NAVIGANT

# GMO Evaluation, Measurement, and Verification Report – FINAL

## Program Year 2017

## Prepared for:

## KCP&L – Greater Missouri Operations


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Reference No.: 185775
December 21, 2018

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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.

## *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 (TRM) Version 5.0.
http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_5/

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: KCP&L 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 |
| ASHRAE | American Society of Heating, Refrigerating and Air-Conditioning Engineers |
| BOEA | Business Online Energy Audit |
| BYOD | Bring Your Own Device |
| CAP | Community Action Program |
| CBL | Customer Baseline |
| C&I | Commercial & Industrial |
| CET | Customer Engagement Tracker |
| CF | Coincident Factor |
| CIS | Customer Information System |
| CL | Curtailable Load |
| CREED | Consortium for Residential Energy Efficiency Data |
| CV | Coefficient of Variation |
| DEM | Demand Elasticity Modeling |
| DI | Direct Install |
| DIY | Do It Yourself |
| DOE | Department of Energy (United States) |
| DR | Demand Response |
| DRI | Demand Response Incentive |
| DSM | Demand-Side Management |
| ECM | Electronically Commutated Motor |
| EE | Energy Efficiency |
| EEP | Energy Efficiency Professional |
| EER | Energy Efficiency Rebate (Business) |
| EM&V | Evaluation, Measurement, and Verification |
| EPD | Estimated Peak Demand |
| ESCO | Energy Service Company |
| ESK | Energy Savings Kit |
| EUL | Effective Useful Life |
| FPL | Firm Power Level |
| FR | Free Rider(ship) |
| GMO | Greater Missouri Operations |
| GPES | Great Plains Energy Services |
| GW | Gigawatt |
| GWh | Gigawatt-Hour |
| HARR | Home Appliance Recycling Rebate |
| HDD | Heating Degree Day |

| | |
|---|---|
| HER | Home Energy Report |
| HLR | Home Lighting Rebate |
| HOEA | Home Online Energy Audit |
| HOU | Hours of Use |
| HSPF | Heating Seasonal Performance Factor |
| HTR | Hard to Reach |
| HUD | US Department of Housing and Urban Development |
| HVAC | Heating, Ventilation, and Air Conditioning |
| IC | Implementation Contractor |
| IE | Income-Eligible |
| IECC | International Energy Conservation Code |
| 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 |
| KPI | Key Performance Indicator |
| kW | Kilowatt |
| kWh | Kilowatt-Hour |
| LED | Light-Emitting Diode |
| LIHTC | Low Income Housing Tax Credit |
| MDM | Meter Data Management |
| 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 |
| 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 |
| SEM | Strategic Energy Management |
| SEER | Seasonal Energy Efficiency Ratio |
| SO | Spillover |
| SPM | Standard Practice Manual |
| SS | Seasonal Savings |
| TA | Trade Ally |
| TMY3 | Typical Meteorological Year 3 |
| TRC | Total Resource Cost |
| TRM | Technical Reference Manual |
| UCT | Utility Cost Test |
| VFD | Variable Frequency Drive |
| 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 |

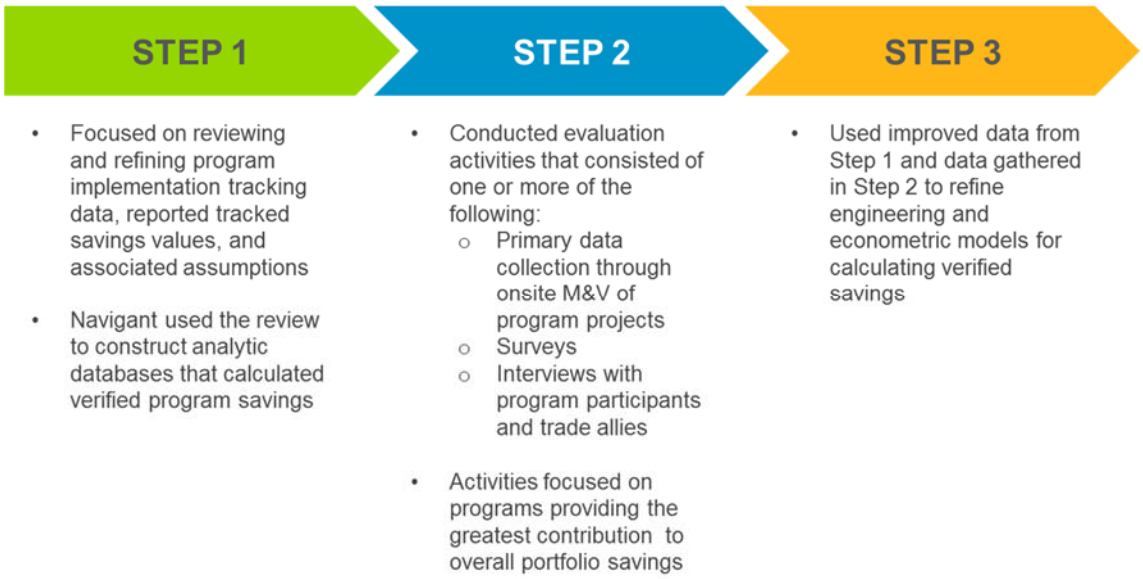
# EXECUTIVE SUMMARY

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) 2017.

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 KCP&L 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) and Online Energy Audit programs. NMR led the Home Lighting Rebate (HLR) 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 (HARR) 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 PY2017, 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).
- **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.

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 goal of the **process evaluation** is to document program design and operations and to provide 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 PY2017 evaluation.

## OVERALL FINDINGS AND EVALUATION RESULTS

This section summarizes the gross and net savings achievements for the GMO portfolio to date and for PY2017. Overall, KCP&L's programs are performing well and are close to meeting their MEEIA 3-year targets. As shown in *Table 1* and *Table 2*, at the close of PY2017, the portfolio achieved 80% of its 3-year energy target and 64% of its 3-year demand target. Progress toward the energy target can largely be attributed to the success of the commercial and industrial (C&I) portfolio of programs, which represent 56% of the verified net energy savings. The residential suite of programs also contributed to the portfolios success, with energy and demand realization rates of 92% and 129%, respectively, and representing 26% of verified net energy savings and 15% of verified net demand savings. Demand savings are largely driven by the suite of demand response programs (i.e., the Residential and Business Programmable Thermostats and Demand Response Incentive [DRI] programs), which contributed 60% of the total net verified savings.

**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 3-Year Target (kWh) | Verified Savings (kWh) | Percentage of MEEIA Target Achieved |
| Commercial EE Programs | 116,176,083 | 89,282,574 | 77% | 102,092,113 | 83,498,909 | 82% |
| Residential EE Programs | 48,650,796 | 44,988,872 | 92% | 55,163,628 | 38,227,315 | 69% |
| Educational Programs | 21,011,479 | 21,011,479 | 100% | 21,070,772 | 21,011,479 | 100% |
| DR Programs | 8,006,460 | 5,188,479 | 65% | 6,223,140 | 5,188,479 | 83% |
| **GMO TOTAL** | **193,844,817** | **160,471,404** | **83%** | **184,549,652** | **147,926,182** | **80%** |

*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 3-Year Target (kW) | Verified Savings (kW) | Percentage of MEEIA Target Achieved |
| Commercial EE Programs | 19,386 | 13,884 | 72% | 20,629 | 12,785 | 62% |
| Residential EE Programs | 9,625 | 12,372 | 129% | 9,150 | 10,184 | 111% |
| Educational Programs | 3,905 | 3,808 | 98% | 4,215 | 3,808 | 90% |
| DR Programs | 53,605 | 40,640 | 76% | 71,972 | 40,640 | 56% |
| **GMO TOTAL** | **86,521** | **70,703** | **82%** | **105,967** | **67,418** | **64%** |

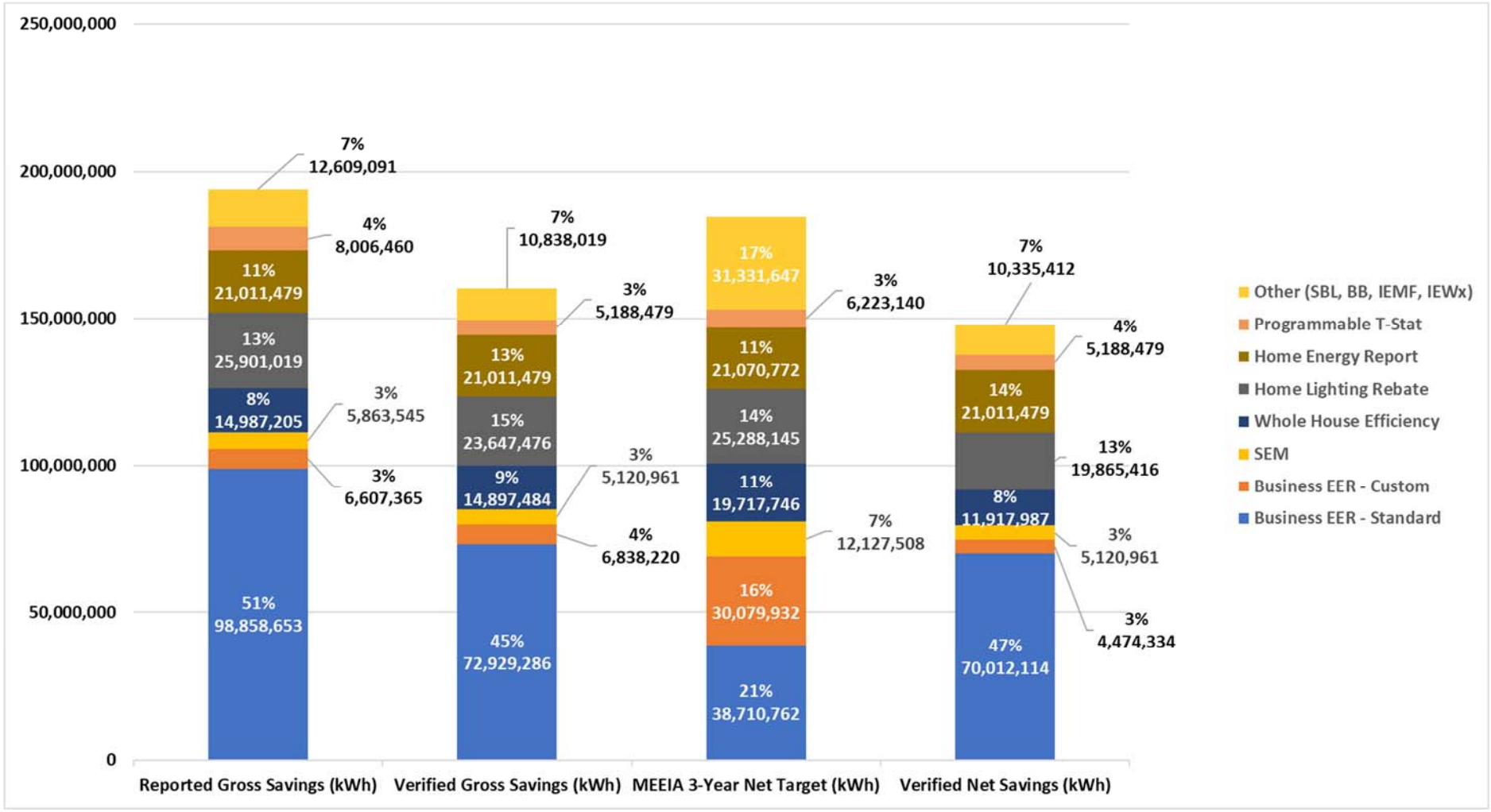
*Source: Navigant analysis*

KCP&L Product Managers have undertaken significant outreach efforts in improving communication channels and ensuring delivery mechanisms are appropriate for the DRI program in PY2018. As such, the DRI Product Manager expects the program to achieve its 3-year MEEIA target in PY2018, which will

contribute a significant portion (55,000 kW) to the portfolio's overall demand target (105,967 kW), indicating that the portfolio will achieve its demand target at the close of the cycle.

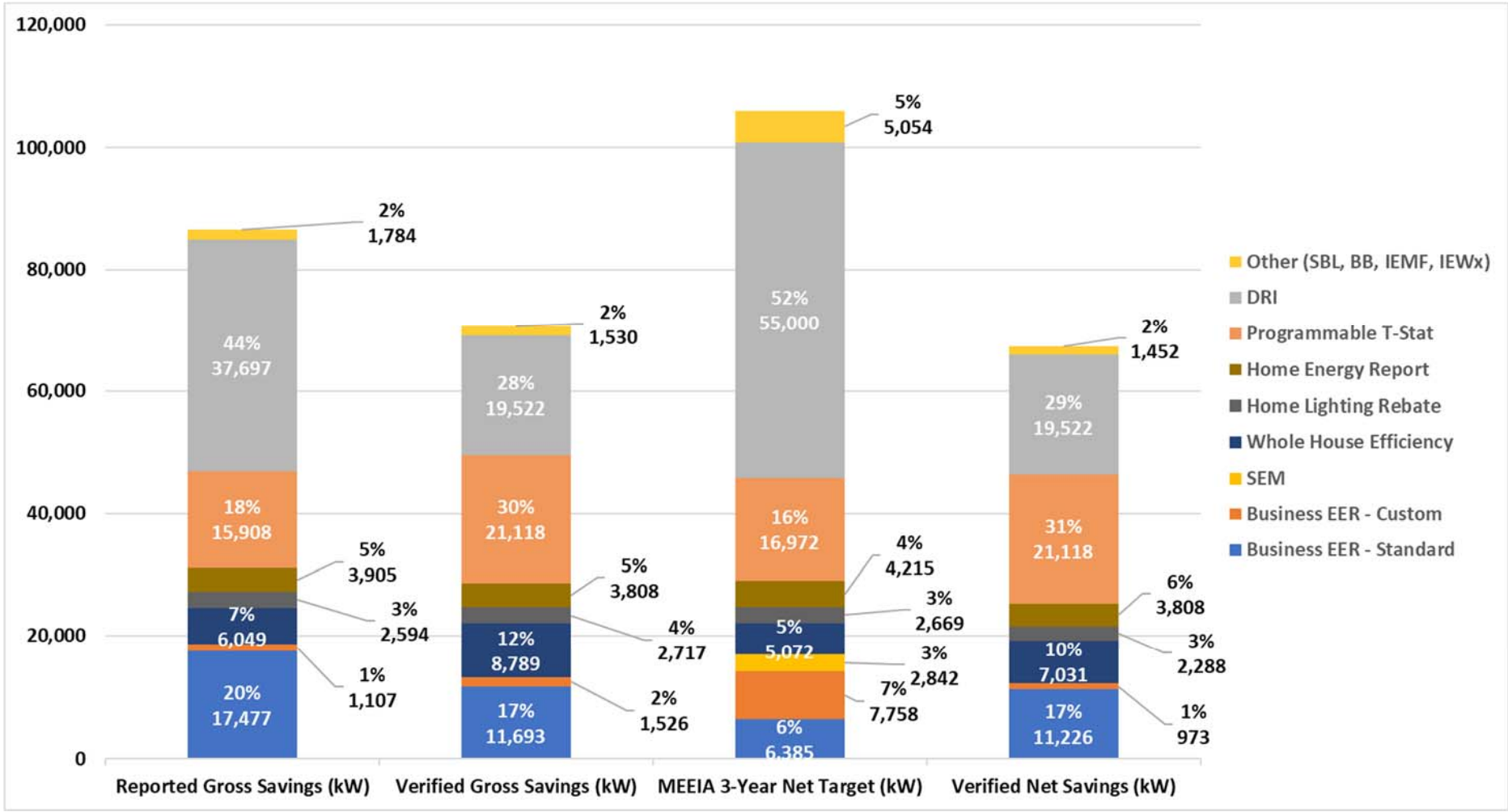
Figures 1 and Figure 2 below show the program to date distribution of energy and demand by program by program.

