-6 and Table 3-7 because Navigant performed a combined sampling approach for GMO and KCP&L-MO and no lighting large projects were sampled for GMO during the random selection process. As shown in the two tables, the realization rate for energy is 1.00 and 1.09 for peak demand for the GMO Custom program in PY2018. Navigant calculated the overall verified program savings by applying 1.00 of energy realization rate and 1.09 of peak demand realization rate to the overall reported energy and peak demand savings, respectively.

**Table 3-6. Energy Impacts at Customer Meter: Business EER – Custom Program**

| Stratum | Total Reported Energy Savings (kWh) | Total Verified Energy Savings (kWh) | Energy Realization Rate | Relative Precision at 90% Confidence (One-Tailed) |
|---|---|---|---|---|
| **Certainty** | 3,857,143 | 3,857,143 | 100% | 0.0% |
| **Lighting Small** | 3,058,333 | 3,373,409 | 110% | 14.4% |
| **Non-Lighting Large** | 2,888,985 | 2,513,067 | 87% | 17.8% |
| **Non-Lighting Small** | 3,997,115 | 3,996,707 | 100% | 3.6% |
| **Total** | **13,801,576** | **13,740,326** | **100%** | **2.6%** |

*Source: Navigant analysis*

**Table 3-7. Peak Demand Impacts at Customer Meter: Business EER – Custom Program**

| Stratum | Total Reported Peak Demand Savings (kW) | Total Verified Peak Demand Savings (kW) | Peak Demand Realization Rate | Relative Precision at 90% Confidence (One-Tailed) |
|---|---|---|---|---|
| **Certainty** | 840 | 649 | 77% | 0.0% |
| **Lighting Small** | 542 | 507 | 94% | 14.5% |
| **Non-Lighting Large** | 287 | 263 | 92% | 19.0% |
| **Non-Lighting Small** | 882 | 1353 | 153% | 56.2% |
| **Total** | **2,550** | **2,773** | **109%** | **25.1%** |

*Source: Navigant analysis*

Table 3-8 shows the project-level energy and peak demand savings and corresponding realization rates for the 13 GMO projects in the sample. The evaluation team verified different savings from the reported savings for 9 projects.

**Table 3-8. Business EER – Custom Program Project-Level Energy and Peak Demand Savings and Realization Rates**

| Navigant Site ID | Project Type | Reported kWh | Verified kWh | Realization Rate | Reported kW | Verified kW | Realization Rate |
|---|---|---|---|---|---|---|---|
| **PRJ-1881125** | HVAC | 119,293 | 128,874 | 108% | 14.19 | 13.40 | 94% |
| **PRJ-1796896** | HVAC | 45,903 | 37,878 | 83% | 30.67 | 30.40 | 99% |
| **PRJ-1516613** | HVAC | 45,649 | 44,041 | 96% | 0.45 | 0.00 | 0% |
| **PRJ-1766318** | Lighting | 25,256 | 25,127 | 99% | 3.96 | 4.37 | 110% |
| **PRJ-1903895** | HVAC | 248,239 | 248,239 | 100% | 6.20 | 6.20 | 100% |
| **PRJ-1709436** | Lighting | 26,144 | 34,363 | 131% | 7.76 | 5.95 | 77% |
| **PRJ-1975652** | Lighting | 27,125 | 27,125 | 100% | 10.18 | 10.18 | 100% |
| **PRJ-1654222** | Motors, Drives & Compressors | 457,994 | 457,994 | 100% | 48.76 | 48.84 | 100% |
| **PRJ-1761610** | Lighting | 1,428,571 | 1,428,571 | 100% | 320.91 | 218.14 | 68% |
| **PRJ-1508166** | New Construction | 1,000,000 | 1,000,000 | NA[28] | 373.49 | 285.25 | NA |
| **PRJ-1737247** | Lighting | 1,428,571 | 1,428,571 | 100% | 145.86 | 145.86 | 100% |
| **PRJ-1951281** | HVAC | 54,261 | 64,919 | 120% | 8.19 | 41.62 | 508% |
| **PRJ-1582333** | Building Optimization | 954,955 | 771,101 | NA[29] | 35.89 | 28.98 | NA |

*Source: Navigant analysis*

The evaluation team summarized the following detailed engineering review findings on a project basis for drivers of energy and peak demand realization rates.

1. For one HVAC project (PRJ-1881125), Navigant verified different savings for the lighting and rooftop unit (RTU) replacement measures. Navigant used CFs and WHFs from Navigant's long-term metering study results for the lighting measure. For the RTU replacement measure, Navigant applied an engineering approach that captures the installed equipment's hourly savings in 1 year, while the reported savings were estimated using a 2°F temperature bin analysis approach.
2. For one HVAC project (PRJ-1796896), Navigant applied an engineering approach that captured the installed equipment's hourly savings in 1 year, while the reported savings were estimated using a 2°F temperature bin analysis approach.
3. For a HVAC project (PRJ-1516613), Navigant applied an engineering approach that captured the installed equipment's hourly savings in a year, while the reported savings were estimated using a 2-degree temperature bin analysis approach. The realization rate for peak demand was zero

[28] The realization rate is "NA" because the reported and verified savings for the project do not represent its actual savings but are the results of savings distribution caused by the program design. More details can be found in the finding summarized in the item #7 below.

[29] The realization rate is "NA" because the reported and verified savings for the project do not represent its actual savings but are the results of savings distribution caused by the program design. More details can be found in finding summarized in the item #9 below.

because the implementer used an incorrect peak period definition. The implementer's calculations used the coldest 26 hours of the year as the peak hours, while Navigant calculated the peak demand savings following the peak period definition. The Navigant team found that the variable speed drive measure operates at full load during the peak period, therefore the verified peak demand savings are zero.

4. For a lighting project (PRJ-1766318), Navigant used CFs and WHFs from its long-term metering study. Additionally, the Navigant team confirmed that the lighting fixtures in some spaces operate during the peak period, therefore verified peak demand savings were higher due to the application of a CF of 1.00.
5. For a lighting project (PRJ-1709436), Navigant used CFs and WHFs from its metering study.
6. For a lighting project (PRJ-1761610), Navigant applied engineering algorithms based on existing and efficient lighting wattages, CFs, and WHFs for estimating the peak demand savings, while the IC used the kW factor approach for calculation of peak demand savings.
7. For a new construction project (PRJ-1508166), Navigant used CFs, HOU, and WHFs from its long-term metering study and verified higher energy savings (1,283,704 kWh) and slightly lower peak demand savings (366.18 kW).

   Project PRJ-1508166 reached the Custom incentive cap ($100,000), based on the project energy savings and the incentive rate of $0.10/kWh saved. The savings of project PRJ-1508166 were capped at 1,000,000 kWh under the Custom program calculated by dividing the Custom incentive cap ($100,000) by the Custom incentive rate ($0.10/kWh saved). The remainder of savings of project PRJ-1508166 were allocated to project PRJ-1898003 and assigned to the Block Bidding program, according to the Block Bidding program design. Table 3-9 illustrates how the implementation contractor and Navigant distributed the reported and verified project savings into the Custom and Block Bidding programs. The realization rates are “NA” for project PRJ-1508166 (“Capped”) and the project PRJ-1898003 (“Block Bidding”) because the reported and verified savings for project PRJ-1508166 (“Capped”) and project PRJ-1898003(“Block Bidding”) do not represent their savings but are the results of savings distribution caused by the program design. The finding of discrepancies in CFs, HOU, and WHFs applies to both the project PRJ-1508166 (“Capped”) and the project PRJ-1898003 (“Block Bidding”).

**Table 3-9. Project Savings Distribution for Project PRJ-1508166[30]**

| | Reported kWh | Verified kWh | Realization Rate | Reported kW | Verified kW | Realization Rate |
|---|---|---|---|---|---|---|
| PRJ-1508166 ("Total") | 1,034,997 | 1,283,704 | 124% | 386.56 | 366.18 | 95% |
| PRJ-1508166 ("Capped") | 1,000,000 | 1,000,000 | NA | 373.49 | 285.25 | NA |
| PRJ-1898003 ("Block Bidding") | 34,997 | 283,704 | NA | 13.07 | 80.93 | NA |
| Total[31] | 1,034,997 | 1,283,704 | 124% | 386.56 | 366.18 | 95% |

*Source: Navigant Analysis*

8. For a HVAC project (PRJ-1951281), the difference between the reported and the verified savings was due to the differences in approaches used. Navigant applied an engineering approach that captures the installed equipment's hourly savings in 1 year, while the reported savings were estimated using a 2°F temperature bin analysis approach.
9. For a building optimization project (PRJ-1582333), projects PRJ-1951281 and PRJ-1582333 were implemented by one customer and combined these two projects reached the Custom program incentive cap ($100,000). The remainder of savings of project PRJ-1582333 were allocated to the Block Bidding project PRJ-2055124. Navigant verified that the implementer's calculations for project PRJ-1582333 are reasonable, so the realization rates are 1.0 for both energy and peak demand.
10. Navigant verified higher energy savings (64,919 kWh) and peak demand savings (41.62 kWh) for project PRJ-1951281. Based on the incentive rate of $550/kW saved, the incentive of project PRJ-1951281 should have been $22,890. Navigant verified energy savings (965,517 kWh) and peak demand savings (36.29 kW) for project PRJ-1582333. Based on the incentive rate of $0.10/kWh saved, the incentive of project PRJ-1582333 should be $96,552. Together the incentives ($119,442) of the two projects PRJ-1951281 and PRJ-1582333 reached the Custom program incentive cap. Therefore, the incentive of project PRJ-1582333 was capped at $77,110 under the Custom program calculated by subtracting $22,890 from $100,000. Based on the project incentive of $77,110 and the incentive rate of $0.10/kWh saved, the energy savings of project PRJ-1582333 were capped at 771,101 kWh under the Custom program and the remainder of savings (194,416 kWh) were allocated to the Block Bidding project PRJ-2055124. It is important to note that projects PRJ-1951281 and PRJ-1582333 started in different program years when the incentive rates were different. The reported and verified savings for the projects PRJ-1582333 ("Capped") and PRJ-2055124 ("Block Bidding") do not represent their actual savings but are the results of savings distribution caused by the program design. Table 3-10 states how the implementation contractor and Navigant distributed the reported versus verified savings into the Custom and Block Bidding programs.

[30] Table 3-9 shows three project numbers to illustrate their differences. Project PRJ-1508166 ("Total") indicates the Custom project PRJ-1508166 Navigant sampled and evaluated. Project PRJ-1508166 ("Capped") includes the savings of the Custom project PRJ-1508166 capped under the Custom program. Project PRJ-1898003 ("Block Bidding") is the Block Bidding project that contains the remainder of savings of the Custom project PRJ-1508166.

[31] The total savings of projects PRJ-1508166 ("Capped") and PRJ-1898003 ("Block Bidding").

**Table 3-10. Project Savings Distribution for Project PRJ-1582333[32]**

| | Reported kWh | Verified kWh | Realization Rate | Reported kW | Verified kW | Realization Rate |
|---|---|---|---|---|---|---|
| PRJ-1951281 | 54,261 | 64,919 | 120% | 8.19 | 41.62 | 508% |
| PRJ-1582333 (“Total”) | 965,517 | 965,517 | 100% | 36.29 | 36.29 | 100% |
| PRJ-1582333 (“Capped”) | 954,955 | 771,101 | NA | 35.89 | 28.98 | NA |
| PRJ-2055124 (“Block Bidding”) | 10,562 | 194,416 | NA | 8.18 | 7.31 | NA |
| Total[33] | 965,517 | 965,517 | 100% | 36.29 | 36.29 | 100% |

Source: Navigant Analysis

#### *3.2.1.4 Net-to-Gross*

The evaluation team conducted participant and trade ally surveys in PY2018. As shown in Table 3-11, 63 of a possible 270 participants across both GMO and KCP&L-MO territories completed the participant survey. Of a possible 152 trade allies across both GMO and KCP&L-MO territories, 48 completed the trade ally survey. Navigant fielded the participant and trade ally surveys on a quarterly basis in PY2018 in an effort to maximize respondent recall and increase response rates.

**Table 3-11. GMO and KCP&L-MO Custom Program Survey Sample Size and Responses**

| | Population Size | Completed Surveys | Response Rate | % of Total Program Savings Represented |
|---|---|---|---|---|
| Participant Survey | 270 | 63 | 23% | 17% |
| Trade Ally Survey | 152 | 48 | 32% | 48% |

*Source: Navigant Survey Analysis*

Appendix C describes methodologies for calculation of free ridership (FR), spillover (SO) and NTG. Table 3-12 shows the components of the NTG ratio for the Custom program. Survey responses indicated FR of 31%, participant SO (PSO) of 0.2%, and non-participant SO (NPSO) of 4.6% for a program NTG ratio of 74%. The PY2018 NTG ratio is higher than in PY2017, which may reflect the additional efforts that the program put into industry-specific outreach and into building and strengthening relationships with trade allies in PY2018.

Navigant’s approach to incorporating trade ally NTG values into the overall program NTG value is consistent with prior year’s evaluations. It uses trade ally FR as a cap on participant FR (meaning, if the trade ally FR estimate is lower than the participant FR estimate, Navigant uses the trade ally value), and Navigant adds the trade ally NPSO value to any PSO. In equation form, this is represented by the following:

[32] Table 3-10 lists four project numbers to help understand the savings distribution. Project PRJ-1951281 and project PRJ-1582333 (“Total”) are the two Custom projects that the customer completed in PY2018. Project PRJ-1582333 (“Capped”) includes the savings of the Custom project PRJ-1582333 capped under the Custom program. Project PRJ-2055124 (“Block Bidding”) is the Block Bidding project that contains the remainder of savings of the Custom project PRJ-1582333.

[33] The total savings of projects PRJ-1582333 (“Capped”) and PRJ-2055124 (“Block Bidding”).

NTG = 1 – MINIMUM(Part FR, Trade Ally FR) + PSO + NPSO

In the PY2018 calculation of NTG, the participant FR score was used in the formula and the trade ally FR was not per the formula above.

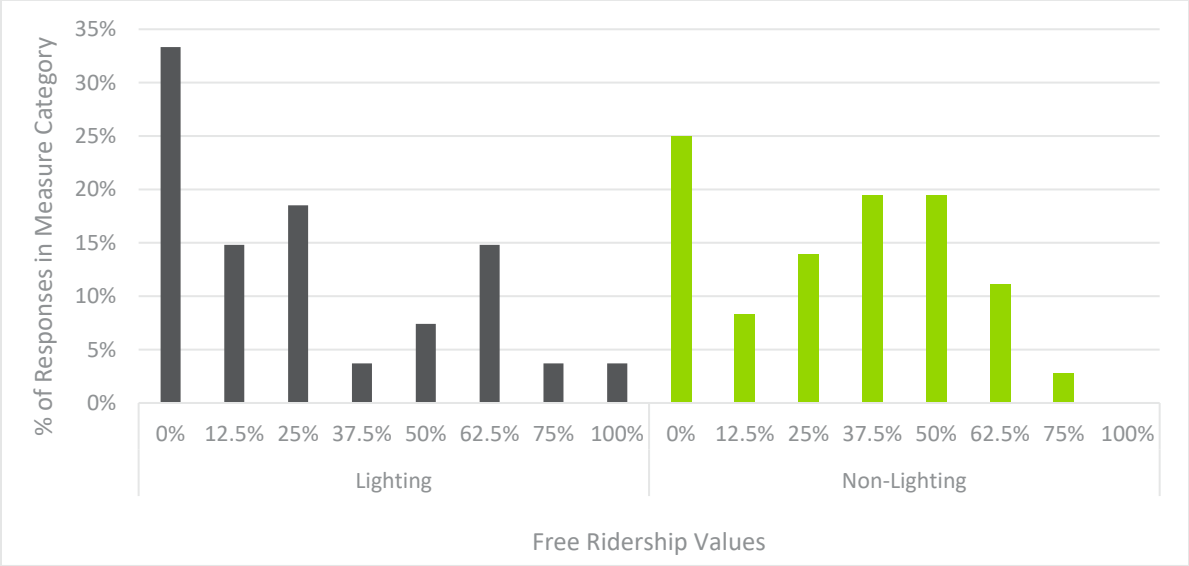
**Table 3-12. Business EER – Custom Program NTG Components and Ratio: PY2018**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| 2018 | 0.31 | 0.002 | 0.046 | 74% |

FR = free ridership, PSO = participant spillover, NPSO = nonparticipant spillover, NTG = net-to-gross
*Source: Navigant's NTG ratio research in PY2018 for the Business EER – Custom program*

Figure 3-1. provides additional information on the distribution of free ridership scores for lighting and non-lighting measures. About one-third of lighting participants were pure non-free riders (FR=0%), and less than 5% were full free riders (FR=100%). One-quarter of non-lighting participants were non-free riders, and none were full free riders. For both measure categories, the majority of participants were partial free riders (FR of greater than 0% and less than 100%). This indicates that the program increased the efficiency or scope of projects, even when the customer intended to do some energy efficiency without the program's help.

**Figure 3-1. Custom Program: Distribution of Free Ridership Scores by Measure Category**




*Source: Navigant's NTG ratio research in PY2018 for the Business EER – Custom program*

### *3.2.2 Cost-Effectiveness*

This section presents Navigant's cost-effectiveness evaluation for the Business EER – Custom program for each of the five standard benefit-cost tests. Reference Section 1.2 for information on how benefits and

program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

Table 3-13 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, PY2018, and program to date, as well as the TRC test filed by GMO. Based on Navigant's 2018 benefit-cost analysis, the program was above 1.0 in the TRC, SCT, utility cost test (UCT), and PCT tests. Navigant's analysis resulted in a TRC ratio that higher than the value filed by GMO. The increase in cost effectiveness of the Custom program can be attributed to the increase in participation, higher year-over-year savings, and high realization rates. GMO's efforts to bring customers to their Custom program have been successful and the evaluator expects this success to continue through the MEEIA Cycle 2 extension period and into MEEIA Cycle 3.

**Table 3-13. Business EER – Custom Program Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[34] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 0.32 | 0.38 | 0.47 | 0.49 | 1.30 | 0.33 |
| 2017 | 0.93 | 0.95 | 1.18 | 1.71 | 1.05 | 0.78 |
| 2018 | 1.15 | 1.30 | 1.62 | 2.94 | 1.37 | 0.84 |
| **Program Overall** | **N/A** | **1.07** | **1.34** | **2.05** | **1.27** | **0.77** |

*Source: Navigant analysis*

### *3.2.3 Process*

Navigant conducted the PY2018 process evaluation by reviewing program materials, conducting interviews with program staff, including the KCP&L program manager and implementation staff at CLEAResult and Lockheed Martin, and fielding surveys to customers and program trade allies. Table 3-14 includes process evaluation questions and the corresponding evaluation activities. The process evaluation questions include general questions and the five Missouri-required questions.

**Table 3-14. Business EER – Custom Process Evaluation Questions and Evaluation Activity**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | • Program staff interviews<br>• Materials review |
| 2. What changes have been made to the program in PY2017, and what changes are planned for PY2018? | • Program staff interviews<br>• Materials review |
| **Missouri-Required Questions for Process Evaluation** | |

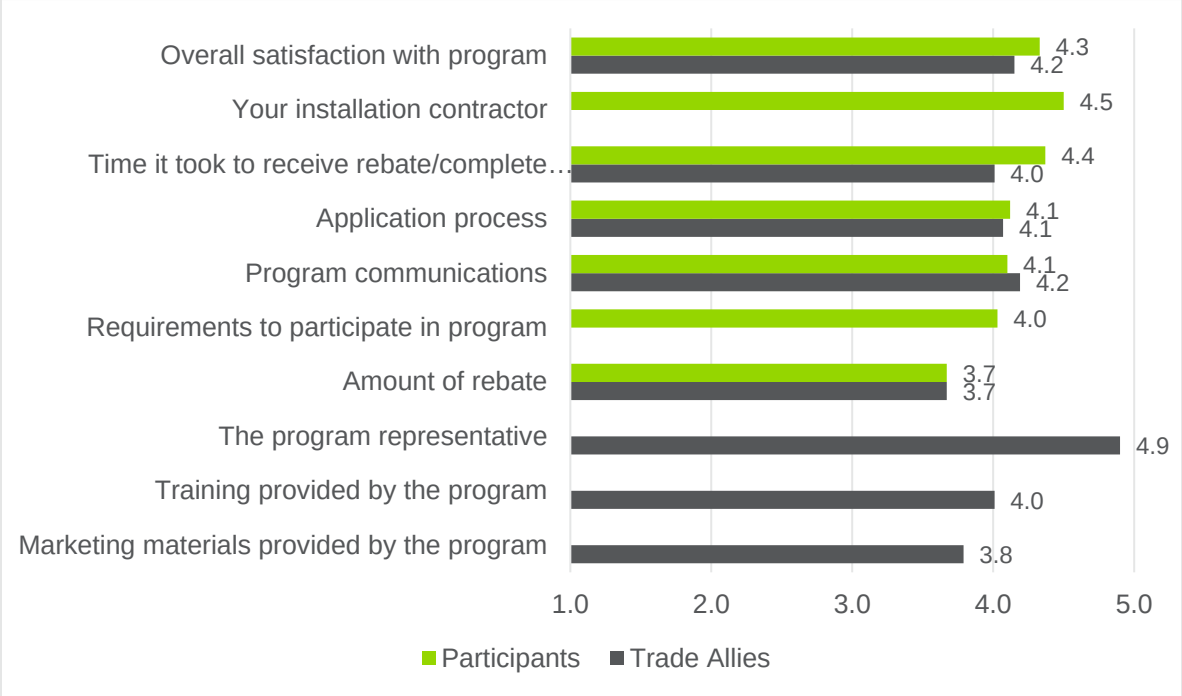
[34] The TRC Test GMO column provides the total resource cost test results based on reported values that was provided by KCP&L staff.

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| 1. What are the primary market imperfections that are common to the target market segment? | • Program staff interviews<br>• Materials review<br>• Customer and trade ally survey |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | • Program staff interviews<br>• Materials review<br>• Customer and trade ally survey |
| 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<br>• Materials review<br>• Customer and trade ally survey |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• Materials review<br>• Customer and trade ally survey |
| 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<br>• Materials review<br>• Customer and trade ally survey |

*Source: Navigant analysis*

Navigant attempted to survey 270 participants and 152 trade allies and received 63 participant survey completes and 48 trade ally survey completes in PY2018, respectively. Figure 3-. indicates the participants' and trade allies' overall satisfaction with the Custom program and aspects of the Custom program in PY2018. The satisfaction level is rated on a scale of 1-5 where 1 means not at all satisfied and 5 means highly satisfied. End-user participant satisfaction remains high and 84% of participants said they are very likely to participate in future GMO programs. Some trade allies are dissatisfied with the project application process and the rebate amounts. Specific findings and recommendations are outlined below.

**Figure 3-. Custom Program Participant and Trade Ally Satisfaction in PY2018**




*Source: Navigant Survey Analysis*

The team's findings are provided in the sections that follow. Recommendations for consideration in relation to these findings are provided in Section 3.3.

#### *3.2.3.1 General Process Evaluation Questions*

Navigant reviewed the status of last year's recommendations and discussed plans for PY2019 as part of the phone interviews conducted with the program staff at GMO and the two implementation contractors. Findings corresponding to the two topics are summarized in this section.

**QUESTION 1: What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?**

**FINDING 1: In PY2017 Navigant made 5 process improvement recommendations for the Custom program. In its review in PY2018, Navigant found that GMO has fully implemented three of the recommendations and is actively working on the other two.**

- Help trade allies increase customer awareness of the non-energy benefits of EE measures by hosting training sessions, developing informational materials and handouts, and participating in joint sales calls. Additionally, continue targeting new construction and large retrofit projects and market EE as a smart business investment.

  **STATUS:** The program has invested considerable effort in strengthening relationships with the participating trade allies and offering them more educational opportunities on both technical topics and sales strategies.

- Continue defining market segments within the Custom program and choose two or three segments as the focus of PY2018 outreach and sales efforts.

  **STATUS:** The program implemented targeted marketing campaigns in four market segments: health care, data centers, new construction, and industrials. One implementer indicated that its initial efforts were not targeted at specific segments because it was trying to get any non-lighting projects in its short ramp-up period, but normally it would strategize around specific segments in a longer program cycle.

- Establish the Custom program as a way for its larger, more sophisticated customers to explore emerging EE technology that they otherwise would not consider.

  **STATUS:** The efforts to better promote non-lighting measures will help achieve this goal, however, program staff indicate that limited cooperation from Customer Service Managers (CSMs) is inhibiting their ability to demonstrate the program's value to larger customers. KCP&L is planning to conduct trainings for CSMs in PY4 to advance this goal.

- Pursue creative and direct marketing campaigns, modeled off the K-12 marketing efforts, and persist in building relationships with design professionals, building architects, and project engineers.

  **STATUS:** The program implemented targeted marketing campaigns in four market segments: health care, data centers, new construction, and industrials.

- Focus on sales-generating activities by further developing methods and metrics for tracking customers through all stages of the program pipeline, from outreach to, if accomplished, project completion.

  **STATUS:** In the middle of PY2018, KCP&L Product Managers engaged the services of a new implementation contractor to focus efforts on non-lighting measures. The new implementation contractor's data tracking software provides a method of capturing data through all phases of a project.

**QUESTION 2: What changes have been made to the program in PY2018, and what changes are planned for PY2019?**

**FINDING 2: Significant changes to the program in PY2018 include a change to how incentives are calculated, the addition of a midstream program component for rooftop units, and increased emphasis on non-lighting measures, including trade ally education and a new implementation contractor focused solely on non-lighting measures.**

- In PY2018, the program began calculating incentives based on the peak coincident kW factor.
- GMO began offering a midstream HVAC program offering through the Custom program in 2018. The midstream program focused on rooftop units (RTUs) in PY2018 but may expand to other non-lighting measures in Cycle 3.
- In October 2018, GMO brought on a second implementation contractor, Lockheed Martin, to focus solely on non-lighting projects.
- The program also implemented several marketing and outreach efforts to increase participation in the non-lighting measures, including targeted marketing to the healthcare, data centers, new construction, and industrial sectors and training sessions for participating trade allies.
- The program added a process called "long leads" to help engage customers with long project timelines that did not align with program cycles. If a customer purchases equipment in Cycle 2,

but cannot install it until Cycle 3, the program will honor the Cycle 2 incentives as long as the project was preapproved by a cut-off date.

- The program is considering breaking out new construction projects into their own program in Cycle 3 to enable a more targeted effort to reach architects and designers earlier in the project timeline.
- The program is also considering bringing retro-commissioning under the Custom program umbrella.

#### *3.2.3.2 Missouri-Required Questions for Process Evaluation*

The evaluation team explored the five Missouri-required questions through the phone interviews with the program managers at KCP&L, CLEAResult, and Lockheed Martin and the online participant and trade ally surveys. The team's findings are provided below. Recommendations for consideration in relation to these findings are provided in Section 3.3.

**QUESTION 1: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 1: GMO has continued its strategy of targeted marketing campaigns toward specific market segments and successfully expanded its network of participating trade allies.**

- GMO conducted targeted marketing campaigns for specific market segments: healthcare, data centers, new construction, and industrials. However, other than the industrial sector, few of the participating trade allies reported that they market high efficiency to these sectors.
    - Over one-half (52%) of surveyed trade allies reported that they market high efficiency to large and medium industrial customers.
    - Just two surveyed trade allies (4%) indicated that they market high efficiency specifically to data centers, and one mentioned the health care segment.
- GMO increased the amount of outreach and education offered to trade allies, particularly with regard to non-lighting measures. These outreach efforts included webinars focused on chillers and data centers, a trade ally newsletter, and sales training.
- KCP&L program staff have some concerns about Tier One customers opting out of the EE rider. They are eager to use the Custom program as a mechanism for demonstrating the additional value that GMO can bring to the table beyond simply recouping the cost of the rider.
- GMO is considering the development of a separate program component focused on new construction projects, which may help them implement more targeted strategies to overcome market barriers specific to those projects.

**QUESTION 2: What are the primary market imperfections that are common to the target market segment?**

**FINDING 2: The measures targeted by the custom program are more complex and have more uncertainty in energy savings than those in the standard program, which makes customers less likely to install them without the education and financial incentives offered by the program.**

- The types of measures targeted by the custom program are more complex than the types of measures offered by standard programs. Specifying and selling these types of efficiency measures requires more technical knowledge on the part of the trade ally, meaning that a lack of trade ally awareness and knowledge can inhibit widespread market adoption.

- New construction projects face some of the more challenging barriers. Program staff noted the importance of reaching customers before/during the design stage of a new construction project and observed that designers are paid by the hour and therefore unlikely to spend time on developing specifications for EE unless the customer is paying them for it. Therefore, the customer has to value EE and be aware of the opportunity to receive GMO incentives at the design stage for the program to have the opportunity to influence new construction projects.
- One trade ally emphasized the importance of streamlining program preapproval requirements to be able to capture new construction programs, noting that new business owners were missing opportunities to incorporate EE into their buildings *"because they want to open the doors, they do not have the additional time to wait for preapproval for higher efficiency designs. Time is money, every day waiting for the doors to open is a dollar lost."*

Most trade allies view the direct financial benefits of EE as the primary motivation for customers and thus do not focus on non-energy/non-financial benefits in their sales pitches.

**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?**

**FINDING 3: Between the Custom program and GMO's other C&I offerings, trade allies and customers are able to receive rebates for all of the measures they are interested in, with the exception of exterior lighting, which has been added back into the program for PY4.**

- When asked if there were any measures that they wanted the program to start offering, the surveyed trade allies most often answered "exterior lighting."
- GMO added exterior lighting back into their program for PY4 of Cycle 2.
- Overall, the Custom program's measure mix is comparable to other custom programs evaluated by Navigant.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: The program's efforts to educate and engage trade allies have been effective, but program staff would like more support from Customer Service Managers to better reach Tier 1 customers. Trade allies and customers value consistency in incentive levels and calculation methods.**

- The program relies heavily on trade allies to market to customers. The program's efforts to increase engagement with existing trade allies and recruit new trade allies appear to be working.
    - Over three-quarters (82%) of surveyed trade allies indicated that they had participated in program webinars and trainings or received educational materials from the program.
    - 27% of surveyed trade allies have brought a program staff member on a sales call with them, and they describe these joint sales calls as very effective.
- Program implementers feel that KCP&L's Customer Service Managers (CSMs) could provide more support for the program. While the need for CSMs to remain involved in any communications with Tier 1 customers is understood, the program implementers question whether the CSMs are truly motivated to encourage customers to participate in the program. The perception is that CSMs "don't poke the bear" strategy is limiting the program's ability to engage Tier 1 customers in opportunities to help them save energy.

- The midstream approach for rooftop units appears to be functioning well and reaching customers at the appropriate time for influencing their decision to select high efficiency.
    - Some surveyed trade allies specifically asked for a midstream or upstream approach to more measures as a suggested improvement to the program.
    - One implementer noted that the midstream approach allowed trade allies to focus on selling and installing high efficiency equipment rather than spending their limited time on paperwork.
- When asked to compare their satisfaction with various program elements relative to the previous year, nearly all trade allies said that their satisfaction has increased or stayed the same, with the exception of the amount of program incentives. Nearly half (45%) of surveyed trade allies indicated that their satisfaction with the amount of program incentives has decreased relative to the prior year in the program.
    - Surveyed participants also indicated lower satisfaction with the rebate amounts and questioned whether the incentive had any effect on their project's efficiency level. One said, "At $0.10/kWh saved the rebate amount is not enough to get management to move from no to yes on a proposed project."
- Some trade allies and customers were confused by the change in incentive calculations. One implementer felt that the uncertainty around incentive calculations resulted in situations where customers ended up getting smaller incentives than they were initially told during the preapproval phase.
    - Several trade allies complained about the changes in incentive levels and incentive calculations.
    - One trade ally specifically noted that they had projects in which customers received smaller incentives than they were initially told and emphasized what a difficult position that puts the trade ally in. Several surveyed participants described similar situations, for example: "…at the end the rebate was much smaller over $400 less than was expected. The explanation was not understandable."
    - One implementer observed that customers do not understand the incentive calculations based on kW savings and noted that on the other side of the state, they keep the kW calculations behind the scenes and talk to the customer on the basis of kWh only.
- The choice to have two implementers simultaneously working on non-lighting projects for several months created some challenges for both implementers and some trade allies.
    - Both implementers were dissatisfied with how the transition was handled and noted that more frequent communication between the two implementation teams would have been beneficial to easing the transition.
    - The overlapping tenure of the two implementers compounded some of the trade ally and customer confusion over incentive calculations. One implementer noted that at one point, they were offering $0.37/kWh for unitary upgrades while the other implementer was offering $0.38/kWh, based on using different incentive calculations.

**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?**

**FINDING 5: Simplifying the program application process when possible would encourage more customers to complete high efficiency projects, particularly when equipment needs to be specified and installed urgently.**

The program has attempted to simplify the application process, but room for improvement remains. Some trade allies indicate that the incentive levels are too low to justify the administrative burden of participating in the program.

- Trade allies indicate that the level of technical expertise required to complete the preapproval process may be causing the program to miss out on significant opportunities. One trade ally stated *"Some customers may not have the resources for the custom program. If you are not an expert in the field/have an engineering team behind you, custom rebate programs are practically impossible."*
- GMO indicated interest in developing better tools for onsite data collection that trade allies or program outreach staff could use on a tablet to pre-populate the preapproval application. Ensuring that complete and accurate data is provided in the preapproval application should help eliminate situations in which the customer feels that they were told one incentive amount and then received another.
- One implementer indicated that some trade allies identified opportunities to improve the requirement to provide baseline cost data because it takes significant effort to spec out the cost for a piece of equipment that will never be purchased. They indicated this is also particularly an issue for Tier One customers who often do not need as much help from trade allies.

- Trade allies and customers noted uncertainty with program rules, eligibility requirements, and rebate levels change can lead to a lack of participation from customers with time-sensitive projects, such as new construction and replace-on-burnout scenarios. Program staff have indicated their awareness of this dissatisfaction.
- The program website could be improved to include more industry-specific information, to reflect the targeted outreach conducted by the program, and perhaps more interactive tools to enable customers to get a better sense of what incentives they could qualify for.
- Developing a separate program offering for new construction will address the unique barriers facing the new construction market. Early outreach and incentives for design professionals may be effective interventions for new construction programs.

See Section 3.3, Recommendations, for more detail.

## 3.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to move the GMO Business EER – Custom program forward and to meet the MEEIA target. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 3.3.1)
- Recommendations from the process evaluation (Section 3.3.2).

### *3.3.1 Impact*

Navigant provides the following recommendations based on its analysis of the program tracking database and completion of the impact analysis activities. The evaluation team provides these comments to improve program tracking records and to facilitate evaluation efforts to better align reported and verified savings. Navigant's recommendations on the GMO Business EER – Custom program implementation components are provided in Figure 3-2.

**Figure 3-2. Business EER – Custom Program Impact Recommendations: PY2018**

| Tracking Data | Project Files | Savings Calculations |
|---|---|---|
| • Provide a column in the tracking database that has a brief narrative describing the installed energy efficient measures or equipment.<br>• Track project cost and incremental cost for each project, when possible.<br>• Consolidate a list of Custom measure categories for both tracking and marketing.<br>• Provide both project-level and measure-level tracking data for evaluation. | • Continue to submit well-organized project files to facilitate the impact evaluation process.<br>• Monitor project files for consistency when more projects enter in PY2019.<br>• Provide editable spreadsheet analysis workbook and all the supporting documents. | • Align the peak demand calculations with the GMO peak period, particularly for non lighting projects. If zero peak demand savings are claimed, please indicate reasons why.<br>• For Custom lighting operating hours, collect detailed operating schedules (8:00 a.m.-7:00 p.m. on weekdays). This helps determine the coincidence factors and creation of lighting operating hours.<br>• For projects where lighting fixtures operate 24/7 annually, use 1.0 as the coincidence factor.<br>• Use Navigant's long-term metering study results if the site-specific calculation inputs cannot be verified for lighting projects.<br>• Use hourly data analysis instead of 2-degree or other interval bin data analysis when appropriate.<br>• Use individual demand factors for each measure when projects contain multiple end-uses. |

*Source: Navigant Analysis*

The evaluation team proposes the following recommendations for improvement of NTG in PY2019.