**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*

To date, the portfolio has achieved 160,471,404 kWh and 70,703 kW in **gross energy and demand** savings at the customer meter. This corresponds to realization rates of 83% and 82%, respectively. To date, the portfolio has achieved 147,926,182 kWh and 67,418 **kW in verified net energy and demand savings**. This corresponds to the portfolio achieving approximately 80% and 64% of its cumulative 3-year MEEIA Cycle 2 energy and demand targets, respectively. **The below points highlight key program to date impact findings.**

**GROSS ENERGY SAVINGS:**
160,471,404 kWh

**GROSS DEMAND SAVINGS:**
70,703 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, resulting in realization rates of 74% and 67% for energy and demand, respectively.
- Program to date, the Business EER – **Standard program achieved 181% and 176% of its 3-year MEEIA Cycle 2 target for energy and demand,** respectively and represented 47% and 17% of total verified net energy and demand savings respectively.
- The Business EER – Custom program achieved approximately 15% and 13% of its 3-year MEEIA Cycle 2 energy and demand targets, respectively. **The Custom program had realization rates of 103% and 138% for energy and demand, respectively.** LED lighting measures, which contributed a significant portion of the overall savings to the Custom program in MEEIA Cycle 1, are now offered through the Business EER – Standard program.
    - The evaluation team views this as a natural maturation of the Cycle 2 offerings where the mainstreaming of LED lighting measures through the Standard program--and high participation in that program--reflects sound program design practices. Furthermore, the team anticipates uptake in the Custom program as new, emerging measures and technologies are added in MEEIA Cycle 3.
- **The portfolio's suite of residential energy efficiency programs performed well,** with energy realization rates ranging from 82% (Income-Eligible Multifamily) to 99% (Whole House Efficiency). Demand realization rates ranged from 97% (Income-Eligible Multi-Family) to 145% (Whole House Efficiency).
- The Residential Programmable Thermostat program represents 31% of total portfolio verified net demand savings and achieved a realization rate of approximately 133%. The DRI program achieved approximately 35% of its 3-year MEEIA Cycle 2 target and represented approximately 28% of total portfolio verified net demand savings.

**NET ENERGY SAVINGS:**
147,926,182 kWh

**NET DEMAND SAVINGS:**
67,418 kW

Figure 3 and Figure 4 below show the PY2017 distribution of energy and demand by program. In PY2017, the portfolio achieved 107,501,821 kWh and 56,386 kW in **gross energy and demand** savings at the customer meter. This corresponds to gross realization rates of 90% and 76%, respectively. The portfolio achieved 99,180,444 kWh and 54,095 kW in verified net energy and demand savings. This corresponds to the portfolio achieving approximately 54% and 51% of its cumulative 3-year MEEIA Cycle 2 energy and demand targets, respectively, in PY2017 alone. **The below points highlight key PY2017 impact findings.**

**GROSS ENERGY SAVINGS:**
107,501,821 kWh

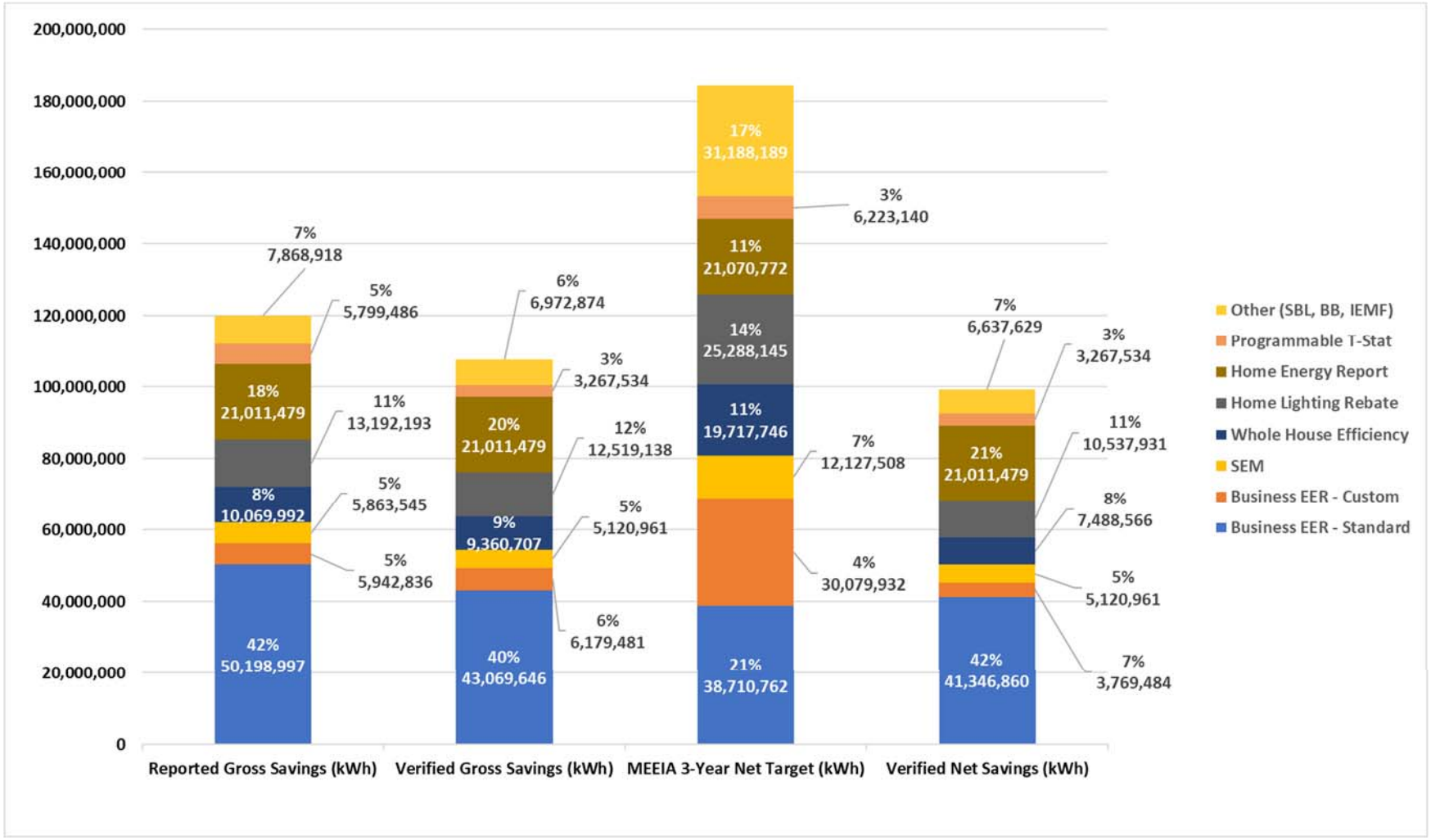
**GROSS DEMAND SAVINGS:**
56,386 kW

- PY2017 portfolio's energy and demand realization rates were driven primarily by the realized savings for the Business EER –Standard program, which represented approximately 40% of verified portfolio energy savings and approximately 13% of verified portfolio demand savings. Realization rates for the Standard program were 86% and 81% for energy and demand, respectively; as noted above, these are largely driven by adjustments to baseline fixture wattages for the largest total savings measure (high bay lighting). **In PY2017, the Standard program achieved 107% and 110% of its 3-year MEEIA Cycle 2 target for energy and demand, respectively.**
- The Business EER – Custom program achieved approximately 13% and 11% of its 3-year MEEIA Cycle 2 energy and demand targets, respectively. **Realization rates for the Custom program were 104% and 141% for energy and demand, respectively.**
- **The portfolio's suite of residential energy efficiency programs performed well,** with energy realization rates ranging from 85% (Income-Eligible Multifamily) to 95% (Home Lighting Rebate). Demand realization rates ranged from 98% (HER) to 147% (Whole House Efficiency).
- The DRI program—representing approximately 35% of total portfolio verified demand savings—achieved a realization rate of approximately 52%, which contributed to the portfolio's lower than expected demand realization rate. The DRI program achieved approximately 35% of its 3-year MEEIA Cycle 2 target and represented approximately 36% of total portfolio verified net demand savings
    - While most DRI customers are contractually meeting program expectations by exhibiting load under their firm power level (FPL) during events, the intent of the program and how it is evaluated—to curtail peak demand—is not being met for some customers. Driving the lower-than-targeted effect of the program was an overestimation of customers estimated peak demand (EPD), leading to less of a load reduction needed to achieve their FPL and negating much of their need for curtailment. KCP&L Product Managers have undertaken significant outreach efforts in improving communication channels and ensuring delivery mechanisms are appropriate for the DRI program in PY2018. As such, the DRI Product Manager expects the program to achieve its 3-year MEEIA target in PY2018.

**NET ENERGY SAVINGS:**
99,180,444 kWh

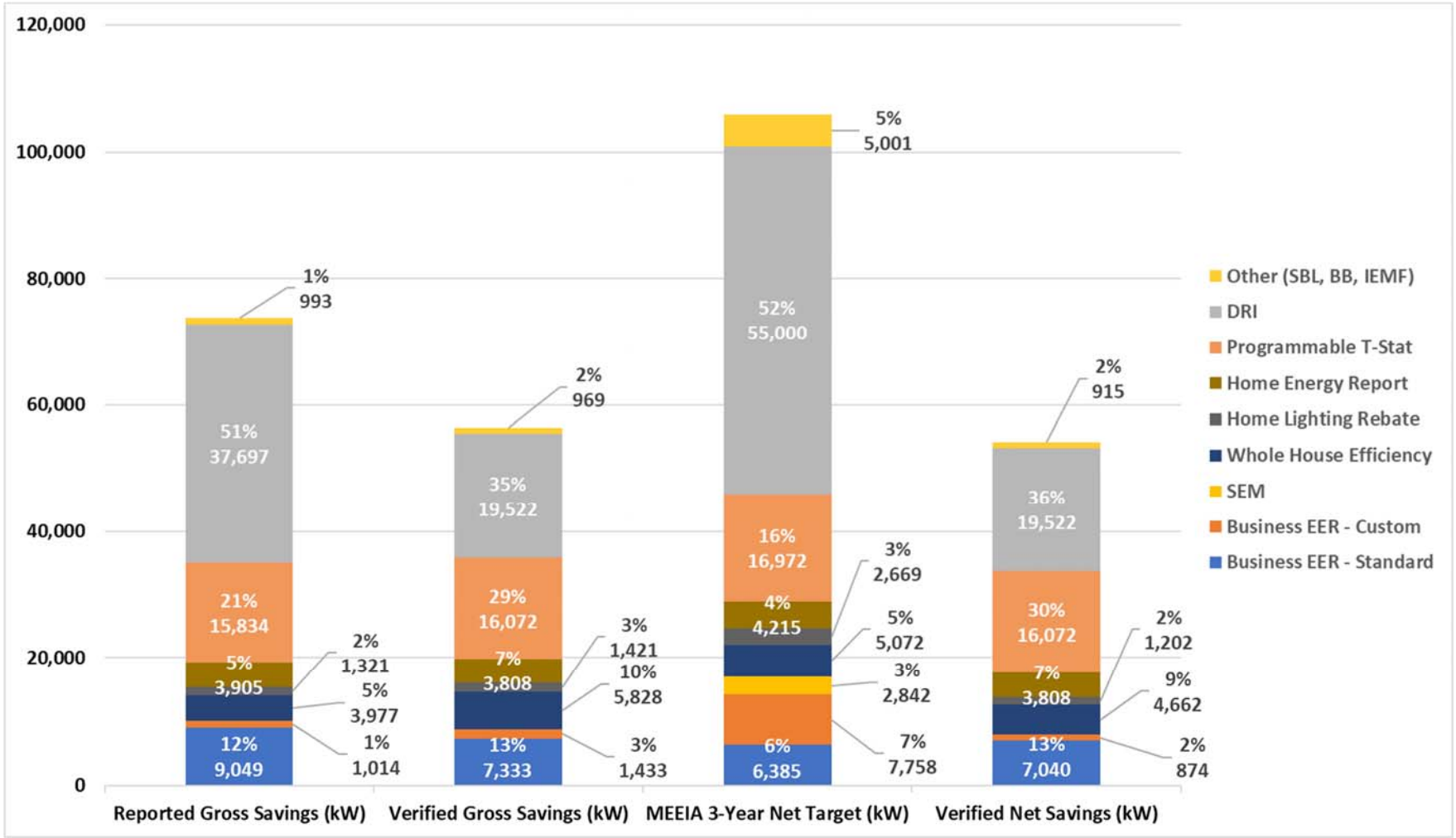
**NET DEMAND SAVINGS:**
54,095 kW

**Figure 3. PY2017 Distribution of Energy Savings by Program**




*Source: Navigant analysis*

**Figure 4. PY2017 Distribution of Demand Savings by Program**




*Source: Navigant analysis*

### *Gross and Net Savings Summary*

Navigant's PY2017 impact evaluation verified savings for all programs, while also focusing evaluation, measurement, and verification (EM&V) resources on high impact measures and programs. We reviewed algorithms and input assumptions for calculating reported savings for all programs. Additionally, the evaluation team conducted onsite verification and metering and telephone surveys with select programs, including the Business EER – Standard, Small Business Lighting (SBL), and the Business EER – Custom programs. In-store intercepts and demand elasticity modeling (DEM) was conducted for the HLR program. 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 PY2017. 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 deemed savings tracked by GMO
- **MEEIA Target:** 3-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 Target (kWh) | Verified Savings (kWh) | Percentage of MEEIA Target Achieved |
| Commercial Energy Efficiency (EE) Programs | ***Commercial EE Programs Subtotal*** | ***116,176,083*** | ***89,282,574*** | ***77%*** | ***102,092,113*** | ***83,498,909*** | ***82%*** |
| | Business EER - Standard | 98,858,653 | 72,929,286 | 74% | 38,710,762 | 70,012,114 | 181% |
| | Business EER - Custom | 6,607,365 | 6,838,220 | 103% | 30,079,932 | 4,474,334 | 15% |
| | Block Bidding | 436,324 | 467,490 | 107% | 17,603,947 | 467,490 | 3% |
| | Strategic Energy Management | 5,863,545 | 5,120,961 | 87% | 12,127,508 | 5,120,961 | 42% |
| | Small Bus. Lighting | 4,410,196 | 3,926,617 | 89% | 3,569,963 | 3,424,010 | 96% |
| Residential EE Programs | ***Residential EE Programs Subtotal*** | ***48,650,796*** | ***44,988,872*** | ***92%*** | ***55,163,628*** | ***38,227,315*** | ***69%*** |
| | Income-Eligible Weatherization | 304,972 | 309,812 | 102% | 143,458 | 309,812 | 216% |
| | Whole House Efficiency | 14,987,205 | 14,897,484 | 99% | 19,717,746 | 11,917,987 | 60% |
| | Income-Eligible Multifamily | 7,457,599 | 6,134,100 | 82% | 10,014,278 | 6,134,100 | 61% |
| | Home Lighting Rebate | 25,901,019 | 23,647,476 | 91% | 25,288,145 | 19,865,416 | 79% |
| Educational Programs | ***Educational Programs Subtotal*** | ***21,011,479*** | ***21,011,479*** | ***100%*** | ***21,070,772*** | ***21,011,479*** | ***100%*** |
| | Home Energy Report | 21,011,479 | 21,011,479 | 100% | 21,070,772 | 21,011,479 | 100% |
| | 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*** | ***8,006,460*** | ***5,188,479*** | ***65%*** | ***6,223,140*** | ***5,188,479*** | ***83%*** |
| | Business Programmable Thermostat | 170,016 | 98,077 | 58% | 79,002 | 98,077 | 124% |
| | Residential Programmable Thermostat | 7,836,444 | 5,090,402 | 65% | 6,144,138 | 5,090,402 | 83% |
| | Demand Response Incentive | The Demand Response Incentive Program did not claim any energy savings. | | | | | |
| | **GMO TOTAL** | **193,844,817** | **160,471,404** | **83%** | **184,549,652** | **147,926,182** | **80%** |

*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 Target (kW) | Verified Savings (kW) | Percentage of MEEIA Target Achieved |
| Commercial Energy Efficiency (EE) Programs | ***Commercial EE Programs Subtotal*** | ***19,386*** | ***13,884*** | ***72%*** | ***20,629*** | ***12,785*** | ***62%*** |
| | Business EER - Standard | 17,477 | 11,693 | 67% | 6,385 | 11,226 | 176% |
| | Business EER - Custom | 1,107 | 1,526 | 138% | 7,758 | 973 | 13% |
| | Block Bidding | 55 | 55 | 100% | 3,052 | 55 | 2% |
| | Strategic Energy Management | 0 | 0 | N/A | 2,842 | 0 | 0% |
| | Small Bus. Lighting | 747 | 610 | 82% | 592 | 532 | 90% |
| Residential EE Programs | ***Residential EE Programs Subtotal*** | ***9,625*** | ***12,372*** | ***129%*** | ***9,150*** | ***10,184*** | ***111%*** |
| | Income-Eligible Weatherization | 226 | 128 | 57% | 53 | 128 | 244% |
| | Whole House Efficiency | 6,049 | 8,789 | 145% | 5,072 | 7,031 | 139% |
| | Income-Eligible Multifamily | 756 | 737 | 97% | 1,357 | 737 | 54% |
| | Home Lighting Rebate | 2,594 | 2,717 | 105% | 2,669 | 2,288 | 86% |
| Educational Programs | ***Educational Programs Subtotal*** | ***3,905*** | ***3,808*** | ***98%*** | ***4,215*** | ***3,808*** | ***90%*** |
| | Home Energy Report | 3,905 | 3,808 | 98% | 4,215 | 3,808 | 90% |
| | 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*** | ***53,605*** | ***40,640*** | ***76%*** | ***71,972*** | ***40,640*** | ***56%*** |
| | Business Programmable Thermostat | 466 | 533 | 114% | 215 | 533 | 248% |
| | Residential Programmable Thermostat | 15,441 | 20,584 | 133% | 16,757 | 20,584 | 123% |
| | Demand Response Incentive | 37,697 | 19,522 | 52% | 55,000 | 19,522 | 35% |
| | **GMO TOTAL** | **86,521** | **70,703** | **82%** | **105,967** | **67,418** | **64%** |

*Source: Navigant analysis*

**Table 5. Energy Savings at the Customer Meter: PY2017**

| Sector | Program | Gross | | | Net | | |
|---|---|---|---|---|---|---|---|
| | | Reported Savings (kWh) | Verified Savings (kWh) | Realization Rate (%) | MEEIA 3-Year Target (kWh) | PY2017 Verified Savings (kWh) | Percentage of MEEIA Target Achieved in PY2017 |
| Commercial Energy Efficiency (EE) Programs | ***Commercial EE Programs Subtotal*** | ***64,725,915*** | ***56,989,184*** | ***88%*** | ***102,092,113*** | ***52,521,156*** | ***51%*** |
| | Business EER - Standard | 50,198,997 | 43,069,646 | 86% | 38,710,762 | 41,346,860 | 107% |
| | Business EER - Custom | 5,942,836 | 6,179,481 | 104% | 30,079,932 | 3,769,484 | 13% |
| | Block Bidding | 0 | 0 | N/A | 17,603,947 | 0 | 0% |
| | Strategic Energy Management | 5,863,545 | 5,120,961 | 87% | 12,127,508 | 5,120,961 | 42% |
| | Small Bus. Lighting | 2,720,537 | 2,619,095 | 96% | 3,569,963 | 2,283,851 | 64% |
| Residential EE Programs | ***Residential EE Programs Subtotal*** | ***28,410,565*** | ***26,233,624*** | ***92%*** | ***55,020,169*** | ***22,380,275*** | ***41%*** |
| | Whole House Efficiency | 10,069,992 | 9,360,707 | 93% | 19,717,746 | 7,488,566 | 38% |
| | Income-Eligible Multifamily | 5,148,380 | 4,353,778 | 85% | 10,014,278 | 4,353,778 | 43% |
| | Home Lighting Rebate | 13,192,193 | 12,519,138 | 95% | 25,288,145 | 10,537,931 | 42% |
| Educational Programs | ***Educational Programs Subtotal*** | ***21,011,479*** | ***21,011,479*** | ***100%*** | ***21,070,772*** | ***21,011,479*** | ***100%*** |
| | Home Energy Report | 21,011,479 | 21,011,479 | 100% | 21,070,772 | 21,011,479 | 100% |
| | 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*** | ***5,799,486*** | ***3,267,534*** | ***56%*** | ***6,223,140*** | ***3,267,534*** | ***53%*** |
| | Business Programmable Thermostat | 143,220 | 73,990 | 52% | 79,002 | 73,990 | 94% |
| | Residential Programmable Thermostat | 5,656,266 | 3,193,544 | 56% | 6,144,138 | 3,193,544 | 52% |
| | Demand Response Incentive | The Demand Response Incentive Program did not claim any energy savings. | | | | | |
| **GMO TOTAL** | | **119,947,445** | **107,501,821** | **90%** | **184,406,194** | **99,180,444** | **54%** |

*Source: Navigant analysis*

**Table 6. Coincident Demand Savings at the Customer Meter: PY2017**

| Sector | Program | Gross | | | Net | | |
|---|---|---|---|---|---|---|---|
| | | Reported Savings (kW) | Verified Savings (kW) | Realization Rate (%) | MEEIA 3-Year Target (kW) | Verified Savings (kW) | Percentage of MEEIA Target Achieved |
| Commercial Energy Efficiency (EE) Programs | ***Commercial EE Programs Subtotal*** | ***10,534*** | ***9,187*** | ***87%*** | ***20,629*** | ***8,281*** | ***40%*** |
| | Business EER - Standard | 9,049 | 7,333 | 81% | 6,385 | 7,040 | 110% |
| | Business EER - Custom | 1,014 | 1,433 | 141% | 7,758 | 874 | 11% |
| | Block Bidding | 0 | 0 | N/A | 3,052 | 0 | 0% |
| | Strategic Energy Management | 0 | 0 | N/A | 2,842 | 0 | 0% |
| | Small Bus. Lighting | 471 | 421 | 89% | 592 | 367 | 62% |
| Residential EE Programs | ***Residential EE Programs Subtotal*** | ***5,821*** | ***7,797*** | ***134%*** | ***9,098*** | ***6,412*** | ***70%*** |
| | Whole House Efficiency | 3,977 | 5,828 | 147% | 5,072 | 4,662 | 92% |
| | Income-Eligible Multifamily | 523 | 548 | 105% | 1,357 | 548 | 40% |
| | Home Lighting Rebate | 1,321 | 1,421 | 108% | 2,669 | 1,202 | 45% |
| Educational Programs | ***Educational Programs Subtotal*** | ***3,905*** | ***3,808*** | ***98%*** | ***4,215*** | ***3,808*** | ***90%*** |
| | Home Energy Report | 3,905 | 3,808 | 98% | 4,215 | 3,808 | 90% |
| | 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*** | ***53,532*** | ***35,594*** | ***66%*** | ***71,972*** | ***35,594*** | ***49%*** |
| | Business Programmable Thermostat | 393 | 463 | 118% | 215 | 463 | 215% |
| | Residential Programmable Thermostat | 15,441 | 15,609 | 101% | 16,757 | 15,609 | 93% |
| | Demand Response Incentive | 37,697 | 19,522 | 52% | 55,000 | 19,522 | 35% |
| **GMO TOTAL** | | **73,791** | **56,386** | **76%** | **105,914** | **54,095** | **51%** |

*Source: Navigant analysis*

**Net Savings**

Navigant used the following definitions, provided by the Uniform Methods Project,[2] to calculate net savings. See the Introduction section for more details on the team's approach. 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 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 inherently have no FR (e.g., Demand Response Incentive, Home Energy Report)
- Programs did not claim any savings (e.g., Home Online Energy Audit, Business Online Energy Audit)
- Impact evaluation methods directly estimate net impacts through a billing analysis that utilizes controls (e.g., HER)
- 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 (e.g., Block Bidding, Business EER – Custom, Income-Eligible Multifamily)

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

**Table 7. NTG Components by Program**

| Program Name* | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| Business EER – Standard | 0.05 | 0.002 | 0.004 | 96% |
| Business EER – Custom | 0.41 | 0.02 | 0.00 | 61% |
| Block Bidding | Deemed 1.0 pending future research. | | | 100% |
| 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 | 0.38 | 0.21 | 0.00 | 83% |
| 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 PY2017 | | | |
| Business Online Energy Audit | N/A – Savings not claimed in PY2017 | | | |
| 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** | **N/A** | **N/A** | **N/A** | **95% / 92%[3]** |

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

[3] A portfolio level NTG of 95% for demand and 92% 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 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 in calculating cost-effectiveness as part of their annual filing.

The following tables present the cost-effectiveness results. Table 8 through Table 10 present program to date results for PY2016 and PY2017 combined. Tables 11 through Table 13 present results for PY2017 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. KCP&L's portfolio of programs have achieved $47,399,733 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 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, please refer to the Whole House Efficiency chapter below.

Additionally, the Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the HLR, WHE, IEMF, SBL and Business EER – Standard programs. This adjustment reflects a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA)[4]. The IL TRM V7.0 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.

[4] The cost effectiveness results should be considered conservative due to the application of the mid-life adjustment to both standard and specialty light bulbs. The most recent information available suggests that it is highly unlikely that the Department of Energy (DOE) will expand the 45 lumens per watt provision of EISA to specialty light bulbs. At the time of writing (November 9, 2018), a notice on the Office and Management and Budget's website indicates that the DOE will soon issue a ruling to rescind its December 2016 expanded definition of a general service lamp (https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=1904-AE26). If this happens, reflector, globe, candelabra, and many other specialty light bulbs will continue as exempt to EISA (their current status) and their baseline bulb will remain a halogen bulb. This stands in contrast to assumptions that underlie the mid-life adjustment included in the IL TRM V7.0, which applies a specialty mid-life adjustment starting in January 2024 (as reflected in the cost effectiveness calculations). Bulbs with the A-line shape will likely remain subject to the 45 lumens per watt efficiency standard named in EISA with delayed implementation until January 2021 (as assumed in the IL TRM and in the cost effectiveness calculations).