- Navigant suggests continuing to conduct online participant surveys on a quarterly basis in PY2019, which was effective in increasing response rates and improving survey representativeness in PY2018 and also helps with recall issues.
- Navigant recommends keeping the Custom program's focus on new and innovative technologies, such as building controls, lighting controls, energy storage, and EV chargers. Customers have less awareness of the benefit of these newer technologies and therefore are less likely to be free

riders because they are less likely to be actively pursuing the technologies in the absence of the program.

### *3.3.2 Process*

The recommendations that correspond to Navigant's findings on the process evaluation are provided to help improve the Custom program. Table 3-15 includes the research question-based recommendations, and Table 3-16 summarizes the recommendations for the five Missouri-required questions.

**Table 3-15. Business EER – Custom Program Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | Navigant recognizes the significant progress made by the program to increase participation, particularly in non-lighting projects, and recommends that the program maintain this proactive continuous improvement mindset while keeping in mind that frequent changes in program implementation and incentive levels can upset and confuse customers. A balance between responsiveness and consistency is ideal for the program's long-term success. |
| 2. What changes have been made to the program in PY2018, and what changes are planned for PY2019? | One of the most significant changes to the program in PY2018 was the shift to calculating incentives based on the peak coincident factor (kW), which can be confusing to customers. One implementer noted that in other jurisdictions, the kW calculations are translated into kWh for the purposes of customer communications. Navigant recommends that the program offer additional education to trade allies on the kW calculations, how they work, and how to talk to customers about how their incentives are calculated. |

*Source: Navigant analysis*

**Table 3-16. Business – EER Custom Program Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant 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. The program should continue their efforts to develop industry-specific outreach campaigns, which help customers see how custom projects benefit customers like them and offer additional technical support during the preapproval phase to help guide customers through the project process. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | KCP&L should prioritize the implementation of targeted trainings for Customer Service Managers to ensure that CSMs are well-equipped to promote the program to the Tier One 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? | GMO has already decided to bring exterior lighting measures back into the program, which trade allies and customers both requested. GMO should be sure to promote this change to lighting trade allies to avoid any missed opportunities for exterior lighting projects from trade allies who may not be aware of the change in eligibility. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | GMO has made significant progress in implementing industry-specific outreach campaigns and should build upon these efforts by adding industry-specific content (such as case studies) to the program website, so that the website reflects their outreach approach. |

| Missouri Question | Navigant 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? | GMO should continue efforts to simplify the application process and offer additional technical support to customers during the application process to ensure that adequate technical information is captured during the preapproval phase. A tablet-based data entry tool would allow trade allies or program outreach staff to collect data during a site visit. Additionally, given the unique barriers facing new construction projects, GMO should develop a separate program for new construction projects, prioritizing early outreach and incentives for design professionals. |

*Source: Navigant analysis*

# 4. BUSINESS ENERGY EFFICIENCY REBATE – BLOCK BIDDING

## 4.1 Program Description

The Block Bidding program is new for the program year (PY) 2016-PY2018 implementation cycle. It offers an opportunity to large commercial and industrial (C&I) customers and trade allies to reserve financial incentives ranging from $50,000 to $1 million for planned energy efficiency (EE) projects. In the absence of this program, each of these participants would be capped at $400,000 for Business Energy Efficiency Rebate (EER) – Standard and $100,000 for Business EER – Custom.

With the Block Bidding program, participants can complete bigger projects that may go above the incentive cap set by the Custom or Standard programs. With Block Bidding, participants lock in the block of energy savings at a rate of cents per kWh or per kW. A participant can aggregate the projects over different technology types and multiple sites. The Block Bidding program saw a significant increase in participation and claimed savings in PY2018 compared to the previous two program years. This reflects Kansas City Power and Light's (KCP&L's) increased outreach and marketing efforts in response to previous and ongoing evaluation, measurement, and verification (EM&V) findings.

GMO offers blocks of electric savings by issuing a request for qualifications (RFQ) to eligible customers and third-party suppliers. The RFQ details the proposal requirements and the electric savings that must be achieved. Customers and/or third parties submit the RFQs to deliver the requested block of cost-effective electric savings. After the RFQs are approved, the participants of the program participate in an online reverse auction where the winning bid is the lowest proposed incentive per kWh saved or per kW. Customers who miss the live auctions will have the option to secure funding through a "Buy Now" incentive rate. The "Buy Now" incentive rate is lower than the winning bid. The electric savings may be achieved in a variety of ways—for example, one customer facility installing EE equipment or a bundle of projects across multiple sites and/or customers. Table 4-1 provides more detail on the Block Bidding program.

**Table 4-1. Block Bidding Program Description**

| Block Bidding Key Details | |
|---|---|
| **Sector** | Commercial and industrial (C&I) |
| **Implementation Contractor** | Overlay conducts the auctions and monitors winning projects' progress through to completion.<br>Similar to the other C&I programs, CLEAResult tracks completed projects and issues incentives. KCP&L recruited Lockheed Martin in PY2018 to implement the non-lighting pilot program. |
| **Program Description** | The Block Bidding program offers two options. First, commercial customers, trade allies, and energy service companies can participate in the Block Bidding program after passing the rebate threshold in the Custom, Standard, and other commercial programs. Second, the Block Bidding program provides a reverse auction where the participants reverse bid the incentive per kWh or per kW down from the starting price. The lowest proposed incentive per kWh saved wins the auction. The other customers who miss the online auction can attend the Block Bidding program at a "Buy Now" incentive rate which is lower than the winning bid rate. In PY2018, auction was not launched. |

| Block Bidding Key Details | |
|---|---|
| **Application Process** | For the reverse auction option, a customer or trade ally must submit the Request for Qualification (RFQ) for review and approval. After review, the Block Bidding team issues a formal preapproval for participant. The team also provides training on how to participate in a Block Bidding reverse auction. Overlay hosts an auction where trade allies bid on an incentive per kWh or per kW amount that will be used to complete their energy efficiency projects.<br>For the "Buy Now" option, a customer or trade ally must first exceed the rebate threshold on the custom or standard program. Once this occurs, the implementation contractor works with the customer to process the "Buy Now" option and required paper work to receive an incentive per kilowatt or kilowatt-hour that will be used to complete their energy efficiency projects. |
| **Verification of Purchase/Project** | Any project completed as a part of program needs a preapproval. Participants provide project documents for preapproval and can start implementing the project only after the preapproval. A project may also get selected for onsite verification for preapproval. Similar in process to the Custom program, CLEAResult performs an engineering review of all completed projects. |
| **Rebate Process** | GMO grants rebates over the $100,000 Custom cap or the $400,000 Standard cap to completed projects in the specified amount. |
| **Disputes, Rejected Applications** | There were no disputes in PY2018. |
| **Project Reporting** | The IC populates the database as participants complete projects. Beginning in PY2016, GMO transitioned to using Nexant's tracking database. |

*Source: Navigant analysis*

## 4.2 Evaluation Findings

Navigant's impact evaluation found that the Block Bidding program had a 105% realization rate for gross energy savings and 106% realization rate for gross coincident demand savings in PY2018. The program achieved 26% of the 3-year Missouri Energy Efficiency Investment Act (MEEIA) target for net energy savings and 18% for net coincident demand savings in PY2018. The program achieved 28% of the 3-year MEEIA target for energy and 19% for demand savings between PY2016 and PY2018.

In PY2018, Navigant conducted impact evaluation, cost-effectiveness analysis, and a process evaluation for the Block Bidding program. For the impact evaluation, Navigant performed a tracking database review and an engineering review of selected projects. For the process evaluation, Navigant conducted interviews with program staff and participants and reviewed program materials to identify opportunities to improve the Block Bidding program processes.

The following sections summarize Navigant's PY2018 findings for the Greater Missouri Operations (GMO) Block Bidding program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

- Impact evaluation findings (Section 4.2.1)
- Cost-effectiveness analysis (Section 4.2.2)
- Process evaluation findings (Section 4.2.3)

### *4.2.1 Impact*

Navigant completed the following impact evaluation tasks for the Block Bidding program to develop project- and program-level realization rates.

- **Tracking system and database review** to verify the availability and accuracy of the data for evaluation purposes and to understand the variability of reported savings calculations among projects.
- **Engineering reviews** to verify operating characteristics and determine gross energy and peak demand savings and develop a program-level realization rate.
- **Telephone verifications** were conducted to support the engineering review for a selection of projects collecting additional project information.

Table 4-2 summarizes the energy and peak demand savings and the corresponding realization rates for the Block Bidding program. Table 4-3 shows the program savings for the Block Bidding program to date. For PY2018, Navigant verified 6,124,084 kWh of energy savings and 723 kW of coincidence peak demand savings which lead to 105% and 106% of realization rates, respectively. PY2018 realized 26% of the Cycle 2 MEEIA target for energy savings and 18% for coincidence peak demand savings. To date, the Block Bidding program has achieved 28% of MEEIA Cycle 2 target energy and 19% for coincidence peak demand savings. It is important to note that the Block Bidding program saw a significant increase in participation and claimed savings in PY2018 compared to the previous two program years. This reflects KCP&L's increased outreach and marketing efforts in response to previous and ongoing evaluation, measurement, and verification (EM&V) findings.

**Table 4-2. Business EER – Block Bidding Program PY2018 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 5,815,858 | 6,124,084 | 105% | 17,603,947 | 4,531,822 | 26% |
| Coinc Demand at Customer Meter (kW) | 682 | 723 | 106% | 3,052 | 535 | 18% |

*Source: Navigant analysis*

**Table 4-3. Business EER – Block Bidding Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA 3-Year Cycle 2 Target | Verified 3-Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 6,252,181 | 6,591,574 | 105% | 17,603,947 | 4,999,312 | 28% |
| Coinc Demand at Customer Meter (kW) | 737 | 778 | 106% | 3,052 | 590 | 19% |

*Source: Navigant analysis*

The following adjustments were made to the engineering calculations, and are the primary drivers of energy and coincidence peak demand realization rates in PY2018:

- **For lighting measures:**
    - Adjusted CFs, HOU, and waste heat factors (WHFs) as per Navigant long-term metering study results if these inputs cannot be verified through phone interviews, desk review, and research.
    - Adjusted the installed lighting fixture wattages based on the manufacturing specifications.

The following sections provide more details on the tracking database review, the sampling approach, the engineering review and net-to-gross (NTG) findings.

#### *4.2.1.1 Tracking Database Review*

The program tracking database lists the projects that were completed during the program year and includes site details, energy and demand savings, application dates, and unique project numbers assigned by the implementation contractors (ICs). Navigant reviewed the tracking system and found that the database and project files contain sufficient information to support evaluation activities. Project files were well-organized, saving time and resources for the evaluation.

#### *4.2.1.2 Sampling*

Since the Block Bidding program implemented seven projects in PY2018, Navigant evaluated all seven projects.

#### *4.2.1.3 Engineering Review*

The evaluation team collected data through phone interviews with the participants. The evaluation team researched the following areas to determine project impacts and realization rates:

- The appropriateness of the pre-installation technology performance baseline via project file and secondary literature review

- Installation and quantity of claimed EE measures
- Pre-retrofit and post-retrofit case performance characteristics of the measures installed and revision of performance variables (i.e., operating hours) as needed
- Peak demand savings (kW) and energy savings (kWh) impacts of the efficiency measures installed for the selected projects

Navigant developed realization rates at the program level using the evaluation results of the seven projects. Table 4-5 shows the project-level energy and peak demand savings and the corresponding realization rates of the seven projects. The evaluation team verified different savings from the reported savings for the seven projects.

**Table 4-4. Business EER – Block Bidding Program Project-Level Energy and Peak Demand Savings and Realization Rates**

| Navigant Site ID | Project Type | Reported kWh | Verified kWh | Realization Rate | Reported kW | Verified kW | Realization Rate |
|---|---|---|---|---|---|---|---|
| **PRJ-1898003** | New Construction | 34,997 | 283,704 | 811% | 13.07 | 80.93 | 619% |
| **PRJ-1820402** | Lighting | 5,012,573 | 4,912,057 | 98% | 511.78 | 528.48 | 103% |
| **PRJ-1781425** | Lighting | 540,976 | 540,976 | 100% | 121.52 | 82.61 | 68% |
| **PRJ-2055124** | Building Optimization | 10,562 | 194,416 | 1841% | 8.18 | 7.31 | 89% |
| **PRJ-2156181** | Misc Custom | 18,220 | 18,218 | 100% | 2.51 | 3.85 | 153% |
| **PRJ-2156150** | Misc Custom | 12,614 | 12,613 | 100% | 1.74 | 2.67 | 153% |
| **PRJ-1948122** | Lighting | 185,916 | 162,100 | 87% | 23.24 | 17.20 | 74% |

*Source: Navigant analysis*

The evaluation team summarized the following detailed engineering review findings on a project basis for drivers of energy and peak demand realization rates.

- Project PRJ-1898003 was implemented through the Block Bidding "Buy Now" portion of Custom project PRJ-1508166. The difference in reported versus verified savings is summarized in item #7 of project-level findings in Section 3.2.1.3 Engineering Review.
- For a lighting project (PRJ-1820402), the difference in reported versus verified savings was because Navigant used CFs and WHFs from its long-term metering study.
- For a lighting project (PRJ-1781425), this is the Block Bidding "buy-now" portion of Custom project PRJ-1761610. The difference in the reported versus verified peak demand savings was due to use of engineering approach by Navigant. Navigant applied engineering algorithms based on existing and efficient lighting wattages, CFs, and WHFs for estimating the peak demand savings, while the IC used the kW factor approach for calculation of peak demand savings.

- For a building optimization project (PRJ-2055124), this is the Block Bidding "Buy Now" portion of Custom projects PRJ-1951281 and PRJ-1582333. The difference in reported versus verified savings is stated in item #9 of project-level findings in Section 3.2.1.3 Engineering Review.
- For two misc. custom projects (PRJ-2156181 and PRJ-2156150), Navigant applied realization rate of Custom program non-lighting small strata because they were classified as non-lighting small strata projects in the Custom program. Navigant included the two projects as part of Custom program because they are Custom projects confirmed by the implementation contractor. However, KCP&L tracking system DSMore classified them as Block Bidding projects. Navigant moved them back to Block Bidding program to align with the DSMore reported savings and applied realization rate of Custom program non-lighting small strata to them in calculation of project savings.
- For one lighting project (PRJ-1948122), the difference in reported versus verified savings was due to two adjustments made to the implementation contractor's calculations. First, Navigant updated the efficient lighting fixture wattage from 242 to 211 as per the manufacturing specifications. Second, Navigant used coincidence factor (0.64) from Navigant's metering study which is higher than the coincidence factor the implementation contractor used (0.59). Additionally, it was unclear how the claimed peak demand savings (23.24 kW) were calculated since the value was hard-coded in the implementation contractor's analysis workbook.

#### *4.2.1.4 Net-to-Gross*

Navigant applied the NTG ratio of 74% for the Custom program researched in PY2018 to the Block Bidding program. All five projects originated from the Custom program based on Navigant's review of supporting project documentation provided by the implementation contractor. Table 4-5 presents the assumed NTG ratios for PY2018.

Attribution analysis (i.e., NTG) focuses on how the market would have been different in the absence of the program. From a market influence perspective, with the elimination of auctions, the Block Bidding program is now indistinguishable from the Custom program and serves as an additional source of incentive dollars for customers with large projects. Spillover results from the utility influencing customers' and trade allies' awareness of and interest in energy efficiency products. The majority of spillover savings are resulting from the program's influence on trade allies, and since most trade allies participate in multiple programs and the trade ally survey asks about the influence of C&I programs as a whole (not the Custom program specifically) - applying the spillover value to both Custom and Block Bidding is appropriate.

**Table 4-5. Block Bidding NTG Components and Ratio: PY2018**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| Projects Originating from the Business EER - Custom Program | | | | 74% |

FR = free ridership, PSO = participant spillover, NPSO = nonparticipant spillover, NTG = net-to-gross
*Source: Navigant analysis*

### *4.2.2 Cost-Effectiveness*

This section presents Navigant's evaluation of cost-effectiveness for the Block Bidding program for each of the five standard-benefit-cost tests. Reference Section 1.2 for information on how benefits and program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

Table 4-6 presents the benefit-cost ratios for the five standard-benefit-cost tests for PY2016, PY2018, and program to date, and the Total Resource Cost (TRC) test filed by Greater Missouri Operations (GMO). The Block Bidding program functions as an extension of the Custom program for projects that exceed the incentive cap, and only captures partial benefits for the associated projects, therefore, one must consider the benefits from both the Custom and BB programs to assess the cost-effectiveness of the program impact.

**Table 4-6. Block Bidding Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[35] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 0.44 | 0.59 | 0.71 | 0.64 | 3.55 | 0.38 |
| 2017 | N/A | N/A | N/A | N/A | N/A | N/A |
| 2018 | 1.38 | 1.52 | 1.78 | 2.63 | 2.16 | 0.69 |
| **Program Overall** | **N/A** | **1.06** | **1.26** | **1.45** | **2.26** | **0.57** |

*Source: Navigant analysis*

### *4.2.3 Process*

Navigant reviewed program materials and conducted interviews with the program manager and the ICs to support its evaluation of the two general process and five Missouri-required questions. Table 4-7 includes process evaluation questions and the corresponding evaluation activities.

[35] The TRC Test GMO column provides the total resource cost test results based on reported values that was provided by KCP&L staff.

**Table 4-7. Block Bidding Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | • Program staff interviews<br>• Materials review |
| 2. What changes have been made to the program in PY2018, and what changes are planned for PY2019? | • Program staff interviews<br>• 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<br>• 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<br>• 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<br>• Materials review |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• 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<br>• Materials review |

*Source: Navigant analysis*

The team's findings are provided in the sections that follow. Recommendations for consideration in relation to these findings are in Section 4.3.

#### *4.2.3.1 General Process Evaluation Questions*

Navigant reviewed the status of last year's recommendations and discussed plans for the PY4 extension and Cycle 3 as part of phone interviews conducted with the program staff at GMO and the implementation contractor. Findings corresponding to the two topics are summarized in this section.

**QUESTION 1: What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?**

In PY2017 Navigant made three main process improvement recommendations for the Block Bidding program. For its PY2018 review, Navigant found that GMO has implemented all three recommendations to varying degrees.

- Navigant recommends that GMO continue its new customer acquisition efforts in the selected target market segments and further its understanding of project processes, timelines, and the organizational structures of its larger customers.

  **STATUS:** Block Bidding served primarily as an extension of the Custom program for large customers that had met the annual Custom incentive cap. While GMO did not actively

engage its large customers to bring them directly into the Block Bidding program, the Custom program did have marketing and training targeted to specific segments.

- Navigant suggests GMO continue to be flexible in updating the program's eligibility requirements and program timing to best fit customers' needs.

  **STATUS:** GMO observed customers' preferences for the "Buy Now" option and proposed that the Block Bidding offering should be limited to the "Buy Now" track to simplify program timing and eliminate RFQ processes that previously were a participation requirement.

- GMO should consider ways to decrease the barrier to entry for the program, including lowering the savings requirement and continuing to provide ample training and support to trade allies.

  **STATUS:** GMO increased its trade ally training and engagement efforts in PY2018 as part of the Custom program and saw more trade ally engagement this year than in the past. GMO also eliminated the 1 million kWh minimum savings requirement as it may have been unnecessarily limiting eligible participants.

**QUESTION 2: What changes have been made to the program in PY2018, and what changes are planned for PY2019?**

**FINDING 2: In PY2018 GMO transitioned to the "Buy Now" track only and does not plan to hold any reverse-bidding auctions in PY2019.**

- There was no Block Bidding auction in PY2018.
- The Block Bidding program moved away from formal auctions and was treated as a complementary program for Custom. Participants who reached their annual Custom or Standard program caps of $100,000 and $400,000, respectively, could still receive additional funding from the Block Bidding program at $0.065/kWh. The only participants that enrolled in the Block Bidding program in PY2018 were those that met the Custom program cap. There were no projects that met the Standard program cap.
- For PY2019, the Block Bidding program serves only as a complement to the Custom program for those projects that exceed the cap. Those customers could still receive an additional incentive but at a lower per-kWh rate. It is uncertain how the incentive rate will be determined since there will no longer be auctions to determine the per-kWh rate.
- The incentive cap of $100,000 for Custom and $400,000 for Standard, which determines Block Bidding eligibility, could change in PY2019.

#### *4.2.3.2 Missouri-Required Questions for Process Evaluation*

The evaluation team asked the five Missouri-required questions during the phone interviews with the program managers at KCP&L and the implementation contractor. The team's findings are provided below. Recommendations for consideration in relation to these findings are provided in Section 4.3.

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: Large customers targeted by the Block Bidding program pose two unique challenges. First, large customers have opted out of GMO's rebate programs because incentive caps precluded them from receiving the same value that they were putting into the program. In**

**addition, GMO is transitioning the incentive design from kWh saved to kW saved, which could further discourage large customers from opting back in to GMO rebates due to perceived uncertainty around the potential rebate amounts. Second, trade allies and customers are not aware of or familiar with the Block Bidding program.**

- The incentive structure and cap were simplified in PY2018. The reverse auction option was also discontinued so customers do not have to meet a scheduled auction date to take advantage of the Block Bidding funds.
- KCP&L worked with the implementer on trade ally training since all Block Bidding projects came through the trade allies in PY2018. The implementation contractor held monthly trainings for new and existing trade allies to become familiar with the program and offer sales strategies showing how the Block Bidding program can further lower a project's cost and increase EE. They also produced monthly newsletters and participated in trade ally forums. However, because there were no auctions in PY3, the marketing and awareness of the program was limited through the Custom program and Custom webpage.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: The target market is defined as any customer or trade ally with projects large enough to exceed the Custom or Standard incentive cap. Despite the fact that all of GMO's C&I programs geared toward large end-users complement each other, GMO saw limited participation among existing customers in past years and is looking to update the Block Bidding target market to increase participation.**

- There is natural synergy among the C&I programs and a satisfied customer in one program will likely carry that momentum to others and across program years. The implementers do a good job at building and maintaining the relationships with Tier One customers and keeping them informed of the options they have.
- The Block Bidding program is best promoted through the help of trade allies. In PY2018, customer service representatives took the lead in emailing Tier One customers newsletters on program updates. It is suggested that customer service representatives pursue a more collaborative approach with trade allies, as they can lend additional technical, education, and logistical (i.e., paperwork or application) support. One example of this in action could be through joint sales calls.
- KCP&L hosted industry-specific events (e.g., municipals, schools) to promote the Block Bidding program and other C&I programs, and at the same time led each customer to the right solution. Trade allies were invited to coordinate with potential customers. Industry-specific events can help customers see beyond the bottom line and increase buy-in on the long-term and non-tangible benefits. Trade allies provide the best outreach when it comes to speaking directly to non-energy saving benefits that are unique to each industry. KCP&L targeted various customer segments such as industrial, healthcare, and grocery stores with its promotional collateral.
- KCP&L also hosted webinars and seminars for non-lighting trade allies.

**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?**

**FINDING 3: The Block Bidding program addresses participants' need for large energy efficient projects that exceed the financial caps of GMO's Custom and Standard programs. While the program should remain open-ended in terms of eligible measures, GMO is working to identify specific end use measures for targeted marketing that are most likely to make up these larger projects.**

- The Block Bidding program encompasses all end uses and addresses projects with high energy and demand impacts. Projects can be implemented across multiple buildings or properties to allow for greater savings.
- GMO should continue observing trends in the types of projects completed through the program and extract the most successful and satisfying measures to use for case studies. These case studies can then be used as marketing material to increase participation.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: In PY2018, GMO relied heavily on Custom program marketing efforts to increase customer awareness of the Block Bidding program. Customers were then target marketed with one-on-one communications if they showed potential eligibility.**

- Four out of the five projects came through the Buy-Now path of the Block Bidding program.
- Awareness is a barrier, since the Block Bidding program is no longer a standalone program. Trade allies and self-direct customers must first know that there is additional funding beyond the Custom and Standard program caps.
- PY2018 had more trade ally engagement compared to previous years. This could reflect continuous exposure to the program through trade forums, sales trainings, and monthly newsletters delivered by the implementer .

**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?**

**FINDING 5: In its third year, the Block Bidding program began to address some of the challenges encountered in past years. Continuing to fine-tune the eligibility requirements, simplify program incentive design, and marketing of specific use cases will ensure greater, more successful participation.**

- Potentially transitioning to an incentive based on demand savings rather than energy savings is seen to some as more transparent and a simplification to the incentive calculation. This is in

contrast to PY2018 where the incentive was a range (i.e., $0.06/kWh to $0.40/kWh) and the awarded value within that range depended on the coincidence of their demand.

- GMO should continue its long-lead tariffs to encourage participation from customers whose projects carry across multiple years. This way, customers with large capital improvement projects that span outside the timeline of Cycle 2 can still receive a rebate. Customers should have support to ensure they meet the extension application deadline to avoid customer frustration.
- As outlined in Question 1, GMO discovered that one of the biggest drivers of participation is a proper incentive cap on the Standard and Custom programs. GMO can use the PY2018 cap and participation levels as an opportunity to better understand this interaction and further adjust the cap as needed to balance Block Bidding participation with Standard and Custom participation. The high cap resulted in only a handful of eligible projects, and if the program wants to increase activity then it is necessary to decrease the cap. While the Block Bidding program is more cost-effective in terms of $/kWh, the right balance must be struck so customers, both large and small, feel they are getting enough value out of the program.
- GMO recognizes the continued need to sell the program value to large customers that previously opted out of GMO's rebate programs. Other, more mature markets possess this large customer buy-in and can serve to guide GMO as they recruit back these previously underserved customers.

## 4.3 Recommendations

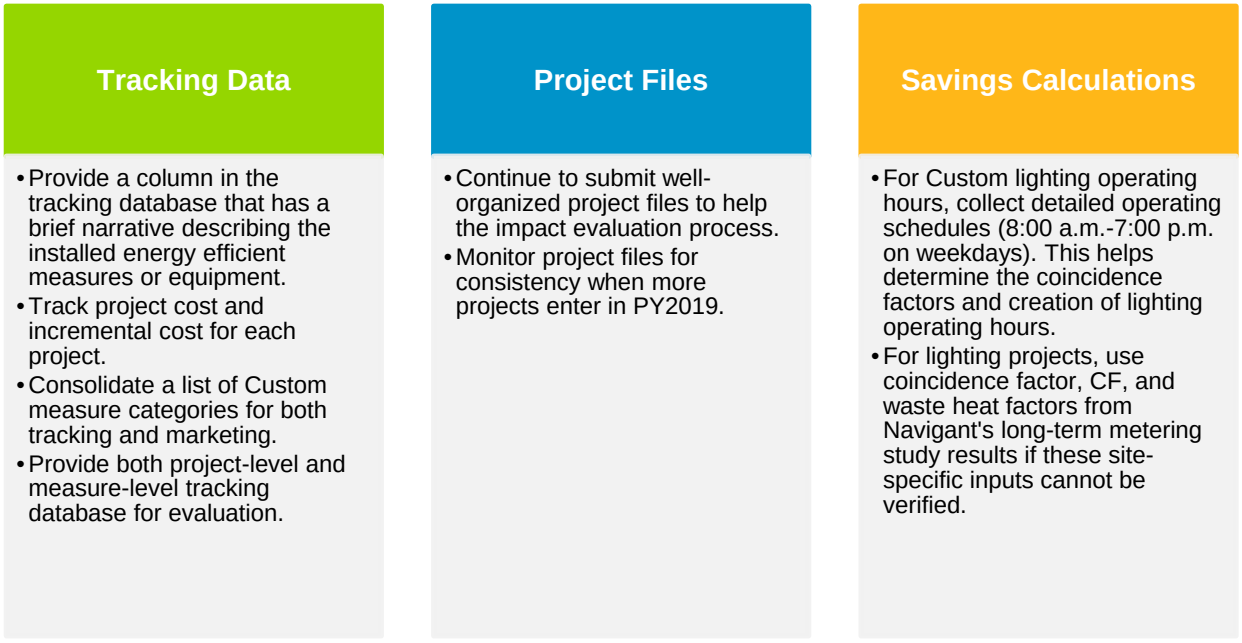
Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to move the GMO Block Bidding program forward and meet the MEEIA target. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 4.3.1)
- Recommendations from the process evaluation (Section 4.3.2)

### *4.3.1 Impact*

For the GMO territory, there were five projects completed in the Block Bidding program in PY2018. Figure 4-1 summarizes Navigant's impact recommendations for the Block Bidding program in PY2018.

**Figure 4-1. Block Bidding Impact Recommendations: PY2018**




*Source: Navigant analysis*

### *4.3.2 Process*

Navigant conducted phone interviews with the KCP&L product manager and the implementation contractor in PY2018. The recommendations that correspond to Navigant's findings on the process evaluation are provided to improve the Block Bidding program. Table 4-8 includes the research question-based recommendations, and Table 4-9 summarizes the recommendations for the five Missouri-required questions.

**Table 4-8. Block Bidding Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | In PY2018, GMO implemented multiple recommendations to respond to customers' concerns and improve its Block Bidding program. Navigant recommends that Block Bidding continue to be marketed as an extension of the Custom Program, so TAs and customers begin to associate the two as a single offering to encourage bigger projects. Additionally, GMO should observe and actively involve themselves with their Tier One and Two customers to best understand the thought process, timeline, and organizational structure during the implementation of a large energy efficient project. Finally, GMO should continue monitoring the impacts of its adjusted rebate incentive cap and determine whether the program is striking the intended balance of cost-effectiveness and customer satisfaction. |
| 2. What changes have been made to the program in PY2018, and what changes are planned for PY2019? | PY2018 saw substantial changes as GMO gained a better understanding of the challenges that the Block Bidding program encountered in its first two years. Navigant suggests GMO continue to re-assess program caps and "Buy Now" incentive levels to best fit customers' needs while maintaining cost-effectiveness. Navigant also recommends that the application process remain the same, but with continued support and educational activities, to grow trade ally familiarity with the process and program as it matures. |

*Source: Navigant analysis*

**Table 4-9. Block Bidding Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market? | Navigant recommends that GMO continue to market Block Bidding as a simple sub-program of the Custom program that provides additional funding beyond the cap. Focus of outreach should emphasize the long-term energy and non-energy benefits of EE projects and the ease at which to participate in the program. It's also suggested that the program's name be re-considered to reflect a program without bidding. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | Because GMO only had five projects participate in the program, Navigant suggests re-assessing the cap on the Custom and Standard programs to increase the quantity of eligible participants. In addition, GMO could direct marketing efforts to recruiting more high capacity customers with the trade allies on the front line instead of customer support representatives. |
| 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? | Outreach and meetings with key players in the target market segments, and tracking the implemented measure types from past projects, will inform KCP&L on what measures are best supported by the Block Bidding program. While KCP&L should not limit the types of measures eligible for Block Bidding, continuing to highlight successful projects or common end-use measures seen in the past (e.g., on the KCP&L website or other marketing materials) will make the program more tangible and generate more interest from potential customers. |

| Missouri Question | Navigant Recommendation |
|---|---|
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | Navigant recommends that KCP&L continue to attend industry events and trade shows, engage in more one-on-one communication with customers and trade allies to understand their pain points and desires, and piggyback off already successful Custom and Standard projects. GMO should dedicate time to understanding the organizational structure of their large customers to ensure that all key players are aware of the Block Bidding program. Moreover, large key accounts that do not think the MEEIA tariff is justifiable based on the return in financial benefits should be targeted and further engaged with to reduce skepticism. |
| 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? | Navigant recommends GMO consider ways to decrease the barrier to entry for the program, including decreasing program caps and continuing to provide ample training and support to trade allies to then transfer to the end-customer. Outreach efforts should continue to target the current customers that have exceeded their rebate caps as well as identifying new customers in promising industries. Navigant suggests that GMO continue to communicate but be flexible in the long-lead application extension timelines to best fit customers' needs and competing priorities. |

*Source: Navigant analysis*

# 5. STRATEGIC ENERGY MANAGEMENT

## 5.1 Program Description

The Strategic Energy Management (SEM) program was a 3-year effort ending in July of Program Year (PY) 2018. There were no new participants added nor any workshops or training provided in PY2018 and support for Cycle 2 participants stopped in July of 2018. The SEM program will likely continue in MEEIA Cycle 3 as one of three possible delivery channels of the Business Process Efficiency program.

The goal of the program was to implement a continuous energy management improvement process that results in energy savings and reductions in energy intensity for industrial and large commercial clients. Energy savings were incentivized at $0.02/kWh and achieved through operational and maintenance (O&M) improvements, incremental increases in capital energy efficiency (EE) projects, additional capital projects that would not otherwise have been considered (e.g., process changes, consideration of EE in all capital efforts), and improved persistence for O&M and capital projects. The program sought to educate commercial and industrial (C&I) staff in identifying low cost/no-cost measures, improve process efficiency, and reduce energy usage through behavioral changes.

The program achieved these goals through a 3-year engagement of workshops and one-on-one coaching conducted by the implementation contractor that began in PY2016. It provided tools, expertise, and technical resources to help sites set and achieve their energy goals by implementing organizational structures, behavior changes, and systematic practices learned through the program.

**Table 5-1. SEM Program Description**

| SEM Program Key Detail | |
|---|---|
| **Sector** | Commercial and industrial (C&I) |
| **Implementation Contractor** | CLEAResult |
| **Program Description** | The Strategic Energy Management (SEM) program was a 3-year program designed to help C&I customers identify behavioral and low-cost measures through training, onsite audits, and technical staff support. |
| **Application Process** | Kansas City Power and Light (KCP&L) account managers identified and introduced potential participants with usage of 10 GWh or more to the program. While customers could apply to the program without the assistance of an account manager, most applicants worked with one. |
| **Verification of Purchase/Project** | The program provided detailed energy models that calculated energy savings based on whole building energy usage. Savings that occurred from other GMO programs are identified and removed from the final claimed SEM savings. |
| **Rebate Process** | Incentives were set at $0.02/kWh and paid over the first year's modeled energy savings. Any incremental energy savings identified in year two was paid out at the same rate. |

| SEM Program Key Detail | |
|---|---|
| **Disputes, Rejected Applications** | The implementation contractor handled potential disputes in modeled energy savings calculations with escalations forwarded to the KCP&L program manager. Mediation and resolution to escalated disputes were handled in-person after review of any supporting documents provided by the customer or their contractor on the customer's behalf. Modeling issues include changes occurring at the site such as a change in production or the installation of new equipment or processes. If these issues were not properly accounted for, the models will misestimate the savings realized by the SEM program. These energy modeling issues were handled by the implementation contractor's program team with history of the correspondence archived in their CRM system, Catalyst. |
| **Project Reporting** | The implementation contractor provided project forecast data for operations and maintenance (O&M) activity to the program manager on a monthly to bimonthly basis depending on the level of activity. Capital-side activity captured through GMO's Business Energy Efficiency Rebate (EER) – Custom and Standard programs was reported on a weekly to monthly basis. Finalized energy and demand savings were reported in Catalyst and uploaded into the Nexant database on an annual basis. GMO received monthly and quarterly updates outside the electronic tracking systems via communications between the implementation contractor and KCP&L program managers. |

*Sources: KCP&L program manager and program supporting documents*

## 5.2 Evaluation Findings

Navigant's evaluation of the SEM program in PY2018 included reviewing the reported energy and demand models for 8 sites. MEEIA Cycle 2 to date, the program achieved a verified energy savings of 4,963,232 kWh, or 41% of the 3-year goal.

The following sections summarize Navigant's PY2018 findings for the SEM program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

- Impact evaluation findings (Section 5.2.1)
- Cost-effectiveness (Section 5.2.2)
- Process evaluation findings (Section 5.2.3)

### *5.2.1 Impact*

Navigant completed the following impact evaluation tasks for the SEM program to develop project- and program-level realization rates.