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

| Sector | Program | TRC Test[5] | TRC | SCT | UCT | PCT | RIM |
|---|---|---|---|---|---|---|---|
| | | GMO | Navigant | | | | |
| Commercial EE Programs | Business EER – Standard | N/A | 1.46 | 1.72 | 3.01 | 1.63 | 0.83 |
| | Business EER – Custom | N/A | 0.77 | 0.97 | 1.23 | 1.08 | 0.64 |
| | Block Bidding | N/A | 0.37 | 0.44 | 0.40 | 3.55 | 0.28 |
| | Strategic Energy Management | N/A | 2.17 | 2.33 | 2.17 | 12.06 | 0.57 |
| | Small Business Lighting | N/A | 0.95 | 1.13 | 1.44 | 1.47 | 0.64 |
| Residential EE Programs | Income-Eligible Weatherization | N/A | 1.15 | 1.45 | 1.15 | INF* | 0.59 |
| | Whole House Efficiency | N/A | 0.97 | 1.16 | 1.87 | 1.28 | 0.70 |
| | Income-Eligible Multifamily | N/A | 1.37 | 1.54 | 1.38 | INF* | 0.43 |
| | Home Lighting Rebate*** | N/A | 1.50 | 1.71 | 2.03 | 3.94 | 0.49 |
| Educational/ Behavioral Programs | Home Energy Report | N/A | 0.84 | 0.84 | 0.84 | 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 | 1.83 | 2.12 | 2.82 | 0.40 | 2.32 |
| | Residential Programmable Thermostat | N/A | 2.04 | 2.38 | 3.44 | 0.87 | 2.06 |
| | Demand Response Incentive | N/A | 3.20 | 3.21 | 1.40 | 1800.21 | 1.40 |

*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, Business Online Energy Audit, or SEM programs 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*

[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 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** | 1.41 | 1.65 | 2.28 | 1.76 | 0.85 |
| **EE Programs*** | 1.27 | 1.50 | 2.26 | 1.77 | 0.71 |
| **Residential EE Programs** | 1.15 | 1.35 | 1.85 | 2.16 | 0.58 |
| **C&I EE Programs** | 1.33 | 1.57 | 2.50 | 1.60 | 0.79 |
| **DR Programs**** | 2.14 | 2.45 | 2.86 | 1.12 | 1.94 |

*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** | **$ 15,844,524** | **$ 21,052,194** | **$ 36,896,718** | **$ 84,296,451** | **$ 84,296,451** | **$ 47,399,733** |

*Source: Navigant analysis*

**Table 11. Benefit-Cost Ratios by Program and Cost Test: PY2017****

| Sector | Program | TRC Test[6] | TRC | SCT | UCT | PCT | RIM |
|---|---|---|---|---|---|---|---|
| | | GMO | Navigant | | | | |
| Commercial EE Programs | Business EER – Standard | 1.52 | 1.82 | 3.72 | 1.46 | 0.95 | 1.52 |
| | Business EER – Custom | 0.95 | 1.18 | 1.71 | 1.05 | 0.78 | 0.95 |
| | Block Bidding | N/A | N/A | N/A | N/A | N/A | N/A |
| | Strategic Energy Management | 2.17 | 2.33 | 2.17 | 12.06 | 0.57 | 2.17 |
| | Small Business Lighting | 1.07 | 1.28 | 1.91 | 1.33 | 0.76 | 1.07 |
| Residential EE Programs | Income-Eligible Weatherization | N/A | N/A | N/A | N/A | N/A | N/A |
| | Whole House Efficiency | 0.99 | 1.16 | 2.10 | 1.34 | 0.69 | 0.99 |
| | Income-Eligible Multifamily | 1.79 | 1.97 | 1.81 | INF* | 0.46 | 1.79 |
| | Home Lighting Rebate*** | 1.24 | 1.38 | 1.88 | 3.44 | 0.45 | 1.24 |
| Educational/ Behavioral Programs | Home Energy Report | 0.97 | 0.97 | 0.97 | INF* | 0.37 | 0.97 |
| | 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 | 1.80 | 2.09 | 2.82 | 0.28 | 2.38 | 1.80 |
| | Residential Programmable Thermostat | 2.29 | 2.66 | 4.88 | 0.69 | 2.58 | 2.29 |
| | Demand Response Incentive | 3.27 | 3.27 | 1.26 | INF* | 1.26 | 3.27 |

*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, Business Online Energy Audit, or SEM programs 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*

[6] 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 – PY2017**

| | Total Resource Cost Test | Societal Cost Test | Utility Cost Test | Participant Cost Test | Rate Impact Measure Test |
|---|---|---|---|---|---|
| **Portfolio** | 1.53 | 1.78 | 2.82 | 1.58 | 0.98 |
| **EE Programs*** | 1.31 | 1.55 | 2.68 | 1.60 | 0.78 |
| **Residential EE Programs** | 1.10 | 1.27 | 2.00 | 1.99 | 0.58 |
| **C&I EE Programs** | 1.40 | 1.68 | 3.06 | 1.44 | 0.90 |
| **DR Programs**** | 2.36 | 2.69 | 3.60 | 0.96 | 2.30 |

*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) – PY2017**

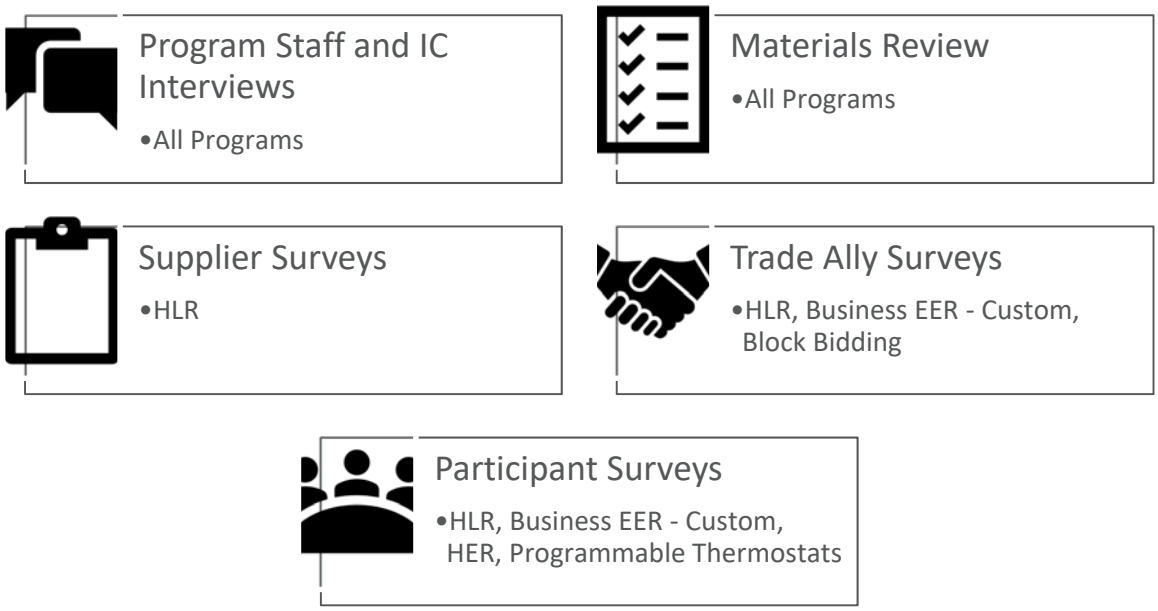
| Sector | Rebate Costs | Direct Program Admin Costs** | Total Costs | Benefits from Energy and Demand Savings*** | Total Benefits | Total Net Benefits |
|---|---|---|---|---|---|---|
| **Portfolio** | **$ 8,333,188** | **$ 10,856,979** | **$ 19,190,167** | **$ 54,326,712** | **$ 54,326,712** | **$ 35,136,545** |

*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, HLR, HER, DRI, and Programmable Thermostat programs. Together, these programs represent verified energy savings of approximately 72% of the total portfolio energy savings and 87% of total verified portfolio demand savings. For detailed results of the team's process evaluation, please refer to the program-specific sections.

Navigant has 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 KCP&L portfolio of C&I programs, as it represents approximately 40% of verified gross energy savings in PY2017. Based on the implementer administered participant surveys, overall customers were very satisfied with the program. At the time of writing, more than 50 responses had been collected for participants in PY2017 in the Standard program. The first question related to overall satisfaction asked about satisfaction with the contractor and

had an average score over 9 with 10 the highest score indicating extremely satisfied. The second question asked about satisfaction with the Business EER program and had an average score of over 9 out of 10. The process evaluation revealed these findings.

**FINDING 1: Smaller C&I customers have limited resources for researching energy conservation. Developing targeted marketing materials can help these customers implement energy conservation measures.**

- KCP&L has focused on developing targeted marketing materials for certain segments to help explain the benefits of implementing energy conservation. For example, KCP&L developed a good, better, best marketing campaign for high bay lighting to make comparing LED high bay fixtures to metal halide or linear fluorescent fixtures more straightforward.

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

- KCP&L is actively tracking 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 addresses a participant's water heating, lighting, refrigeration, and manufacturing energy end-uses, 95% of the projects in PY2017 were for lighting measures.**

- From the customer perspective, the Standard program and the Custom program are one program not two programs. Most of the measures that are not covered by Standard are covered by another program. The program is not intended to stand alone from the customer perspective, but be considered an integrated C&I portfolio.

**FINDING 4: The IC for the Standard program works one on one with the larger customers. Medium and smaller customers are mostly addressed through the trade-ally network. In addition, there is also targeted marketing for some sectors with historically lower participation. Due to the high level of participation in the Standard program, these channels are appropriate for the target market.**

- Of the program participants that participated in the implementer administered survey, more than 85% of the participants indicated that they participated in the program due to the available rebate and or recommendations from the contractor. This is in line with the low FR found in the PY2016 survey. It also indicates that communications about KCP&L programs is leading to participation in these programs.

**FINDING 5: In PY2017, KCP&L 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 many of those measures are covered by other programs such as the Custom program.**

- KCP&L has had great success with the lighting rebates. Even after lowering rebate amounts in the fall of 2017, the participation remained strong in the Standard program through the end of the program cycle.

**HLR Program**

The HLR program represented approximately 12% of verified gross energy savings. The HLR program's process evaluation focused on understanding program design and revisions, marketing and outreach, and what factors drive consumer bulb purchases. The upstream nature of the HLR makes it difficult to identify program participants because the program does not collect contact information for customers who buy a discounted bulb from participating retailers. Thus, in-store intercept surveys conducted in the KCP&L-MO and KCP&L-GMO service territories addressed factors that influence lighting purchases and exposure to program marketing and outreach, and the impact and NTG elements described above. The process evaluation revealed these 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 led to budget reductions to maintain Cycle 2 portfolio spending caps. Therefore, in PY2017 the program focused primarily on reducing the shelf price and increasing the availability of specialty LEDs.**

- The HLR program reduced the shelf price of standard LEDs by $1.49 from $3.76 to $2.27. For specialty LEDs, the program reduced the price by $2.66 from $7.38 to $4.72. 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, PY2016 results suggested that targeted marketing may help recruit additional hard-to-reach (HTR) customers (i.e., income-eligible households, renters, non-English speaking households, bargain store shoppers), but the recent budget reductions have limited the ability to expand outreach to HTR customers.**

- Although many materials are available in both English and Spanish, the program did not develop marketing that specifically targeted HTR customers. This is appropriate given the need to manage HTR program expenditures to the remaining budget. The program will continue to provide incentives and marketing support for standard LEDs in the discount channel, which disproportionately serves the HTR population.

**FINDING 3: The program supported standard and specialty LEDs through PY2017, but it will focus mainly on specialty bulbs in PY2018 to maintain budget integrity. This design makes sense given the budget constraints.**

- 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.
- The program budgetary constraints mean that GMO must decide how to spend limited funds in an efficient manner. However, the focus on specialty bulbs may strain GMO's ability to achieve gross and net savings targets, given lower specialty sales and NTG ratios. If this occurs, KCP&L could provide a special offer on standard LEDs in PY2018 to meet overall MEEIA Cycle 2 targets, although this is unlikely to occur, as KCP&L's Product Manager has indicated, based on portfolio

performance, they are unlikely to invest further funds towards the HLR program in MEEIA Cycle 2.

**FINDING 4: GMO and the IC market the program widely through mass media (including the internet) and within retail stores. This strategy matches the current program budget and has been suitable to meet sales and savings targets through PY2017.**

- The program has met—and sometimes exceeds—sales and savings targets with their current HLR marketing efforts. As described above, these efforts have served to increase sales of program supported bulbs.

**FINDING 5: Navigant verified that the KCP&L-GMO HLR program has achieved 90% of reported savings and 75% of its MEEIA Cycle 2 net savings targets cumulatively over PY2016 and PY2017.**

- 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.

**HER Program**

The HER program represents 20% 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, a program materials review, a process evaluation survey of treatment and control group customers, and review of the program IC's PY2017 Customer Engagement Tracker (CET) survey results. Note that CET results report combined KCP&L GMO and KCP&L MO results. The PY2017 CET included customers from the 2016 Expansion wave. The process evaluation revealed the following findings.

**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 PY2017 program targeted over 150,000 customers to receive five HERs. An additional 50,000 customers served as a control group in the experimental design. Based on responses to the CET, 73% of treatment customers agree that KCP&L provides tools to help customers learn about energy use. Furthermore, 71% of treatment customers report that the energy efficiency tips on the report are useful, while 61% 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.**

- As the program adds waves, the new waves 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 KCP&L 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.
- The print reports also cross-promoted Nest thermostats and rebates for air conditioners or heat pumps through GMO programs. The email reports included messaging on Energy Analyzer, air conditioner tune-ups, rebates on a new air conditioners or heat pumps, seasonal umbrella messaging about KCP&L programs, Nest thermostats, and in-home assessments.
- Based on the evaluation survey, 10%-20% of treatment customers own smart home assistants, home security, smart light bulbs, or smart appliances.

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

- Customers with email addresses on file (about 12%) 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. However, there may be an opportunity to engage the 29% of customers who either did not recall the report or did not look at the report.**

- Of CET respondents, 29% either did not recall receiving the report or did not read the report. Respondents who recall the reports, 72% like the reports, and 61% talk to other people about the reports.
- Based on responses to the evaluation survey, customers are most likely to recall the neighbor comparison (92%) and then by energy-saving tips (62%) but give higher ratings to the tips (7.1 on a 10-point scale) compared to the neighbor comparison (6.2).

**Residential and Business Programmable Thermostat Programs**

Navigant's process research consisted of survey analysis, program materials review, and an interview with the product manager. The evaluation team executed post event customer surveys as well as a post season survey to assess program and event awareness amongst participants, participant behavior during events, and participant satisfaction with the program. Overall survey findings show that program satisfaction is relatively high, particularly for Seasonal Savings. The Residential and Business Programmable Thermostat programs represent a combined verified demand savings of 29%. The process evaluation revealed these 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.**

- KCP&L calls curtailment events during which Nest cycles participants' HVAC systems 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.
- 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 Demand Response Incentive (DRI) program provides DR opportunities for large C&I customers.**

**FINDING 3: The PT 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 evaluation report and found to be consistent in PY2017.**

- In the future, competition among PT vendors and evolving technological developments could lead to the market shifting from one vendor toward another. Navigant suggests KCP&L monitor the market to avoid missing market trends. The BYOD segment of the RHR population is small. KCP&L 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.

**FINDING 4: KCP&L has successfully reached enrollment targets. In fact, in PY2017, marketing ramped down a bit to reduce new enrollment. Marketing efforts in PY2017 focused on increasing thermostat activation for the Rush Hour Rewards program.**

- As in PY2016, the CLEAResult technicians cross-promoted the Residential PT program with the Whole House Efficiency's (WHE's) Energy Savings Kit program but ceased promotion through HER program mailers in November 2017 due to intended enrollment slowdown. Other methods of communication have been through social media and participant promotion through peer-to-peer word-of-mouth communication between customers.
- Many survey respondents who were dissatisfied with event notification channels requested notification through means that are already available (such as text or push notifications). Navigant recommends re-educating customers on notification channels for the upcoming DR season. Additionally, evaluation surveys revealed that additional education and communication regarding program goals and purposes would be useful to customers.

**FINDING 5: KCP&L is close to reaching enrollment goals for Cycle 2; thus, it is redirecting efforts from enrollment to continuing thermostat activation and designing a process to handle thermostat participants that move out of their home.**

**DRI Program**

The DRI program represents approximately 35% of verified demand savings in PY2017. Through the in-depth interviews with the program's product manager and IC, the evaluation team found the following:

**FINDING 1: Two main barriers for participating in the DRI program are (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 on to the individual who can manually curtail load at the customer site.**

- 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 has confirmed that a customer's point of contact is aware of the responsibilities associated with being a DRI participant. Thus, Navigant expects to see this barrier of participation eliminated for PY2018.

**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 a cost-effective program. The DRI product manager emphasized improving the accuracy of EPD and FPL calculations. Much of these efforts went into redefining EPD values and FPLs for existing customer contracts. The DRI program did not add as many new customers to the program as planned for PY2017 due to focusing efforts on redefining existing customers' EPD values and FPLs. Through a planned increase in recruitment efforts, KCP&L anticipates an increase in program participation beginning in MEEIA 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 PY2017, the energy consultants 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.

**FINDING 4: Although room for improvement exists, KCP&L's product manager has taken great efforts to improve communication channels and ensure delivery mechanisms are appropriate for the DRI program.**

- In PY2017, the product manager initiated 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 typically notified of potential events more than 24 hours in advance by their energy consultants.

**FINDING 5: KCP&L has implemented targeted marketing to recruit new customers. In addition, KCP&L has refined curtailment plans and expectations (i.e., the EPD values and FPLs) with current customers.**

- As mentioned in the PY2016 EM&V report, KCP&L recruited smaller customers in PY2017. KCP&L is updating the EPD and FPL calculation for existing customers for PY2018. CLEAResult will use interval data during potential peak hours during weekdays to identify a more accurate EPD value. During PY2017, KCP&L also redefined contracted curtailable load (CL) for many existing customers, through thorough onsite visits.

# SUMMARY OF RECOMMENDATIONS

The following section provides a high level summary of Navigant's impact and process evaluation recommendations. The evaluation team consolidated program-level impact and process recommendations into those that apply to a wide range of GMO programs to provide the reader with the most impactful recommendations. For program-specific recommendations, please refer to 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 below 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.

**RECOMMENDATION 1: Navigant recommends that the IC perform additional review of the efficient wattage to ensure that it matches the efficient product installed.**

- The evaluation team found that some of the reported efficient wattages did not match the wattages based on the product IDs listed in the efficient measure column. In many instances when this happened, the reported efficient wattage matched the equivalent lamp type, i.e., 65 W, and not the efficient wattage, i.e., 9 W. Navigant reviewed all instances where the reported efficient wattage did not align closely with the efficient wattage assumed for the deemed savings. Navigant used a corrected efficient wattage when necessary to match the manufacturer listed wattage for the reported efficient measure product ID.

**RECOMMENDATION 2: Navigant recommends accounting for actual building types in the deemed savings to more accurately predict the savings.**

- Currently, all tracked savings assume performance variables that reflect operation of an office building.

**RECOMMENDATION 3: Navigant recommends using results of onsite logger analysis for lighting measures for HOU, CF, and WHF for calculating building level deemed measure savings.**

**HLR Program**

Navigant developed the following recommendations based on the impact evaluation. The recommendations take the decreased program budget and reduced scope of PY2018 into consideration. The recommendations are provided based on corresponding findings to move the KCP&L-GMO HLR program forward and meet the MEEIA Cycle 2 target.

**RECOMMENDATION 1: Navigant suggests revising energy and demand savings calculations for the HLR program to reflect the following:**

- Account for leakage, assumed to be 14% of HLR LED bulb sales (GMO currently makes no adjustment for leakage)
- Retain an annual HOU of 840 hours for HLR standard LED bulb sales installed in residential settings
- Adopt an annual HOU of 986 for HLR specialty LED bulb sales installed in residential settings
- Account for C&I cross-sector sales contribution of HLR LED bulb sales by applying HOU and coincident factor (CF) values of 3,306 and 0.6, respectively, to 4% of the bulbs sold through the program
- Assume a NTG ratio of 88% for standard LEDs and 71% for specialty LEDs

**HER Program**

The tracking data and savings calculations provided by Oracle are appropriate for billing analysis of an RCT. Initial kilowatt reduction values provided by Oracle did not use the correct multiplier of 1.5 for all waves (see methodology for calculation details), but Oracle identified and corrected the error. Navigant makes the following recommendations related to the impact evaluation:

**RECOMMENDATION 1: Continue to use Oracle reported savings for tracking purposes.**

**RECOMMENDATION 2: Evaluate the reported savings every 2-3 years to monitor continued consistency between evaluated savings and implementer-reported savings.**

**RECOMMENDATION 3: Conduct an analysis of demand impacts using advanced metering infrastructure (AMI) data from a sample of treatment and control customers. While the Oracle methodology is robust, it does not include customers from KCP&L. Navigant suggests using a post-only difference approach (most customers will not have AMI data for the pre-period).**

**Residential and Business Programmable Thermostat Programs**

Navigant's impact recommendations for the Programmable Thermostat programs in PY2016 centered around data quality and availability. Overall, Navigant found data processing in PY2017 simpler than in PY2016 due to the improvements made in tracking data quality.

**RECOMMENDATION 1: KCP&L should continue efforts to understand impacts for future program improvements**

- KCP&L should consider running an assessment with the thermostat telemetry data to identify why some thermostats did not participate in some RHR events. Such information could lead to process improvement in the future of the program.
- The process evaluation identified that many customers wanted text message notification as well as Nest App push notification for their event notification. These forms of notification are already offered by KCP&L. Navigant recommends increased marketing of event notification options to improve customer awareness of events and program satisfaction.

**RECOMMENDATION 2: KCP&L should consider using AMI data to identify non-thermostat related impacts during event hours.**

- The process evaluation identified that some customers too additional energy saving actions during events.

**RECOMMENDATION 3: Navigant recommends including tips on alternative forms of electricity savings during event hours.**

- Customers indicated willingness to save electricity outside of thermostat use in the customer survey. These types of tips could increase future energy savings.

**DRI Program**

Overall, Navigant found that KCP&L is on its way to meet the 3-year program target. The following impact recommendations are based on the analysis of program interval and tracking data.

**RECOMMENDATION 1: For an improved data transfer process in PY2018, Navigant recommends that KCP&L send Navigant a unique list of customers for tracking data.**

- Additionally, the evaluation team recommends that KCP&L ensures Navigant receives the same interval data as A2A.

### *Process Evaluation Recommendations*

This section presents the most important recommendations resulting from Navigant's process evaluation activities for PY2017. 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.

**RECOMMENDATION 1: An overall recommendation is to use the Standard program to help increase participation in other C&I programs.**

- For example, adding a link on the Standard program webpage indicating that other rebates are available through the Custom program may be warranted.

**RECOMMENDATION 2: Navigant recommends KCP&L develop strategies to use previous program participation in lighting measures to encourage participation in other end-use measures.**

- While KCP&L does offer a wide array of measure end-uses, lighting continues to dominate in both total measures installed and claimed energy and demand savings.

**RECOMMENDATION 3: The following recommendations are provided to improve the communication channels and delivery mechanisms of the program:**

- The webpage could be better organized to make it easier to find information on measures eligible for rebates based on end-use and not based on program type. Also, it is difficult to find the targeted marketing materials online.
- When sending out the rebate check, KCP&L could consider including additional documentation on what the rebate is about, why they received it, and other programs that are available.

**HLR Program**

Drawing on the findings from the interviews with program and implementation staff and suppliers, onsite saturation visits to customer homes, consumer surveys, and a marketing materials review, the evaluation team developed the following recommendations to enhance the success of the program.

**RECOMMENDATION 1: Monitor the effect of switching to a specialty-focused program in PY2018.**

- KCP&L-GMO and the IC should monitor the effect of supporting mainly 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.

**RECOMMENDATION 2: Continue program incentives and marketing, despite reduced budget.**

- Continue to brand marketing and educational materials with ENERGY STAR and take part in national ENERGY STAR efforts. Although the program will support few standard bulbs, 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.

**RECOMMENDATION 3: Focus marketing efforts on benefits of ENERGY STAR LEDs.**

- KCP&L-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.”

**HER 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: KCP&L could consider emphasizing low cost energy saving actions or tips geared toward lower-energy users on reports sent to the 2016 Expansion wave.**

- For example, customers in that wave might be less likely to have central air conditioning (given lower baseline usage), so tips on managing fan use or plug loads may be more relevant to some members of the wave than upgrading a central air conditioner.

**RECOMMENDATION 2: The program should continue to keep abreast of new ways to use and save energy to provide up-to-date tips.**

- While penetration of smart technologies among treatment customers is still low, as more customers adopt these technologies, the reports should include tips on how to use these technologies to manage energy use. If reducing peak demand is a priority for KCP&L, then the program could add tips to encourage shifting of energy use.

**RECOMMENDATION 3: The program may want to consider signing up more customers for email reports so that customers can receive messaging from both channels.**

- Navigant notes that this would require capturing and sharing more customer emails with Oracle which may or may not be feasible given the program resources. The program may want to continue exploring the possible option of KCP&L sending email reports so that email addresses are not given to Oracle.

**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: KCP&L took major strides in PY2017 to increase Rush Hour Rewards activation rate for DIY customers. KCP&L should continue this effort to close the gap of thermostats that have not yet been activated.**

- At the moment there are few guidelines in place for how to account for thermostats that are part of a households where the customer has moved out. KCP&L began identifying processes to instate for such circumstances in PY2017 and should aim to solidify these in PY2018.
- Navigant acknowledges that the product manager instituted data management processes to improve data quality and movement of data in PY2017. Navigant recommends continuing these efforts in PY2018.

**RECOMMENDATION 2: Navigant recommends KCP&L consider working with property owners on access to the thermostat program in future program years and MEEIA Cycle 3. At the moment, the program is less accessible for multi-family housing to participate in. Access to this market could provide more energy savings and DR impact.**

**RECOMMENDATION 3: Navigant recommends that KCP&L considers expanding the BYOD program measure in MEEIA Cycle 3. BYOD is common in other jurisdictions and is cheaper than the DIY and DI measure.**

**DRI Program**

Overall, Navigant found that KCP&L is on its way to meet the 3-year program target as a result of the many process improvements the product manager made during PY2017. The following process recommendations are based on interviews with the KCP&L product manager and implementation contractor, and a review of program materials.

**RECOMMENDATION 1: The IC began using propensity modeling in PY2017 to select customers to recruit.**

- KCP&L should continue to refine propensity modeling to select customers for the program.

**RECOMMENDATION 2: As the DRI program continues to grow, KCP&L should consider that having both large and smaller customers can lead to a dilution of focus and specific feedback to both customer groups. KCP&L is actively addressing this issue through the implementation of account managers who check in with program participants throughout the program year.**

- As the program continues to grow in PY2018, Navigant recommends continuing efforts to provide individualized program assistance for participants. In addition, Navigant encourages continued internal partnership with the other commercial EE programs to cross-promote programs.
- Finally, as AMI becomes more prevalent, KCP&L should consider investigating ways of providing more consistent updates to participants regarding their program performance. Additionally, since this performance data would be captured, it would also allow for more periodic updates of participants' event target values (FPL).