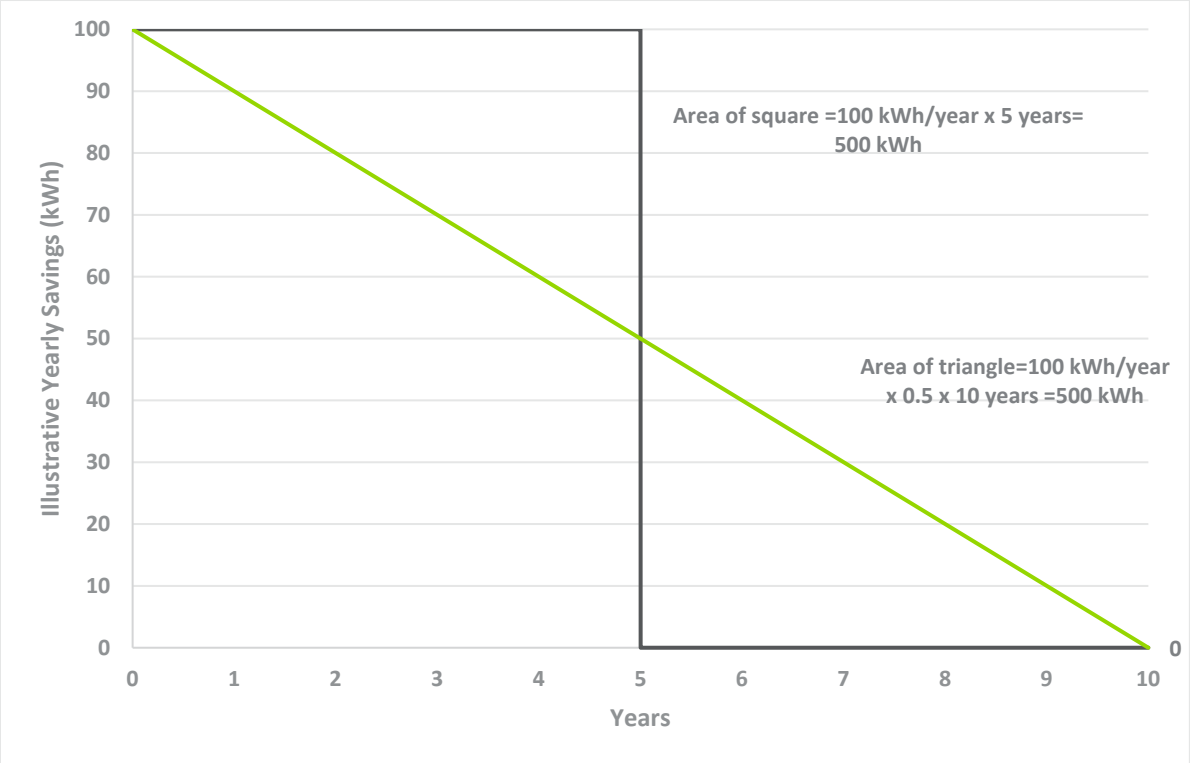
- **Engineering reviews for all projects in the PY2018 population**.
- **Detailed review of reporting documentation for each project** to verify that all non-SEM activities have been properly accounted for within the gross reported savings. This could include the installation of non-SEM measures, the effect of equipment changes and malfunctions, and any major process changes.

The SEM program achieved positive savings program to date; however, the calculated incremental savings were not positive in PY2018. The SEM program, through design, ceased customer support in July 2018. Persistence of savings in behavioral programs, such as the SEM program, relies on continued

customer engagement and support. In PY2017, the SEM program was able to achieve 41% of the MEEIA Cycle 2, 3-year target, showing the effectiveness of cohort and one-on-one support efforts with customers. However, as support for the program ceased in July 2018, the savings some customers achieved in 2018 are a portion of those achieved in 2017. This is expected, as customers' energy use will have increased (due to no longer being active and taking actions to reduce energy and demand) compared to the same period of the previous year, when customers were supported and received training on energy saving opportunities they could implement. Note that in the context of this program "negative incremental savings" means that the overall savings for these customers are still apparent and positive, but they are less than anticipated if the continued customer engagement and support had materialized.

Navigant addresses the decline in behavioral program savings by setting the lifetime of the savings at half (i.e. 5 years) the time period for which the savings persist (i.e. 10 years), albeit at a declining rate. This results in the same lifetime savings as using a declining savings rate over the entire effective useful life. This is illustrated in the Figure 5-1 for an illustrative project with 100 kWh savings in the first year.

**Figure 5-1. SEM Declining Savings Rate**




The declining savings rate implies that there will be negative year over year incremental savings after the program ends.

Table 5-2 and Table 5-3 summarize the energy and demand savings and the corresponding realization rates for the SEM program for PY2018 and the program to date, respectively. The SEM program achieved positive savings program to date; however, the calculated incremental savings were not positive in PY2018. As noted above, the SEM program, through design, ceased customer support in July 2018. Persistence of savings in behavioral programs, such as the SEM program, relies on continued customer

engagement and support. In PY2017, the SEM program was able to achieve 42% of the MEEIA Cycle 2, 3-year target, showing the effectiveness of GMO's cohort and one-on-one support efforts with customers. However, as GMO support for the program ceased in July 2018, some customers experienced negative incremental energy impacts which are expected, as customers' energy use will have increased (due to no longer being active and taking actions to reduce energy and demand) compared to the same period of the previous year, when customers were supported and received training on energy saving opportunities they could implement.

**Table 5-2. SEM Program PY2018 Energy and Demand Savings Summary**

| | Gross | | | Net[36] | | |
|---|---|---|---|---|---|---|
| | Reported Savings[37] | Verified Savings[38] | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 147,872 | -157,729 | N/A | 12,127,508 | -157,729 | -1.3% |
| Coincident Demand at Customer Meter (kW) | 0 | -45 | N/A | 2,842 | -45 | -1.6% |

*Source: Navigant analysis*

**Table 5-3. SEM Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA 3-Year Cycle 2 Target | Verified 3-Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 6,011,417 | 4,963,232 | 83% | 12,127,508 | 4,963,232 | 41% |
| Coincident Demand at Customer Meter (kW) | 0 | -45 | N/A | 2,842 | -45 | -1.6% |

*Source: Navigant analysis*

1. Navigant compared the energy consumption in PY2018 to the consumption in the same season of PY2017 in order to calculate seasonal incremental savings. The implementation contractor (IC) compared the energy consumption during PY2018 to the average consumption during all of PY2017. During this equivalent time period in PY2017, the site averaged greater energy savings per day than the rest of the year. Navigant calculated the incremental savings over this equivalent

[36] Navigant calculated net verified savings by multiplying gross verified savings by the NTG ratio.

[37] 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.

[38] Verified savings represent energy savings verified at the time of the evaluation.

period in PY2017, which led to lower claimed savings. Of the 8 sites evaluated, Navigant verified negative incremental energy impacts for 2 sites, positive energy savings for 1 site, and 0 savings for 5 sites due to customers opting out of the program before PY2018.

2. For some models, there were several incentivized measures which were installed in March and April of 2017. This means that the energy savings achieved during this time period in PY2017 are more attributable to SEM activities than the savings achieved in PY2018. Navigant accounted for this by calculating a daily rate of energy savings (kWh/day) during PY2018 as well as the equivalent time period in PY2017. Next, Navigant subtracted the daily rate of incentivized savings which occurred during each of these periods. This is a large source of discrepancy between the IC's model and Navigant's model. In the IC's model, the PY2018 savings are compared to the total annual PY2017 savings. In this model, 12 total months are used to calculate the average daily PY2017 savings, and 9 of those months (75%) contain incentivized savings. This skews the daily PY2017 savings in the IC's model and results in Navigant's calculated incremental PY2018 savings being lower.
3. Navigant **adjusted variables and the model structure** including:
    a. Removal of or adjustments for data points that were outside the bounds of reasonable site operation parameters.
    b. Adjustment of the models as needed to include variables that were dynamic in the post condition and were not the same for every time period.
4. Navigant reviewed the demand models provided by the implementer and verified the demand savings. Navigant found that these models were robust and accurately calculated demand savings. The implementer did not report any demand savings, but Navigant verified savings according to these models.

A full description of the methodology is provided in Appendix H.

The following sections summarize the impact evaluation activities of the SEM program.

#### *5.2.1.1 Tracking Database Review*

Navigant was provided with tracking data for this program before all the reports and associated models were completed. Navigant reviewed this data for errors such as missing or unrealistic information. No issues were noted by the evaluator.

#### *5.2.1.2 Engineering Review*

Navigant conducted a review of all projects submitted through the SEM program. Navigant performed a detailed review of all project documentation for each site, including:

- Review of the provided site report in order to understand any non-SEM activities that may have affected the SEM models.
- Confirmation that all impacts of non-SEM measures installed at the sites were correctly removed to avoid the double counting of savings.
- Confirmation of the baseline model by recreating the model based on provided data.

- Identification and adjustment of any variables that were outliers. This includes any values that were 110% or more than the maximum or 90% or less of the minimum value for that variable during the baseline period.
- Adjustment of the model to account for any short-term or long-term effects on the whole building use. This includes issues such as equipment repair and malfunction, non-typical production or building operation, or other issues that may have affected the energy use of the site.

#### *5.2.1.3 Verification*

Navigant evaluated all eight projects from the SEM program. Table 5-4 details the results from this analysis including the project-level energy and demand savings, corresponding realization rates, and reasons for the discrepancies in savings. Only one of the projects evaluated had multiple models. In this instance, the impact of each of these models was summed to estimate the final site-level savings. To maintain customer anonymity, Navigant has genericized the site IDs in Table 5-4.

Navigant's energy model is created for each site and estimates energy use based on variables such as production, weather, and seasonal operation. A baseline is created for each site using two years of pre-program billing data. This accounts for energy efficiency activities occurring in the baseline and represents the energy use of the site before the SEM program was implemented.

Final SEM energy savings are calculated using whole building billing data. The total savings are the difference between the baseline energy use and actual energy use. Impacts for any non-SEM activities occurring during the post period are subtracted from the differences in the model.

The energy impact of any non-SEM measures, equipment upgrades, and site changes that occur after baseline period are collected by the implementer and verified by Navigant through telephone interviews with the customer. The impacts of these activities are derived through the collection of site data and/or based on the claimed ex ante savings for installed measures. For example, a site installed an equipment upgrade 6 months into the SEM program that resulted in an ex ante savings of 10,000 kWh. Since these measures were installed 6 months into the SEM program 5,000 kWh is removed from the final claimed SEM savings.

Demand savings were calculated using data from the peak period of PY2016 as the baseline and data from the peak period of PY2017 as the measurement year. The total savings are calculated as the difference in demand between these periods after adjusting for site-specific factors such as production, weather, and occupation. The peak hours for SEM demand savings measurement are consistent with GMO's other energy efficiency programs: the average demand for the hours ending 4PM through 6PM on non-holiday weekdays for the period June 1 – August 31. The peak hours that fall within a cohort's energy savings measurement period will be used to calculate that program year's demand savings, such that the energy savings and peak demand savings periods are coincident to the extent possible. A detailed explanation of the methodology is provided in Appendix H.

The implementer provided models which were used to calculate demand savings for each site. However, no demand savings were claimed by the IC for any of the sites in PY 2018.  . Navigant used the models provided to verify demand savings, and the site-level savings are shown in Table 5-4. Realization rates were not calculated since no demand savings were claimed.

**Table 5-4. SEM Program Project-Level Energy and Peak Demand Savings and Realization Rates**

| Navigant Site ID | Reported kWh | Verified kWh | Energy RR (%) | Verified kW | Number of Models | Reason for Discrepancy |
|---|---|---|---|---|---|---|
| **Site A** | 0 | 0 | N/A | 0 | 1 | Opted out of the program before year 3. |
| **Site B** | 0 | 0 | N/A | 0 | 1 | Opted out of the program before year 3. |
| **Site C** | 34,212 | -111,961 | N/A | -13.49 | 2 | Navigant compared the energy use in PY2018 (February - May) to the energy use in the equivalent time period in PY2017. This led to negative verified savings while the implementer reported positive savings. |
| **Site D** | 480,095 | 43,592 | 9% | 0 | 1 | Navigant compared the energy use in PY2018 (February - May) to the energy use in the equivalent time period in PY2017. This led to lower verified savings than the implementer reported. |
| **Site E** | -251,385 | 0 | N/A | 0 | 1 | Customer opted out of the program before year 3. The implementer reported negative savings in PY2018 to account for PY2016 savings being claimed in PY2017, but Navigant did not verify savings in PY2018. |
| **Site F** | -94,040 | -89,359 | N/A | 17.47 | 1 | Navigant compared the energy use in PY2018 (January - February) to the energy use in the equivalent time period in PY2017. This led to verified savings that are less negative than the savings reported by the implementer. |
| **Site G** | 0 | 0 | N/A | -49.18 | 1 | Opted out of the program before year 3. Demand savings are claimed from PY2017. |
| **Site H** | -21,010 | 0 | N/A | 0 | 1 | This site contains two buildings, one which is in GMO and one which is in KCP&L-MO. The models for these two buildings were combined after PY2016 due to a large section of one building migrating to the other building. All energy savings were calculated using this combined model, and the savings were verified in KCP&L-MO because the larger building is located there. |

*Source: Navigant analysis*

#### *5.2.1.4 Net-to-Gross*

Navigant applies 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). Without the SEM program, customers would not have the tools or ability to address the savings identified through the SEM program. While savings from initial use of the tools still persist, they do so at a lower magnitude. Navigant accounts for free ridership and spillover within the model by developing a baseline calibrated to 2-years of pre-activity and by removing any capital expenditures that also received incentives.

### *5.2.2 Cost-Effectiveness*

This section presents Navigant's cost-effectiveness evaluation for the SEM program for each of the five standard benefit-cost tests. Reference Section 1.2 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 5-5 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2017 and program to date, as well as the Total Resource Cost (TRC) test filed by GMO. The benefits for changes in coincident demand that occurred as part of behavioral changes made in PY2017 but could not be verified until PY2018 are included in the "Program Overall" line in Table 5-5 below and can be found in the "Overall Results PY2018" tab of the accompanying Databook. The lower benefit cost ratios for the program-to-date values reflect the costs incurred in PY2016 and PY2018, while benefits were largely achieved in PY2017. The impact of the declining savings rate as described above is captured in the PY2017 cost-effectiveness values and included in the program-to-date results. The below table shows a lower program-to-date benefit cost ratio because while there were incremental savings there were costs incurred by the program in PY2018. Therefore, we chose not to show a benefit cost ratio for 2018 and just include this impact in the program-to-date values.

**Table 5-5. SEM Program Benefit-Cost Ratios**

| Program Year | TRC Test[39] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | N/A | N/A | N/A | N/A | N/A | N/A |
| 2017 | 1.50 | 2.17 | 2.33 | 2.17 | 12.06 | 0.57 |
| 2018 | N/A | N/A | N/A | N/A | N/A | N/A |
| **Program Overall** | **N/A** | **1.29** | **1.36** | **1.28** | **12.13** | **0.48** |

*Source: Navigant analysis*

Navigant applies a 5-year measure life that accounts for persistence and degradation of savings resulting from SEM interventions. This value is based on an evaluation completed for another Midwestern utility SEM program. During this evaluation, Navigant investigated the persistence of savings for customers who had participated in the program for multiple years to develop an Effective Useful Life (EUL). Navigant used the following process to develop the EUL:

[39] The TRC Test GMO column provides the total resource cost test results based on reported values that was provided by KCP&L staff.

- Navigant was given SEM energy models developed by the implementer for approximately 50 sites that covered three years of program participation.
- For each of these sites, the first year was focused on training. In program years 2 and 3, the evaluator provided minimal support, but the implementer continued to collect data to create and evaluate the energy models.
- Navigant defined EUL as the number of years it would take for the annual savings achieved by the SEM program to be 50% of what was derived in year 1. For example, if a site saved 100 kWh in year 1, the measure would reach the end of its life once the site was savings 50 kWh annually.
- Navigant found that savings reached this end of life between 4 and 5 years. After interviewing customers, Navigant identified that some of the reduction in savings was due to issues with the energy models and calculating savings. Issues included capital projects that were not accounted for in the model, changes in site processes, and anomalous operation that could not be properly accounted for using energy model developed.

### *5.2.3 Process*

GMO's SEM program employs a systematic approach to delivering persistent energy savings to organizations by integrating energy management into regular business practices. The SEM program began in April 2016 and ended in March 2018 with a 3-year goal of 12.1 GWh in energy savings and 2.8 MW in demand savings. The program involved forming an energy team within participating organizations that regularly correspond with program representatives. An Energy Scan was performed at each participant site identifying low cost behavioral changes and measures eligible for GMO's other EE incentive programs.

Navigant addressed one process evaluation research question and the five Missouri-required questions for process evaluation through in-depth interviews with program staff and the implementation contractor. Table 5-6 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

**Table 5-6. SEM Questions and Activities**

| Process Evaluation Research Questions | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | • Program staff interview<br>• Implementer interview |
| **Missouri-Required Questions for Process Evaluation** | |
| 1. What are the primary market imperfections that are common to the target market segment? | • Program staff interview |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | • Program staff interview<br>• Implementer interview |
| 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 interview<br>• Implementer interview |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interview<br>• Implementer interview |
| 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 interview<br>• Implementer interview |

*Source: Navigant analysis*

#### *5.2.3.1 General Process Evaluation Questions*

To conduct the process evaluation, Navigant conducted in-depth interviews with the SEM program staff and the IC. The process evaluation also included a review of GMO's progress on previous recommendations. The following is a list of the PY2017 recommendations and the status of the recommendation.

**QUESTION 1: What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?**

In the PY2017 report, there were four findings and recommendations for the SEM program. Below is a restatement of the PY2017 process evaluation recommendations and corresponding updates for those findings:

- **FINDING 1:** The limited amount of time customers have to focus on EE prevents them from identifying and implementing projects. Creating a Shared Energy Manager position will help ease the burden and create opportunities for both behavioral and capital measures.

  - **STATUS:** In PY2018, the Energy Advisor role was expanded to include the Shared Energy Manager function. The Energy Advisor continued to meet with the customer to review the opportunity registers on a monthly basis to help them achieve as many of the opportunities as possible.

- **FINDING 2:** It is unclear to current participants if the program will be available next year. Navigant recommends informing the current participants the status of the program. If the program will continue, consider forming an alumni cohort for the existing participants to join. Alumni cohorts encourage sustaining existing energy savings and the identification of additional savings.

  - **STATUS:** This program is not expected to continue in its current form in MEEIA Cycle 3. Therefore, there was not an Alumni cohort formed in PY2018. GMO has taken this recommendation into consideration for MEEIA Cycle 3.

- **FINDING 3:** The program identifies and addresses the major end uses for these sites providing training for the participants to become self-sufficient in identifying and implementing energy efficiency measures. However, one participant noted that the recommendations provided did not achieve their expected level of savings. Before expanding further into new Commercial segments, GMO should ensure there is an understanding of the energy end-uses of these customers so that energy-savings recommendations can be given.

  - **STATUS:** Because workshops and training for the SEM program were limited in PY2018, the implementation contractor was unable to address this recommendation. Navigant recommends that for Cycle 3, as part of the Business Process Efficiency program, the implementation contractor ensures they understand the energy end-uses of the customer so that energy-savings recommendations can be given.

- **FINDING 4:** Over 40% of the interviewed participants felt the cost of the MEEIA rider (the EE rider) did not offset the benefits of the SEM incentive and lower energy costs. On a scale of 0-10, participants ranked the program's influence to install capital measures an average of 6 (n=7). Working with the implementer, GMO could develop a checklist identifying the benefits (including non-energy benefits) a participant realizes by reducing their energy usage to encourage a customer's participation in the program.
  - **STATUS:** Because program activity in PY2018 was limited, the recommendation to develop a checklist was not addressed. Navigant recommends that for Cycle 3, a checklist identifying the benefits (including non-energy benefits) a participant realizes by reducing their energy usage to encourage a customer's participation in the program is developed. Because there was no formal program in PY2018, program activity in PY2018 was limited, the recommendation to develop a checklist was not addressed. Navigant recommends that for Cycle 3, a checklist identifying the benefits (including non-energy benefits) a participant realizes by reducing their energy usage to encourage a customer's participation in the program is developed.

#### *5.2.3.2 Missouri-Required Questions for Process Evaluation*

The following are the team's findings regarding the MO requirements for process evaluation, the associated recommendations can be found in Section 5.3.2.

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1:** As identified in the PY2017 report, time and money needed to participate in SEM activities continues to be a market imperfection identified in this program. This was exemplified by most of the customers needing assistance in maintaining this energy model.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2:** GMO has a well-defined target market for the SEM program. KCP&L's SEM team works with its key accounts team to identify high energy usage customers with approximately 10 MWh of annual consumption and then validates whether these customers have the savings potential to participate in the program by conducting onsite visits. A planned, intentional reduction in customer support and engagement led to the decline in participation in PY2018.

**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?**

**FINDING 3:** The SEM program addresses all the major energy end-uses for the majority of participants.

- The SEM program focuses on behavior-based and no-cost or low cost measures that may fall under any major end use.
- Overall, the SEM program can address any end use at a facility if there are possible behavior-based, no-cost or low cost measures available. Other Business EER programs (like Standard and Custom) are available to address capital projects.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4:** GMO directly markets the SEM program to its customers through key accounts. This is appropriate as these accounts prefer a personalized approach in place of a broad-focused marketing effort.

- Larger energy consumers prefer a personalized approach where the benefits of the program to their specific facility are discussed.

**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?**

- **FINDING 5:** There was not an option for existing participants to continue their involvement in the program and the pursuit of energy saving opportunities. GMO should develop and Alumni group

of past participants and provide the needed support to allow them to implement identified energy and demand savings measures and maintain their energy models

- **FINDING 6:** The Key Account customer is the target segment for the SEM program. However, given the complexities of a large customer and such a limited time, the implementation contractor had limited access to key account customers, restraining the avenues that could be explored to develop new energy and demand savings opportunities**.**
- **FINDING 7:** The transition of participant's energy sponsor or champion made it difficult to maintain the changes made, update the energy model, and continue to address the opportunities identified in the register.

## 5.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are based on corresponding findings to move the GMO Business EER – SEM program forward and meet the MEEIA target. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 5.3.1)
- Recommendations from the process evaluation (Section 5.3.2)

### *5.3.1 Impact*

Navigant provides the following recommendations based on its analysis of the provided site-level models and reports. These comments are intended to improve program model consistency, ensure that enough information is provided for future review, and better align reported and verified savings. Navigant's findings and recommendations for PY2018 are consistent with those from PY2017.

1. Steps should be taken to only count the savings which were achieved in the reported program year. Navigant recommends designing SEM program years in 12-month increments. Savings related to SEM activities have a strong seasonal dependence due to weather, production, and occupancy, which causes difficulty in annualizing savings.
2. Develop a process for coordination across C&I programs to identify capital projects at SEM sites, and ensure savings models are adjusted accordingly.
3. When creating detailed energy models, the implementer should carefully consider the following:
    - All outliers should be identified, explained, and carefully handled. If data points are removed, the model should be annualized. All outliers should be checked in both the

baseline model and the measurement model to ensure that any seasonal or reoccurring outliers are handled the same in both models.

- Placeholder variables that represent certain project installations or permanent site change should be used sparingly as they do not change in the measurement model.
- Each model should include a variable that represents site load. This could be a production variable for manufacturing sites, occupancy for hospitals or offices, or other similar variables that adjust site usage to site operation.
- When possible, all variables should be independent variables to not count the impact of certain changes multiple times.
- If the value for a production variable is an outlier for a given month, the production should not be capped. The value should either be discarded or included, depending on the statistical significance.

### *5.3.2 Process*

The SEM achieved a significant portion of the 3-year MEEIA target. The SEM program was a 3-year effort ending in PY2018. There were no new participants added nor any workshops or training provided in PY2018, and the SEM program will not be offered or operated after PY2018. The SEM program will likely continue in MEEIA Cycle 3 as one of three possible delivery channels of the Business Process Efficiency program.

**Table -5-7. SEM Program Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market? | The time and money needed to participate in the SEM program continues to be an identified market imperfection. This was exemplified by most of the customers needing assistance in maintaining their energy models.<br><br>The Energy Advisor's role as a Shared Energy Manager could be expanded to include the more technical required of a participant performs such as the maintenance of the energy model or the cost benefit analysis of the recommended opportunity. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | GMO had a well-defined target market for the SEM program. KCP&L's SEM team worked with its key accounts team to identify high energy usage customers with approximately 10 MWh of annual consumption and then validates whether these customers have the savings potential to participate in the program by conducting onsite visits. The SEM program will likely continue in MEEIA Cycle 3 as one of three possible delivery channels of the Business Process Efficiency program at which point the appropriateness of the target market will need to be reexamined. |
| 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 identified and addressed the major end uses for these sites providing training for the participants to become self-sufficient in identifying and implementing energy efficiency measures. |

| Missouri Question | Navigant Recommendation |
|---|---|
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | In PY2016 and PY2017, the delivery of the program was varied to meet the diverse needs of the participant and included separate training workshops, workbooks designed specifically for the industrial and commercial customer. The implementer provided Onsite Energy Scans to identify low cost energy saving measures and opportunities to save energy through participation in GMO's other EE programs. This delivery method was successful and should be continued in Cycle 3. The SEM program will likely continue in MEEIA Cycle 3 as one of three possible delivery channels of the Business Process Efficiency program at which point the appropriateness of the target market will need to be reexamined. |
| 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? | There was not an option for existing participants to continue their involvement in the program and the pursuit of energy and demand saving opportunities. GMO should develop and Alumni group of past participants and provide the needed support to allow them to implement identified energy and demand savings measures and maintain their energy models.<br><br>The Key Account customer is the target segment for the SEM program. However, given the complexities of a large customer such a limited time, the implementation contractor had limited access to work directly with them reducing the potential energy and demand savings**.** To successfully engage participants, the implementing contractor should have full access to work with the participant and support their efforts in implementing energy and demand saving measures.<br><br>The transition of participant's energy sponsor and or champion made it difficult to maintain the changes made, update the energy model and continue addressing the opportunities identified in the register. This lack of consistency reduced the persistency of long-term savings. The implementation contractor should help the participant design a procedure manual which explains the energy and demand saving measures implemented at the site and how they can be maintained. |

*Source: Navigant analysis*

# 6. SMALL BUSINESS LIGHTING

## 6.1 Program Description

The Small Business Lighting (SBL) program was a new program for the program year (PY) 2016-PY2018 implementation cycle. It stopped accepting applications at the end of PY2017 due to successfully exhausting available funding; however, 10 projects that submitted applications in PY2017 were completed in PY2018. The SBL program offered small business customers an energy assessment that included information on potential energy savings and anticipated payback. The SBL program also offered lighting measures similar to most of the Standard program measures. However, in general, the program offered higher incentives per measure than the Standard program. This was to help small business customers overcome the financial hurdle to implement the energy efficiency (EE) measures. To ensure only small business customers benefited from these higher incentives, customers had to have an average monthly coincident peak demand below 100 kW at one location, or if they had more than one location, an aggregate average monthly coincident peak demand below 100 kW over the past year to qualify for the program. The program capped the total incentive that can be received for a project at 70% of total project cost (equipment and installation). Eligible measures included but are not limited to occupancy sensors, light-emitting diode (LED) exit signs, and T5 lamps.

**Table 6-1. SBL Program Description**

| SBL Key Details | |
|---|---|
| **Sector** | Commercial and industrial (C&I) |
| **Implementation Contractor** | CLEAResult |
| **Program Description** | The Small Business Lighting (SBL) program provides the smaller customer (with an average monthly coincident peak demand less than 100 kW over the past year) an opportunity to lower their lighting bills through a low cost turnkey direct install program.<br>The program is based on a per-measure installation, with deemed costs, rebate, and savings amounts. It is limited to replacement and retrofits for the following categories of lighting measures:<br>• Light-emitting diode (LED) exit sign<br>• Directional/omni-directional LED lamps<br>• High bay/low bay fluorescent fixtures<br>• Lighting controls (daylighting/occupancy)<br>• Parking garage LED lamps<br>• Linear/troffer LED lamps<br>• Refrigerator/freezer case lighting<br>• Exterior LEDs<br>• LED downlights |

| SBL Key Details | |
|---|---|
| **Application Process** | Working with an authorized lighting contractor, participants have a free lighting evaluation performed on their facility to identify lighting recommendations. The contractor provides the participant with a proposal of the improvements, the payback, and any available rebates. After selecting the lighting installation plan, the contractor will receive preapproval for the project and complete the work. The contractor will receive the rebate directly from the program so the customer will need to pay for any remaining project costs. |
| **Verification of Purchase/Project** | Upon completion of the project, CLEAResult performs full site pre and post inspections on the first three rebate applications submitted by each new contractor for quality assurance in addition to projects with greater than average scope or perceived variability. After the first three projects, CLEAResult reviews every application before granting preapproval for project to move forward. |
| **Rebate Process** | The rebate is paid directly to the contractor; the participant pays the remaining project costs. The rebate amount is established on a per-measure basis. The total amount a participant can receive is limited to 70% of the project's cost. |
| **Disputes, Rejected Applications** | Measures that do not meet minimum efficiency requirements do not qualify for rebates. Disputes are escalated from the implementation contractor's (IC's) outreach and administration teams to program management. Final resolutions are documented in the IC database. |
| **Project Reporting** | The IC populates the database as projects are completed. There is a monthly upload from the IC to the Kansas City Power and Light (KCP&L) data warehouse for reconciliation. |

*Source: Program staff and supporting documents*

## 6.2 Evaluation Findings

Kansas City Power and Light (KCP&L) introduced SBL as a new program in PY2016. Navigant's findings indicate the SBL program is performing well. While it almost surpassed the 3-year MEEIA Cycle 2 target by the end of PY2017, 10 additional projects were completed in PY2018, bringing to-date verified savings up to 99% and 93% of energy and demand savings targets, respectively. Navigant's process research indicates that the program was successful in its third year, it exhausted almost all funding in KCP&L-MO and Greater Missouri Operations (GMO) by the end of PY2017. Navigant also found a relatively high realization rate of PY2018 energy and demand savings (92% and 82%, respectively) through its impact evaluation of tracking data.

For the impact evaluation, Navigant performed a tracking database review and a deemed measure savings review. The evaluation team reviewed the tracking database to verify its validity and ensure that it contained all necessary information to evaluate the program (see Appendix I). The evaluation team reviewed the deemed measure savings that the KCP&L team developed and assessed it for the reasonability of the algorithms and assumptions used (see Appendix I). Navigant combined the onsite inspections for the SBL program with Standard program fieldwork to determine the lighting hours of use (HOU) and coincidence factors (CFs) by building type in PY2017. Navigant had previously verified installed measure quantities, equipment specifications (i.e., size, capacity, wattage) and operating parameters (i.e., observed building type, HOU, CF). HOU and CF had been updated in PY2017 based on

the long-term onsite data and Navigant used them to recalculate the energy and demand savings (see Appendix I for methodology).

Navigant conducted program staff interviews, program material review, and review of implementer administered customer surveys.

The following sections summarize Navigant's PY2018 findings for the SBL program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook companion files. Navigant divided the evaluation findings into the following:

- Impact evaluation findings (Section 6.2.1)
- Cost-effectiveness analysis (Section 6.2.2)
- Process evaluation findings (Section 6.2.3)

### *6.2.1 Impact*

This section provides Navigant's findings from the SBL program impact evaluation for PY2018. Overall, the program achieved a 92% realization rate for energy savings and an 82% realization rate for demand savings (as shown in Table 6-2). Variations in the gross realization rate were due to Navigant's engineering analysis, inclusion of the efficient wattage in the savings calculation, the results of the long-term lighting study, and adjustments to baseline assumptions identified in prior years. Navigant modified the savings calculations based on the engineering analysis and the results of the long-term lighting study. Navigant also included waste heat factors (WHFs) in the verified savings calculation. Based on the results of the long-term lighting study, Navigant adjusted the in-service rate (ISR), HOU, CFs.

Navigant adjusted the ISR, HOU, CFs, and WHFs in the verified savings calculation. To determine the net savings, Navigant used the net-to-gross (NTG) analysis conducted in PY2016 which indicated limited instances of free ridership (FR) (14%) and spillover (SO) (0.2%). Based on these findings, Navigant applied a NTG ratio of 0.87.

**Table 6-2. SBL PY2018 Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 136,332 | 124,891 | 92% | 3,569,963 | 108,905 | 3% |
| Coinc Demand at Customer Meter (kW) | 27 | 22 | 82% | 592 | 19 | 3% |

*Based on PY2016 research, the evaluation team applied a NTG ratio of 0.87 to the SBL program.

*Source: Navigant analysis*

Table 6-3 presents the SBL program's energy and demand saving summary to date in the GMO territory.

**Table 6-3 SBL Program to Date Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA 3-Year Cycle 2 Target | Verified 3-Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 4,546,528 | 4,051,508 | 89% | 3,569,963 | 3,532,915 | 99% |
| Coinc Demand at Customer Meter (kW) | 774 | 632 | 82% | 592 | 551 | 93% |

*Based on PY2016 research, the evaluation team applied a NTG ratio of 0.87 to the SBL program.

*Source: Navigant analysis*

#### *6.2.1.1 Tracking Database Review*

The program tracking database review ensures sufficient data is captured regarding the installed projects (i.e., quantity, wattages, efficiency, building type, etc.) to support the engineering analysis used to calculate verified savings. Table 6-4 shows the disaggregation of total reported energy savings by lighting measure types.

**Table 6-4. SBL PY2018 Summary by Measure Type**

| Measure Type | Reported Energy Savings (kWh) | Percentage of Total | Reported Demand Savings (kW) | Percentage of Total |
|---|---|---|---|---|
| LED Linear | 82,671 | 61% | 18 | 66% |
| LED Screw In | 25,767 | 19% | 4 | 16% |
| Lighting Optimization | 21,016 | 15% | 4 | 16% |
| LED Exterior | 4,369 | 3% | 0 | 0% |
| LED Low/ High Bay | 2,420 | 2% | 0 | 2% |
| LED Other | 0 | 0% | 0 | 0% |
| Lighting Control | 0 | 0% | 0 | 0% |
| **Total** | **136,332** | **100%** | **27** | **100%** |

*Source: C&I SBL Program Tracking Database and Navigant analysis*

The program tracking database lists projects completed during the program year and includes measure details, energy and demand savings, application dates, and unique project numbers assigned by the implementation contractor (IC). Savings calculations include spreadsheets used by the ICs or the site's personnel to calculate the energy and peak demand savings.

Major findings from tracking database review included the following:

- **The tracking database contains sufficient information:** Overall, Navigant found that the database contains sufficient information to support the impact evaluation.

- **Incorrect measure codes used on two projects**: In two cases, a different measure code was used for a particular measure, resulting in the deemed savings value being higher than it should have been. This was corrected during the engineering analysis and resulted in a minimal decrease in savings.
- **Tracking database contains efficient measure information:** Inclusion of the efficient measure information allowed Navigant to use the actual efficient wattage which overall increased the realization rate such that for many measures it was greater than 100%.

#### *6.2.1.2 Deemed Measure Savings Review*

Navigant reviewed the deemed savings to verify the validity of the engineering algorithms used and the inputs to those algorithms. Navigant adjusted algorithms and inputs with data that best reflects the performance of equipment in the GMO service territory using onsite verification results. Navigant's review found the following:

- Navigant found that GMO uses industry-standard algorithms for all 14 SBL measures in PY2018.
- Assumptions for Waste Heat Factors (WHE), Coincident Factors (CFs), and Hours of Use (HOU) were previously used from four different sources and did not vary by building type. For evaluation purposes, Navigant created building type-specific values using the onsite verification results described below as an improved approach. These values were used in both the PY2017 and PY2018 evaluation.

#### *6.2.1.3 Onsite Findings*

Navigant completed the long-term lighting logger study started in PY2016 to capture improved primary inputs for the engineering analysis equations to be used as part of PY2018's evaluation. The information captured during the onsite visits included:

- Observed building type
- Actual installed quantity
- Typical operating schedules from onsite interview
- Installed lighting loggers to capture data for lighting measures.

To maximize evaluation resources and based on discussions with the IC and GMO, Navigant evaluated both service territories in a combined sample. This was found to be a reasonable approach due to similarities in program execution. Navigant also only included three strata for the long-term metering: "Office," "School," and "Warehouse." These three strata represent a large fraction of the savings and may have operating conditions that vary by season. Table 6-5 summarizes the meter count by strata for the long-term metering study for the Standard program. Some of these sites are smaller and may have building characteristics representative of sites in the SBL program.

**Table 6-5. Business EER Standard Program Meter Count by Building Type for Long-Term Metering**

| Strata | Long-Term Sampling | | Total Installed Meters |
|---|---|---|---|
| | GMO Installed Meters | KCP&L-MO Installed Meters | |
| Office | 3 | 20 | 23 |
| School | 15 | 29 | 44 |
| Warehouse | 12 | 18 | 30 |
| **Total** | **30** | **67** | **97** |

*Source: Navigant analysis*

Navigant included the HOU and CF determined from lighting loggers installed in Cycle 1 and in SBL sites to increase the size of the overall sample. Navigant included these sites after reviewing the measures rebated through SBL and Standard, finding that, based on reported savings, the distribution of savings was similar between the programs. For example, high bay lighting measures continue to represent the majority of savings for both programs and territories. In GMO, high bay lighting measures made up 56% for the Standard program and 23% for the SBL program. In KCP&L – MO, high bay lighting measures made up 61% for the standard program and 14% for the SBL program.

Navigant reviewed the lighting measures offered in the Standard and SBL programs and found that the majority of measures in the SBL program have reported savings identical to the Standard program. The main difference with the SBL program is that it serves smaller C&I customers. While the operating characteristics for small participants in SBL and the larger participants in Standard may be similar for some building types, other building types may have operating differences between the small and large customers. For example, a smaller retail building may close at 6 p.m., whereas a large retail store may stay open to 10 p.m. or later and be open on Sundays. Navigant assumed that smaller customers that participated in the Standard program would have similar operating schedules to smaller customers that participated in the SBL program. For the SBL program, Navigant used the HOU and CF developed for the small substratum sites across Cycle 1 Standard, and Cycle 2 Standard, and SBL. This is discussed in more detail in Appendix I.

The HOU and CF used reflect findings from the long-term lighting study. Navigant's analysis of the long-term lighting study data showed a change in HOU that ranged from -46% for "Office" to +15% for "Exterior" and a change in CF between -18% for "Office" and "Other" to +3% for "Industrial" building types.

- Table 6-6 shows a comparison of PY2016 inputs used in the PY2018 evaluation.
- Navigant also used the WHF energy (WHFe) and WHF demand (WHFd) based on actual building types from the Illinois Technical Reference Manual (IL TRM), similar to the analysis in PY2016. Table 6-7 shows the WHFs used for PY2018. Table 6-8shows the input assumptions that were used to develop reported savings.
- During onsite verification completed in PY2016, Navigant verified 2.5% of the total lights were in storage and not connected to any electricity circuit. Navigant uses this information to update the ISR in the lighting savings calculation. Lights were not found onsite for several reasons:
    - Onsite contact does not have information on these measures
    - Limited access to the installed location

- Unable to locate due to an unknown reason
- Different lamp types found at location instead

**Table 6-6. SBL Updated Calculation Parameters from Onsite Findings**

| Building Type | PY2016 CF | PY2018 CF | PY2016 HOU | PY2018 HOU |
|---|---|---|---|---|
| Industrial | 0.62 | 0.64 | 5,144 | 4,262 |
| Office | 0.75 | 0.61 | 4,484 | 2,399 |
| Other | 0.67 | 0.55 | 5,280 | 4,774 |
| Retail | 0.83 | 0.77 | 5,662 | 4,183 |
| School | 0.59 | 0.53 | 4,074 | 3,675 |
| Warehouse | 0.64 | 0.56 | 4,110 | 2,378 |

*Source: C&I SBL Program Tracking Database and Navigant analysis*

**Table 6-7. Waste Heat Factors for PY2018 Evaluation**

| Building Type | PY2018 WHFe | PY2018 WHFd |
|---|---|---|
| Industrial | 1.02 | 1.04 |
| Office | 1.21 | 1.44 |
| Other | 1.09 | 1.36 |
| Retail | 1.12 | 1.29 |
| School | 1.18 | 1.35 |
| Warehouse | 1.00 | 1.22 |

WHFe = waste heat factor energy, WHFd = waste heat factor demand, CF = coincidence factor
*Source: Navigant analysis*

**Table 6-8 SBL Reported Savings Assumptions and Sources**

| Source | Measure | WHFe | WHFd | CF | Hours |
|---|---|---|---|---|---|
| AEG KCP&L Program Plan 2016-2018 | All Interior | 1.34 | 1.41 | 0.66 | 3,088 |
| AEG KCP&L Program Plan 2016-2018 | Low/High Bay | 1.34 | 1.41 | 0.83 | 4,367 |
| Weighted Averages Using in TRM | Linear LEDs | 1.2 | 1.5 | 0.75 | 4,128 |

*Source: KCP&L TRM*

#### *6.2.1.4 Engineering Review*

To verify the SBL program's measure savings, Navigant performed an engineering review (see Appendix I for more information). In the engineering review, Navigant calculated each measure's savings using the MEEIA deemed assumptions to verify whether the tracking system and IC's database align. Navigant further compared the quantity from these two different datasets. The evaluation team found that there are no discrepancies between these two datasets.

#### *6.2.1.5 Net-to-Gross*

Table 6-9 summarizes the components of the NTG ratio determined in PY2016 and used for PY2016, PY2017, and PY2018. The NTG ratio of 87% is driven primarily by low FR found in the participant survey. FR is low mainly due to the high reported program influence and the fact that nearly two-thirds of participants indicated that they would have canceled or postponed the project in the absence of the program. Low SO may reflect the wide variety of lighting upgrade rebates available through the program that are meeting participants' lighting needs, and the overall satisfaction of participants and trade allies with the ease of participation in the program.

**Table 6-9. SBL NTG Components and Ratio: PY2018**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| 2018 | 0.14 | 0.002 | 0.01 | 87% |

*FR = free ridership, PSO = participant spillover, NPSO = nonparticipant spillover, NTG = net-to-gross*
*Source: Navigant analysis*

### *6.2.2 Cost-Effectiveness*

This section presents Navigant's evaluation of cost-effectiveness for the SBL program for each of the five standard benefit-cost tests. Please refer to Section 1.2 for information on how benefits and program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

Navigant applied a mid-life adjustment to both standard and specialty lamps offered through the SBL program. This adjustment reflected a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA). The IL TRM v7 guided this adjustment, and it assumes that CFLs will become the baseline in 2021 for standard bulbs and 2024 for specialty bulbs. The annual savings claimed were reduced within the life of the measure to account for this baseline shift and were incorporated into cost effectiveness screening calculations. Although recent final and draft rulemakings by the Department of Energy (DOE)[40] now make it unlikely that these changes in efficiency standards will occur as assumed in the IL TRM v7, the Navigant team has retained the mid-life adjustment for the PY2018 evaluation because the program implementation and verification efforts occurred prior to the September 2019 release of the DOE rulings. This decision results in conservative estimates of the cost-effectiveness for standard and specialty lamps in these programs.

Table 6-10 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, and program to date, as well as the Total Resource Cost (TRC) test filed by GMO. In PY2018, program participation was limited in the Small Business Lighting program to projects that were initiated at the end of PY2017 and finalized in the first quarter of PY2018. As such, benefits and costs for this limited participation have been included in the sector level results presented above in the Executive Summary.

[40] https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps
https://www.federalregister.gov/documents/2019/09/05/2019-18941/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps

above and in the "Program Overall" line in Table 6-10 below. Benefits for PY2018 can be found in the "Overall Results PY 2018" tab of the Databook.

**Table 6-10. SBL Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[41] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 1.25 | 0.78 | 0.88 | 0.91 | 1.75 | 0.47 |
| 2017 | 1.19 | 1.07 | 1.28 | 1.91 | 1.33 | 0.76 |
| 2018 | N/A | N/A | N/A | N/A | N/A | N/A |
| **Program Overall** | **N/A** | **0.92** | **1.09** | **1.37** | **1.46** | **0.63** |

*Source: Navigant analysis*

### *6.2.3 Process*

In PY2018, Navigant addressed two process evaluation research questions and the five Missouri-required questions for process evaluation through staff interviews, a program materials review, and IC administered participant surveys.

Table 6-11 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

[41] The TRC Test GMO column provides the total resource cost test results based on reported values that was provided by KCP&L staff.

**Table 6-11. SBL Process Evaluation Research Questions and Approaches**

| Process Evaluation Research Question | Evaluation Activities |
|---|---|
| **General Process Evaluation Questions** | |
| 1. How satisfied are participants with the program overall? | • Program staff interviews<br>• Implementer administered participant surveys |
| 2. What changes would be made if the program were to restart in Cycle 3? | • Program staff interviews |
| **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<br>• Implementer administered 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<br>• Implementer administered participant surveys |

*Source: Navigant analysis*

The team's findings and recommendations are provided in Section 6.3.

#### *6.2.3.1 General Process Evaluation Questions*

**QUESTION 1: How satisfied are participants with the program overall?**

**FINDING 1: Navigant's review of the implementer administered participant surveys indicated that there is a high satisfaction among the participants for the SBL program. This finding aligns with the customer and trade-ally surveys conducted in PY2016 and PY2017.**

- Only one customer out of the 10 total projects for this program year responded to the implementer administered customer survey during PY2018. This is too small of a sample to draw any conclusions. However, looking at the responses for Cycle 3 overall, participants gave an average score over 9 with 10 being extremely satisfied when asked how satisfied they were with GMO's SBL program.

**QUESTION 2: What changes would be made if the program were to restart in Cycle 3?**

**FINDING 2: GMO is considering expanding the program to other end uses beyond lighting based on the success seen with the lighting program.**

- GMO is still considering potential changes to the C&I programs for Cycle 3. One possibility they are considering is adding more energy end uses to transform the SBL program to a small business direct install program. It is possible that additional measures would also be well received by the targeted market based on the success of the SBL program.

#### *6.2.3.2 Missouri-Required Questions for Process Evaluation*

Considering the SBL program operated in such a limited capacity for this program year, the process related findings did not change from those in PY2017.

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: The primary market imperfection common to the target market for the SBL program is that most of the customers that qualify for the program have less resources such as time and money to pursue the efficient lighting projects.**

- Small business customers are likely to be limited in both time and money to pursue lighting projects that could lead to fast paybacks. The SBL program addresses this issue in two ways. First, the incentive levels are higher than the Standard program—with up to 70% of project costs to help with the lack of available funds. Second, the trade ally facilitates the incentive process by proposing the efficient lighting solution, managing the preapproval process, and handling the rebate.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: The target market is well defined but could be expanded to additional groups.**

- The SBL program targets small business customers who have an average monthly coincident peak demand of 100 kW or lower. The lower demand helps to identify the small business owner who could benefit from additional incentives and education about efficient lighting measures.
- Some additional groups that might benefit from the higher incentives and additional EE education are nonprofit organizations such as churches or community centers. These organizations tend to have limited budgets for improvements. However, in some cases these organizations did not qualify for the SBL program due to their coincident demand being higher than 100 kW.
- All applications submitted to the SBL program by a trade ally go through a preapproval process where the implementer confirms that the project is eligible for the program. This allows for the program to be consistent in which customers are part of the SBL program.

**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?**

**FINDING 3: The lighting measures provided by the SBL program cover the wide range of lighting types that may be present in a small business. Expanding to other end-use categories may be worth considering for Cycle 3 as part of a small business direct install program.**

- The incentives available for the SBL program range from less than $1 for a 28 W, 4-foot fluorescent lamp to more than $450 for LED high bay fixtures replacing a fixture with more than 750 W. This large range in available rebates exemplifies the diversity of lighting measures available in the SBL program.
- If the SBL program were to expand to another end-use category, other rebates could focus on heating or cooling measures, water saving measures, or refrigeration measures.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: Communication channels and delivery mechanisms are working for the program as-is, though there are opportunities for further improvement.**

- The effective communication channels helped lead to the success of the SBL program, as evidenced by the fact that it surpassed its 3-year target in a little over 2 years. With the discontinuation of the program in PY2018, the webpage clearly indicated the availability of other programs, such as the Standard program.
- For the SBL program, GMO developed two case studies for targeted marketing, one of a bank and one of a gift boutique. These case studies provide useful information to potential program participants. However, there is no way to access these case studies directly on the webpage. Increasing the amount of material available online may increase participation if the program starts up again in Cycle 3.

**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?**

**FINDING 5: Overall, the SBL program ran successfully but exhausted all funding before the end of the cycle. Moving forward, the implementer and GMO could consider changes to future programs so that they can last the entire cycle.**

- Ending a program mid cycle even if it is due to over-participation can be disruptive to customers and trade allies. It may also be preferable for planning purposes if the program lasts the entire cycle. Navigant provides recommendations on potential ways to address this issue moving forward:
    - Increase the 3-year program budget
    - Decrease the incentive levels

## 6.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings if the GMO SBL program were to restart in Cycle 3. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 6.3.1)
- Recommendations from the process evaluation (Section 6.3.2)

### *6.3.1 Impact*

Navigant provides the following recommendations based on its analysis of the program tracking database and completion of the impact analysis activities. These comments are intended to improve program tracking records to facilitate evaluation efforts and to better align reported and verified savings.

**Tracking Data:**

- Consider including the incremental cost in the tracking database. The incremental cost for the installed measures is useful in calculating the benefit-cost ratios for the measures. This information is easier to track and include in the database from the beginning—if it is available at project initiation.

**Contractor Training:**

- KCP&L could work to train contractors to limit increasing light output from the project. Navigant noticed that in a few instances, LED fixtures that replace more than one lamp were installed when it was indicated only one lamp was removed, leading to “negative” savings.

**Onsite Verification:**

- Based on findings from the onsite verification, Navigant recommends using an ISR of 99% while calculating the reported savings. The ISR was mainly due to lights in storage or an inability to locate the fixtures.

**Figure 6-1. SBL Program Impact Recommendations: PY2016**

| Tracking Data | Contractor Training | Onsite Verification |
|---|---|---|
| • Consider including incremental cost in the tracking database which will help for calculating the benefit-cost ratios.<br>• Include additional quality control of reported efficient wattage to check if it aligns closely with deemed savings assumed wattage. | • Reduce "negative" savings by training contractors to replace fixtures like for like and not fixtures that replace more than one lamp when only one lamp is being replaced. | • Use an ISR of 99% while calculating the reported savings. |

*Source: Navigant analysis*

### *6.3.2 Process*

The SBL program had limited activity during PY2018 due to successfully using nearly all its funding by the end of PY2017. This success was driven by demand among small businesses for the education and increased incentives available through the program. Also important to the success of the program was the small group of loyal trade allies that had developed a way for the program to be successful for them. While the program was successful, Navigant identified areas for improvement should the program restart in Cycle 3. First, for future direct install programs, program managers should consider adjusting the program mid-cycle so that the program is able to exist for the entire cycle to limit trade ally confusion. Second, program marketing materials such as case studies or specific web portals should be available on the SBL program webpage. Finally, if GMO decides to expand to other end-use categories, they may consider developing a troubleshooting guide for the OPEN field tool that can be distributed to new trade allies that specialize in other end-use categories. Figure 6-2 presents a summary of Navigant's process recommendations that could be applied if the program were to start again in Cycle 3.

**Figure 6-2. SBL General Process Recommendations: PY2018**


*Source: Navigant analysis*

#### *6.3.2.1 Recommendations Based on the Research Questions*

Navigant added two research questions to the five Missouri-required questions. After interviews with the program manager and IC, and after reviewing the implementer administered participant surveys, Navigant developed the following recommendations based on the two research questions (Table 6-12).

**Table 6-12. SBL Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. How satisfied are participants with the program overall? | Satisfaction was high among participants for the program overall, which seems to be driven by positive experiences with contractors. If the program were to add new end uses in Cycle 3, Navigant recommends continuing to vet new trade allies for these end uses with the same rigor in order to maintain participant satisfaction. |
| 2. What changes would be made if the program were to restart in Cycle 3? | If the program were to restart in Cycle 3, GMO could consider adding new end uses such as HVAC and refrigeration, as well as creating an online application process to replace the current paper applications. |

*Source: Navigant analysis*

#### *6.3.2.2 Recommendations Based on Missouri's Requirements for Process Evaluation*

Navigant addressed the five required process evaluation questions set forth in the MO regulations[42] for the SBL program. The overall success of the SBL program can be attributed to successful implementation of the program. First, the implementer developed strong relationships with a set of trade allies that were able to make the program work for them. Second, the implementer successfully tailored the program offerings to address the lighting savings available in the small business sector. Navigant's recommendations based on these questions are provided in Table 6-13. Due to the limited operation of the SBL program in PY2018, these recommendations did not change from those made in PY2017.

[42] 4 CFR- 240-22.070(8)

**Table 6-13. SBL Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market segment? | GMO could continue to provide additional education, funding, and increased incentive levels to help increase participation for small businesses. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | While GMO has made adjustments in previous program years to further define the target market, they could consider the impact of expanding the program to nonprofit customers that might have more than the 100 kW of average coincident demand. |
| 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? | Similarly to PY2, Navigant suggests if the program moves beyond a lighting only program that this could include refrigeration, heating and cooling, and water heating measures. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | To improve the communication channels, Navigant suggests including case studies or other marketing materials on the program webpage. If the program expands to other end-use categories, it would be best to include an example of a small business customer that did a comprehensive site efficiency upgrade. Additional training or improvements to the OPEN field tool could also improve communication with 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? | As stated in PY2, to more effectively overcome the market imperfections and if there is more overlap between the Standard and the small business program through the inclusion of products outside of lighting, then the program managers could closely review the incentive levels to confirm that participation in the small business program is the most appropriate for small business customers that meet the requirements. |

*Source: Navigant analysis*

# 7. WHOLE HOUSE EFFICIENCY

## 7.1 Program Description

The Whole House Efficiency (WHE) program encourages whole house improvements to existing homes by promoting home energy audits and comprehensive retrofits. Customers are eligible for this program if they own or rent a residence. The program has five key goals:

- Demonstrate persistent energy and demand savings
- Encourage energy-saving behavior and whole house improvements
- Help residential customers reduce their electricity bills
- Educate customers about the benefits of energy efficient homes
- Develop partnerships with HVAC contractors and energy auditors to bring efficient systems to market

In program year (PY) 2018, customers could participate in the program through three different options, known as tiers. The three tiers are described below.

- **Tier 1 – Home Energy Assessment and Energy Savings Kit:** Offers a home energy assessment and direct install (DI) measures such as faucet aerators, low flow showerheads, advanced power strips, hot water pipe insulation, furnace filter alarms, and energy efficient light-emitting diode (LED) lighting
- **Tier 2 – Weatherization Measures:** Offers building shell and weatherization measures including air sealing, ceiling insulation and wall insulation after completing an energy audit by an authorized energy auditor trade ally.
- **Tier 3 – HVAC Equipment:** Offers HVAC measures such as heat pump water heaters, furnace fans with electronically commutated motors, HVAC tune-ups, ductless mini-split heat pumps, and other efficient air conditioning units and heat pumps

Table 7-1 presents additional details about the WHE program.

**Table 7-1. WHE Program Description**

| WHE Key Details | |
|---|---|
| **Sector** | Residential |
| **Implementation Contractor** | ICF International (ICF) implements the Whole House Efficiency (WHE) program.<br>For Tier 1, ICF employs energy efficiency professionals (EEPs) who conduct the home energy assessments and install the direct install (DI) measures.<br>For Tier 2 and Tier 3, ICF processes applications, provides a program support call center and manages the authorized trade ally networks. |
| **Program Description** | Kansas City Power and Light (KCP&L) offers customers three options, or tiers, to participate in the WHE program. Tier 1 offers home energy assessments and DI energy-saving measures. Tier 2 offers customers incentives to upgrade their home's building shell. Tier 3 offers customers incentives to upgrade their HVAC systems. |

| WHE Key Details | |
|---|---|
| **Application Process** | Residential customers use the KCP&L website to sign up for the free Tier 1 energy assessment and DI measures. Trade allies enroll customers into the Tier 2 and Tier 3 options. |
| **Verification of Purchase/Project** | The Tier 1 energy assessment is conducted by EEPs employed by the implementation contractor (IC). The EEPs also install the DI measures free of charge to the customer. For Tier 2 and Tier 3, the IC reviews customer applications. Additional verification is done through the post-participation surveys and random field inspections for all tiers. |
| **Rebate Process** | Tier 1 DI measures are installed by EEPs free of charge to customers during the home energy assessment. Tier 2 and Tier 3 measures are installed by trade allies who lead the rebate process. |
| **Disputes, Rejected Applications** | Customers can contact the IC's call center for any rebate disputes. The IC handles disputes and elevates them to KCP&L as needed. |
| **Project Reporting** | Project tracking data is collected during all measure installations. The IC sends KCP&L the tracking data continuously. |

*Source: Evaluation team analysis*

## 7.2 Evaluation Findings

Navigant's impact evaluation found that the WHE program had a 68% realization rate for gross energy savings and 69% realization rate for gross coincident demand savings. This means that in PY2018 the program achieved 29% of the 3-year Missouri Energy Efficiency Investment Act (MEEIA) target for net energy savings and 54% of the target for net coincident demand savings. Combining these results with PY2016 and PY2017, the program achieved 89% of its 3-year MEEIA net energy savings target and 193% of its net coincident demand savings target. These results will be added to the savings achieved during the MEEIA extension to quantify the total savings achieved during MEEIA Cycle 2.

An adjustment to baseline efficiency assumptions for early retirement air conditioner and heat pump measures resulted in lower realization rates and verified savings compared to previous years. Despite the reduction in savings, the early retirement measures achieved similarly high participation compared to previous years. The program achieved a 0.87 TRC cost-effectiveness for PY2018.

The following sections present Navigant's PY2018 findings for the WHE program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

- Impact evaluation findings (Section 7.2.1)
- Cost-effectiveness analysis (Section 7.2.2)
- Process evaluation findings (Section 7.2.3)

### *7.2.1 Impact*

Navigant analyzed savings for most measures in the WHE program using industry-standard energy and demand savings algorithms from the Illinois Technical Reference Manual (IL TRM) v5. For early retirement air conditioning and heat pump measures, Navigant used the methodology presented in the IL TRM v7 as it defines a more explicit approach to equipment degradation than the IL TRM v5, including

efficiency values for existing units. Where the measure was not included in the TRM, Navigant used other industry-accepted evaluation methods, as described in Appendix J. The evaluation team extracted input values for the algorithms from the program tracking data whenever possible. The team used deemed inputs from the IL TRM v5 and v7 in most cases when the required input values were not present in the program tracking data. The analysis methodologies, including algorithms and variable input values, are detailed in Appendix J.

Table 7-2 presents the energy and demand savings summary for the WHE program in PY2018. The cumulative energy and demand savings achieved by the program from PY2016 to PY2018 are presented in Table 7-3. The program has achieved 89% of its 3-year MEEIA energy savings target between PY2016 and PY2018, with additional savings to be achieved during the MEEIA 2 extension. The 3-year target for net coincident demand has already been met with the program achieving 193% of the target by the end of PY2018.

**Table 7-2. WHE Program PY2018 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 10,465,375 | 7,085,368 | 68% | 19,717,746 | 5,668,294 | 29% |
| Coincident Demand at Customer Meter (kW) | 4,981 | 3,453 | 69% | 5,072 | 2,763 | 54% |

*Source: WHE program tracking database and Navigant analysis*

**Table 7-3. WHE Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA 3-Year Cycle 2 Target | Verified 3-Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 25,452,581 | 21,982,852 | 86% | 19,717,746 | 17,586,282 | 89% |
| Coincident Demand at Customer Meter (kW) | 11,029 | 12,242 | 111% | 5,072 | 9,794 | 193% |

*Source: WHE program tracking database and Navigant analysis*

The following sections describe the tracking database review, verification results, and the net-to-gross (NTG) ratio for the WHE program in PY2018.

#### *7.2.1.1 Tracking Database Review*

Navigant conducted a tracking database review to assess the following:

- The ability to verify gross savings by including data about the baseline units removed and efficient units installed.
- The level of detail on the characteristics of the program measures, including rebate amounts, number of units installed, and measure-specific data such as unit efficiencies, wattage values, operating schedules, nameplate data, and similar specifications.
- Any possible errors in the data by verifying that the values for each variable fell within reasonable bounds.
- Whether data aligned with expectations based on the program design.

The evaluation team found that most of the measure-specific information needed to verify energy and demand savings was tracked in the database. Some information, however, was not. For cases where needed information was not present in the tracking data, Navigant used industry-approved references, such as IL TRM default values, to calculate the program's verified savings (see more about this in Section 7.2.1.2). Navigant discussed with GMO the need to record the information in future program years.

#### *7.2.1.2 Verification*

Navigant verified the WHE program savings using a two-stage approach. The first was an engineering review to ensure deemed savings approaches were appropriate. The second was the application of the IL TRM algorithms and project-specific data to calculate verified savings.

The evaluation team used site-level data and industry-standard algorithms to calculate the verified savings for the program measures. Consistent with the evaluation team's approach in the MEEIA Cycle 1 evaluation and in PY2016 and PY2017, Navigant referenced the IL TRM, except where otherwise noted.[43] Whenever possible, the team extracted input values (i.e., capacity, efficiency) for the algorithms from the program tracking data. When project-specific inputs were not available, the team used relevant performance variables (i.e., operation hours, coincident factors [CFs]) sourced from the IL TRM that were reflective of the GMO climate. Navigant chose this TRM given its geographic proximity to the GMO service territory. The evaluation team then compared these calculations against the gross energy and coincident demand savings reported by the WHE program.

The WHE program's three tiers achieved a combined 7,085,368 kWh of verified gross energy savings in PY2018 for a realization rate of 68%. The program achieved a combined total of 5,668,294 kWh of verified net energy savings, 29% of the PY2016-PY2018 MEEIA target. The program also achieved a total of 3,453 kW of verified gross coincident demand savings in PY2018 for a realization rate of 69%. The program achieved a total of 2,763 kW of verified net coincident demand savings, 54% of the PY2016-PY2018 MEEIA target.

The following tables show how each of the three tiers of the WHE program contributed to the combined total program savings.

[43] The algorithms for each measure evaluated in this analysis are detailed in Appendix J.

**Table 7-4. WHE Program PY2018 Gross Energy Savings by Program Tier**

| WHE Program Tier | Total Reported Energy Savings (kWh) | Total Verified Energy Savings (kWh) | Energy Realization Rate |
|---|---|---|---|
| Tier 1: Energy Savings Kit | 329,500 | 381,926 | 116% |
| Tier 2: Building Shell Measures | 367,308 | 154,925 | 42% |
| Tier 3: HVAC Measures | 9,768,567 | 6,548,517 | 67% |
| **Total** | **10,465,376** | **7,085,368** | **68%** |

*Source: WHE program tracking database and Navigant analysis*

**Table 7-5. WHE Program PY2018 Gross Coincident Demand Savings by Program Tier**

| WHE Program Tier | Total Reported Coincident Demand Savings (kW) | Total Verified Coincident Demand Savings (kW) | Coincident Demand Realization Rate |
|---|---|---|---|
| Tier 1: Energy Savings Kit | 36 | 53 | 147% |
| Tier 2: Building Shell Measures | 54 | 65 | 121% |
| Tier 3: HVAC Measures | 4,891 | 3,335 | 68% |
| **Total** | **4,981** | **3,453** | **69%** |

*Source: WHE program tracking database and Navigant analysis*

The primary drivers of the program-level verified savings of the WHE program were the verification updates to the savings for the Tier 3 measures, which made up 92% of the verified gross energy savings and 97% of the verified gross coincident demand savings. Navigant updated the early retirement air conditioner and heat pump measure calculations to use IL TRM v7 methodologies. The Seasonal Energy Efficiency Ratio (SEER) and EER values of removed early retirement air conditioners and heat pumps are explicitly defined in the IL TRM v7—a new addition from TRM v5 that preempts the use of questionable removed efficiency data.[44]

Navigant examined several calculation methodologies to corroborate the approach mandated by IL TRM v7:

1. Navigant leveraged equipment age and efficiency values collected during Efficiency Analysis (EA) program site visits, combined with a 1%-per-year degradation factor suggested by the IL TRM v7 to estimate existing efficiency. This method calculated a baseline SEER of 8.45 and EER of 7.78 given the average EA equipment age of 16.74 years and a SEER 10 nameplate efficiency.

[44] Over 90% of collected data lists SEER 10 as the removed air conditioning efficiency, while the rest lists SEER 9. These values appear to be estimates rather than exact values, given their homogeneity.

2. The team also examined the impact of using a National Renewable Energy Lab-provided degradation curve upon the estimated efficiency values[45]. This method used equipment age and an assumed maintenance factor to calculate a SEER of 7.90 and EER of 7.60.

Each of the examined methods produced comparable results, and as such, Navigant moved forward with the industry-standard approach of referencing a TRM when available and referring to the IL TRM v7 as written.

Table 7-6 shows the differences in the SEER and EER baseline values used for reported and verified savings.

**Table 7-6. WHE Program PY2017 vs PY2018 HVAC Baseline SEER and Energy Efficiency Ratio Adjustments**

| Tier 3 Early Retirement HVAC Measure | PY2017 Verified Baseline SEER | PY2018 Verified Baseline SEER* | PY2017 Verified Baseline EER | PY2018 Verified Baseline EER* |
|---|---|---|---|---|
| Air Conditioning Units | 6.82 | 9.3 | 6.00 | 7.5 |
| Heat Pumps | 6.82 | 9.3 | 6.00 | 7.5 |

*These SEER and EER values are defined in the IL TRM v7 as SEER_exist and EER_exist. The values are the same for heat pumps and central air conditioning units.

*Source: IL TRM v7 and Navigant analysis*

The other two program tiers contributed the remaining 8% of the verified gross energy savings and 3% of the verified gross coincident demand savings. Tier 1 contributed 5% and 2% to the total energy and demand savings, respectively. Tier 2 contributed the final 2% of total energy and demand savings.

The main drivers for the Tier 1 realization rates were the verification updates to the savings for LED measures. LEDs had similar participation rates in PY2018 as compared to PY2017, accounting for 71% of verified gross energy savings and 72% of verified gross coincident demand savings of Tier 1 measures. Navigant adjusted values for baseline specialty (candelabra, globe, and BR30) bulb wattage to align with the IL TRM v7, as well as some values for lighting HOU, interaction factors, and CFs based on GMO-specific measure mixes (proportion of indoor/outdoor installation). These adjustments increased the verified savings for the tier, which achieved realization rates of 116% for gross energy savings and 148% for gross demand savings.

As in PY2017, the main drivers for the Tier 2 realization rates were differences between the GMO and evaluation methodologies for air sealing and insulation measures. For example, the evaluation methodology used program tracking data and Illinois and Missouri TRM assumptions, while the reported savings apply values for heating and cooling degree day and variables such as leakage factor from other sources. Insulation measures had similar participation in PY2018 as compared to PY2017, accounting for 42% of verified gross energy savings and 39% of verified gross coincident demand savings of Tier 2. The tier also achieved realization rates of 42% for gross energy savings and 121% for gross demand savings.

[45] Hendron, Robert. 2006. Building America Performance Analysis Procedures for Existing Homes. Golden, CO: National Renewable Energy Labs, 7, 10 - 12. Last accessed July 11, 2019. http://www.nrel.gov/docs/fy06osti/38238.pdf, pg. 7.

#### *7.2.1.3 Net-to-Gross*

Navigant conducted NTG research in PY2016 and applied the results to PY2018. Details can be found in the PY2016 evaluation report for the WHE program. Table 7-7 summarizes the results for the components of the WHE NTG ratio.

**Table 7-7. WHE NTG Components and Ratio**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| 2018* | 0.35 | 0.01 | 0.14 | 80% |

FR = free ridership; PSO = participant spillover; NPSO = nonparticipant spillover
* Based on Navigant NTG Research in PY2016
*Source: Navigant analysis*

### *7.2.2 Cost-Effectiveness*

This section presents Navigant's evaluation of cost-effectiveness for the WHE program for each of the five standard benefit-cost tests. Please refer to Section 1.2 for information on how benefits and program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

Table 7-8 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, PY2018, and program to date, and the total resource cost (TRC) test filed by GMO. Based on Navigant's 2018 benefit-cost analysis, the program achieves a cost test ratio of 0.88 in the TRC, and greater than 1.0 in the societal cost test (SCT), utility cost test (UCT), and participant cost test (PCT). Navigant's analysis resulted in a TRC ratio that is slightly higher than that filed by GMO due to conservative savings assumptions for early retirement measures in GMO's reported results, however, these early retirement measures still have a lower TRC ratio than the average program measure. The GMO territory saw more participation of these measures than the KCP&L-MO territory and also incurred in higher administrative costs. These factors contributed to the lower TRC.

Navigant analyzed early retirement measures in the 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 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.[46]

A dual baseline approach is applied to energy and demand savings for retrofit measures to capture the impact of changing baselines, codes, and standards. The dual baseline approach is broken into two periods: a pre-RUL period and a post-RUL period, where RUL refers to the early retired equipment's remaining useful life. During the pre-RUL period, the efficient equipment is credited with savings that are incremental to the early retired equipment. In the post-RUL period, the efficient equipment is credited with savings that are incremental to a code-required baseline in the year that the early retired equipment would have needed to be replaced. This means that future code changes, occurring within the early retired equipment's RUL, are considered in the baseline for the post-RUL period.

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

Additionally, the Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the WHE program. This adjustment reflected a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA). IL TRM v7 guided this adjustment, and it assumes that CFLs will become the baseline in 2021 for standard bulbs and 2024 for specialty bulbs. The annual savings claimed were reduced within the life of the measure to account for this baseline shift and were incorporated into cost effectiveness screening calculations. Although recent final and draft rulemakings by the Department of Energy (DOE)[47] now make it unlikely that these changes in efficiency standards will occur as assumed in the IL TRM v7, the Navigant team has retained the mid-life adjustment for the PY2018 evaluation because the program implementation and verification efforts occurred prior to the September 2019 release of the DOE rulings. This decision results in conservative estimates of the cost-effectiveness for standard and specialty lamps in these programs.

Navigant applied mid-life adjustments for specialty lamps in Appendix R. Appendix R contains one line-item for "Screw In – LEDs." This includes a mix of specialty and standard bulbs that may or may not be impacted by EISA. Therefore, energy and demand savings, energy savings retrofit, and demand savings retrofit, and RUL are a weighted (by installed lamp count) combination for these bulbs. The participation sums the total across all bulb types.

**Table 7-8. WHE Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[48] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 0.78 | 0.94 | 1.17 | 1.60 | 1.19 | 0.71 |
| 2017 | 0.95 | 0.99 | 1.16 | 2.10 | 1.34 | 0.69 |
| 2018 | 0.79 | 0.88 | 1.06 | 1.52 | 1.73 | 0.53 |
| **Program Overall** | **N/A** | **0.95** | **1.13** | **1.77** | **1.39** | **0.64** |

*Source: Navigant analysis*

### *7.2.3 Process*

Navigant addressed the five Missouri-required questions for process evaluation in PY2018 through interviews with the product manager and implementation manager, and a review of program documentation and marketing materials. A summary of these research questions is provided in Table 7-9

**Table 7-9. WHE Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| 1. What are the primary market imperfections that are common to the target market segment? | • Program staff interviews<br>• Materials review |

[47] https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps
https://www.federalregister.gov/documents/2019/09/05/2019-18941/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps

[48] The TRC Test GMO column provides the TRC test results based on reported values provided by GMO staff.

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | • Program staff interviews<br>• 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<br>• Materials review |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• 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<br>• Materials review |

*Source: Navigant analysis*

Navigant conducted a thorough process evaluation for the WHE program in PY2016 and documented all findings and recommendations in the PY2016 report. Below is a restatement of the main PY2016 process evaluation findings along with status updates of those findings for PY2018. Recommendations for consideration in relation to these findings are in Section 7.3.

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: The program Operations Manual identifies lack of education for both end-use consumers and trade allies as a primary barrier to residential EE upgrades, along with high upfront costs—particularly for HVAC purchases. PY2016 research showed that surveyed participants and trade allies alike support that view.**

> **STATUS:** Cost continues to be a barrier to residential EE upgrades, especially for HVAC purchases. GMO and the implementer have made strides in this area by streamlining messaging to encourage customer participation in Tiers 2 and 3. The majority of WHE savings is attributed to HVAC measures, but it is still important to continue educating the consumer that the lowest cost option is not always the lowest cost in the long-run, nor is the first cost the only consideration. GMO should also continue to emphasize the non-energy benefits of EE, including home comfort factors.