**RECOMMENDATION 3: Navigant recommends continuing to work on event behavior management in PY2018.**

- In PY2017, the DRI product manager developed methods to better manage participants' event behavior. The evaluation team believes that these efforts will result in a more efficient and effective program.

# 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 16 demand-side management (DSM) programs for program year (PY) 2017.

Navigant conducted the following tasks as part of its impact evaluation, process evaluation, and cost-effectiveness analysis for PY2017:

- 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.[7] Navigant's plan concentrates on those programs with the greatest contribution to overall portfolio savings.[8]

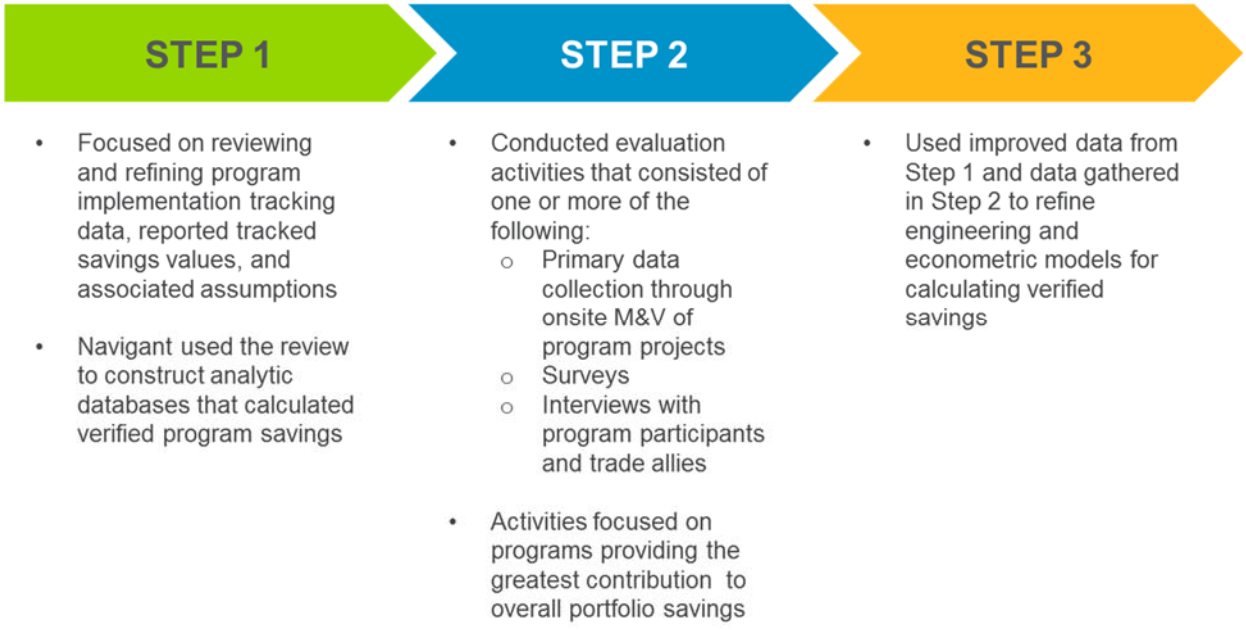
## 1.1 Impact Evaluation Approach

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 below and describes the key methods in the following sections.

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

[8] 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 (MO) regulations,[9] GMO is required to complete an impact evaluation for each program using one or both of the methods and one or both of the protocols detailed below.

1. **Impact evaluation methods.** At a minimum, comparisons of one or both of the following types shall be used to measure program and rate impacts in a manner that is based on sound statistical principles:
    a. Comparisons of pre-adoption and post-adoption loads of program or demand-side rate participants, corrected for the effects of weather and other intertemporal differences
    b. Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same time period
2. **Load impact measurement protocols.** The evaluator shall develop load impact measurement protocols designed to make the most cost-effective use of the following types of measurements, either individually or in combination:
    a. Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses
    b. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics

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, as they align with the MO requirements, for the impact evaluation are summarized in Table 1-1.

[9] 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) 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 PY2017.

**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. Sometimes, when all Stakeholders and KCP&L agree, these research findings are applied to the following program years. For example, in PY2017, Navigant conducted net-to-gross research for the Home Lighting Rebate program. The results from this research were applied to PY2017 gross savings and will be applied to PY2018 gross results.

The evaluation team uses primary in-state data when possible and agrees with the applicability to the KCP&L territories. Primary out-of-state data is leveraged 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 and PY2017 from participants and—where appropriate—from trade allies, or they utilize NTG research from Cycle 1 for programs that have

similar program designs. Navigant used the following definitions, provided by the Uniform Methods Project,[10] 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, Home Energy Report)
- Programs did not claim any savings (e.g., Home Online Energy Audit, Business Online Energy Audit)
- Impact evaluation methods directly estimate net impacts through a billing analysis that utilizes controls (e.g., Home Energy Reports, Strategic Energy Management)
- 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 PY (e.g., Block Bidding, Income-Eligible Multifamily)

[10] 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 | 0.41 | 0.02 | 0.00 | 61% |
| Block Bidding | Deemed 1.0 pending future research. | | | 100% |
| 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 | 0.38 | 0.21 | 0.00 | 83% |
| 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 PY2017 | | | |
| Business Online Energy Audit | N/A – Savings not claimed in PY2017 | | | |
| 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** | **N/A** | **N/A** | **N/A** | **95% / 92%[11]** |

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 in calculating cost-effectiveness as part of their annual filing. KCP&L's DSMore formulation of the benefit-cost tests followed the 2001 California Standard Practice Manual (SPM)[12] and does not account for the subsequent 2007 SPM Clarification Memo.[13] Navigant will provide KCP&L with the evaluated savings included in this analysis to support its performance incentive calculation.

[11] A portfolio level NTG of 95% for demand and 92% for energy was calculated by dividing the verified net savings by the verified gross savings.

[12] 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.

[13] 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.

The process used for calculating cost-effectiveness in PY2017 involved the following. KCP&L provided a template to Navigant which contained all the measures available in the Plan Year along with the associated 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, 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 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, please refer to the Whole House Efficiency chapter below.

Additionally, the Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the HLR, WHE, IEMF, SBL and Business EER – Standard programs. This adjustment reflects a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA)[14]. The IL TRM V7.0 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.

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.

[14] The cost effectiveness results should be considered conservative due to the application of the mid-life adjustment to both standard and specialty light bulbs. The most recent information available suggests that it is highly unlikely that the Department of Energy (DOE) will expand the 45 lumens per watt provision of EISA to specialty light bulbs. At the time of writing (November 9, 2018), a notice on the Office and Management and Budget's website indicates that the DOE will soon issue a ruling to rescind its December 2016 expanded definition of a general service lamp (https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=1904-AE26). If this happens, reflector, globe, candelabra, and many other specialty light bulbs will continue as exempt to EISA (their current status) and their baseline bulb will remain a halogen bulb. This stands in contrast to assumptions that underlie the mid-life adjustment included in the IL TRM V7.0, which applies a specialty mid-life adjustment starting in January 2024 (as reflected in the cost effectiveness calculations). Bulbs with the A-line shape will likely remain subject to the 45 lumens per watt efficiency standard named in EISA with delayed implementation until January 2021 (as assumed in the IL TRM and in the cost effectiveness calculations).

**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. Please refer to Appendix R for inputs to Navigant's benefit-cost model.

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

| Data[15] | Source |
|---|---|
| Avoided energy costs | Provided by GMO |
| 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) v5, 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*

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

## 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) (MO 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?

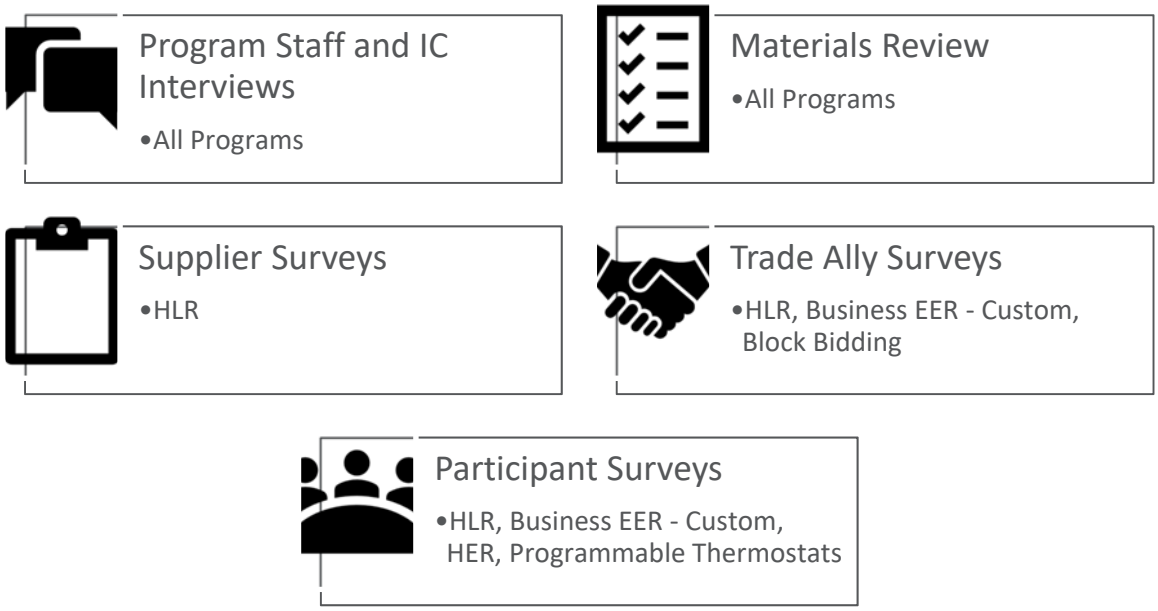
**QUESTION 4**

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:




## 1.4 Document Structure

Navigant divided the remainder of this document into program-specific chapters 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 PY2017 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 file 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 energy efficiency (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>• Air conditioners, heat pumps, and advanced rooftop unit controls (moved to Custom in fall 2017)<br>• Energy efficient lighting and controls<br>• Refrigeration/food service<br>• Water heating<br>• Appliances<br>• Standard process equipment (e.g., barrel wraps, insulated pellet dryer ducts) (moved to Custom in fall 2017) |
| **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

In program year (PY) 2017, Navigant evaluated the Standard program and found that the program is performing well in the territory, meeting 181% and 176% of its 3-year energy and demand savings targets, respectively, in the first 2 years.

For the Standard program's impact evaluation, Navigant performed a deemed measure savings review, tracking database review, and completed the lighting study to capture improved primary inputs for the engineering analysis equations as 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). Overall, there were 1,768 projects in the Business EER – Standard program; among those, 752 projects were from the GMO territory.

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

The following sections summarize Navigant's PY2017 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 an 86% realization rate for energy savings and an 81% realization rate for demand savings. Variations in the gross realization rate were due to adjustments to baseline assumptions identified in prior years, to Navigant engineering analysis, inclusion of the efficient wattage in the savings calculation for lighting measures, the results of the long-term onsite verification 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. As a result of the engineering analysis, Navigant included waste heat factors (WHFs) in the verified savings calculation. In addition, based on the results of the long-term lighting study, Navigant adjusted the in-service rate (ISR), hours of operation (HOU), and coincidence factors (CFs). 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.

Specifically, the realization rate of less than 100% for the Standard program is largely due to the reduction in the energy savings for the light-emitting diode (LED) high bay 176 W-350 W measure. The issues with the high baseline wattage assumptions for the high bay measures were identified in PY2016 by the implementation contractor. Navigant's onsite findings verified that the actual difference in wattages between baseline and efficient case lighting for this measure is approximately 40% lower than originally estimated (Please see Section 2.2.1.3 for more details). This discrepancy was proactively identified by KCP&L's implementation team and new measure definitions were created to address this issue. These new measure definitions specify the replacement wattage for increased clarity. For example, the previous measure definition of LED high bay 176 W-350 W is now defined as LED high bay fixture replacing > 750 W fixture. While applications were no longer accepted after March of 2017 for the original measure, this measure continued to be approved until July 2017 and therefore included in PY2017 savings. The original measure still represents 47% of reported program level savings even though it was only carryover from measures installed during the last month of PY2016.

The following sections presents results of the database review, deemed savings review, and onsite measurement and verification (M&V). Table 2-2 presents the energy and demand savings with and without the LED high bay 176 W-350 W measures included. Without this measure included the realization rate increases to 114% and 111% for energy and demand savings, respectively. This measure stopped being installed in March 2017 and will no longer impact the realization rate for PY2018 like it did in both PY2016 and PY2017. The realization rate greater than 100% without the high bay measure is primarily due to the use of the reported efficient lamp or fixture wattage in the savings calculation. The deemed values were determined at the beginning of the cycle and underestimate the installed efficiency leading to a higher efficient wattage. The deemed values underestimate the efficiency because they do not account for improvements in product characteristics over time that lead to more efficient products.

**Table 2-2. Business EER – Standard PY2017 Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 50,198,997 | 43,069,646 | 86% | 38,710,762 | 41,346,860 | 107% |
| Coinc Demand at Customer Meter (kW) | 9,049 | 7,333 | 81% | 6,385 | 7,040 | 110% |
| Energy at Customer Meter (kWh) – With High Bay Removed | 26,423,084 | 30,181,409 | 114% | 38,710,762 | 28,974,152 | 75% |
| Coinc Demand at Customer Meter (kW) – With High Bay Removed | 4,754 | 5,256 | 111% | 6,385 | 5,046 | 79% |

*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 overall realization rate is still impacted primarily by the high bay measure, which accounts for more than 60% of program to date reported savings.