**FINDING 2: Participants in the Whole House Efficiency program tend to be largely middle-class, with fewer programmatic options available to low-income residents.**

> **STATUS:** The Energy Savings Kit is one of the few and important offerings available to low-income, single-family residents, and provides a no-upfront-cost option to those customers who might benefit the most. The Energy Savings Kit is slated to be removed from the program after PY3 due to lower-than-anticipated adoption and the associated cost of kit installation. Navigant recommends that GMO examine the feasibility of keeping the Energy Savings Kit available to low-income participants, as well as researching the cost-effectiveness of mail-in savings kits.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 3: GMO's primary target audience for this program is defined as owners of single-family homes, although 2-unit to 4-unit residences and renters are also eligible. There may be an opportunity to address a gap in the multifamily 'market-rate' segment. There are currently**

**programmatic offerings for income-eligible multifamily customers, but not for multifamily customers that are on Residential meters.**

> **STATUS:** GMO is planning to address this market gap via a market-rate multifamily incubator program for Cycle 3. The program is likely to use a modified version of the Income-Eligible Multifamily program TRM for evaluation purposes.

**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?**

**FINDING 4: The program offers measures that cover most of the common energy end uses in residential homes. However, most energy savings and participation come from air conditioning units and heat pumps, with little participation in the heat pump water heater, air sealing, or insulation measures.**

> **STATUS:** The program maintained participation across all measure tiers similar to PY2017, including sustained participation in the HVAC-focused Tier 3. The WHE program continues to evaluate the cost effectiveness of existing measures and that of potential new measures.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 5: The current means of communication are appropriate, with high levels of customer satisfaction for the program. The implementer suggests that additional direct marketing may be useful.**

> **STATUS:** The WHE program has continued to emphasize the synergies that occur when customers participate in multiple program tiers. Customers that have already participated in the program have demonstrated a high level of receptivity and a willingness to engage with GMO and with the program implementer.

**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?**

**FINDING 5: The main driver for customer participation is their understanding of the cost-to-value ratio. There are not too many barriers beyond first cost, and GMO is communicating non-energy benefits to customers as a part of their implementation strategy.**

> **STATUS:** GMO has offered energy savings kits in tandem with the adoption of other, higher-tier measures. While adoption of the energy savings kit has been lower than expected, this remains a strong method to engage lower-income customers.

## 7.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to move the GMO WHE program forward and meet the MEEIA target for net verified energy savings. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 7.3.1)
- Recommendations from the process evaluation (Section 7.3.2)

### *7.3.1 Impact*

Navigant reviewed the program tracking database to verify if it tracks the data needed to monitor the program and determine program savings. The evaluation team also reviewed the program's reported savings calculation inputs and methodology.

**Tracking Data:**

- Navigant recommends the program implementer ensure that the tracking database contains all data needed to track installed program measures and calculate program savings. This includes all equipment specifications and household characteristics for baseline and efficient measure installations.
- Track efficiency and age of existing or removed equipment for the early retirement measures. The implementer has made improvements in this area in PY2018, with 75% of projects containing efficiency values of existing units. These new values indicate an increased effort to collect higher quality unit-specific data. Currently, existing equipment age is not included in the program tracker, but household age is included in three age bins:1979, 2004, and 2005. Navigant used the tracked household age as an indicator for equipment age and recommends the program consider interviewing customers about when the replaced equipment was originally installed.

**Program Offerings:**

- Navigant recommends that GMO and the program implementer actively monitor cost-effectiveness values for each of the program measures to determine which measures may not be providing as much value as expected, as well as to identify any new or emerging gaps where new measure offerings may be appropriate in the future.
- WHE program-related interviews identified a gap in the offerings for market-rate multifamily residential customers. GMO is planning to address this market gap via a market-rate multifamily incubator program for Cycle 3. The program is likely to use a modified version of the Income-Eligible Multifamily program TRM for evaluation purposes.
- Navigant identified "quality install" as a cost-effective measure not currently offered by GMO. The quality install option is a newly-added option to the IL TRM v7, and can augment any early-retirement or time-of-sale air conditioner or Air-Source Heat Pump (ASHP) measure. According to the IL TRM v7: "*Additional savings are attributed to the Quality Installation (QI) of the system. QI programs should follow industry standards such as those described in ENERGY STAR Verified HVAC Installation Program, ANSI ACCA QI5 and QI9vp. This must include considerations of system design (including sizing, matching, ventilation calculations) and equipment installation (including static pressure, airflow, refrigerant charge) and may also consider distribution."*

**Savings Calculations:**

- Navigant recommends that the program implementer amend the methodology used to calculate the program's reported savings to align with the algorithms, inputs, and sources used to calculate the evaluated savings as detailed in Appendix J. Alignment will bring realization rates closer to

100% (or 1.0) while providing more accurate data for tracking progress toward targets and overall program management.

### *7.3.2 Process*

Navigant addressed the five required process evaluation questions through the research activities described above. Table 7-10 describes Navigant's recommendations based on each question.

**Table 7-10. WHE Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | The target market is well-defined and the program has implemented strategies to identify customers with high savings potentials to increase targeted outreach. GMO should research additional offerings targeting the multifamily market-rate segment. |
| 2. What are the primary market imperfections that are common to the target market? | Up-front first costs remain the largest barriers to customer participation in the WHE program. GMO should continue to educate customers on the benefits of energy and cost savings, as well as emphasizing the comfort benefits of EE. GMO should continue emphasizing customer participation in multiple program Tiers to encourage greater synergy and more energy savings. |
| 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's measure mix is appropriate for the market. Customers achieve maximum savings and the best overall results by participating in all three program tiers. The program should continue to highlight the synergies of the three tiers through their leave-behind materials, trade ally communications with customers, and targeted email, social media, and in-store campaigns. This will continue attracting customers to participate in the program holistically so they are able to extract maximum benefits while achieving maximum savings. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | Navigant does not have any recommendations related to this research question since the communication channels and delivery mechanisms are appropriate, including the customer support and education provided by the EEPs and trade allies, the leave-behind materials for customers, and the targeted marketing campaigns. |
| 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? | Although progress has been made in this area, the program should continue to pursue strategies to increase customer participation in more than one program tier, including expanding the initiative to have Tier 3 trade allies implement Tier 2 building shell measures for their customers. |

*Source: Navigant analysis*

# 8. INCOME-ELIGIBLE MULTIFAMILY

## 8.1 Program Description

The Income-Eligible Multifamily (IEMF) program delivers long-term energy savings and bill reductions to residents in multifamily housing that meet the income requirements and to multifamily housing owners and property managers whose buildings have income-eligible residents. The program consists of three different options, known as tracks. The three tracks are described below.

- **Track 1 – Direct Install:** Efficiency kits that are installed directly into tenant residences and energy efficient measures that are installed in multifamily common areas
- **Track 2 – Custom:** Custom program option for measures that fall outside of those offered as part of the efficiency kits or measures for common areas
- **Track 3 – Food Banks:** Partnership with food banks in the area to provide light-emitting diode (LED) bulb kits as another way to reach the program's target market segment

Table 8-1 details the IEMF program.

**Table 8-1. IEMF Program Description**

| IEMF Key Details | |
|---|---|
| **Sector** | Income-eligible multifamily housing |
| **Implementation Contractor** | ICF International (ICF) |
| **Program Description** | The IEMF program provides home energy efficiency (EE) direct install (DI) measures including lighting, aerators, low flow showerheads, power strips, and pipe insulation. The program also provides a custom option that allows for proposing other measures not part of the pre-defined DI options. These measures combine to provide property owners and tenants reduced energy usage and energy bills. The program also distributes LEDs through food banks. |
| **Application Process** | Customers apply to the program by contacting GMO directly or by visiting the GMO website. Once a customer completes the application, the implementation contractor (IC) visits the site to install the DI measures. Custom measures are incented through rebates of $0.28/kWh for common area lighting projects and $0.12/kWh for other custom projects. |
| **Verification of Purchase/Project** | The IEMF program manager verifies project completion. The program manager routinely follows up by phone with property management after project completion to discuss the process and their satisfaction. The program manager is also present for the installation of DI equipment at a sampling of units. For custom rebates, the project manager completes on-site verification of the installed equipment. |
| **Rebate Process** | Eligible tenants participate in this program free of charge. Property managers participate both through DI and custom incentivized measures. The rebates are issued by check to one of two parties at the discretion of the GMO customer. The customer may elect to have the rebate check issued to themselves or to the contractor performing the energy conservation measures (service provider). |

| IEMF Key Details | |
|---|---|
| **Disputes, Rejected Applications** | The Greater Missouri Operations (GMO) program manager handles disputes and rejected applications. The most common complaint is from tenants directly to IC employees performing DI. The next most common complaint is tenant complaints to property management. Property management typically handles tenant complaints that they receive directly. For complaints that cannot be handled onsite in the moment, property management contacts the IEMF program manager by phone or email. |
| **Project Reporting** | GMO stores data on completed projects in its project tracking database intermittently as projects are completed. |

*Source: Evaluation team analysis*

## 8.2 Evaluation Findings

The impact and process evaluations for the IEMF program are detailed in this section, including the gross impact findings and activities that took place during PY 2018. The evaluation team used method 1a and protocol 2b of the Missouri regulations to evaluate the program.

The evaluation team reviewed the IEMF program database to confirm that the savings methodologies were implemented correctly and that the savings reported are accurate. Navigant found the tracking database sufficiently detailed to conduct an evaluation of the program for the direct install and food bank measures. However, a subsequent data request was required to obtain detailed information pertaining to the custom measures. Navigant then verified the savings using the tracking database to calculate savings for each installed measure.

The following sections present Navigant's PY 2018 findings for the IEMF program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following sections:

- Impact evaluation findings (Section 8.2.1)
- Cost-effectiveness analysis (Section 8.2.2)
- Process evaluation findings (Section 8.2.3)

### *8.2.1 Impact*

Navigant verified savings using industry-standard engineering algorithms. The evaluation team leveraged actual characteristics (i.e., capacity, efficiency) of the program-incented equipment, when available, as inputs to these algorithms. When project-specific data was not available, the team used relevant performance variables (i.e., operation hours) sourced from the Illinois Technical Reference Manual (IL TRM) v7 for lighting measures and heating, ventilation and air conditioning (HVAC) measures, and IL TRM v5 for the other measures. The IL TRM v7 raised hours of use (HOU) assumptions for standard bulbs, baseline wattage assumptions for specialty bulbs, and coincidence factors (CFs) for both standard and specialty bulbs. The IL TRM v7 revisions served to increase savings. The revisions also led to slight reductions in specialty bulb HOU and waste heat factors (WHFs), which depressed savings. In addition, the IL TRM v7 defines a more explicit approach to equipment degradation than the IL TRM v5 for early retirement heat pump measures. Navigant chose this TRM given its geographic proximity to the service territory. Where applicable, climate conditions used in the analyses were reflective of the GMO area.

Navigant's verification methods indicate that the GMO IEMF program achieved 4,337,457 kWh and 572 kW in energy and demand savings at the customer meter, resulting in realization rates of 113% for energy 116% for coincident demand. During PY 2018, the program achieved 43% of its MEEIA net energy target and 42% of its net coincident demand target.

**Table 8-2. IEMF Program PY2018 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 3,824,584 | 4,337,457 | 113% | 10,014,278 | 4,337,457 | 43% |
| Coinc Demand at Customer Meter (kW) | 493.65 | 571.83 | 116% | 1,357 | 572 | 42% |

*Source: Program tracking database and Navigant analysis*

As seen in Table 8-3, the IEMF program has achieved 105% of its net energy savings goals to-date and 96% of its net coincident demand savings goals to-date.

**Table 8-3. IEMF Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year MEEIA Target | Verified 3-Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 11,282,183 | 10,471,557 | 93% | 10,014,278 | 10,471,557 | 105% |
| Coinc Demand at Customer Meter (kW) | 1,250 | 1,309 | 105% | 1,357 | 1,309 | 96% |

*Source: Program tracking database and Navigant analysis*

Table 8-4 presents the breakdown of savings by measure type.

**Table 8-4. IEMF Savings Summary by Measure**

| Measure Category | Gross | | | | | |
|---|---|---|---|---|---|---|
| | Reported kWh | Verified kWh | Realization Rate | Reported kW | Verified kW | Realization Rate |
| Lighting | 2,126,982 | 2,618,810 | 123% | 210 | 315 | 150% |
| Aerators | 104,257 | 118,577 | 114% | 51 | 58 | 114% |
| Power Strips | 4,944 | 4,944 | 100% | 1 | 1 | 100% |
| Low Flow Shower Head | 115,010 | 158,360 | 138% | 11 | 18 | 168% |
| Custom | 1,473,391 | 1,436,766 | 98% | 221 | 180 | 81% |

*Source: Program tracking database and Navigant analysis*

Below is a description of the savings drivers for the measure types with realization rates different from 1.0.

- **Lighting:** Realization rates for lighting overall increased from PY2017. For the PY2018 lighting measures, Navigant referred to Illinois TRM v7, which provided updated operating hours, waste heat factors, and coincidence factors. The evaluation team applied 1,089 hours of use for in-unit and 1,159 hours of use for common areas, multifamily waste heat factors of 1.04 (electric) and 1.07 (demand), and coincidence factor of 0.128. The reported savings applied 938 hours of use for in-unit and 5,950 hours of use for common area, single family waste heat factors of 1.06 (electric) and 1.11 (demand), and coincidence factor of 0.028 for in-unit and 0.0133 for common areas.

- **Aerators:** The Navigant team applied IL TRM v5 hours of use for multifamily dwellings (77 hours for kitchen and 22 hours for bath). The evaluation team also applied the Federal gallons per minute (GPM) baseline value of 2.2 GPM and the actual GPM value of 1.0 GPM for bathroom faucet aerators. The reported savings applied IL TRM v5 hours of use for single family dwellings (94 hrs. for kitchen and14 hrs. for bath) and an actual GPM value of 1.5 GPM.

- **Low-flow showerheads:** The Navigant team applied IL TRM v5 HOU for multifamily dwellings (248 hours) and updated the reported number of showerheads from the single-family value (1.79) to the multifamily value (1.3).

- Custom measures: PY2018 included 3,532 custom measures including refrigerators, washing machines, bathroom exhaust fans, blower motors, ductless mini-split heat pumps, air conditioning, and lighting projects. Custom measure savings are presented in Table 8-5.

**Table 8-5. IEMF Custom Measure Savings by Measure**

| Custom Measure | Quantity | kWh Savings* | kW Savings* | % of kWh Custom Measure Savings* | % of kW Custom Measure Savings* |
|---|---|---|---|---|---|
| Refrigerator | 1 | 1,346 | <1 | <1% | <1% |
| Bathroom Exhaust Fan | 49 | 18,529 | 2. | 1% | 1% |
| Washing Machine | 1 | 414 | <1 | <1% | <1% |
| ECM Blower Motor | 110 | 73,260 | 16 | 5% | 8% |
| Air Conditioners | 110 | 44,866 | 43 | 3% | 24% |

| | | | | | |
|---|---|---|---|---|---|
| Ductless Mini-Split Heat Pump | 25 | 104,569 | 2 | 7% | 1% |
| Lighting | 3236 | 1,193,792 | 117 | 83% | 65% |
| Total | 3532 | 1,436,776 | 187 | 100% | 100% |

*Source: Program tracking database and Navigant analysis*
**Totals might not add up due to rounding*

#### *8.2.1.1 Net-to-Gross*

Navigant assumed a net-to-gross (NTG) value of 1.0 for the IEMF program in PY2018 due to this market's limited capital availability.

**Table 8-6. IEMF NTG Components and Ratio: PY2018**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| | Deemed 1.0 | | | 100% |

FR = free ridership; PSO = participant spillover; NPSO = nonparticipant spillover
*Source: Navigant analysis*

### *8.2.2 Cost-Effectiveness*

This section presents Navigant's evaluation of cost-effectiveness for the IEMF program for each of the five standard benefit-cost tests. Reference Section 1.2 for information on how benefits and program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

The Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the IEMF program. This adjustment reflected a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA). IL TRM v7 guided this adjustment, and it assumes that CFLs will become the baseline in 2021 for standard bulbs and 2024 for specialty bulbs. The annual savings claimed were reduced within the life of the measure to account for this baseline shift and were incorporated into cost effectiveness screening calculations. Although recent final and draft rulemakings by the Department of Energy (DOE)[49] now make it unlikely that these changes in efficiency standards will occur as assumed in the IL TRM v7, the Navigant team has retained the mid-life adjustment for the PY2018 evaluation because the program implementation and verification efforts occurred prior to the September 2019 release of the DOE rulings. This decision results in conservative estimates of the cost-effectiveness for standard and specialty lamps in these programs.

Table 8-7 presents the benefit-cost ratios for the five standard benefit-cost tests for PY 2018, and the Total Resource Cost (TRC) test filed by GMO. Based on Navigant's benefit-cost analysis, the program achieves a cost test ratio greater than 1.0 in the TRC, Societal Cost Test (SCT), Utility Cost Test (UCT), and Participant Cost Test (PCT). Navigant's analysis resulted in a TRC ratio that is greater than that filed

[49] https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps
https://www.federalregister.gov/documents/2019/09/05/2019-18941/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps

by GMO due to the removal of incremental costs associated with direct install measures. These costs would be double counted if included as both program administrative and participant incremental costs.

**Table 8-7. IEMF Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[50] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 0.92 | 0.90 | 1.01 | 0.90 | INF* | 0.36 |
| 2017 | 1.32 | 1.79 | 1.97 | 1.81 | INF* | 0.46 |
| 2018 | 0.72 | 1.37 | 1.65 | 1.37 | 6.84 | 0.39 |
| **Program Overall** | **N/A** | **1.37** | **1.59** | **1.38** | **13.75** | **0.41** |

*Source: Navigant analysis*

### *8.2.3 Process*

Navigant conducted staff interviews and a program material review to address one general process evaluation research question and the five Missouri-required questions for process evaluation. The evaluation team interviewed the GMO program manager and IC for IEMF, reviewed the program materials on the GMO website, and emailed with the program manager and IC to inform the process evaluation.

[50] The TRC Test GMO column provides the TRC test results based on reported values provided by GMO staff.

**Table 8-8. IEMF Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. What changes have been made to the program in PY2018, and what changes are planned for PY2019? | • Program staff interviews<br>• 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<br>• 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<br>• 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<br>• Materials review |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• 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<br>• Materials review |

*Source: Navigant analysis*

The team's findings are provided in the following sections. Recommendations for consideration in relation to these findings are provided in Section 8.3.

#### *8.2.3.1 General Process Evaluation Questions*

**QUESTION 1: What changes have been made to the program in PY2018, and what changes are planned for the next program year?**

**FINDING 1: The IEMF custom program track expanded significantly during PY2018. Custom measures focused heavily on common-area lighting. GMO plans to add an HVAC tune-up measure offering during the next program year.**

- The implementation manager reported that most custom lighting projects come in through lighting contractors or from larger property management groups (for example, property managers completed custom projects at one property and then enrolled subsequent properties in the program).
- Rebates for custom lighting projects were provided to either the lighting contractor or the property owner/manager, though the implementation manager reported that the contractor typically received the rebate.
- Custom lighting projects were labor intensive for the implementation team, particularly related to tracking all required data and inputs.

- The program manager completed pre-inspections, desk reviews, and post-inspections for all custom lighting projects.

- GMO is planning to offer HVAC tune-ups through the custom program track in the next program year.

#### *8.2.3.2 Missouri-Required Questions for Process Evaluation*

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: The target market for this program was low-income multifamily properties, targeting both property owners and managers for building efficiency improvements, and tenants for direct install measures. This market generally has limited capital availability and property management staff experience high turnover.**

- The primary difficulty in this market is the inability of income-eligible tenants to afford custom energy efficiency (EE) measures, and the limited incentive for property owners and managers to increase EE when the tenants pay the utility bills.

- Another obstacle to this market is high turn-over among property managers. According to the implementation manager, there was approximately a 50% turnover among this group from PY2017 to PY2018.

- The program continues to prioritize direct outreach to property owners and managers through phone calls and in-person visits to increase awareness of the IEMF program. Implementation staff reported that they have more robust relationships with property owners and managers because of these interactions. Implementation staff also tried other outreach strategies in PY2018 including lunch and learn events and appreciation dinners. However, these types of events were ineffective as many customers signed up to participate but then did not attend the events.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: The market for the IEMF program in PY2018 was defined using the Federal Poverty Income guidelines. However, program staff noted alternative methodologies for identifying income-eligible multifamily units and described some difficulty in identifying all eligible properties.**

- KMO defines the target market of income-eligible customers as multifamily properties that are subsidized federally or at the state level, or if 50% or more of tenants have household incomes that are at or below 200% of the Federal Poverty Limit. Per the implementation manager, they can validate federal or state subsidy receipts for properties. However, validating that 50% or more of tenants are at or below 200% of the Federal Poverty Limit has been challenging. Regarding the latter, the implementation team is relying on estimates based on rent rolls or validation from property owners and managers.

- The definition of income-eligible will be broadened in MEEIA Cycle 3 to include Census tract information and average income at the Census tract level. Program staff reported that this revised definition will aid in targeting eligible properties.

**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?**

**FINDING 3: Navigant found that the program included appropriate measures for its targets.**

- The program installed the following end-use measures in PY 2018: faucet aerators, low-flow showerheads, lighting, and smart power strips. Common area measures included lighting and optional custom measures. Implementation staff reported that customers were satisfied with the custom options, especially the custom lighting measures. They reported that the custom lighting measures were frequently implemented because property owners and managers were able to update mismatched lighting in different common areas throughout their properties to consistent, higher quality lighting. Improving common area lighting also helped alleviate the burden on maintenance staff, which implementation staff noted was a challenging role for multifamily properties to fill.

- The custom program track will offer an HVAC tune-up measure in the next program year. Per implementation staff, this measure is needed primarily due to a lack of maintenance personnel available to service existing units, including those located at ground-level and on roofs.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: Communication channels focused largely on direct outreach and in-person contacts with property owners and managers. The program continued to identify opportunities to leverage partnerships with the Missouri Housing Development Corporation (MHDC), United States Department of Agriculture (USDA), and other organizations involved in income-eligible housing.**

- Communication channels and delivery are appropriate given the direct interaction with program participants. The implementer reported that these have been the most effective way to engage property owners and managers.

- Program implementation staff reported that getting property owners and managers to attend program events, such as lunch and learn events and appreciation dinners, continued to be a challenge.

- The program continued to work with MHDC, USDA, and other organizations to identify opportunities for outreach. For example, the program worked to identify new opportunities where property owners and managers can get together for events such as MHDC low-income housing tax credit application workshops and other workshops.

**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?**

**FINDING 5: The custom track saw substantial growth during PY2018.**

- The custom track saw substantial growth during PY2018, up from fewer than 10 custom measures during PY 2017.

- A program change occurred between PY 2017and PY2018 wherein common area lighting became included within the custom program track. According to the program implementer, the program incentives (28 cents/kwh) for these projects are used as a marketing tool by contractors in instances where there is a strong possibility of the project being little to no cost to the property. The incentives are also promoted to property managers and owners with targeted outreach, including via case studies, postcards, and newsletters. Implementation staff estimate that approximately 85% of all custom lighting projects were fully covered by program incentives. The remaining 15% were typically project scenarios with a high ratio of exterior lights but little common area 24-hour lighting (for example, a garden-style apartment complex with few interior hallways) where the incentive covered the majority of the project cost. Implementation staff also noted that there were projects where the 28 cents/kwh incentive paid for more than the total cost of the project. In those instances, the implementer adjusted the incentive downward so that it matched the payment for the project.

- High participation in the custom measures suggests that there is a customer need for these measures. However, custom measures are more time and resource intensive to install and process for the IC and GMO. Measures offered in the custom track could be considered for prescriptive offerings to reduce implementation burden associated with custom measures, particularly for lighting.

## 8.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to move the IEMF program forward and to meet the MEEIA target. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 8.3.1)
- Recommendations from the process evaluation (Section 8.3.2)

The IEMF program functions smoothly overall, is viewed positively by customers and provides valuable energy savings and increased comfort for IEMF residents and property owners. Navigant provides suggestions for consideration to help make the customer experience even better and to increase savings achieved by the program.

### *8.3.1 Impact*

The tracking data and savings calculations provided by GMO and ICs are appropriate for the direct install and food bank program tracks. The tracking data included type, quantity, and location of measures, which was sufficient for evaluation.

The tracking database did not include all data needed to evaluate the custom measures. The evaluation team made a separate request for detailed information for custom measures, including, but not limited to, the following.

- Equipment descriptions (multiple measure types)

- Quantity of energy efficient units installed (for example, for ductless mini-split heat pumps)

- Heating and cooling capacities, and efficiencies of existing units (for example, for ductless mini-split heat pumps)
- Equipment models and configurations for both the existing and the efficient equipment (for example, for washing machines and refrigerators)
- Motor details such as motor load factor, installed motor efficiency, heating and cooling run hours (for example, for variable frequency drives)
- Baseline wattage and bulb location (for lighting measures)

In past program years, custom measures made up a smaller portion of the IEMF program. With the large increase in custom measures expected in PY2019 and beyond, capturing detailed data in the tracking database will facilitate overall program tracking and savings calculations. Navigant recommends that the program implementer capture detailed custom measure data required to calculate savings in the tracking data.

### *8.3.2 Process*

Drawing on the materials review and staff interviews, the evaluation team developed recommendations to enhance the success of the program. The recommendations are provided in the following section.

#### *8.3.2.1 Recommendations Based on Missouri's Requirements for Process Evaluation*

Navigant addressed the five required process evaluation questions set forth in Missouri regulations[51] for the IEMF program. Table 8-9 presents Navigant's recommendations for the program.

[51] 4 CFR- 240-22.070(8)

**Table 8-9. IEMF Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market? | The program is attempting to address the market imperfections—namely, limited property owner/manager investment capital for efficiency improvements and high property staff turnover—by prioritizing direct outreach to building owners and property managers. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | For MEEIA Cycle 3, the program plans to implement new methods to identify low-income eligible properties, including the use of Census tract information and average income at the Census tract level. Future evaluation research tasks such as GIS mapping and data mining GMO and third-party data could aid in identifying income-eligible properties. |
| 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 measures for the direct install and food bank tracks of the program are appropriate. Given the high volume of custom measures, particularly for lighting, Navigant recommends that GMO identify commonly implemented measures that may be suited for a prescriptive track. Examples include common area lighting, or measures GMO intends to offer year over year such as refrigerators and bathroom exhaust fans. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | Working with the property managers and owners via phone calls and in-person visits has proven to be an effective means of communication. In addition, continuing to leverage partnerships with the MHDC, USDA, and other organizations involved in income-eligible housing is expected to open up new communication channels. |
| 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 plans to offer an HVAC tune-up measure to meet growing customer need and interest for this measure. Lighting measures offered in the custom track should be considered for prescriptive offerings. |

*Source: Navigant analysis*

# 9. HOME LIGHTING REBATE

## 9.1 Program Description

The Home Lighting Rebate (HLR) program provides upstream incentives to partnering manufacturers and retailers in the Kansas City Power and Light Missouri Operations Company (GMO) and Greater Missouri Operations (GMO) service territories. In turn, the manufacturers and retailers discount the shelf price of ENERGY STAR-qualified light-emitting diode (LED) bulbs, passing the incentive on to their customers. The program also provides marketing and educational materials at the point of purchase. In program year (PY) 2018, the, the program supported specialty LEDs (reflectors, floods, candelabras, and globe lamps, among others) in all retail channels for the entire year. The HLR took a different approach for standard A-line general service, medium screw base LEDs. Initially, the HLR only supported standard LEDs in the Discount (e.g., dollar store) channel, but removed support for all standard LEDs after the first few program months due to over performance. However, GMO and the implementation contractor (IC) reintroduced standard LED incentives in all channels in the Q4 PY2018. In contrast to PY2018, the program offered both types of LEDs in all retail channels in PY2016 and PY2017. GMO initially instituted the specialty-focused program due to the high program performance in PY2016 and PY2017, allowing the utility to shift funds to other programs in the portfolio. They decided to reintroduce standard LEDs to the program in Q4 to assist with overall portfolio performance for PY2018.

In PY2018, the GMO HLR program paid an average markdown discount of about $1.41 per standard LED bulb and $1.63 per specialty LED bulb. In PY2018, 10 manufacturers and 12 retailers sold 112,249 standard LEDs and 94,747 specialty LEDs through the GMO program.

**Table 9-1. HLR Program Description**

| HLR Program Key Details | |
|---|---|
| **Sector** | Residential |
| **Implementation Contractor** | ICF International (ICF) determines rebate levels and product mixes, solicits manufacturer partners, conducts visits to participating retailers to place point-of-sale materials, and trains sales staff. ICF also tracks sales, pays invoices to manufacturers and retailers, and provides weekly sales reports to Kansas City Power and Light (GMO). |
| **Program Description** | The Home Lighting Rebate (HLR) program pays incentives to manufacturers and retailers for documented sales of ENERGY STAR-qualified light-emitting diodes (LEDs). The manufacturers and retailers pass the incentives on to customers in the form of discounted prices for the supported bulbs. |
| **Application Process** | Manufactures respond to requests for bids issued by the IC. Manufacturers identify retail partners and propose sales of specific bulb types and incentive levels. The IC selects the winning manufacturers and retailers, and GMO signs the Memoranda of Understanding (MOU) with them. Customers do not apply to participate; instead, they buy discounted bulbs without the need for rebate coupons. |
| **Verification of Purchase/Project** | Manufacturers and retailers provide invoices and proof of sale to the IC, which verifies the invoices. |
| **Rebate Process** | The HLR program offers no customer rebates; instead, it pays incentives as outlined in MOUs to manufacturers and retailers upon verified proof of program sales. |

| HLR Program Key Details | |
|---|---|
| **Disputes, Rejected Applications** | Customers can contact the GMO Home Energy Programs Line (staffed by the IC) with concerns. Manufacturers and retailers work directly with ICF representatives. |
| **Project Reporting** | The IC provides weekly sales reports to GMO. |

*Source: Evaluation team analysis*

## 9.2 Evaluation Findings

The following sections present the Navigant team's PY2018 findings for the HLR program. Additional detail on the evaluation team's approach and findings are available in the accompanying appendices and databook files. The evaluation team divided the evaluation findings into the following sections:

- Impact evaluation findings (Section 9.2.1)
- Cost-effectiveness analysis (Section 9.2.2)
- Process evaluation findings (Section 9.2.3)

### *9.2.1 Impact*

To verify program impacts, the Navigant team reviewed tracking databases to assess the thoroughness, clarity, and accuracy of the information provided on program sales, bulb characteristics, and savings assumptions. The evaluation team also performed an engineering desk review, comparing GMO's energy and demand savings assumptions to evaluated results for GMO from PY2016, PY2017, and during Missouri Energy Efficiency Investment Act (MEEIA) Cycle 1. The Navigant team estimated HLR energy and demand savings using assumptions drawn from the Illinois Technical Reference Manual (IL TRM) v7, as described in Appendix L.1.

The specialty-focused HLR program performed strongly in PY2018. The GMO verified energy savings exceeded reported values, yielding a realization rate of 136%. The program made substantial progress toward the 3-year net energy savings target (24%) (Table 9-2). Cumulatively, the HLR program has achieved a realization rate of 100% for gross energy savings and secured 103% of the 3-year MEEIA net energy savings target. The Navigant team verified a gross demand realization rate of 193% for PY2018, and the program secured 32% of its net demand savings target. The 3-year demand savings realization rate stands at 121%, and the program has achieved 118% of its net demand savings targets.

Three factors drove the realization rates. Some of these factors increased savings, while others decreased them. This resulted in the observed annual realization rates described above.

The first factor, leakage, served to reduce savings. Leakage occurs when customers who live outside of the GMO service territories buy HLR program-supported bulbs. In PY2017, the evaluation team calculated leakage to be 14% for the combined KCP&L-MO and GMO service territories (sample sizes were too small to provide unique estimates for each territory).

The second factor, cross-sector sales to commercial and industrial (C&I) customers, increased savings, particularly demand savings. In PY2017, the evaluation team estimated cross-sector sales to be 4%. Cross-sector sales occur when customers buy HLR program-incentivized bulbs for use in C&I applications. Savings are higher for cross-sector sales because C&I customer exhibit higher hours of use

(HOU) (3,306 hours vs. 1,089 hours for standard and 974 hours for specialty bulbs) and CFs (0.6 vs. 0.13).

The third factor stems from the decision to update non-evaluated savings assumptions from the IL TRM v5 to v7. IL TRM v7 raised HOU assumptions for standard bulbs, baseline wattage assumptions for specialty bulbs (weighted to the mix of bulbs sold in the HLR), and CFs for both standard and specialty bulbs (additional details presented in Appendix L.1). The IL TRM v7 revisions served to increase savings. The revised Illinois TRM also led to slight reductions in specialty bulb HOU and waste heat factors (weighted to the mix of bulbs sold in the HLR), which depressed savings.

**Table 9-2. HLR Program PY2017 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 5,294,233 | 8,079,990 | 136% | 25,288,145 | 6,079,412 | 24% |
| Coinc Demand at Customer Meter (kW) | 589 | 1,137 | 193% | 2,669 | 850 | 32% |

Note: Net verified savings equals sum of standard and specialty net savings, with separately applied ratios, rather than the application of the program-wide net-to-gross (NTG) ratio of 76% cited below in *Table 9-4*
*Source: Program tracking database and Navigant analysis*

**Table 9-3. HLR Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified 3 - Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 31,825,252 | 31,727,466 | 100%[1] | 25,288,145 | 25,944,828 | 103% |
| Coinc Demand at Customer Meter (kW) | 3,183 | 3,854 | 121% | 2,669 | 3,138 | 118% |

[1] The energy realization rate Is 99.7%
*Source: Program tracking database and Navigant analysis*

#### *9.2.1.1 Net-to-Gross Analysis*

The Navigant team estimated net energy savings using deemed net-to-gross (NTG) ratios—85% for standard LEDs and 66% for specialty LEDs—developed through a negotiated process with the Missouri state auditor. In PY2017, the evaluation team conducted in-store intercepts and demand elasticity modeling (DEM), which resulted in free ridership (FR) of 33% for standard and 50% for specialty bulbs. It

also resulted in spillover (SO) of 21% for both bulb types. Using Equation 9-1, this led to NTG ratios of 88% for standard bulbs and 71% for specialty bulbs.

**Equation 9-1. Net-to-Gross Ratio**

$$Net\ to\ Gross\ Ratio = 1 - Free\ Riders + Spillover$$

However, the state auditor raised a concern about the SO estimate. Although the state auditor supported the in-store intercept approach used to estimate SO, they believed that the approach did not ask respondents to think deeply enough about the relative importance of program versus non-program influences on their purchase, leading the approach to overstate the program influence on non-program LED purchases. They suggested an approach that adjusted spillover by the FR rate. In response, the Navigant team provided evidence that the in-store SO approach did, to an extent, take non-program factors into account that may also have influenced purchases, but the evaluation team also acknowledged that that the approach did not explicitly address the relative importance of program versus non-program factors. For PY2017, GMO, the state auditor, and Navigant decided to use the Navigant team's evaluation approach for NTG, but adopted a deemed spillover estimate for PY2018. Appendix L.1.2 provides the estimation method for this deemed approach, and Table 9-4 provides the deemed FR, SO, and NTG values.

**Table 9-4. HLR NTG Components and Ratio: PY2018**

| Stratum | FR | SO | Net of FR |
|---|---|---|---|
| Standard LEDs | 0.33 | 0.18 | 85% |
| Specialty LEDs | 0.50 | 0.18 | 66% |
| **Total** | **0.41** | **0.17** | **76%** |

*Source: Evaluation team analysis; total represents the 2018 sales weighted average*

### *9.2.2 Cost-Effectiveness*

This section presents Navigant's evaluation of cost-effectiveness for the HLR program for each of the five standard benefit-cost tests. Reference Section 1.2 for information on how benefits and program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

Table 9-5 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, PY2018 program to date, and the Total Resource Cost (TRC) test filed by GMO. Based on Navigant's benefit-cost analysis, the program exceeds 1.0 in the TRC, Societal Cost Test (SCT), Utility Cost Test (UCT), and Participant Cost Test (PCT). Navigant's analysis also resulted in a slightly higher TRC ratio than that filed by GMO due to lower incremental costs.

The Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the HLR program. This adjustment reflected a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA). The Illinois Technical Reference Manual (IL TRM) v7 guided this adjustment, and it assumes that CFLs will become the baseline in 2021 for standard bulbs and 2024 for specialty bulbs. The annual savings claimed were reduced within the life of the measure to account for this baseline shift and were incorporated into cost effectiveness screening

calculations. Although recent final and draft rulemakings by the Department of Energy (DOE)[52] now make it unlikely that these changes in efficiency standards will occur as assumed in the IL TRM v7, the Navigant team has retained the mid-life adjustment for the PY2018 evaluation because the program sales and verification efforts occurred prior to the September 2019 release of the DOE rulings. This decision results in conservative estimates of the cost-effectiveness for standard and specialty lamps in these programs.

The benefit-cost results for the HLR program contain adjustments for cross-sector sales—that is, lighting sales intended for residential installations that found their way into commercial applications. Because these lighting sales made their way into the commercial sector, Navigant used an ex post analysis to adjust the HLR program savings by accounting for the differences in savings associated with these cross-sector sales.

**Table 9-5. HLR Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[53] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 1.45 | 1.73 | 2.02 | 2.14 | 4.39 | 0.52 |
| 2017 | 1.37 | 1.24 | 1.38 | 1.88 | 3.44 | 0.45 |
| 2018 | 1.39 | 2.37 | 2.64 | 2.11 | 14.03 | 0.43 |
| **Program Overall** | **N/A** | **1.60** | **1.83** | **2.04** | **4.60** | **0.48** |

*Source: Navigant analysis*

### *9.2.3 Process*

The HLR program's process evaluation activities in PY2018 reflected the reduced program scope by limiting evaluation activities to conducting in-depth interviews with program and implementation contractor staff members. This stands in contrast to prior program years, in which the evaluation team had conducted a series of studies that gathered input from participating manufacturers and retailers, GMO residential customers, and light bulb shoppers in retail settings. The Navigant team also reviewed program marketing and outreach materials.

In PY2018, the evaluation team addressed two process evaluation research questions. The team also explored the five Missouri-required questions[54] for process evaluation through program and implementation staff interviews and in-store intercept surveys. Table 9-6 provides a summary of the PY2016 to PY2018 research questions and activities.

[52] https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps
https://www.federalregister.gov/documents/2019/09/05/2019-18941/energy-conservation-program-energy-conservation-standards-for-general-service-incandescent-lamps

[53] The TRC Test GMO column provides the TRC test results based on reported values provided by GMO staff.

[54] 4 CFR- 240-22.070(8)

**Table 9-6. HLR Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions in PY2018** | |
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | • Program staff interviews |
| 2. What changes have been made to the program in PY2018, and what changes are planned for the PY2019 and MEEIA Cycle 3? | • Program staff interviews |
| **Missouri-Required Questions for Process Evaluation** | |
| 1. What are the primary market imperfections that are common to the target market segment? | • Program staff interviews (all years)<br>• Materials review (PY2016)<br>• Consumer surveys (PY2016) |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | • Program staff interviews (all years)<br>• Materials review (PY2016)<br>• Consumer surveys (PY2016)<br>• Onsite saturation visits (PY2016) |
| 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 (all years)<br>• Materials review (PY2016)<br>• Supplier interviews (PY2016)<br>• In-store intercept surveys (PY2017) |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews (all years)<br>• Materials review (PY2016) |
| 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 (all years)<br>• Materials review (PY2016)<br>• Consumer surveys (PY2016)<br>• Onsite saturation visits (PY2016)<br>• In-store intercept surveys (PY2017) |

*Source: Navigant analysis*

The evaluation team's findings are provided in the following sections. Recommendations for consideration in relation to these findings are provided in Section 9.3.

#### *9.2.3.1 General Process Evaluation Questions*

**QUESTION 1: What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?**

**FINDING 1: In the PY2017 report, there were four actionable recommendations for the HLR program. Below is a restatement of the PY2017 process evaluation recommendations along with status updates of those findings:**

1. 1. GMO and the IC should monitor the effects of mainly supporting specialty LEDs and limiting the number of promotional events on sales. The IC should reach out to program partners and see if they will share non-program ENERGY STAR LED sales, which could identify permanent program market effects and the continuing impact of marketing on efficient bulb sales in the absence of incentives.

**STATUS:** GMO and the IC tracked the effects of mainly supporting specialty LEDs (for most of the year) and limiting promotional events by regularly tracking program sales. The IC reached out to program partners and was able to secure high-level LED sales information from one manufacturer for two retail chains. The sales data from one retailer documented a rapid decline in ENERGY STAR qualified LED sales in program stores after the removal of incentives. Program-store sales stabilized just above ENERGY STAR qualified LED sales in non-program stores, likely reflecting a combination of continued program-support for specialty LED sales and a small amount of permanent market effects stemming from the HLR program. The sales information from the second retailer demonstrated that standard halogen sales increased as the program removed incentives for standard LEDs. This reversion back to an inefficient technology is known as backsliding. These results strongly suggest that removal of incentives from ENERGY STAR qualified standard LEDs likely caused consumers to opt for less efficient halogen bulbs; thereby, reducing the energy and demand savings that could have been gained with continued program support of standard LEDs. In short, LED incentives still mattered in the MO service territory in PY2018. Unfortunately, at the time of writing (June 2019), the IC was not able to secure similar sales information with the reintroduction of standard LED incentives in Q4. This information would help clarify the degree to which the program continues to boost LED sales in the rapidly changing and uncertain residential lighting market.

2. GMO should continue to brand marketing and educational materials with the ENERGY STAR label and take part in national ENERGY STAR efforts. Although the program will support few standard bulbs, the utility should make certain that marketing materials and promotional events (even though fewer in number) address the benefits of ENERGY STAR-qualified lighting generally to increase both standard and specialty LED sales.

   **STATUS:** GMO did not update marketing materials and only held a limited number of promotional events in PY2018. However, as in PY2016 and PY2017, the materials and events continued to promote ENERGY STAR-qualified LEDs, both standard and specialty.

3. GMO and the IC should continue to provide guidance on which ENERGY STAR-qualified bulbs are interchangeable with incandescent and halogen ones, targeting those non-LED purchasers who selected bulbs based on a familiar shape.

   **STATUS:** Due to the limited scope of the PY2018 HLR program, GMO and the IC did not develop materials to provide guidance on which LEDs are the best suited to replace specific incandescent and halogen bulbs. Such guidance is provided during promotional events.

4. While Navigant agrees with the decision to focus mainly on specialty bulbs in PY2018, the evaluation team encourages GMO and the IC to continue to explore the strengths and weaknesses of including fixtures, downlight kits, and emerging lighting products in the MEEIA Cycle 3 programs.

   **STATUS:** At the time of data collection, GMO had not decided on the product mix for MEEIA Cycle 3, but the utility is considering expanding to other lighting products (e.g., fixtures, downlight kits).

**QUESTION 2: What changes have been made to the program in PY2018, and what changes are planned for the PY2019 extension and MEEIA Cycle 3?**

**FINDING 2: For the first three quarters of PY2018, GMO offered incentives almost exclusively on specialty LEDs, incenting standard LEDs for the first few months of the program year in the Discount (e.g., dollar store) retail channel only. In Q4 of PY2018, GMO reintroduced standard LED**

**incentives and experimented with a small online promotion with one home improvement retailer. GMO will continue to offer both standard and specialty LEDs in the PY2019 extension to MEEIA Cycle 2. GMO and the IC anticipated having lighting pop-up stores in conjunction with Earth Day (April 2019) during the PY2019 extension. At the time of data collection, GMO had not decided on the product mix for MEEIA Cycle 3, but the utility is considering expanding to other lighting products (e.g., fixtures, downlight kits).**

- In PY2018, standard LED sales decreased by 67% compared to PY2017 (from 339,545 to 112,249).Three-fourths (85,419 or 76%) of standard bulb sales occurred in Q4 PY2018. In contrast, specialty LED sales increased by 9% during the same period (from 86,653 to 94,747). Quarterly specialty sales were 7% in Q1, 30% in Q2, 36% in Q3, and 27% in Q4.

#### *9.2.3.2 Missouri-Required Questions for Process Evaluation*

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: The program seeks to address imperfections of price, availability, and consumer knowledge of efficient lighting choices. The program has 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 great success of the program in PY2016 and PY2017 led the program to focus primarily on reducing the shelf price of specialty LEDs for most of PY2018.**

- The HLR program reduced the shelf price of standard LEDs by $1.41 from $2.67 to $1.26. For specialty LEDs, the program reduced the price by $1.63 from $4.58 to $2.95. Manufacturers and retailers sometimes added their own discounts to reduce the shelf price further.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: The program appropriately defines the target market as all residential customers. In PY2018, GMO retained standard incentives in the Discount channel in Q2 even as they removed standard incentives in most other channels during Q2 and Q3. The continued support in the Discount channel was designed to make these bulbs available to hard-to-reach customers.**

- Although the Discount channel accounted for only 8% of the 112,249 standard bulb sales in the GMO service territory in PY2018, the channel accounted for 100% of Q2 standard sales and 56% of Q3 standard sales. In contrast, Discount stores only sold 9% of standard bulbs in Q1 (likely PY2017 holdover sales)[55] and zero standard bulbs in Q4.

[55] Retailers submit invoices that typically span weeks, but can sometimes span months, depending on their sales volumes and accounting practices. The Navigant team can attest that this overlap of sales between program years is a common practice for retail-based utility programs across the nation.

**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?**

**FINDING 3: Although the program focused incentives on specialty LEDs for most of PY2018 to allow GMO to move resources from the high-performing HLR to other programs in the GMO portfolio, the reintroduction of standard LEDs in Q4 of PY2018 caused standard bulb sales to outpace specialty sales for the year. This means that the program offered technologies to meet many of the end-use energy service lighting needs of the target market.**

- GMO will continue to offer standard LED incentives to the program in PY2019, thereby continuing its efforts to meets the end-use energy service needs of the target population.
- Suppliers interviewed in PY2016 suggested that the program add LED downlight and retrofit kits and integrated LED fixtures. In-depth interviews with program and IC staff in PY2017 suggest that they are considering these additions for MEEIA Cycle 3.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: GMO and the IC reduced marketing and outreach in PY2018, in keeping with the reduced program scope for the program year. They also decided to delay creation of new point-of-purchase or outreach materials until the GMO to Evergy rebranding was complete.**

- The program has met and exceeded the PY2018 sales and savings targets with the reduced level of HLR marketing efforts.
- Redesigning marketing materials for PY2018 would have wasted valuable ratepayer funds, given the limited scope of the HLR in PY2018 and the in-progress rebranding effort.

**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?**

**FINDING 5: Navigant verified that the GMO HLR program has achieved 100% of reported savings and 101% of its MEEIA Cycle 2 net savings targets cumulatively between PY2016 and PY2018.**

- Given strong realization rates and progress toward net savings goals, the HLR program has shown great success in increasing consumer acceptance and implementation of ENERGY STAR qualified LED bulbs.

## 9.3 Recommendations

The Navigant team developed the following recommendations based on the impact and process evaluations. The recommendations take the decreased program incentive budget and reduced scope for PY2018 into consideration. The recommendations are provided based on corresponding findings to move the GMO HLR program forward and meet the MEEIA Cycle 2 target. The recommendations are divided into 2 parts:

- Recommendations from the impact and NTG evaluations (Section 9.3.1)

- Recommendations from the process evaluation (Section 9.3.2)

Overall, the HLR program functions smoothly, its marketing materials are adequate, and the evaluation team encourages the program to continue supporting ENERGY STAR LEDs. The Navigant team concurs with GMO's decision to reinstitute support for standard LEDs in Q4 PY2018 and to retain standard LEDs in PY2019 to avoid consumer backsliding to standard halogen bulbs.

### *9.3.1 Impact*

The Navigant team suggests revising energy and demand savings calculations to reflect the following:

- Account for leakage, assumed to be 14% of HLR LED bulb sales (GMO currently makes no adjustment for leakage)
- Align the standard and specialty LED savings assumptions listed below with the IL TRM v7 as outlined in the residential savings assumptions in Appendix L.1:
    - Annual HOU (weighted by program sales and interior and exterior installation)
    - Baseline wattages (weighted by program sales in each lumen bin)
    - Coincidence factors
    - Waste heat factors
- Account for the **C&I cross-sector sales** contribution of HLR LED bulb sales by applying HOU and CF values of 3,306 and 0.6, respectively, to 4% of the bulbs sold through the program
- Assume a NTG ratio of 85% for standard LEDs and 66% for specialty LEDs

### *9.3.2 Process*

Drawing on the findings from interviews with program and implementation staff and suppliers, and a review of program sales information, Navigant developed recommendations to enhance the success of the program.

#### *9.3.2.1 Recommendations Based on the Research Questions*

The process evaluation found that the HLR program continues to provide benefits to GMO customers by offering them a low-cost alternative to halogen and other inefficient bulbs. While the broader program portfolio benefited from the HLR's shift to specialty LEDs for most of PY2018—and while the HLR exceeded its reduced sales and savings targets—consumer backsliding to standard halogens prevented GMO and its customers from achieving even greater energy and demand. GMO and the IC recognize this and reintroduced standard LED incentives in Q3 PY2018 and will continue to offer standard LEDs in PY2019. Table 9-7 summarizes recommendations based on the two additional process questions Navigant explored in this evaluation.

**Table 9-7. HLR Program Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | Navigant believes the HLR program has made appropriate progress on prior recommendations given the PY2018 shift to a specialty focus, and the decision to reintroduce standard LEDs in Q3 of PY2018 and retain them in PY2019. |
| 2. What changes have been made to the program in PY2018 and what changes are planned for the PY2019 extension and MEEIA Cycle 3? | GMO and the IC should monitor the effect of reintroducing standard LEDs back into the program, ideally working with program partners to obtain information for PY2018 and PY2019 on non-program sales (e.g., non-program LED sales and halogen sales). GMO should decide whether to include lighting fixtures, downlight kits, and controls in the program in MEEIA Cycle 3. |

*Source: Navigant analysis*

#### *9.3.2.2 Recommendations Based on Missouri's Requirements for Process Evaluation*

Navigant's investigation into Missouri's five required process evaluation questions[56] for the HLR program suggests that GMO successfully reduces the upfront cost of standard and specialty LEDs so that they are comparable to less efficient bulb types and non-ENERGY STAR LEDs. Marketing materials and outreach activities explain the benefits of using LEDs over less efficient products and have boosted the sales of program-supported LEDs. Given the reduced incentive budget for PY2018, the Navigant team makes only a few recommendations regarding the required process evaluation questions.

**Table 9-8. HLR Program Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market? | Navigant concurs with GMO's decision to focus on specialty LEDs for most of PY2018 in an effort to assist meeting overall portfolio needs, but the team also supports the reintroduction of standard LED incentives in Q3 PY2018 and continued support in PY2019, given the observed backsliding to halogens in PY2018. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | Navigant believes the target market is appropriately defined as residential 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? | Navigant supports GMO's decision to reintroduce standard LEDs in Q3 of PY2018 and retain support in PY2019. Navigant also encourages GMO and the IC to continue to explore the strengths and weaknesses of including fixtures, downlight kits, and emerging lighting products in the MEEIA Cycle 3 programs. |

[56] 4 CFR- 240-22.070(8)

| Missouri Question | Navigant Recommendation |
|---|---|
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | Current promotional efforts have contributed to the great success of the HLR program in MEEIA Cycle 2. |
| 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? | Given the strong program success, Navigant concludes that GMO's current efforts meet identified market imperfections. As noted above, GMO and the IC should continue exploring the possibility of adding fixtures, downlight kits, and emerging lighting technologies to the program in MEEIA Cycle 3. They should also consider the most appropriate ways to market the program in MEEIA Cycle 3 once the Evergy rebranding is complete. |

*Source: Navigant analysis*

# 10. HOME ENERGY REPORTS

## 10.1 Program Description

Through the Home Energy Reports (HER) program, Kansas City Power and Light (GMO) distributes single-page print reports by mail to educate residential customers about their home energy usage and provide them with information designed to encourage behavior change in energy usage. The reports contain the following information:

- A comparison of the customer's energy usage to that of similar homes in their area
- A comparison of the customer's energy usage to that of average homes and efficient homes over the last 12 months to show trends and progress over time
- Energy-saving action steps, including no cost or low cost tips
- A month-by-month comparison of the customer's energy usage in the current year to the previous year to show trends and progress over time
- A marketing module that changes each month and highlights different GMO programs and savings opportunities
- Options to (a) opt out of receiving the reports, (b) go online to find more energy-saving solutions, and (c) view home information used in the similar homes comparison

To measure savings impacts for this program, customers are screened for eligibility and then are randomly assigned to either a treatment group (recipients of reports) or a control group (non-recipients) using a randomized control trial (RCT) approach. The control group provides a comparative baseline for measuring the influence and energy savings effect of the program on the treatment group. Customers are grouped into waves based on start date in the program. Program year (PY) 2018 included four waves:

- KCP&L Greater Missouri Operations (GMO) 2013
- KCP&L GMO 2015
- KCP&L GMO 2016 Expansion
- KCP&L GMO 2017

Waves are identified by the year they started throughout this report. Results refer to PY2018 unless otherwise noted.

Customers in all waves received reports in April, August, and October 2018 and in January 2019. Customers with email addresses on file (about 8% of customers) also received email reports. These reports contained the similar homes comparison, energy-saving tips, and additional messaging on Greater Missouri Operations (GMO) programs. These emails were sent monthly on an opt-out basis.

**Table 10-1. HER Program Description**

| HER Key Details | |
|---|---|
| **Sector** | Residential |
| **Implementation Contractor** | Oracle processes household energy data, selects participant and control groups, distributes reports to participants, and performs ongoing analysis of changes in customer energy use for future rounds of messaging. |
| **Program Description** | Oracle provides customers with an energy report that compares their energy usage to similar households and historical usage and provides specific energy-saving tips based on household characteristics and usage. |
| **Application Process** | The program is an opt-out program with customers randomly assigned to treatment and control groups. As such, there is no application process. Customers who change residences are removed from the program. |
| **Verification of Purchase/Project** | No measures are incented or installed through the Home Energy Reports (HER) program, though participants may choose to participate in other energy efficiency (EE) programs as a result of the reports.[57] |
| **Rebate Process** | The HER program offers no rebates. |
| **Disputes, Rejected Applications** | Customers can contact the call center to opt out of the program (stop receiving reports). |
| **Project Reporting** | Oracle provides monthly estimates of savings based on billing analysis. |

*Source: Evaluation team analysis*

## 10.2 Evaluation Findings

To verify program impacts, the evaluation team conducted a billing analysis for PY2018 for each program wave of customers. The billing analysis compares the pre-program period to program period change in monthly energy use for the treatment group to the pre-period to program period change in energy use for the control group. Because the home energy reports encourage participation in other energy efficiency (EE) programs, the team also compared participation in GMO's other EE programs between the treatment and control group to adjust impact estimates for possible double-counted savings between the HER program and other GMO EE programs.

The billing analysis cannot directly measure coincident demand impacts because it is based on monthly data. Monthly data does not have the granularity needed to derive demand impacts. Demand impacts can only be estimated for hourly or more granular usage data. To obtain estimates of coincident demand impacts, Navigant applied the method used by the implementer: multiply average daily savings from August by 1.5 to attain peak demand reduction (see Appendix M for more details).

A key feature of the RCT design is that the analysis inherently yields energy savings estimates that are net of free ridership (FR) and participant spillover (PSO) bias. Customers are assigned to treatment and control groups: There are no participants who otherwise might have received the individualized reports in the absence of the program. While some customers receiving reports might have taken energy-conserving actions or purchased high efficiency equipment in the absence of the program, the random selection of program participants and control group customers means it is likely that the treatment and

[57] During the years that Navigant conducts a billing analysis, Navigant deducts energy savings attributable to uplift in participation in these other programs from HER program savings to avoid double-counting.

control customers will have similar propensities to undertake energy-conserving behaviors and purchases in the absence of the program. Thus, the evaluation team applied a net-to-gross (NTG) ratio of 1.0.

The following sections present Navigant's PY2018 findings for the HER program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files.

Navigant divided the evaluation findings into the following:

1. Impact evaluation (Section 10.2.1)
2. Cost-effectiveness assessment (Section 10.2.2)
3. Process evaluation (Section 10.2.3)

### *10.2.1 Impact*

The HER program achieved 19,894,420 kWh of verified gross and net incremental energy savings at the customer meter in PY2018. This represents the combined savings from the four waves of customers. The program achieved 94% of the 3-year Cycle 2 Missouri Energy Efficiency Investment Act (MEEIA) target.

The program achieved 3,413 kW of verified gross and net coincident demand savings at the customer meter in PY2018. This represents the combined coincident saving from all four waves of customers. The program achieved 81% of the 3-year Cycle 2 MEEIA target. Demand reductions are based on August energy savings as August is the assumed peak month for GMO.[58] Lower than expected savings in August will lead to lower estimated demand reductions. Reported savings for August 2018 were 18% lower than reported savings in August 2017.

Verified energy savings are 107% of the reported savings; however, the reported savings fall within the 90% confidence interval of the verified savings. Several factors can contribute to differences between verified savings and reported savings when the savings calculations are based on billing analysis:

1. The implementer reports savings to GMO on a monthly basis while the evaluation is based on modeling the full year of data at the same time. Monthly estimates will have more variability. In addition, billing data for a particular month is not finalized until a few months after. In order to provide GMO with savings estimates more quickly, the implementer uses data available at the time which may not be final.
2. Differences in data cleaning approaches can result in differences in savings.
3. Some of the waves have declining treatment and/or control group sizes due to attrition. The control groups for the GMO 2015, GMO 2016, and GMO 2017 waves and the treatment group for GMO 2015 have less than 10,000 customers. Small differences in data cleaning or modeling can have a larger effect on the results as group sizes shrink.

Households in the 2016 Expansion and 2017 waves experienced lower savings (0.7% and 1.3% of baseline usage, respectively), while households in the 2013 and 2015 waves experienced higher savings (2% and 1.5% of baseline usage, respectively). Similar to the 2017 evaluation, the 2016 Expansion wave savings remain lower than other waves. Like the previous evaluation, households in the 2016 Expansion

[58] KCP&L directed the program implementer to use August.

and the 2017 waves have lower average baseline energy use (33 kWh and 28 kWh per day, respectively) than the 2015 wave (64 kWh/day) and the 2013 wave (46 kWh/day). The 2016 Expansion and the 2017 wave may have fewer opportunities to reduce energy use. The 2017 process evaluation noted that the 2016 Expansion wave treatment customers were less likely to read the report, less likely to find the tips useful, and were less familiar with GMO EE programs than other waves. Table 10-2 provides a summary of the program-to-date savings.

**Table 10-2. HER Program PY2018 / Program-to-Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 18,651,728 | 19,894,420 | 107% | 21,070,772 | 19,894,420 | 94% |
| Coinc Demand at Customer Meter (kW) | 3,107 | 3,413 | 110% | 4,215 | 3,413 | 81% |

*Source: Navigant analysis*

#### *10.2.1.1 Net-to-Gross*

As shown in Table 10-3, for PY2018, Navigant applies a NTG value of 1.0 for the HER program because the analysis approach provides a result that is net of FR and PSO.

**Table 10-3. HER NTG Components and Ratio: PY2018**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| PY2018 | | Navigant assumed a net-to-gross (NTG) value of 1.0 for the HER program | | 100% |

NPSO = nonparticipant spillover

*Source: Navigant analysis*

### *10.2.2 Cost-Effectiveness*

This section presents Navigant's evaluation of cost-effectiveness for the HER program for each of the five standard benefit-cost tests. Reference Section 1.2 for information on how benefits and program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

Table 10-4 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, PY2018, and program to date, and the Total Resource Cost (TRC) test filed by GMO. Based on Navigant's 2018 benefit-cost analysis, the program achieved a 1.0 in the TRC, Societal Cost Test (SCT), Utility Cost Test (UCT), and PCT. The Participant Cost Test (PCT) benefit-cost ratio is infinite (INF), indicating there are program benefits to participants but no costs. Navigant's analysis resulted in a TRC ratio that is slightly higher than that filed by GMO due to a 107% energy realization rate and 110% demand realization rate.

**Table 10-4. HER Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[59] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 0.79 | 0.71 | 0.71 | 0.71 | INF* | 0.32 |
| 2017 | 0.98 | 0.97 | 0.97 | 0.97 | INF* | 0.37 |
| 2018 | 1.16 | 1.25 | 1.25 | 1.25 | INF* | 0.35 |
| **Program Overall** | **N/A** | **0.93** | **0.94** | **0.93** | **INF*** | **0.35** |

*Source: Navigant analysis*

### *10.2.3 Process*

Navigant addressed four process evaluation research questions and the five Missouri-required questions for process evaluation through staff interviews, a program materials review, and a review of the program implementation contractor's (IC's) PY3 Customer Engagement Tracker (CET) survey results.

[59] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

**Table 10-5. HER Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | • Program staff interviews<br>• Materials review |
| 2. What changes have been made to the program in PY2018, and what changes are planned for PY2019? | • Program staff interviews<br>• Materials review |
| 3. How are customers engaging with the program through the reports and energy-saving actions? | • CET survey |
| 4. How satisfied are customers with the reports? Do reports impact their satisfaction with GMO? | • CET survey |
| **Missouri-Required Questions for Process Evaluation** | |
| 1. What are the primary market imperfections that are common to the target market segment? | • Program staff interviews<br>• 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<br>• 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<br>• Materials review<br>• Evaluation survey |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• 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<br>• Materials review<br>• Evaluation survey<br>• CET survey |

*Source: Evaluation team analysis*

The team's findings are provided in the following sections. Recommendations for consideration in relation to these findings are in Section 10.3.

#### *10.2.3.1 General Process Evaluation Questions*

**QUESTION 1: What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?**

**FINDING 1: Below we summarize the recommendations from PY2017 and provide an update on the recommendation:**

- **Increase the number of customers receiving email reports:** GMO is collaborating with the program implementer to develop the APIs necessary to send email reports to treatment customers who have an email address on file with GMO, while maintaining those lists internally. This is expected to go live during PY2019.

- **Target tips, refresh tips, conduct in-depth customer research to understand customer actions**: In PY4 the program will undergo improvements (see Finding 2 for details) with the integration of advanced metering infrastructure (AMI) interval energy use date. The reports will draw on the more granular data to provide a different energy use feedback experience. Any additional research should wait until after the new reports and new online platform are live.

**QUESTION 2: What changes have been made to the program in PY2018 and what changes are planned for PY2019?**

**FINDING 2: The marketing modules (messaging specific to GMO program offerings) change from year to year, but the basic report format was unchanged for PY2018. However, more substantial changes are expected in the 2019 program year. For example, GMO is collaborating with Oracle to:**

- Develop APIs to enable email HERs to be sent to all treatment customers with email addresses on file with GMO.
- Provide a data feed of AMI interval data to enable reports to show disaggregated energy use feedback. Disaggregated feedback will help customers identify which uses in their home are using the most energy and give customers information to make targeted changes to their energy use. Program will include additional features such as high bill alerts.
- Include new tips and updated graphics on print and emailed reports. New tips include load shifting, use of smart devices, and EV charging.

GMO is considering shifting to more reliance on email reports in future program years. There is little research on the relative effectiveness of sending only email reports compared to sending only print or a combination.[60] GMO's print reports have high readership rates (69%). The email report open rate is 40%, but that is based on only a small percentage of customers (8%) who receive emails.

**QUESTION 3: How are customers engaging with the program through the reports and energy-saving actions?**

**FINDING 3: Most customers (69%) read the report and 29% report taking an energy-saving action.**

- Of GMO customers responding to the CET who recall receiving the HER, 91% state that they read some or all of the report or glanced at the pictures and 47% report talking to others within or outside their household about the report.
- Of GMO customers responding to the CET who recall receiving the HER, 29% said they took an action after reading the report. The most common actions were adjusting behavior with their lights, thermostats, and appliances and replacing light bulbs with LED bulbs

**QUESTION 4: How satisfied are customers with the reports? Do reports impact their satisfaction with GMO?**

[60] One report found lower, but still robust savings (1.8%) for an email-only wave. However more research is needed to be confident that savings can be maintained through email-only reports. See, Integral Analytics. 2012. *Impact and Persistence Evaluation Report: Sacramento Municipal Utility District Home Energy Report Program.*

**FINDING 4: Among GMO customers responding to the CET survey who have looked at the reports, 70% agree or strongly agree that they like the reports. Treatment and control customers express similar levels of satisfaction with GMO.**

- Of treatment respondents, 80% were satisfied with GMO (satisfaction rating of 8–10 on a scale of 1–10) compared to 86% of control customers (this difference is not statistically significant).
- Similar proportions of treatment customers than control customers responded to the following statements:
    - GMO provides useful suggestions on ways I can lower my energy usage and reduce my bill: 82% of treatment customers agree compared to 80% of control customers.
    - GMO wants to help me save money: 70% of treatment customers agree compared to 71% of control customers.
    - GMO provides customers with useful tools to learn about energy usage: 81% of treatment customers agree compared to 82% of control customers.
- Customer recommendations for report improvements include: 1) providing more detail about and accounting for occupancy and home size in the neighbor comparison; 2) providing more detailed tips, more affordable tips, and new tips for saving energy; 3) moving to paperless reports to conserve resources.

#### *10.2.3.2 Missouri-Required Questions for Process Evaluation*

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: Some residential customers do not understand how their behaviors, appliances, and electronic devices can affect their energy use and contribute to their monthly bills. Customers are also unaware of cost-effective strategies to reduce energy in their home.**

- The PY2018 program targeted over 123,000 customers to receive four HERs. An additional 41,000 customers served as a control group.
- Based on responses to the CET, 81% of treatment customers agree that GMO provides tools to help customers learn about energy use. Furthermore, 66% of treatment customers report that the energy efficiency tips on the report are useful, while 55% report that the HERs help the customer make better decisions to use and save energy.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: The target market segment is appropriately defined as residential customers in single-family homes.**

- The initial waves included the highest energy users.
- As the program adds waves, the new waves should continue to include customers beyond the highest energy users. For example, the 2016 Expansion wave and the 2017 wave include customers that have lower baseline energy use.

**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?**

**FINDING 3: HERs provide a diverse set of suggestions that target all residential end uses. The focus of the report is to modify behaviors; therefore, the program does not offer rebates for specific measures, but does promote rebates provided through other GMO programs.**

- These tips include many low cost and no cost actions and suggestions to buy efficient equipment and appliances.
- The tips cover the main residential electricity end uses: lighting, HVAC, electronics, water heating, appliances, and pools. New tips include EV charging, smart device usage, and load shifting.
- The print reports also cross-promoted rebates on new cooling equipment, heating and cooling system tune-ups. The email reports included messaging on the Online Energy Audit, heating and cooling tune-ups, rebates on new air conditioners or heat pumps, EVs, and solar subscription.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: The HER program uses two primary communication channels: paper mailed reports and emails.**

- All treatment customers received four paper reports in PY2018.
- Customers with email addresses on file (about 8%) also received monthly email reports.
- Customers could also access an online portal to monitor energy use through the Home Online Energy Audit.
- The timing and frequency of messaging through these channels is appropriate given the need to provide information through multiple mediums over time so participants can monitor the effect of any efficiency and consumption changes they make.

**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?**

**FINDING 5: Most treatment customers read or look at the report, and many talk about the report with others. Readership rates are consistent with Oracle-reported utility averages.[61] However, there may be an opportunity to engage the 9% of customers who either did not look at the report and the 22% who did not recall receiving the report at all.**

- Of CET respondents, 9% who recalled receiving the reports did not read or did not remember reading the report; 22% of all CET respondents did not recall receiving the report at all.
- Of CET respondents who recall the reports, 77% like the reports and 66% talk to other people about the reports.

[61] See slide 45 of "Oracle Opower + Evergy: Program Review & Customer Engagement Tracker Results", presented February 4, 2019.

## 10.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to move the GMO HER program forward and meet the MEEIA target. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 10.3.1)
- Recommendations from the process evaluation (Section 10.3.2)

Overall, the HER program functions smoothly, is viewed positively by customers, provides valuable education and energy use tracking to residential customers, and results in verifiable energy savings. Navigant provides suggestions for consideration to help make the customer experience even better and to increase savings achieved by the program.

### *10.3.1 Impact*

The tracking data and savings calculations provided by Oracle are appropriate for billing analysis of a RCT. While the evaluated savings differed from the implementer-reported savings, the implementer-reported savings fell within the 90% confidence interval of the evaluated savings.

Navigant makes the following recommendations related to the impact evaluation:

- Continue to use Oracle-reported savings for tracking purposes.
- Evaluate the reported savings every 2 years to monitor continued consistency between evaluated savings and implementer-reported savings.
- Evaluate the performance of the 2016 Expansion after the implementation of the new report design with disaggregated feedback and additional features.
- After the program integrates AMI data, consider evaluating demand impacts using AMI data from a sample of treatment and control customers. Navigant suggests using a post-only difference approach as most customers will not have AMI data available for the pre-period.

### *10.3.2 Process*

Given that the program is undergoing improvements, the Navigant team does not make recommendations beyond what was recommended in the PY2017 evaluation at this time. The Navigant team suggests conducting a full impact and process evaluation after the changes have been in place for a full program year.

#### *10.3.2.1 Recommendations Based on the Research Questions*

The Navigant team examined four research questions in addition to the Missouri-based evaluation research questions. Table 10-6 summarizes conclusions, but the Navigant team does not make recommendations at this time.

**Table 10-6. HER Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | The program is addressing many past recommendations by implementing a process to send more email HERs and by integrating AMI data and revamping the reports and refreshing tips. No further recommendations are suggested. |
| 2. What changes have been made to the program in PY2018, and what changes are planned for PY2019. | Redesigned reports with disaggregated feedback and increased distribution of emailed reports are in process for PY2019. No further recommendations are suggested for PY2019.<br>If, in future years, GMO is considering shifting to email-only reports, GMO should consider starting with a test wave with half the treatment group randomly assigned to receive paper reports and half assigned to receive email reports to test the relative effectiveness of email compared to paper reports. |
| 3. How are customers engaging with the program through the reports and energy-saving actions? | Customers are reading the reports and taking action. No further recommendations are suggested. |
| 4. How satisfied are customers with the reports? | Reports have a positive impact on customer satisfaction. No further recommendations are suggested. |

*Source: Navigant analysis*

#### *10.3.2.2 Recommendations Based on Missouri's Requirements for Process Evaluation*

Navigant addressed the five required process evaluation questions set forth in the Missouri regulations[62] for the HER program. Overall, the evaluation team found that the program meets the requirements. The Navigant team summarizes its conclusions in Table 10-7 and recommends a full process and impact evaluation after the revised reports with AMI data have been live for a full program year.

[62] 4 CFR- 240-22.070(8)

**Table 10-7. HER Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market? | GMO should continue providing reports and encouraging customers to log into the Online Energy Audit to help customers understand how to manage their energy use. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | The target market segment is appropriately defined as residential single-family homes. As the program modifies the reports and add features, GMO should consider assessing the effectiveness of the program with customers in multifamily homes in order to expand the target market. |
| 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 should continue to keep abreast of new ways to use and save energy to provide up-to-date tips, including tips for load-shifting, tips for using smart home devices, and EV charging. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | With launch of the new process that will enable more customers to receive email reports, high bill alerts, and other communications, GMO may want to consider additional future research on the effectiveness and customer experience with these touchpoints. |
| 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? | With upcoming changes to access to email reports and data granularity, GMO may want to consider tracking of participation and additional research on effectiveness after the new program elements have been in place for a program year. |

*Source: Navigant analysis*

# 11. HOME ONLINE ENERGY AUDIT AND BUSINESS ONLINE ENERGY AUDIT

## 11.1 Program Description

The Home Online Energy Audit (HOEA) and Business Online Energy Audit (BOEA) for small business are online tools that enable residential and business customers to track and analyze their energy use. The tools also provide educational materials on energy savings for heating, cooling, lighting, and other electrical equipment.

Residential customers in the KCP&L – Greater Missouri Operations (GMO) territories can access the full functionality of the tools through KCP&L's My Account webpage. Residential customers can compare their bills to analyze changes on a monthly or annual basis, retrieve their billing information, compare their home to similar homes using the dashboard comparison, and find out more about where they are using energy in their homes via the What Uses Most (WUM) survey.

Business customers that are 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 a neighbor comparison or WUM survey.