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

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 98,858,653 | 72,929,286 | 74% | 38,710,762 | 70,012,114 | 181% |
| Coinc Demand at Customer Meter (kW) | 17,478 | 11,693 | 67% | 6,385 | 11,226 | 176% |

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

#### *2.2.1.1 Tracking Database Review*

The program tracking database review ensures sufficient data is captured regarding the installed projects (i.e., quantity, size, capacity, efficiency, building type, etc.) to support the engineering analysis used to calculate verified savings. Overall, the standard program had 752 projects in PY2017. Table 2-4 shows the disaggregation of total reported energy savings by end uses. Lighting projects accounted for the majority of reported savings, with approximately 99% of the total program savings.

**Table 2-4. Business EER – Standard PY2017 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 | 717 | 50,037,598 | 99.7% | 8,989 | 99.3% |
| Pumps/Fans | 15 | 94,306 | 0.2% | 28 | 0.3% |
| HVAC | 19 | 64,631 | 0.1% | 31 | 0.3% |
| Pool Pumps | 1 | 2,461 | 0.0% | 0 | 0.0% |
| Refrigeration | 0 | 0 | 0.0% | 0 | 0.0% |
| **Total** | **752** | **50,198,997** | **100%** | **9,049** | **100%** |

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

The program tracking database lists projects completed during the PY 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:** Overall, Navigant found that the database and project files contain sufficient information to support the impact evaluation.
- **Some of the reported efficient wattages did not match the wattages based on the product IDs listed in the efficient measure column**: In many instances when this happened, the reported efficient wattage matched the equivalent lamp type, i.e., 65 W, and not the efficient wattage, i.e., 9 W.
- **The tracking database contains efficient measure information:** Inclusion of the efficient measure information allowed Navigant to use the actual efficient wattage. Overall, this increased the realization rate such that for many measures the realization rate was greater than 100%.

#### *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 KCP&L's service territory using onsite verification results. Navigant's review found the following:

- KCP&L uses industry-standard algorithms for all 60 lighting measures. Non-lighting measures also use the industry-standard algorithms.
- However, assumptions for WHFs, CFs, and HOU are used from four different sources and do not vary by building type. This limits KCP&L's ability to effectively capture the effects of variation in program activity across different building types. For example, a grocery store may have longer hours than an office building, and a church may have a low number of HOU. Navigant recognizes the Illinois TRM used by KCP&L is focused on forecast and thus the mix of building types is unknown at that stage. For evaluation purposes, Navigant created building type-specific values using the onsite verification results described below as an improved approach.
- The deemed savings relies on an efficient wattage of the replacement fixture or lamp based on efficacies at the beginning of the cycle or prior. 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.

Table 2-5 summarizes the top ten contributing measures and their corresponding baseline wattage assumptions and sources.

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

| Measure Name | % of Estimated Energy Savings | Baseline Wattage (Watts) | Baseline Wattage Source |
|---|---|---|---|
| LED High Bay 176-350W | 31% | 736 | Fieldwork Verified Baseline Wattage |
| LED Linear Lamp Replacing 4ft T8, T12, or T5 Lamp | 12% | 29 | Average of 25W, 28W, and 32W T8 |
| Exterior LED replacing > 400W Fixture or Mogul Screw-Base Lamp | 11% | 1031 | Average of 1000W Metal Halide lamp and 1000W Metal Halide Fixture |
| LED 2X4 Retrofit Kit replacing T8, T12 or T5/T5HO fixture | 8% | 98 | Average of 3 lamp T8 and T5 fixtures, and 2 lamp T5HO fixtures |
| LED Low/High Bay Fixture replacing 301W-450W fixture | 5% | 375 | Midpoint of listed wattage range |
| Occupancy or Vacancy Sensor Replacing No Controls | 4% | NA | NA |
| LED 2X4 Troffer or Linear Ambient replacing T8, T12 or T5/T5HO fixture | 3% | 98 | Average of 3 lamp T8 and T5 fixtures, and 2 lamp T5HO fixtures |
| LED High Bay fixture replacing > 750W fixture | 2% | 1078 | Assumes 1000W Metal Halide Fixture |
| Directional LED Lamp replacing 50-70W Lamp | 2% | 60 | Midpoint of listed wattage range |
| Remove 4ft Lamp from T8 or T12 system | 2% | 28 | Average of 25W, 28W, and 32W T8 |

*Source: Navigant Analysis*

#### *2.2.1.3 Onsite Verification*

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 this year's evaluation. Due to the high proportion of program savings attributable to lighting measures, the evaluation team used onsite verification and lighting loggers to update inputs (e.g., HOU, CF) for lighting measures. 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 implementer and KCP&L, Navigant evaluated both service territories in a combined sample. This was found to be a reasonable approach due to similarities in program execution. Also, Navigant 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 2-6 summarizes the meter count by strata for the long-term metering study.

**Table 2-6. Business EER – Standard Program Meter Count by Building Type for Long-Term Metering**

| Strata | Long-Term Sampling Standard | | 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 Small Business Lighting (SBL) sites to increase the size of the sample. Navigant included these sites after reviewing the measures rebated through SBL and Standard and finding that, based on reported savings, the distribution of savings was similar between the programs. For example, high bay lighting measures continued 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 reported savings are identical. 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 quite similar for some building types, some 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 who participated in the Standard program would have similar operating schedules to smaller customers that participated in the SBL program. To include both small and large sites in the sample, Navigant weighted the HOU and CF determined for small and large sites within a building type based on their share of the overall population savings in PY2016. This is discussed in more detail in Appendix E.1.3.

Navigant leveraged the findings from the onsite M&V to calculate verified savings for lighting measures. Adjustments include:

- Based on the onsite findings, the average baseline wattage for the LED high bay 176 W-350 W measure was 736 W. However, in the deemed measure savings, the baseline wattage was 1,078 W and the efficient wattage was 350 W. The onsite findings of the lower baseline wattage led to a lowering of the realization rate. Also, Navigant used the reported efficient wattage for all lighting measures and for this measure it was approximately 195 W. The LED high bay 176 W-350 W measure made up 47% of all PY2017 reported savings even though applications were no longer received after PY2016 and it was only approved through July 2017 based on prior year applications.

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 -19% for "Office" to +15% for "Exterior" and a change in CF between -15% for "Warehouse" to +9% for "Other" building types.

- Table 2-7 shows a comparison of PY2016 inputs to the inputs used in the PY2017 evaluation.
- Navigant also used the WHF energy (WHFe) and WHF demand (WHFd) based on actual building types from the Illinois TRM, similar to the analysis in PY2016. Table 2-8 shows the WHFs by business type that were used for the PY2017 evaluation.
- Table 2-9 shows the input assumptions that were 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. 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 2-7. Business EER – Standard Updated Calculation Parameters from Long-Term Logger Analysis**

| Building Type | PY2016 CF | PY2017 CF | PY2016 HOU | PY2017 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 2-8. Business EER - Standard Waste Heat Factor by Business Type**

| Building Type | PY2017 WHFe | PY2017 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 |

*Source: Navigant analysis*

**Table 2-9. Business EER – Standard 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 |

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

#### *2.2.1.4 Engineering Review*

To verify the Standard program's measure savings, Navigant performed an engineering review (see Appendix E for more information).

In the engineering review, Navigant calculated each measure's savings using the Missouri Energy Efficiency Investment Act (MEEIA) deemed assumptions to verify whether the tracking system and IC's database align. The team further compared the quantity from these two different datasets. Navigant found that quantities from the two different data sources aligned.

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

Table 2-10 summarizes the components of the NTG ratio determined in PY2016 and used for PY2016 and PY2017. The NTG ratio of 96% was driven primarily by limited FR found in the participant survey conducted previously in PY2016. FR is mainly limited due to high reported program influence: 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 2-10. Business EER – Standard NTG Components and Ratio: PY2017**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| 2017 | 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 reflects a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA)[16]. The IL TRM V7.0 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.

Table 2-11 presents the benefit-cost ratios for the five-standard benefit-cost tests for PY2016, PY2017, 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 2017 analysis resulted in a TRC ratio lower than that filed by GMO due to an energy realization rate of 86% and a coincident demand realization rate of 81%.

An additional note regarding the application of mid-life adjustments, Navigant found that for Troffers, the Illinois TRM makes mid-life adjustments only when T12's are included in the baseline wattage calculation. 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 13% of combined verified energy savings for GMO and KCP&L-MO. The majority of the program verified savings were LED High & Low Bay Fixtures, for which the Illinois TRM does not make any mid-life adjustment. Navigant we will revisit the weighting and baseline assumptions in PY3 to ensure they are still in alignment with program participation.

[16] The cost effectiveness results should be considered conservative due to the application of the mid-life adjustment to both standard and specialty light bulbs. The most recent information available suggests that it is highly unlikely that the Department of Energy (DOE) will expand the 45 lumens per watt provision of EISA to specialty light bulbs. At the time of writing (November 9, 2018), a notice on the Office and Management and Budget's website indicates that the DOE will soon issue a ruling to rescind its December 2016 expanded definition of a general service lamp (https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=1904-AE26). If this happens, reflector, globe, candelabra, and many other specialty light bulbs will continue as exempt to EISA (their current status) and their baseline bulb will remain a halogen bulb. This stands in contrast to assumptions that underlie the mid-life adjustment included in the IL TRM V7.0, which applies a specialty mid-life adjustment starting in January 2024 (as reflected in the cost effectiveness calculations). Bulbs with the A-line shape will likely remain subject to the 45 lumens per watt efficiency standard named in EISA with delayed implementation until January 2021 (as assumed in the IL TRM and in the cost effectiveness calculations).

**Table 2-11. Business EER – Standard Benefit-Cost Ratios: PY2017**

| Program Year | TRC Test[17] | 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 |
| **Program Overall** | **N/A** | **1.46** | **1.72** | **3.01** | **1.63** | **0.83** |

*Source: Navigant analysis*

### *2.2.3 Process*

The Standard program is an important component of KCP&L 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 PY2017 for the Standard program. Table 2-12 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

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

**Table 2-12. 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 PY2017, and what changes are planned for 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 below. 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 KCP&L's progress on previous recommendations.

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

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

- At the time of writing, more than 50 responses had been collected for participants in PY2017 in the Standard program. The first question related to overall satisfaction asked about satisfaction with the contractor and had an average score over 9, with 10 being the highest score and indicating extremely satisfied. The second question related to overall satisfaction asked specifically about satisfaction with the Business EER program and had an average score of over 9 out of 10.
- One comment did stand out as an area for improvement. A customer indicated that the rebate check did not come with any documentation demonstrating what the rebate was for, confusing the customer for some time. Due to the lag between measure installation and rebate check receival, it might be warranted to include further documentation or even information on other rebate programs available with the rebate check.

**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 PY2016 GMO report, there were three findings and recommendations for the Standard programs. Below is a restatement of the PY2016 process evaluation recommendations along with status updates of those findings:**

- Work with trade allies to increase participant awareness of the non-lighting measures.

  **STATUS:** KCP&L moved some of the non-lighting measures in the Standard program to the Custom program due to the recommended incentive levels being below the end of the filed range. This way KCP&L could offer incentives for this measure through the Custom program that might be more appealing to customers. The measures moved include rooftop controls, air source air conditioners, heat pumps, water heaters, pool pumps, high volume fans, LED Exit Signs, pool pump variable speed drives, and pre-rinse spray valves. KCP&L also retired the exterior LED measures because there is no peak kilowatt savings associated with these measures. Overall, KCP&L is working to better align kilowatt and kilowatt-hour acquisition.

- Specialize its training to specific markets such as property management and data centers.

  **STATUS:** KCP&L developed targeted marketing materials for schools and universities and for property management companies. Targeted marketing materials such as specific case studies can be useful tools for trade allies to help increase participation.

- Provide trade ally training for under-performing end uses such as HVAC, motors, and building controls.

  **STATUS:** KCP&L is investigating training trade allies on the non-utility benefits associated with energy upgrades that improve worker conditions as an option to increase participation in HVAC measures, building controls, and other non-lighting measures. Non-utility benefits include increased productivity and reduced sick days due to more optimal working conditions created from upgrades to the building energy management systems, HVAC, lighting, and other categories.

**QUESTION 3: What changes have been made to the program in PY2017, and what changes are planned for PY2018?**

**FINDING 3: In PY2017, KCP&L adjusted the incentive levels and the names of the measures to better align with the market and the baseline. This is in addition to moving some of the measures from the Standard program to the Custom program discussed above.**

- In the fall of 2017, KCP&L decreased the incentive levels for the majority of the Standard program measures. These decreases ranged from $1 to $170, with an average decrease of $33 per measure. As a percent of the original measure incentive, the decreases ranged from 11% to 75% of the original incentive. This was done to better align with the market. KCP&L saw some adjustment after the changes, but generally program participation snapped back.
- Due to the difficulty in PY2016 with the unrepresentative baseline assumption for the high bay measures that led to low realization rates, KCP&L changed many of the measure names to include information on the baseline product being replaced. This was done to help trade allies better match the measures to the baseline conditions and keep the realization rate close to 100%.

#### *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 implementer administered participant surveys. The evaluation team found that KCP&L's Standard program continues to have a well-defined customer base. These customers continue to benefit particularly 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: Smaller C&I customers have limited resources for researching energy conservation. Developing targeted marketing materials can help these customers implement energy conservation measures.**

- KCP&L has focused on developing targeted marketing materials for certain segments to help explain the benefits of implementing energy conservation. For example, KCP&L developed a good, better, best marketing campaign for high bay lighting to make comparing LED high bay fixtures to metal halide or linear fluorescent fixtures more straightforward. Alongside this marketing campaign, they created a sales incentive specifically for LED high bays for the trade allies to encourage them to sell before the end of the year. While most high bay measures were installed in larger facilities such as industrial sites or warehouses, over 30% of the high bay projects in PY2017 were installed in "Retail," "School," "Office," and "Other" building types. This indicates that high bay measures are present in many building types and marketing campaigns may increase uptake of these measures independent of facility size. The good, better, best analysis for high bays also provided a framework that the business owner could use for other applications.