**Table 11-1. Online Energy Audit Program Description**

| Online Energy Audit Key Details | |
|---|---|
| **Sector** | Residential and commercial |
| **Implementation Contractor** | Oracle |
| **Program Description** | The Home Online Energy Audit (HOEA) and Business Online Energy Audit (BOEA) programs provide an online tool to residential and business customers to access their billing information and their electric usage on a monthly or yearly basis or on an end-use basis; they also receive educational energy-saving tips by end use through residential and commercial tip libraries. Residential customers can complete an online questionnaire and compare their homes to similar homes. |
| **Application Process** | All residential and small business (non-demand) customers who enroll in the My Account portal can use the tool. |
| **Verification of Purchase/Project** | N/A |
| **Rebate Process** | N/A |
| **Disputes, Rejected Applications** | The program manager or the Kansas City Power and Light (KCP&L) call center handles disputes. |
| **Project Reporting** | Oracle provides more frequent program tracking reports. |

*Source: Evaluation team analysis*

## 11.2 Evaluation Findings

Because the HOEA and BOEA do not claim savings for program activities, a savings impact analysis was not part of the scope of the evaluation. However, the Navigant team reviewed program materials and the

Home Energy Report (HER) Customer Engagement Tracker (CET) and evaluation survey questions that apply to HOEA.

### *11.2.1 Cost-Effectiveness*

The evaluation does not include cost-effectiveness testing because HOEA and BOEA do not claim savings for program activities.

### *11.2.2 Process*

Navigant addressed three process evaluation research questions and the five Missouri-required questions for process evaluation through the following activities:

- Staff interviews
- Program materials review
- Analysis of the program implementation contractor's (IC's) CET survey, which included questions about the HOEA tool, and the HER process evaluation survey questions that apply to HOEA

**Table 11-2. HOEA and BOEA Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report? | • Program staff interviews<br>• Materials review |
| 2. What changes have been made to the program in PY2018, and what changes are planned for PY2019? | • Program staff interviews<br>• Materials review |
| 3. How are residential customers engaging with Energy Audit and energy-saving actions? | • CET survey<br>• HER Evaluation survey |
| 4. How satisfied are residential customers with the Online Energy Audit? | • CET survey |
| **Missouri-Required Questions for Process Evaluation** | |
| 1. What are the primary market imperfections that are common to the target market segment? | • Program staff interviews<br>• 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<br>• 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<br>• Materials review |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• 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<br>• Materials review<br>• CET survey |

*Source: Navigant analysis*

The team's findings are provided in the following sections. Recommendations for consideration in relation to these findings are in provided Section 11.3.

#### *11.2.2.1 General Process Evaluation Questions*

**QUESTION 1: What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?**

**FINDING 1: Past recommendations included updating energy saving tips and conducting research on how customers are using the tools. Upcoming changes to the tools will include new tips and a different customer experience. Additional research should wait until after the changes are in place.**

**QUESTION 2: What changes have been made to the program in PY2018, and what changes are planned for PY2019?**

**FINDING 2:** The PY2018 HOEA and BOEA programs did not have any substantial changes from the PY2017 programs. However, GMO expects to launch substantial changes to HOEA in 2019. Changes include updates to the look and feel and functionality of the tools. Additional features will include disaggregated energy use feedback, customer segmentation, and updated energy-saving tips. GMO is planning to update BOEA in 2020.

**QUESTION 3: How are residential customers engaging with Energy Audit and energy-saving actions?**

**FINDING 3: 73,574 customers in the combined Greater Missouri Operations (GMO) and KCP&L Missouri Operations Company (KCP&L-MO) territories completed the online WUM audit in calendar year 2018. Across all KCP&L territory, 16% of My Account users completed WUM in calendar year 2018 which was just shy of the 18% program goal.**

- According to the implementer, In PY2018 the highest page views were for Ways to Save (24%), Dashboard (20%), and My Energy Use (12%). Of page views in PY2018, 12% were on the My Energy Use page; this is down from the 2017 My Energy Use page views at 45%.
- Based on the CET, 37 GMO customers (n = 452) reported using the Energy Audit tool.
- However, 87% of customers logins in PY2018 were unique, suggesting that there are opportunities to encourage customers to return to the tools.

**QUESTION 4: How satisfied are residential customers with the Energy Audit?**

**FINDING 4: Most HER customers who have also used the Energy Audit tool report high levels of satisfaction.**

- Of CET respondents who have used the Energy Audit, 76% are satisfied with it and 73% find the information useful. Because this tool is optional and available to everyone, these results may be due to selection bias.

#### *11.2.2.2 Missouri-Required Questions for Process Evaluation*

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: Some customers do not understand how their actions and appliances or equipment in their home or business can affect their energy use.**

- The HOEA and BOEA tools educate customers on their energy use and provide tips to help them lower their use.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: In PY2018, the program targeted residential and small business customers interested in making their homes/businesses more energy efficient and/or reducing their electricity bill.**

- The high level targets for the program are customers who perceive their bills as high and customers who are motivated by the green movement.
- The applicability of energy-saving tips is different for residential and small business customers, so it is appropriate to have separate tools for these groups. The tips for small businesses are more appropriate for smaller businesses than medium or large businesses. Medium or large businesses can participate in the Strategic Energy Management (SEM) program.

**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?**

**FINDING 3: The tools appropriately reflect the diversity of end-use energy service needs of the target market.**

- The residential tool has five components:
    - *My Energy Usage:* Customers can view their own usage on a monthly or annual basis.
    - *Neighbor Comparison:* Customers can view their usage compared to similar homes.
    - *What Uses Most:* This is an online survey that helps customers understand the sources of their energy use.
    - *Ways to Save:* This tip library provides practical suggestions for customers to reduce their energy use. The library contains over 50 tips and includes common residential end uses such as lighting, HVAC, pools, and plug loads.
    - *My Plan:* Customers can select tips they would like to act on and track their completion.
- The small business tool has three components:
    - *My Energy Usage:* Customers can view their own usage on a monthly or annual basis.
    - *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.
    - *My Plan:* Customers can select tips they would like to act on and track their completion.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: Both communication channels and delivery mechanisms are appropriate for the target market segments. However, the program did not target any communications to small businesses in PY2018.**

- In PY2018 GMO included messaging about HOEA in their series of welcome emails for new customers. The third email in the series highlighted HOEA. GMO cross-promoted HOEA on monthly bills, through social media, and via the call center and messaging on HERs.
- Completions of WUM increased from 2017 (nearly 38,000 cumulative completions from Missouri customers [combined territories]) to over 73,000 in 2018.
- BOEA did not do any targeted communications in PY2018 pending changes to the program expected in 2020.

**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?**

**FINDING 5: The main barriers to entry for residential customers are technology-related.**

- This free tool for GMO customers is provided through the corporate website. This requires a computer, tablet, or smartphone, internet access, and computer literacy. Increasingly, customers are logging in via smartphone and tablets: 30% of views in 2018 were on smartphones (25%) or tablets (5%).
- A potential barrier for some customers could be knowledge of the tools and uncertainty around how to use the tools. GMO has tried to address this by guiding customers to start with the WUM online audit and by including messaging in their welcome emails to new customers.
- The main barrier to entry for small business customers is likely time and perceived value of the tools.

## 11.3 Recommendations

HOEA and BOEA provide education to customers to help them better understand the drivers of their energy use and how to reduce their energy use. Limited survey data suggests that customers are satisfied with the tools. Given the substantial changes to the tools expected in 2019 (HOEA) and 2020 (BOEA) the evaluation team suggests conducting a more in-depth evaluation after the tool have been live for several months to a year.

### *11.3.1 Impact*

There are no savings associated with the Energy Audit programs. The programs track overall page views and customer-level activity on key program pages such as WUM and Ways to Save. This detailed information is valuable for tracking use of the tools and should be continued.

### *11.3.2 Process*

HOEA and BOEA can serve as valuable educational and engagement tools. Planned changes in the tools appear to address many of the past recommendations. The evaluation team recommends more in-depth research and evaluation after the new tools have launched.

#### *11.3.2.1 Recommendations Based on the Research Questions*

Based on its research question findings and expected program changes, the evaluation team suggests future research to further understand customer engagement with HOEA and BOEA.

**Table 11-3. HOEA and BOEA Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. How are residential customers engaging with HOEA and energy-saving actions? | After the revised tools launch, GMO should consider in-depth interviews or focus groups with residential and small and medium business customers to better understand how they are using the tools and what would make them more useful. In particular, this research could address usability and customer experience and explore ways to encourage customers to visit the tools several times per year. |
| 2. How satisfied are residential customers with the HOEA? | |

*Source: Navigant analysis*

#### *11.3.2.2 Recommendations Based on Missouri's Requirements for Process Evaluation*

Navigant addressed the five required process evaluation questions set forth in the Missouri regulations[63] for HOEA and BOEA. Overall, the evaluation team found that the program meets the requirements. Table 11-4 summarizes the team's conclusions, and the team recommends more in-depth evaluation after the revised tools have been live for a full program year.

**Table 11-4. HOEA and BOEA Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market? | After the revised tools have launched, GMO may want to consider gathering additional feedback from customers to understand, from the customer perspective, how effectively the tools engage and educate customers on their energy use and how to reduce their energy use. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | GMO should continue to monitor the effectiveness of outreach to ensure residential and small business customers learn about the tools. |
| 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 should continue to keep abreast of new ways to use and save energy to provide up-to-date tips. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | GMO has used a variety of communication channels in the past. With the launch of the updated tools, using and assessing the efficacy of a variety of channels will continue to be important. |

[63] 4 CFR- 240-22.070(8)

| | | |
|---|---|---|
| 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 tools launch GMO may want to assess the most effective approaches to drive customers to the tools. |

*Source: Navigant analysis*

# 12. RESIDENTIAL AND BUSINESS PROGRAMMABLE THERMOSTAT PROGRAMS

## 12.1 Program Description

The Residential and Business Programmable Thermostat (PT) programs incentivize customers to sign up to receive a Nest thermostat at no cost or for an incentiveon their previously owned Nest thermostat. By participating in this Rush Hour Rewards (RHR) program, customers allow GMO to remotely operate their HVAC system during peak demand periods by sending a signal to participating thermostats. The thermostats help participants save energy throughout the year through optimization algorithms that learn participants' HVAC use. Finally, thermostat customers can elect to enroll in the Seasonal Savings (SS) program, which further optimizes energy efficiency through more aggressive cooling schedules.

In Cycle 2, customers participated through three delivery channels:

1. **Do It Yourself (DIY):** These participants are customers who sign up for the program through the online web portal and receive their free thermostat in the mail. DIY participants install the thermostat themselves and receive a $50 incentive upon installation. These customers receive a $25 incentive each year they remain in the program. DIY participants are the most common type of thermostat participant in PY2016 and PY2017. The DIY delivery channel was shut down in PY2018 because the implementation contractor would have had to prematurely stop the program until the next Cycle due to high enrollment numbers via the portal.
2. **Direct Install (DI):** These participants sign up for the program, and CLEAResult sends technicians to install the free thermostat. They also receive a $25 incentive each year they remain in the program.
3. **Bring Your Own Device (BYOD):** These participants already own a Nest thermostat when they sign up for the program. Upon program enrollment, they receive a $100 incentive. These customers also receive a $25 incentive each year they remain in the program.

GMO met its enrollment targets. To limit program enrollment, the utility shut down the DIY portal on January 9, 2018. In addition, the utility set caps on the number of DI installations that could occur each month.

**Table 12-1. Programmable Thermostat Program Description**

| Programmable Thermostat Details | |
|---|---|
| **Sector** | Residential and Small to Mid-Size Business |
| **Implementation Contractor** | Nest is the thermostat vendor and hosts the online do it yourself (DIY) portal.<br>CLEAResult issues incentives and facilitates the direct install (DI) and bring your own device (BYOD) customer types. |
| **Program Description** | Customers agree to have a Nest advanced, learning thermostat installed in their house. The utility can remotely control the thermostat during demand response (DR) events to offset peak demand. Customers benefit by receiving a free thermostat (or an incentive on a previously owned Nest thermostat) and enhanced control over home heating and cooling by using a programmable thermostat (PT). |

| Programmable Thermostat Details | |
|---|---|
| **Program Measure** | At the onset of Cycle 2, the PT programs provided customers with the Nest third generation thermostat. In January 2018, GMO began providing new customers with Nest Thermostat E. Nest Thermostat E is now the default measure for the PT program unless it cannot be installed at the site, in which case the third generation Nest thermostat is installed. |
| **Application Process** | DIY: Customers enroll in the program through an online portal hosted by Nest. This channel was not available to customers in PY 2018.<br>DI: Customers can call the contact center to enroll in the program.<br>BYOD: Customers can call the contact center to enroll in the program. |
| **Verification of Purchase/Project** | If a technician installs a thermostat through the DI program, the technician confirms that the thermostat is connected to Wi-Fi and enrolled in the program before leaving. For the DIY channel, the customer must install the thermostat, create their Nest account, and connect the thermostat to Wi-Fi. The thermostat is then automatically enrolled in the RHR program. In Missouri Energy Efficiency Investment Act (MEEIA) Cycle 2, each thermostat that is installed as part of GMO's RHR is also eligible to participate in the Seasonal Savings (SS) program. |
| **Incentive Process** | CLEAResult issues thermostat incentives to customers. DIY customers receive a $50 incentive post installation, and BYOD customers receive a $100 incentive post enrollment in the program. All customers receive $25 annually for continued participation in the program. |
| **Disputes, Rejected Applications** | CLEAResult and GMO's product manager handle disputes if and when they arise. |
| **Project Reporting** | Following DR events, Nest provides an estimate of achieved demand reductions to GMO. |

*Source: Navigant interview of GMO product manager*

## 12.2 Evaluation Findings

In PY2018, Navigant relied on deemed savings values that were calculated during the PY2017 evaluation. In PY2017, Navigant calculated annual energy savings and demand impact per thermostat and reviewed Nest's SS analysis and used an adjusted version of its analysis to identify annual SS energy savings. The analyses conducted to reach these values are detailed in Appendix O and outlined below:

- **Annual energy savings per thermostat:** In PY2017, Navigant conducted a monthly billing analysis to calculate annual energy savings per thermostat. The evaluation team used monthly billing data provided by GMO to conduct this analysis. The team found that each thermostat achieved 197 kWh in savings, which accounts for about 1.6% of annual energy use. This result is used as the deemed savings value in PY2018.
- **Additional energy savings from the SS program:** In PY2017, due to the lack of experimental design (i.e., no control group for SS customers), there was not sufficient data for Navigant to perform a billing analysis to calculate an annual savings value for SS customers. Thus, the

evaluation team employed a modified version of the SS kWh annual savings that Nest found.[64] This result is used as the deemed savings value in PY2018.

- **DR impact across events:** In PY2017, Navigant converted thermostat telemetry data provided by Nest to power output, and used this data in a regression analysis that identified DR event impact. The team found that across events, each thermostat achieved 1.40 kW in DR impact on average. This value is in line with what Nest found in its analysis of the PY2017 event season. This result is used as the deemed savings value in PY2018.

The deemed savings values were multiplied by specific quantities of participating thermostats, as detailed in Appendix O, to identify total program energy savings and DR impact. Navigant used the tracking data provided by CLEAResult to identify the quantities of thermostats to include in this extrapolation.

The following sections present Navigant's PY2018 findings for the PT programs. Additional detail on the evaluation team's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

1. Impact evaluation (Section 12.2.1)
2. Cost-effectiveness assessment (Section 12.2.2)
3. Process evaluation (Section 12.2.3)

### *12.2.1 Impact*

As shown in Table 12-2 and Table 12-3, the Residential PT program achieved 540,767 kWh of energy savings at the customer meter in PY2018 for a realization rate of 47%. The program achieved 9% of the 3-year MEEIA target in PY2018. The program achieved 4,472 kW of demand impact in PY2018 for a realization rate of 142%, meeting 27% of the 3-year MEEIA target.

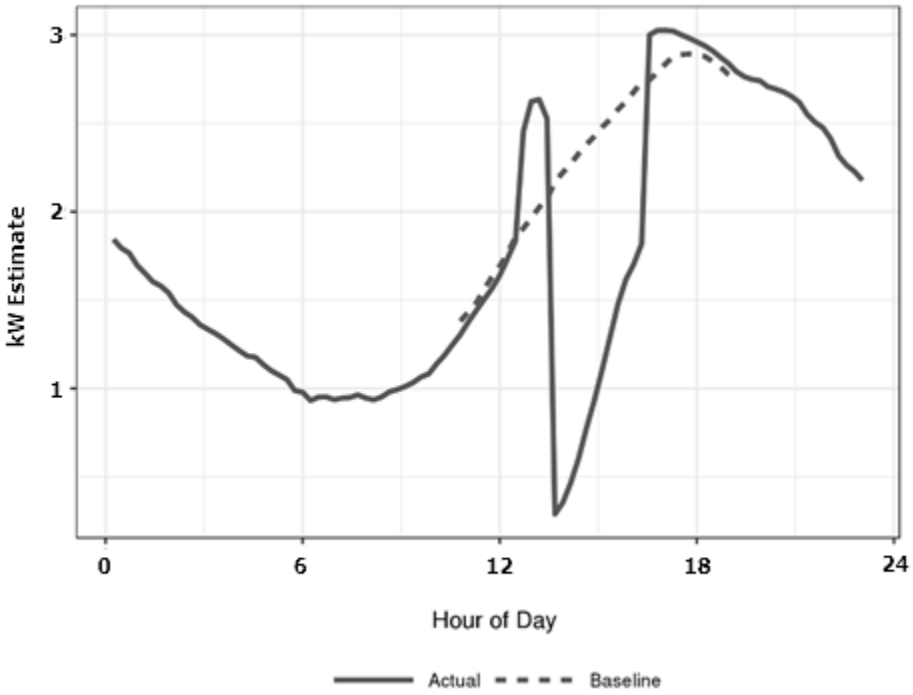
As shown in Table 12-4 and Table 12-5, the Business PT program achieved 30,791 kWh of energy savings at the customer meter in PY2018 for a realization rate of 44%. The program achieved 39% of the 3-year MEEIA target. The program achieved 214 kW of demand impact in PY2018 for a realization rate of 113%, meeting 99% of the 3-year MEEIA target.

Verified savings in PY2018 are a result of per device deemed savings based on billing data (for energy) and telemetry data (for demand) as well as the number of thermostats in the program and enrolled in RHR by the end of the program year. Reported savings also rely on the per device deemed savings values but calculate the number of enrolled thermostats differently. Thus, the realization rate can be different from 100%. The deemed energy savings per thermostat decreased from 462 kWh in PY2016 to 197 kWh in PY2017 and PY2018. Navigant believes the baseline thermostats used in the PY2017 analysis were more efficient than the thermostats used to determine the PY2016 energy savings value because the program targeted existing customers with programmable thermostats and Wi-Fi-connected Honeywell thermostats. The deemed demand impact per thermostat increased from 1.26 kW in PY2016 to 1.40 kW in PY2017 and PY2018.

[64] Nest found that Seasonal Savings (SS) customers annually saved an additional 144 kWh based on an air conditioning unit system size of 3.8 kW. In the demand response (DR) impact analysis, Navigant identified that the average air conditioning unit system size for customers with available data in the tracking database was 3.2 kW. Thus, Navigant scaled 144 kWh down to 121 kWh considering the smaller air conditioning unit system size. Full methodology is detailed in Appendix O.

Figure 12-1 demonstrates the regression method used to determine demand savings for RHR events in PY2017. The dashed line shows the model predictions that constitute a participant's baseline usage, and the solid line shows the participants actual usage over the full event day. The precooling and snapback effects are visible before and after the event, respectively. Snapback occurs after an event as the customer uses more energy to cool the home back to its original setpoint.

**Figure 12-1. Event Usage vs. Regression-Predicted Baseline**




The amount of demand reduction throughout a RHR event is not constant due to each home or business warming at different rates during the time that air conditioning is turned off. During an event, the thermostat runs the air conditioning after the home or business has warmed to a point where cooling is necessary to return the building to the desired setpoint. This may take a couple hours following the event. This behavior is why the amount of demand reduction diminishes throughout the event. Due to the precooling initiated in advance of RHR events, it takes longer for temperatures to rise to the point that cooling is needed during the event. With precooling, each thermostat can provide a greater average demand reduction for a longer period. During PY2017, RHR events were 2 or 3 hours in duration and the impact estimates reflect the average reduction for those event durations. If RHR events were longer than 3 hours, the average demand reduction would decrease to the additional need for air conditioning to run as events progress. In PY2018, RHR events were 2 hours in duration, so the impacts calculated in PY2017 will be representative of the PY2018 event season.

**Table 12-2. Residential PT PY2018 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 1,152,228 | 540,767 | 47% | 6,144,138 | 540,767 | 9% |
| Coinc Demand at Customer Meter (kW) | 3,146 | 4,472 | 142% | 16,757 | 4,472 | 27% |

*Source: Navigant analysis*

**Table 12-3. Residential PT Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified 3 - Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 8,988,672 | 5,631,169 | 63% | 6,144,138 | 5,631,169 | 92% |
| Coinc Demand at Customer Meter (kW) | 24,549 | 25,056 | 102% | 16,757 | 25,056 | 150% |

*Source: Navigant analysis*

**Table 12-4. Business PT PY2018 Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 69,300 | 30,791 | 44% | 79,002 | 30,791 | 39% |
| Coinc Demand at Customer Meter (kW) | 189 | 214 | 113% | 215 | 214 | 99% |

*Source: Navigant analysis*

**Table 12-5. Business PT Program to Date Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified 3 - Year Savings | Percentage of MEEIA 3-Year Target Achieved |
| Energy at Customer Meter (kWh) | 239,316 | 128,868 | 54% | 79,002 | 128,868 | 163% |
| Coinc Demand at Customer Meter (kW) | 655 | 748 | 114% | 215 | 748 | 347% |

*Source: Navigant analysis*

#### *12.2.1.1 Net-to-Gross*

For RHR, free ridership (FR) and spillover (SO) are assumed to be 0 because customers would not provide demand reductions during the hours of RHR events without being a participant in the program. This results in a net-to-gross (NTG) ratio of 1. For SS, FR and SO are assumed to be 0 because the program is an opt-in program that reduces thermostat runtime in a manner that would not happen in the absence of the program, resulting in a NTG ratio of 1. However, there could be FR associated with the annual energy savings because the thermostats were offered for free. Navigant is using the working GMO assumption for NTG (1.0) and has highlighted this as an area for future research.

.

**Table 12-6. PT NTG Components and Ratio: PY2018**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| PY2018 | Assumed to be zero pending future research. | | | 100% |

FR = free ridership; PSO = participant spillover; NPSO = nonparticipant spillover

*Source: Navigant analysis*

#### *12.2.1.2 PowerSaver Impact Findings*

In PY2018, GMO tested the demand and energy saving impacts provided by Tendril's Orchestrated Energy platform. Orchestrated Energy is a thermostat optimization algorithm that provides seasonal EE savings similar to Nest's Seasonal Savings program, as well as DR impacts similar to Nest's RHR program. The program was offered to GMO residential customers with Ecobee thermostats and was marketed as the PowerSaver program.

The PowerSaver program enrolled 34 GMO participants with Ecobee thermostats during the first week of August 2018. The program was in effect through September 30, 2018 and called three afternoon DR events (August 6, August 28, and September 19). Events lasted 2-3 hours in duration.

Navigant conducted the evaluation analysis using two methods. The first relied on whole-home interval data provided by GMO, and the second relied on thermostat runtime data provided by Tendril. The two

methods produced similar results, demonstrating the robustness of both evaluation methods. More information on the evaluation methodology can be found in Appendix O.

As shown in Table 12-7, the PowerSaver program achieved between 48 kW and 55 kW of demand savings in PY2018. The per-device demand savings were between 1.42 and 1.62 kW. The PowerSaver program achieved between 77 kW and 83 kWh of energy savings each day. The per-device daily energy savings were between 2.25 and 2.43 kWh.

**Table 12-7. PowerSaver Program Demand Impacts: PY2018**

| Methodology | Per-device Demand Savings (kW) | Program Total Demand Savings (kW) | Percentage Demand Savings (%) |
|---|---|---|---|
| Interval Data | 1.42 | 48 | 39% |
| Runtime Data | 1.62 | 55 | 44% |

**Table 12-8. PowerSaver Program Daily Energy Impacts: PY2018**

| Methodology | Per-device Daily Energy Savings (kWh) | Program Total Daily Energy Savings (kWh) | Percentage Daily Energy Savings (%) |
|---|---|---|---|
| Interval Data | 2.25 | 77 | 5.7% |
| Runtime Data | 2.43 | 83 | 6.2% |

### *12.2.2 Cost-Effectiveness*

This section presents Navigant's evaluation of cost-effectiveness for the Residential and Business PT programs for each of the five standard benefit-cost tests. Reference Section 1.2 for information on how benefits and program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

The following tables present the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, PY2018, and program to date for the Residential and Business PT programs, respectively, and the Total Resource Cost (TRC) test filed by GMO. In PY2018, there was a high ratio of returned thermostats to new thermostats in the RPT and BPT programs. The PY2018 analysis does not deduct benefits for returned thermostats that were claimed in previous years. Doing so would have a negligible impact on the benefit calculation and the program would remain cost-effectiveness.

**Table 12-9. Residential PT Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[65] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 1.95 | 1.54 | 1.79 | 1.83 | 1.29 | 1.29 |
| 2017 | 2.37 | 2.29 | 2.66 | 4.88 | 0.69 | 2.58 |
| 2018 | 1.24 | 1.64 | 1.90 | 2.13 | 0.86 | 1.67 |
| **Program Overall** | **N/A** | **1.97** | **2.29** | **3.15** | **0.87** | **1.99** |

*Source: Navigant analysis*

**Table 12-10. Business PT Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[66] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 2.42 | 2.06 | 2.39 | 2.82 | 0.93 | 1.98 |
| 2017 | 1.62 | 1.80 | 2.09 | 2.82 | 0.28 | 2.38 |
| 2018 | 1.11 | 1.18 | 1.37 | 1.63 | 0.29 | 1.46 |
| **Program Overall** | **N/A** | **1.61** | **1.86** | **2.39** | **0.37** | **2.03** |

*Source: Navigant analysis*

### *12.2.3 Process*

Navigant addressed two process evaluation research questions and the five Missouri-required questions for process evaluation through the staff interviews, implementation contractor interviews, and program materials review. A summary of the team's process activity is provided in Table 12-11.

**Table 12-11. PT Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. What changes have been made to the program since PY2017, and how have these changes affected program satisfaction, participation, savings, and costs? | • Program staff interviews<br>• Implementation contractor interviews |
| 2. Are there additional changes to the program that would be useful in future years or are planned for the Cycle 2 extension or Cycle 3? | • Program staff interviews<br>• Implementation contractor interviews |

[65] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

[66] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

| 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<br>• Implementation contractor interviews<br>• 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<br>• Implementation contractor interviews<br>• 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<br>• Implementation contractor interviews<br>• Materials review |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• Implementation contractor interviews<br>• 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<br>• Implementation contractor interviews<br>• Materials review |

*Source: Navigant analysis*

The team's findings are provided in the sections that follow. Recommendations for consideration in relation to these findings are provided in Section 12.3.

#### *12.2.3.1* General Process Evaluation Questions

**QUESTION 1: What changes have been made to the program since PY2017, and how have these changes affected program satisfaction, participation, savings, and costs?**

**FINDING 1: The PT program achieved 150% of program enrollment targets and high activation rates in PY2018. As a result, marketing efforts were decreased and the DIY portal was closed.**

- GMO's efforts to target DIY customers and increase their activation rates in PY2017 paid off and the program reached 150% of the program enrollment target at the end of PY2018. Following this milestone, GMO closed the DIY portal, which was historically the largest customer acquisition channel.
- Customer experience and communication no longer focuses on marketing new enrollment due to GMO approaching enrollment targets.
- The KCP&L product manager continued improvements to tracking data quality and data management processes, which eased data processing in PY2018. GMO worked with Nest to identify duplicate serial numbers in the program tracking data. These duplicates occurred for some customers with more than one device or were sometimes introduced for other customers through clerical errors. Navigant used the list provided by GMO to ensure the correct number of thermostats were counted in the impact analysis.

**QUESTION 2: Are there additional changes to the program that would be useful in future years or are planned for the Cycle 2 extension or Cycle 3?**

**FINDING 2: GMO will reopen the DIY portal and resume marketing for the Cycle 2 extension enrollment targets. GMO is developing a one-stop customer portal to recruit, educate, and enroll customers in the program.**

- With the extension of Cycle 2, GMO has new enrollment targets and will resume enrolling customers to meet those targets beginning in April 2019.
- GMO is working with CLEAResult to develop a customer-facing portal to educate and interact with customers online. The portal will guide customers through the enrollment process, helping them to choose the channel (DI, DIY, or BYOD) which is best for them. The portal will confirm customer eligibility in real-time and eliminate the need for a manual work order to be created. The portal will provide a platform to communicate with customers and educate them on the program and DR itself.

#### *12.2.3.2* Missouri-Required Questions for Process Evaluation

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: Utilities use residential and small commercial thermostat DR programs to obtain needed demand reductions. The programs address the fact that traditional rate structures do not provide customers appropriate incentives to reduce electricity usage during peak periods.**

- GMO calls curtailment events during which Nest increases the set point of a customer's thermostat by three degrees in order for the HVAC system to achieve aggregate demand reductions. If DR resources are large enough, they can offset enough demand to delay or avoid the need to purchase power at spot market prices or invest in new sources of generation to meet peak summer demand. DR is a lower cost means of reducing demand and thus the need for generation and can be called on during periods of high demand in the same manner as a peaking power plant—which might be built and brought online to serve the same end.
- The Nest learning thermostat adjusts to customer behavior year-round; this enables energy savings throughout the year, not only during event hours. Unlike the previous Honeywell thermostats, customers can remotely control their Nest devices, which also enables year-round energy savings.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: The target market appropriately addresses residential and small commercial customers. The Demand Response Incentive (DRI) program provides DR opportunities for large C&I customers.**

**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?**

**FINDING 3: The program aligns with the overall diversity of end-use energy service needs and existing technologies by using the cooling end-use for DR purposes. This is appropriate because it is the highest contributor to peak demand in the residential and small C&I sector. This was noted in the PY2016 and PY2017 evaluation reports and found to be consistent in PY2018.**

- In the future, competition among PT vendors and evolving technological developments could lead to the market shifting from one vendor toward another. Navigant suggests GMO monitor the market to avoid missing market trends. The BYOD segment of the RHR population is small. GMO could consider expanding the BYOD customer segment through targeted marketing in MEEIA Cycle 3. BYOD programs are comparatively inexpensive to operate and a way that many utilities run thermostat programs successfully.
- GMO has tested the performance of Tendril's Orchestrated Energy platform, a comparable DR and energy optimization technology that is similar to Nest's RHR and Seasonal Savings. Tendril's offering could expand the pool of eligible participants to customers with other brands of Wi-Fi connected thermostats.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: GMO has successfully reached enrollment targets and decreased marketing in PY2018.**

- Communication channels including email, cross-program promotion, social media, and participant promotion through peer-to-peer word-of-mouth have proved successful in meeting enrollment targets.

**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?**

**FINDING 5: GMO has reached enrollment goals for Cycle 2 but will resume customer acquisition efforts to meet the new enrollment targets set for the Cycle 2 extension.**

- GMO is developing a customer-facing portal to increase program understanding and participation.
- GMO is required to call five RHR events in the summer of 2019. This requirement provides the opportunity to test DR impacts under a variety of conditions.

#### *12.2.3.3 PowerSaver Process Findings*

Navigant evaluated customer satisfaction with the PowerSaver program through survey analysis. Tendril fielded three surveys throughout the study period:

- Post-event DR surveys
- Monthly satisfaction surveys
- Randomized seasonal surveys

Although satisfaction with the program was generally high (78% happy or very happy), participants were uncertain whether PowerSaver was helping them. Most participants (59%) would continue using

PowerSaver in the next year. Figure 12-2 shows customer responses to the customer satisfaction survey questions. In general, negative responses were limited; however, customers often expressed neutrality or uncertainty in the program. This uncertainty is likely due to the short duration of the study, limiting customers' exposure to the technology and the program.

**Figure 12-2. PowerSaver Customer Satisfaction Findings**

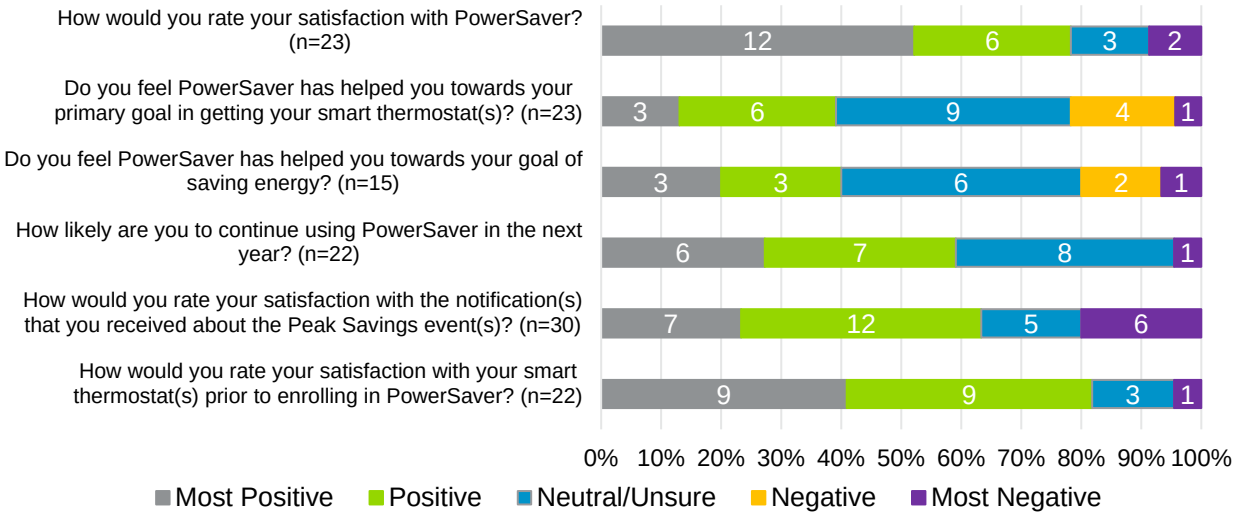
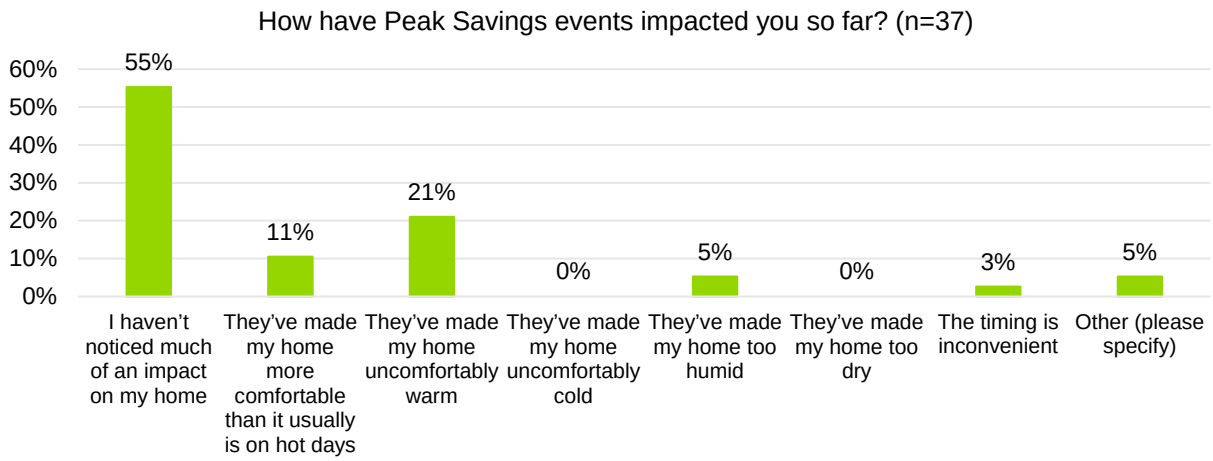


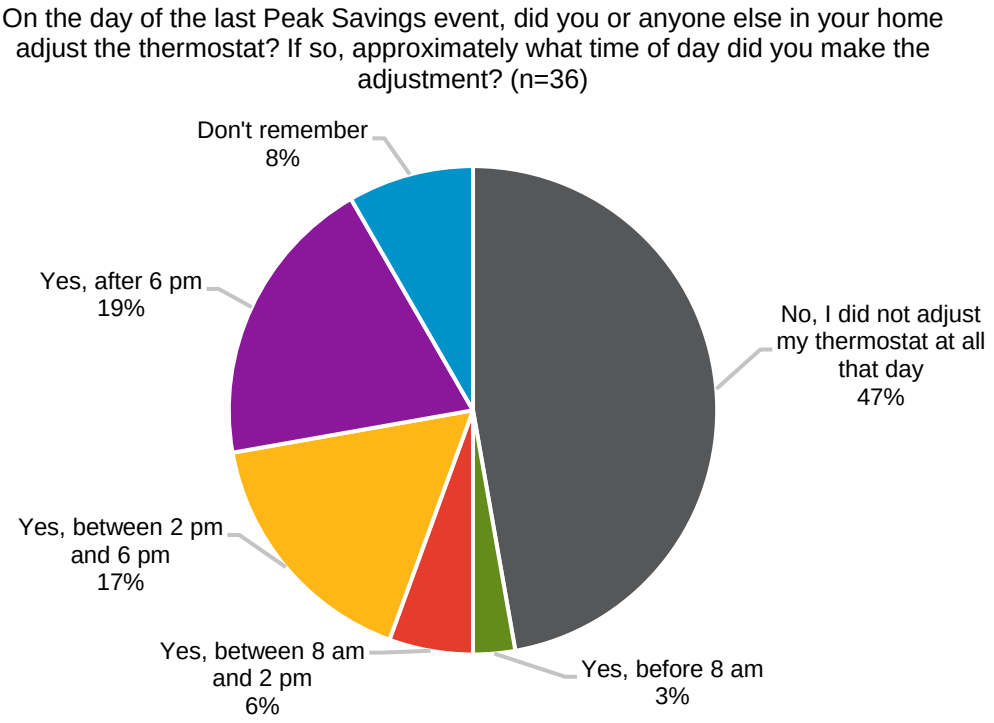

Figure 12-3 shows how customers were impacted by the Peak Savings events. The majority of participants (55%) have not noticed much of an impact of their homes from Peak Savings events, but a noticeable number of participants (21%) said that Peak Savings events have made their home uncomfortably warm. However, other customers (11%) said that Peak Savings events have made their home more comfortable than it usually is on hot days, which is likely a result of the extended pre-cooling period dictated by Orchestrated Energy.

**Figure 12-3: Peak Savings Event Customer Comfort Findings**



As shown in Figure 12-4 , almost half of participants (47%) did not adjust their thermostat on Peak Savings event days. About one-quarter of participants adjusted their thermostat during precooling hours (6%) or during the event hours (17%). Customers who made adjustments outside of precooling or event hours do not interfere with the Peak Savings event algorithm and make up roughly three-quarters of the participants.

**Figure 12-4. Peak Savings Event Thermostat Adjustments**




## 12.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The team provides these recommendations based on corresponding findings to move the GMO PT programs forward and meet their MEEIA targets. The recommendations are divided into two parts:

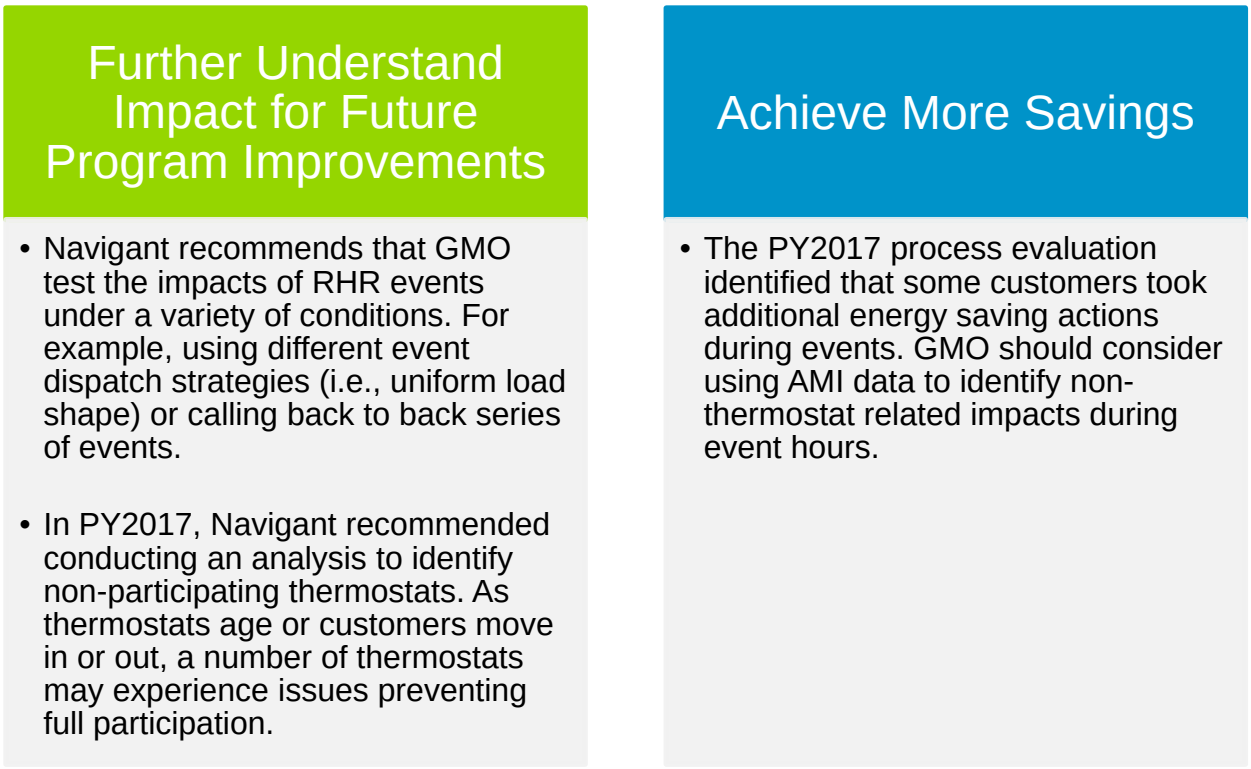
- Recommendations from the impact evaluation (Section 12.3.1)
- Recommendations from the process evaluation (Section 12.3.2)

GMO surpassed enrollment goals this year. The evaluation team's recommendations are focused on maintaining cost-effectiveness and enrollment targets and improving program processes.

### *12.3.1 Impact*

Navigant's impact recommendations in PY2017 centered around further areas for analytical investigation and customer education, some of which are still valid recommendations in PY2018. The program recommendations listed in Figure 12-5 could help program processes in the Cycle 2 extension and in MEEIA Cycle 3.

**Figure 12-5. PT Impact Recommendations: PY2018**




*Source: Navigant analysis*

### *12.3.2 Process*

The evaluation team interviewed the product manager and implementation contractor and conducted a program materials review. The team provides the process recommendations based on findings from these activities in Figure 12-6.

**Figure 12-6. PT Process Recommendations: PY2018**

## Resume Efforts

- GMO met enrollment targets and reduced efforts in customer recruitment, but intends to resume these activities with the new enrollment targets in the Cycle 2 extension. Navigant recommends a continued focus on BYOD customers, whose acquisition costs are lower.
- Navigant acknowledges that the product manager instituted data management processes to improve data quality and movement of data in PY2018. Navigant recommends continuing these efforts in the Cycle 2 extension.

## Considerations for the Future

- In PY2017, Navigant recommended expanding the program to reach more multifamily participants. If the barriers to participation for this segment can be overcome, the program could access a new pool particpants to increase energy and DR impacts.
- GMO should continue to explore opportunities to include other brands of wifi thermostats. This will widen the pool of potential participants, especially BYOD customers who have low cost of acquisition.

*Source: Navigant analysis*

#### *12.3.2.1 Recommendations Based on Missouri's Requirements for Process Evaluation*

Navigant addressed the five required process evaluation questions set forth in the Missouri regulations[67] for the Residential and Business PT programs. Table 12-12 details recommendations surrounding these questions.

[67] 4 CFR- 240-22.070(8)

**Table 12-12. PT Programs Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market segment? | As noted in the PY2017 evaluation, the program addresses market imperfections by providing customers with an ability to reduce electricity usage during hours of peak demand. Continuing to monitor the market for how the Nest solution compares to competition can help ensure the program is matching the market. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | GMO no longer targeted or actively recruited customers in PY2018 because it has met enrollment targets. In the Cycle 2 extension, GMO will resume marketing to meet the new enrollment targets. Navigant recommends focusing on BYOD customers. In MEEIA Cycle 3, GMO may consider targeting a more staggered program enrollment over the cycle's duration. |
| 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 mix of end-use measures included in the program (i.e., PTs) meets the needs of the existing market. GMO could consider expanding the program to include customers that have already purchased other brands of smart/connected thermostats. In addition, GMO could consider expanding the BYOD customer segment through targeted marketing in MEEIA Cycle 3. BYOD programs are comparatively inexpensive to operate and a way that many utilities run thermostat programs successfully. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | GMO should consider further educating customers on event notification options and the purpose of DR events to reduce customer confusion and increase program satisfaction. The program should continue to focus communication channels around activating DIY thermostats that have yet to be activated. |
| 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? | As noted in PY2017, GMO should monitor program savings targets in addition to enrollment goals to ensure that program cost-effectiveness remains high. Navigant acknowledges GMO addressed this issue in PY2018, identifying the need to limit program enrollment in PY2017 and PY2018. |

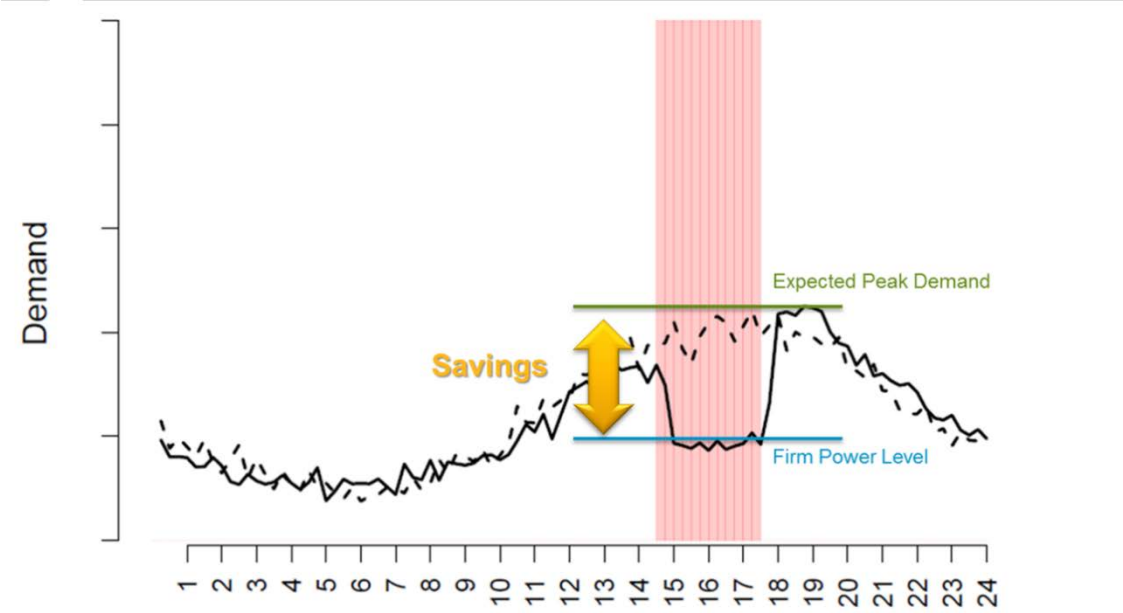
*Source: Navigant analysis*

# 13. DEMAND RESPONSE INCENTIVE PROGRAM

## 13.1 Program Description

The Demand Response Incentive (DRI) program provides rebates to commercial and industrial (C&I) customers for curtailing energy usage during system peak demand periods. Participating customers provide GMO) with demand reduction capacity by committing to reduce electric load upon request during the demand response (DR) curtailment season (June-September). During enrollment, participants sign a contract that obligates them to reduce electric load to a predefined firm power level (FPL) during curtailment events. As illustrated in Figure 13-1, GMO counts the DR savings capacity represented by the summed differences between a participant's estimated peak demand (EPD) and FPL as an offset to generation. When GMO calls an event, participants reduce load (shown as the solid black line in the figure) toward their FPL to create the demand savings.

**Figure 13-1. Illustration of EPD vs. FPL**




*Source: Navigant analysis*

GMO agrees to limit curtailment events to a maximum of 10 events during the season. Events are restricted to weekdays from 12:00 p.m. to 8:00 p.m. Participating customers receive an event notification at least 4 hours before the event starts and are often notified a full day before the event's start.

CLEAResult, the implementation contractor (IC), recruits C&I customers for participation. GMO contracts with A2A to perform event notifications and to analyze participant meter data to verify performance. The GMO meter data management system maintains the interval data used for billing and this analysis.

Participants receive two different incentives for participating in the program:

1. **Participation payment:** A monthly participation payment of $32.50 per participating kW for being on call to curtail load. These payments are provided as either bill credits (settled on the following bill monthly during the DR season) or by paper check at the end of the DR season.
    a. The annual payment of $32.50 per kW is paid in equal payments to each participant over the 4-month DR season.
2. **Event payment:** An additional payment per curtailment event of $0.075/kW per hour curtailed up to the first 30 hours of dispatch and $0.25/kW for the remaining 50 hours of dispatch. These variable payments are paid at the end of the DR season. This payment is a net true up of what the customer did or did not perform over each of the event periods. Customers are accountable to pay a penalty[68] if they do not meet their contracted FPL.

Descriptions of the program, application process, verification of purchase, rebate process, dispute process, and project reporting are provided in Table 13-1.

**Table 13-1. DRI Program Description**

| DRI Program Key Details | |
|---|---|
| **Sector** | Commercial and industrial (C&I) |
| **Implementation Contractor** | CLEAResult provides full marketing, active recruitment, and in-season customer support for the program. A2A maintains all participant records (contracts, names and numbers of customer contacts, firm power levels [FPLs]), notifies participants in advance of curtailment events, verifies compliance, and calculates participant event compensation. |
| **Program Description** | C&I participants respond to curtailment events throughout the summer. |
| **Application Process** | Large C&I customers (minimum of 25 kW load) are identified by CLEAResult. CLEAResult has an initial meeting with the potential participant where they review a questionnaire to identify whether the customer can participate. If the customer moves to the next step, CLEAResult goes onsite to identify a curtailment plan and attainable FPL. Finally, the contract is reviewed by the customer and signed. The signed contract is counter signed by GMO and a copy returned to the customer for their records. |
| **Verification of Purchase/Project** | A2A verifies participant energy curtailment using post-event interval meter data. |
| **Rebate Process** | There are two options for rebates: bill credits and checks. Bill credits are monthly participation payments. The check option is a onetime payment provided after the season ends. All event payments/penalties are paid at end of season as a net true up and either delivered as a bill credit or on the end of season check. |
| **Disputes, Rejected Applications** | Any disputes or questions identified by participants are first routed to their Kansas City Power and Light (KCP&L) Energy Consultant or CLEAResult contact and then routed to the KCP&L product manager for direct intervention and timely resolution. |

[68] As defined in the DRI customer contract: Penalty Per Hour = 150%*(1-%Performance), %Performance = Curtailable Load Actual/ Curtailable Load Contractual, HRP = ($32.50 * Curtailable Load Contractual)/ 80 hours.

| DRI Program Key Details | |
|---|---|
| **Project Reporting** | If a customer has an advanced metering infrastructure (AMI) meter, the KCP&L product manager learns about the customer's performance a few days after the event. If a customer still has a non-AMI meter, the KCP&L product manager learns about the customer's performance a minimum of 30 days after the event. Currently, customers do not learn about their program performance until the end of the season. |

*Source: Navigant interview of KCP&L product manager*

## 13.2 Evaluation Findings

Navigant used a three-step process to verify that the program met its objectives. First, the evaluation team reviewed the participant interval data and program tracking data (provided for GMO), which includes contracted curtailable load. Second, the team executed an econometric analysis and customer baseline (CBL)[69] analysis to verify program demand impact. Third, the team interviewed the KCP&L product manager and implementation contractor to review program process flow.

GMO made a concerted effort in PY2018 to recalculate EPD values by using interval data during potential event hours as opposed to the monthly billing data previously used. During PY2018, GMO also redefined contracted curtailable load (CL) through onsite visits and customer engagement. The EPD and CL are primary factors in potential impacts and the reformulation of these numbers allow program performance to be assessed more accurately. Some customers' EPD and CL could not be adjusted, despite evidence that it should be changed, because some customers were engaged in multiyear contracts. The Cycle 2 extension presents the opportunity to readjust every customer's EPD and CL with new contracts, which will continue to improve the accuracy in calculating program potential.

The following sections present Navigant's PY2018 findings for the DRI program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

1. Impact evaluation (Section 13.2.1)
2. Cost-effectiveness assessment (Section 13.2.2)
3. Process evaluation (Section 13.2.3)

### *13.2.1 Impact*

The impact evaluation had the following objectives:

- Verify load reduction during events
- Confirm FPL achievements
- Assess the reasonability of the EPD

[69] The customer baseline analysis calculates an average hourly baseline usage for the 10 days before each event occurs (excluding weekends, prior events, holidays, and July 3). The impact is calculated by taking the difference between event day usage and the baseline usage.

Navigant verified impacts for 121 out of the 123 Greater Missouri Operations (GMO) customers. Twenty-one of the customers did not have sufficient data for regression or CBL analysis.[70] The evaluation team verified impacts for 90 customers using a customer-specific regression analysis using participant interval data from May 2018 through September 2018. The team employed a CBL approach for 12 customers who had inconsistent usage patterns relative to observable variables (i.e., temperature, day of week, hour of day) and whose interval usage data was not well explained by a regression model. The team used the average GMO realization rate to calculate savings for 19 customers with missing interval usage data. Customer-specific impact estimates were averaged across each event. The evaluation team then averaged the two event impacts to get the full program impact.

Navigant confirmed that customers met their FPL by observing whether their energy profile during the event aligned with contract limits. The evaluation team assessed the reasonability of the EPD values by observing customer peak usage 2 days[71] before each event occurred (excluding weekends or event days). Navigant used the second preceding day because customers had already received event notification the day immediately before the event. These days were June 26 for the June 28 event (83°F and 96°F, respectively) and August 3 for the August 6 event (90°F and 91°F, respectively). Navigant included temperature on the graphs and kept in mind differences in temperature when reviewing these graphs and determining the feasibility of each customer's EPD.

The DRI program achieved 31,605 kW of gross and net demand impacts in PY2018 for a realization rate of 62%. In PY2018, the program achieved 57% of the 3-year Missouri Energy Efficiency Investment Act (MEEIA) target. Reported and verified demand impacts are based on the amount of electricity curtailed, not whether customers met their FPL. GMO does not claim energy savings for DRI; thus, the evaluation team did not calculate energy savings. Navigant assumes energy loads to be mostly shifted to times outside of the event period.

While the realization rate improved in PY2018 from PY2017, the majority of customers did not meet their contracted curtailable load. Navigant found that, on average, across events:

- Ninety of the 121 customers performed at less than 80% of their contracted curtailable load during event hours.
- Five of the 121 customers performed at more than 120% of their contracted curtailable load during event hours.
- Twenty-six of the 121 customers performed within 20% of their contracted curtailable load during event hours.

Some customers that performed at less than 80% of their contracted curtailable load did not respond to the event at all, while others responded but did not reach what they had contracted. This emphasizes the need for both behavior management among customers and a need to recalculate EPD and CL— both of which the KCP&L product manager prioritized for the Cycle 2 extension participants. Many customers

[70] Nineteen of the 21 customers lacked billing data during the event or the days leading up to the event. For these customers, Navigant calculated verified impacts using the average GMO realization rate for customers with complete data. Two customers dropped out of the program midway through the program year. Navigant did not include these customers in the reported or verified savings totals. The list of customers with missing data was compiled by GMO and reviewed by Navigant.

[71] The evaluation team chose to look at customer load 2 days before each event occurred as this day was likely to resemble event day weather. Navigant recognizes that while this is an easy check for evaluation, knowing the conditions when setting an EPD value is more challenging and must be revisited each year to ensure alignment.

who did not respond at all will not be invited back into the program for the Cycle 2 extension. To further motivate participation, the KCP&L product manager is considering moving to a "pay-for-performance" settlement process beginning in Cycle 3. Process improvements are detailed in Section 13.2.3.

**Table 13-2. DRI PY2018 Demand Impact Summary[72]**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA Cycle 2 3-Year Target | Verified Savings | Percentage of MEEIA 3-Year Target Achieved |
| MEEIA Participant Demand Savings (kW) | 48,145 | 29,684 | 62% | - | - | - |
| Opt-Out Demand Savings (kW) | 3,089 | 1,921 | 62% | | | |
| **Total Demand Savings (kW)** | **51,234** | **31,605** | **62%** | **55,000** | **31,605** | **57%** |

*Source: Navigant analysis*

#### *13.2.1.1 Net-to-Gross*

As shown in Table 13-3, the DRI billing analysis generates net results rather than gross results because free ridership (FR) is zero for curtailment programs, as customers have no incentive to reduce peak demand in the absence of the program. The implied net-to-gross (NTG) ratio is 1.0.

**Table 13-3. DRI NTG Components and Ratio: PY2018**

| FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|
| - | - | - | 100% |

PSO = participant spillover; NPSO = nonparticipant spillover

*Source: Navigant analysis*

### *13.2.2 Cost-Effectiveness*

This section presents Navigant's evaluation of cost-effectiveness for the DRI program for each of the five standard benefit-cost tests. Please refer to Section 1.2 for information on how benefits and program costs are allocated to each of the cost tests and the sources for the benefit and cost input assumptions.

Table 13-4 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, PY2018, and program to date, and the Total Resource Cost (TRC) test filed by GMO. Navigant's analysis resulted in a TRC ratio that is lower than that filed by GMO due to its coincident demand realization rate of 62%.

[72] DR impacts persist for 1 year and, therefore, do not accumulate year over year. As a result, the program-to-date achievements for DRI are equal to those in the most recent year, as shown in Table 13-2.

**Table 13-4. DRI Benefit-Cost Ratios: PY2018**

| Program Year | TRC Test[73] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|
| | GMO | Navigant | | | | |
| 2016 | 6.24 | 3.09 | 3.09 | 1.73 | 433.33 | 1.73 |
| 2017 | 6.19 | 3.27 | 3.27 | 1.26 | INF* | 1.26 |
| 2018 | 5.73 | 3.71 | 3.71 | 1.38 | 701.23 | 1.38 |
| **Program Overall** | **N/A** | **3.42** | **3.43** | **1.39** | **1024.21** | **1.39** |

*Source: Navigant analysis*

### *13.2.3 Process*

Navigant addressed two process evaluation research questions and the five Missouri-required questions for process evaluation through staff interviews, implementation contractor interviews, and a program materials review. A summary is provided in Table 13-5.

[73] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

**Table 13-5. DRI Process Evaluation Questions and Activities**

| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| **General Process Evaluation Questions** | |
| 1. What changes have been made to the program since PY2017, and how have these changes affected program satisfaction, participation, savings, and costs? | • Program staff interviews<br>• Implementation contractor interviews |
| 2. Are there additional changes to the program that would be useful in future years or are planned for the Cycle 2 extension or Cycle 3? | • Program staff interviews<br>• Implementation contractor interviews |
| **Missouri-Required Questions for Process Evaluation** | |
| 1. What are the primary market imperfections that are common to the target market segment? | • Program staff interviews<br>• Implementation contractor interviews |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | • Program staff interviews<br>• Implementation contractor interviews<br>• 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<br>• Implementation contractor interviews |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• Implementation contractor interviews<br>• 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<br>• Implementation contractor interviews<br>• Materials review |

*Source: Navigant analysis*

The team's findings are provided in the following sections. Recommendations for consideration in relation to these findings are provided in Section 13.3.

#### *13.2.3.1 General Process Evaluation Questions*

**QUESTION 1: What changes have been made to the program since PY2017, and how have these changes affected program satisfaction, participation, savings, and costs?**

**FINDING 1: The KCP&L product manager implemented many improvements in communication channels and delivery mechanisms to improve customer awareness of events. The program continues to reassess customer EPD and FPL values to increase accuracy of program potential.**

- The program began using propensity modeling to recruit customers in PY2018. A new product manager began leading the program at the start of the PY2017 DR season and implemented many changes that were recognized in PY2018.

**STATUS:** Conversations between the product manager and program participants indicated that program communication improvements resulted in messaging reaching the correct person more often in PY2018. However, program performance continues to be limited by program design. Customer surveys were not conducted in PY2018 because survey findings would not be available until after Cycle 3 planning ends.

**QUESTION 2: Are there additional changes to the program that would be useful in future years or are planned for the Cycle 2 extension or Cycle 3?**

**FINDING 2: The product manager made many changes to the program in PY2018, but the effectiveness of those changes in improving program realization rates is limited by the fundamental program design.**

- Findings from PY2016 and PY2017 indicated that in many cases EPD values and FPLs did not reflect customers' capability or performance. As a result, the product manager invested in an effort to recalculate many existing customers' EPD values and FPLs in PY2018. In addition, the program manager improved the process to calculate the EPD values and FPLs of new customers. These efforts made PY2018 curtailable loads more attainable for some customers, but others remained unattainable due to multiyear contracts. In the Cycle 2 extension, all customers will engage in a new contract, allowing GMO to reassess every customer's EPD and FPL.
- As part of Cycle 3 planning, the product manager will consider moving the program to a "pay-for-performance" structure. This means customers' performance incentives would be tied to their actual event performance. This change to the fundamental program design is expected to improve program performance by financially penalizing underperformance.

**STATUS:** GMO is in the process of contract negotiations with customers for the Cycle 2 extension and recalculating EPD and FPL values. Changes to the fundamental program design and payment structure cannot be implemented until Cycle 3 because the Cycle 2 tariff cannot be changed.

#### *13.2.3.2* Missouri-Required Questions for Process Evaluation

**QUESTION 1: What are the primary market imperfections that are common to the target market segment?**

**FINDING 1: The PY2017 report cited two main barriers for participating in the DRI program: (1) businesses do not have automatic load curtailment; and (2) for some customers, the point of contact (as indicated on the contract) neglected to pass the event notification onto the individual who can manually curtail load at the customer site. PY2018 revealed the importance of one additional barrier: (3) lack of real-time feedback following DR events.**

- **STATUS:** Manual load shedding limits the ability of customers to participate in DR programs that require them to reduce a significant amount of load with minimal notice. Securing automated load reduction technologies is not cost-effective for many customers and cannot be accomplished using the financial incentives provided by the DRI program alone. As such, a subset of

businesses is not able to participate in this program. The product manager plans to target a segment of customers with automated curtailment capabilities beginning in Cycle 3.

- In PY2016 and PY2017, the customer point of contact for some participants was the CFO or the head of facilities. Such individuals are often eager to sign participation contracts but fail to either contact the appropriate individual to verify that manual load curtailment is possible on a day's notice or fail to notify the necessary individual that an event is taking place. For PY2018 participation, the KCP&L product manager confirmed that a customer's point of contact is aware of the responsibilities associated with being a DRI participant. Customers have reported that these communication improvements have made participation in DR events easier. GMO plans to keep the lines of communication open throughout the winter season in preparation for the Cycle 2 extension.
- Following each event in PY2018, the field team provided customers with graphs reporting how the customers performed in the event. Customers reported that receiving this data within a week of was helpful to executing their curtailment strategies effectively throughout the season.

**QUESTION 2: Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?**

**FINDING 2: The target market segment is defined as all commercial customers that can reduce their demand to at least 25 kW below estimated peak usage when a curtailment event is called between June 1 and September 30 of a given year.**

- **STATUS:** The program has continued to focus on customers with the highest savings potential to maintain a cost-effective program. The DRI program product manager used a propensity model to identify high usage customers, redirecting the program recruitment process to be data-driven. The program implementer built this propensity model and continues to refine it through PY2018. The DRI product manager emphasized the improving accuracy of EPD and FPL calculations. Much of these efforts went into redefining EPD values and FPLs for existing customer contracts.
- GMO achieved an increase in program enrollment in PY2018 through these recruitment efforts. With the Cycle 2 extension, all customer contracts will be eligible for renewal, and some customers who have underperformed in the previous program years will not be invited back to the program. To maintain program growth, the product manager intends to continue using the propensity model and focusing on the top customers with the largest potential for curtailment. Additionally, the program will aim to enroll more national accounts with third-party management, which may provide opportunities for automated load curtailment in Cycle 3.

**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?**

**FINDING 3: The mix of end-use measures included in the program appropriately reflects the diversity of end-use energy service needs and existing end-use technologies within the target segment.**

- **STATUS:** There was no change in mix of end-use measures in PY2018. Participants control how they meet their demand reduction obligations through curtailing or rescheduling end uses, using backup generators, or both.

- End-use options that can be chosen include but are not limited to: rescheduling use to off-peak time; temporarily shutting down factory production lines; reducing motor, process, lighting, and cooling loads; and turning off or lowering water heater setpoints.
- In PY2018, the energy consultants (ECs) and CLEAResult representatives worked with many existing customers to confirm that their end-use technologies contracted to curtail were in fact curtailable before the event season to help ensure surprises did not occur during event season.

**QUESTION 4: Are the communication channels and delivery mechanisms appropriate for the target market segment?**

**FINDING 4: KCP&L's product manager has taken great efforts to improve communication channels and ensure delivery mechanisms are appropriate for the DRI program. Customers in PY2018 have recognized improvements in program communication.**

- **STATUS:** The following topics were identified in the product manager interview as areas that were improved in PY2018:
    - The product manager continued to provide phone and email notifications 24 hours and 4 hours before events started in which customers needed to confirm notification receipt. A2A sent these notifications. If A2A did not receive receipt confirmation, the KCP&L product manager asked the energy consultant or CLEAResult to reach out to customers directly. The highest usage customers were often notified of potential events more than 24 hours in advance by their energy consultants.
    - During the PY2017 event season, the product manager found that their email notifications were going to certain customers' spam email folder. The DRI team has ensured their email notifications are going to the appropriate contact at the customer site by asking customers to mark the DRI email account as not spam.
    - Every interaction with a customer becomes an opportunity to cross-promote programs. GMO does not partake in blind prospecting when recruiting participants. Instead, GMO recruits customers for the DRI program using customer contacts from other energy efficiency (EE) programs such as GMO's suite of C&I programs. The use of customer propensity modeling by the program implementer expanded the pool of potential participants outside of existing EE programs.
    - Targeted email marketing was executed in PY2018. High usage customers were identified through CLEAResult's propensity modeling and received marketing materials including email, flyers, personalized marketing packets, individual field visits, and in-person DR forums. The product manager has a full marketing plan for PY2018 that includes targeted email and direct mail marketing. In PY2018, there was also a Tier 1 campaign in which energy consultants targeted large customers with high curtailment potential. The marketing plan for the Cycle 2 extension will be similar to what was conducted in PY2018, with a heavy focus on individual field visits to recruit new customers quickly.
    - KCP&L's product manager reworked communication channels and delivery mechanisms for PY2018 that have improved program recruitment in the following ways:
        - The product manager created and formalized an initial recruitment questionnaire that CLEAResult uses to better identify whether customers would be suitable DRI participants. As an example, the enhanced questionnaire now identifies whether

there are certain days or hours that a customer cannot participate in an event. If the customer passes this initial round of interview, then CLEAResult deploys engineering resources onsite to assess whether the customer would be a good participant. During this visit the CLEAResult representative gathers necessary data to create a facility audit report and to identify the curtailment plan. When the audit report is delivered, CLEAResult verifies the proposed curtailment plan is understood and agreeable and if whether the customer is interested in and willing to participate in the program.

- The Cycle 2 extension presents the opportunity to recontract all new and existing customers. GMO is focusing on behavior management by identifying, before the contract is signed, the specific individual that will physically perform curtailment and how they will perform curtailment. The CLEAResult recruiter identifies the disconnect point for curtailment with the individual performing curtailment to ensure everyone is in alignment with the curtailment plan and to proactively identify any issues with it.
- The product manager has initiated participant account management for the Cycle 2 extension recruitment season to maintain relationships with DRI participants throughout the year to make sure items are in order for the curtailment season and customer contacts are up to date. Continuous communication with customers throughout the DR season was a recommendation Navigant provided GMO in PY2016.

**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?**

**FINDING 5: GMO has implemented targeted marketing to recruit new customers. In addition, GMO has refined curtailment plans and expectations (i.e., the EPD values and FPLs) with current customers. Looking to Cycle 3, GMO is aiming to implement a "pay-for-performance" incentive model and enroll more automated curtailment customers to increase program impacts.**

- **STATUS:** As noted in the PY2017 evaluation, measurement, and verification (EM&V) report, GMO began recruiting smaller customers in PY2017. GMO is updating the EPD and FPL calculation for existing customers for the Cycle 2 extension. CLEAResult will use interval data during potential peak hours during weekdays to identify a more accurate EPD value. During PY2017 and PY2018, GMO also redefined contracted CL for many existing customers through thorough onsite visits.
- Changes to the fundamental program design cannot be made until Cycle 3. In preparation for a "pay-for-performance" incentive structure, GMO continues to focus on real-time data analysis following each DR event and report back to customers with their findings. This ability to measure customers' event performance will be crucial in calculating performance incentive payments in the program design under consideration for Cycle 3.

## 13.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations, which are found in Section 13.2.

### *13.3.1 Impact and Process Recommendations*

Overall, Navigant found that the DRI program is limited by the fundamental program design, making it difficult to reach the 3-year program target. The KCP&L product manager implemented many process improvements during PY2018, but there are still many customers who continue to miss their contracted CL yet still receive participation incentive payments. The following impact and process recommendations, in Figure 13-2, are based on the evaluation team's analysis of program interval and tracking data, interviews with the KCP&L product manager and IC, and a program materials review.

**Figure 13-2. DRI Program Impact and Process Recommendations: PY2018**

| Program Design | Tracking and Interval Data |
|---|---|
| • Navigant acknowledges that the EPD and CL calculations have been modified for the Cycle 2 extension to better represent customer peak demand and curtailment capabilities.<br>• The limitations to relying on EPDs and CLs to report savings are clear. Navigant recommends the program move toward a "pay-for-performance" incentive structure that calculates customer performance and corresponding payment following each event. | • Navigant, GMO, and CLEAResult successfully collaborated on data transfer protocols, and recommends continuing the process in the extension of Cycle 2.<br>• The GMO and CLEAResult teams provided reports on customers with data issues that were to be excluded from the analysis. Navigant recommends continuing this collaboration process to be upfront about what data limitations exist and how to handle them. |

*Source: Navigant analysis*

#### *13.3.1.1 Recommendations Based on Missouri's Requirements for Process Evaluation*

Navigant addressed the five required process evaluation questions set forth in the Missouri regulations[74] for the DRI program.

[74] 4 CFR- 240-22.070(8)

**Table 13-6. DRI Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market segment? | CLEAResult continued using propensity modeling in PY2018 to select customers to recruit. GMO should continue to refine propensity modeling to select customers for the program and begin to target customers with automated curtailment capabilities. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | 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? | GMO was able to include net power in PY2017 and PY2018 data, which was a recommendation in the PY2016 report. GMO should continue to provide net power. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | Per PY2017 recommendation, as AMI becomes more prevalent, GMO has made a concerted effort to provide more consistent updates to participants regarding their program performance. Navigant recommends continuing this effort in preparation for a "pay-for-performance" incentive structure in which immediate event feedback in required. Such capabilities would also allow for more periodic updates of participants' event target values (FPLs), as recommended in PY2017. |
| 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 PY2018, the DRI product manager made progress to better manage participants' event behavior. The results of the PY2018 impact evaluation reveal limitations in what performance improvements are achievable through behavior management due to the fundamental program design. Navigant recommends moving to a "pay-for-performance" incentive structure to increase event participation in Cycle 3. As noted earlier, the DRI Product Manager is considering adopting this recommendation in MEEIA Cycle 3 |

*Source: Navigant analysis*