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

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

- All of KCP&L's C&I customer classes have participated in the Standard program.
- KCP&L considers the Custom program to be complimentary to the Standard program since both programs target some of the same customers but focus on different measures.
- KCP&L is actively tracking the sales cycle to understand sales conversion from prospective to completed projects in the targeted market. It is 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 addresses a participant's water heating, lighting, refrigeration, and manufacturing energy end-uses, 95% of the projects in PY2017 were for lighting measures.**

- The Standard program complements the other Business EER programs, specifically the Custom program, by providing rebates for the more straightforward projects. KCP&L is working to better align the two programs.
- From the customer perspective, the Standard program and the Custom program are one program, not two. Most of the measures that are not covered by Standard are covered by another program. The program is not intended to stand alone from the customer perspective but be considered an integrated 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. Medium and smaller customers are addressed through the trade-ally network. In addition, there is also targeted marketing for some sectors with historically lower participation. Due to the high level of participation in the Standard program, these channels are appropriate for the target market.**

- KCP&L developed additional channels for communication by creating high quality targeted videos for property managers and special energy conservation coffee for schools and universities.
- Of the program participants that participated in the implementer administered survey, more than 85% of the participants indicated that they participated in the program due to the available rebate and or recommendations from the contractor. This is in line with the low free ridership found in the PY2016 survey. It also indicates that communications about KCP&L programs is leading to participation in these programs.
- The program staff has identified that the majority of errors with rebate form submittal is found with new trade allies and has worked on new trade ally training to reduce these 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 PY2017, KCP&L 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 many of those measures are covered by other programs such as the Custom program.**

- KCP&L has had great success with the lighting rebates. Even after lowering rebate amounts in the fall of 2017, the participation remained strong in the Standard program through the end of the program cycle.

## 2.3 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 – Standard program forward. 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.

**Tracking Data:**

- Navigant recommends that the IC perform additional review of the efficient wattage is conducted to ensure that it matches the efficient product installed. The evaluation team found that some of the reported efficient wattages did not match the wattages based on the product IDs listed in the efficient measure column. In many instances when this happened, the reported efficient wattage matched the equivalent lamp type, i.e., 65 W, and not the efficient wattage, i.e., 9 W. Navigant reviewed all instances where the reported efficient wattage did not align closely with the efficient wattage assumed for the deemed savings. Navigant used a corrected efficient wattage when necessary to match the manufacturer listed wattage for the reported efficient measure product ID.
- 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 that reflect this.
- Navigant recommends that for all non-lighting measures, the IC track the size of the unit installed. Navigant was unable to determine the size of some of the installed air conditioners and heat pumps because the reported model numbers did not match any model numbers available online. The size of the air conditioner or heat pump is necessary for estimating the savings. In these cases, the evaluation team needed to assume a size based on the other similar measures installed.

**Deemed Measure Savings:**

- Navigant recommends accounting for actual building types in the deemed savings to more accurately predict the savings. Currently, all tracked savings assume performance variables that reflect operation of an office building.
- Navigant recommends using results of onsite logger analysis for lighting measures for HOU, CF, and WHF for calculating building level deemed measure savings. If KCP&L continues to use a blended baseline for HOU and CF, Navigant recommends they use 4,191 hours for HOU and 0.63 for CF based on weighting the verified building specific values determined from the lighting logger study.

**Savings Calculation:**

- Navigant recommends that to improve predictions of total savings by program, KCP&L use the deemed measures savings by building type and consider a lower ISR due to some lights being in storage.

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

**Figure 2-1. Business EER – Standard Program Impact Recommendations: PY2017**

| 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 of the product installed to ease calculation of the savings. | • Calculate deemed savings by building type.<br>• Use results of onsite logger analysis for lighting measures for HOU, CF, and WHF. | • Improve predictions by including building type in savings estimate.<br>• Account for lower ISR due to some lights being in storage. |

*Source: Navigant analysis*

### *2.3.2 Process*

The Standard program almost 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.

An overall recommendation is to use the Standard program to help increase participation in other C&I programs. For example, adding a link on the Standard program webpage indicating that other rebates are available through the Custom program might be warranted. Instead of organizing the 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 be improved to make it easier to find the case studies that KCP&L developed detailing certain building types participation in the program or other targeted marketing materials available. The only resource available under the Standard program webpage at the time of review was about high bay measures, which may not be applicable to all customers. There also was no clear way to navigate from the main page of the two webpages indicated in the targeted marketing material for either schools and property managers.

Documentation should be provided with the rebate check of what the rebate check is for and information on other C&I programs that the customer could participate in to increase savings. This will help with brand recognition, reduce any confusion associated with the rebate check, and potentially lead to more participation from previous participants. Figure 2-2 details Navigant's recommendations from the process evaluation.

**Figure 2-2. Business EER – Standard Program Process Recommendations: PY2017**


*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 2-13. Business EER – Standard Program Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. Are participants satisfied with the program? | Based on survey responses, KCP&L could add documentation with the rebate check to reduce confusion when the check is received. |
| 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, KCP&L has developed targeted marketing materials for schools and universities and property management companies. Additional targeted marketing could be created for data centers. This targeted marketing should be made easier to access through the KCP&L webpage. |
| 3. What changes have been made to the program in PY2017, and what changes are planned for PY2018? | During PY2017, KCP&L moved many of the measures from the Standard program to the Custom program. Moving forward in PY2018, KCP&L could work on identifying customers that participated in the Standard program for further participation in other C&I programs. Much of the marketing material is split by program which may reduce participation in the other C&I programs such as the Custom program. KCP&L could also focus on additional benefits of upgrades beyond energy efficiency savings such as improved comfort and increased productivity. |

*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[18] for the Standard program. Table 2-14 describes Navigant's recommendations based on each question. Overall, Navigant found that KCP&L could increase marketing for some targeted market sectors and make participation in multiple C&I programs more straightforward.

[18] 4 CFR- 240-22.070(8)

**Table 2-14. 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? | KCP&L could continue to develop targeted marketing materials that clearly outline the benefits of energy conservation for more sectors such as data centers. KCP&L could also focus on marketing to smaller C&I customers that have the least amount of resources to devote to researching energy conservation. |
| 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, KCP&L could continue to target specific sectors of interest within 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? | While KCP&L 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, KCP&L could develop strategies to leverage previous participation in the program in a lighting measures to encourage participation in other end use measures. |
| 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 with trade allies since many of the errors are found with newer trade allies.<br>• Data centers are still a market segment that may be worth targeting in a similar manner to schools and property managers.<br>• The webpage could be better organized to make it easier to find information on measures eligible for rebates based on end-use not based on program type. Also, it is difficult to find the targeted marketing materials online.<br>• When sending out the rebate check, KCP&L could consider including additional documentation on what the rebate is about, why they received it, and other programs that are available. |
| 5. Continue education with trade allies since many of the errors are found with newer trade allies. | Since many non-lighting end uses were moved to the Custom program, KCP&L should find ways to increase participation in the Custom program by leveraging participation in the Standard program. This could be done through trade allies training, combined marketing, and follow ups with previous participants. Another option is to add bonus 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 SCT score of 1.0 or higher.
- Calculates rebates[19] in program year (PY) 2017 with an application received date of October 2, 2017–March 31, 2018 based on following:
    - $0.10 per first-year kWh saved for non-lighting projects and $0.07 per first-year kWh saved for lighting projects
    - Projects with high coincidence peak demand savings receive additional bonus rebates based on the ratio of first-year kWh saved to coincidence peak kW reduced, as follows:
        - $0.02/kWh saved bonus for projects with 4,500-3,501 kWh:kW ratio
        - $0.03/kWh saved bonus for projects with 3,500-3,001 kWh:kW ratio
        - $0.04/kWh saved bonus for projects with < 3,000 kWh:kW ratio
    - Up to 50% of the total project costs (materials plus labor)
    - Up to $100,000 of maximum annual cap per customer per service territory for Custom rebates
- Requires preapproval from GMO before participants purchase and install equipment

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 |

[19] All GMO Custom applications with an application date of April 1, 2017 – September 30, 20017 were eligible for a Custom incentive of $0.10 per first-year kWh saved. The Custom program incentive structure was updated for PY2018. The new incentive structure for PY2018 is summarized in the section 3.2.3.1.

| Business EER – Custom Program Key Detail | |
|---|---|
| **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. |
| **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 pre-approved 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** | KCP&L set rebate amounts to $0.10 per first-year kWh saved for non-lighting projects and $0.07 per first-year kWh saved for lighting projects and up to 75% of the total project cost. Custom projects with high coincidence peak demand savings receive additional bonus rebates. In PY2017, the $500,000 maximum annual cap per customer per service territory was updated to $100,000 for Custom projects and $400,000 for Standard. 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 KCP&L-MO and CLEAResult staff in PY2017*

## 3.2 Evaluation Findings

Navigant's impact evaluation found that the Custom program had a 104% realization rate for gross energy savings and a 141% realization rate for gross coincident demand savings in PY2017. The program achieved 13% of the 3-year MEEIA target for net energy savings and 11% of the target for net

coincident demand savings in PY2017. The program achieved 15% and 13% of the 3-year MEEIA target for energy and demand savings, respectively, between PY2016 and PY2017.

In PY2017, 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, and an engineering review of sampled projects. The evaluation team researched a net-to-gross (NTG) ratio in PY2017 to understand the net impact of the Custom program. Navigant ran benefit-cost tests to analyze cost-effectiveness of Custom program. For its process evaluation, Navigant conducted interviews with program staff, reviewed program materials, and launched online surveys to customer and program trade allies to identify opportunities to improve the Custom program processes.

The following sections summarize Navigant's PY2017 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 PY2017. Table 3-3 shows the program's savings to date for the GMO Custom program in Cycle 2. For PY2017, Navigant verified 6,179,481 kWh of energy savings and 1,433.32 kW of coincidence peak demand savings, which lead to 104% and 141% of realization rates, respectively. PY2017 realized 13% of the MEEIA Cycle 2 target for energy savings and 11% for coincidence peak demand savings.

To date the Custom program has achieved 15% and 13% of MEEIA Cycle 2 target energy and coincidence peak demand savings, respectively. The Custom program implemented 47 projects in PY2017 compared to only six projects in PY2016. Kansas City Power and Light (KCP&L) product managers and the implementation contractor (IC) have taken substantial efforts for the purpose of moving 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 (CHP) project. Additionally, the incentive for the program was restructured in PY2018.

**Table 3-2. Business EER – Custom Program PY2017 Energy and Demand Savings Summary**

| | Gross | | | Net[20] | | |
|---|---|---|---|---|---|---|
| | Reported Savings[21] | Verified Savings[22] | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 5,942,836 | 6,179,481 | 104% | 30,079,932 | 3,769,484 | 13% |
| Coinc Demand at Customer Meter (kW) | 1,014 | 1,433 | 141% | 7,758 | 874 | 11% |

*Source: Navigant analysis*

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

| | Gross | | | Net[23] | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 6,607,365 | 6,838,220 | 103% | 30,079,932 | 4,474,334 | 15% |
| Coinc Demand at Customer Meter (kW) | 1,107 | 1,526 | 138% | 7,758 | 973 | 13% |

*Source: Navigant analysis*

The following adjustments made to the engineering calculations were the primary drivers of energy and coincidence peak demand realization rates in PY2017:

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 (HOU) to account for schedules verified through phone interviews
    c. Adjusted occupancy sensor control savings based on Illinois Technical Reference Manual (TRM) v5

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

[21] 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.

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

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

2) **For building optimization measures:**
    a. Updated billing data analysis and calculated peak demand savings by aligning with utility peak period
3) **For a refrigeration upgrade project:**
    a. Adjusted hourly calculations using an updated regression analysis and recreated peak demand savings by aligning with utility peak period
4) **For a new construction project:**
    a. Accounted for additional HVAC measure not included in the reported savings
5) **For a custom packaged rooftop unit (RTU) project:**
    a. Adjusted ex ante analysis to include hourly data approach
    b. Used part-load fan power equation from ASHRAE Standard 90.1 2013
    c. Aligned calculation of peak demand savings with utility peak period

The following three sections provide more details on the tracking database review, the sampling approach, the engineering review, and the 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.

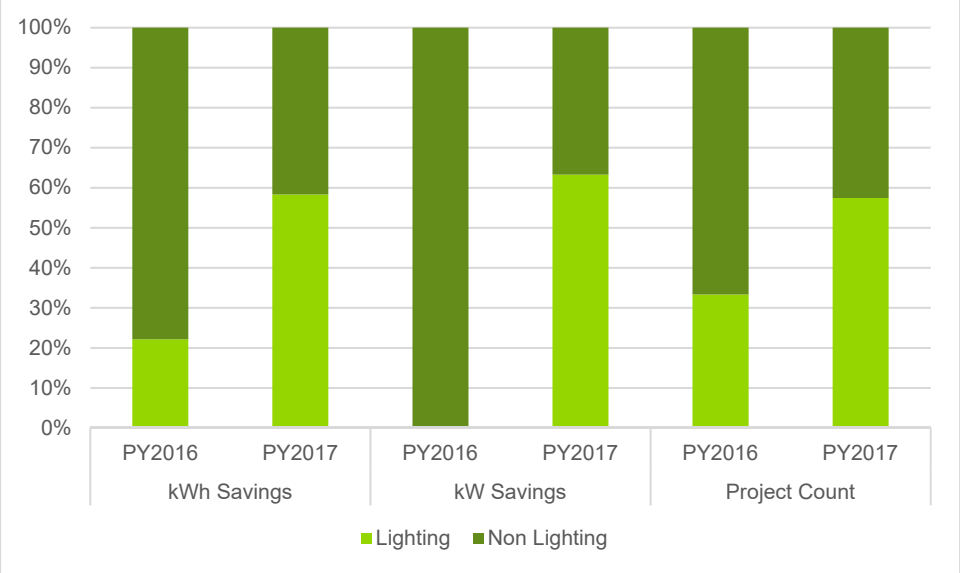
Overall, the GMO Custom program had 47 projects completed in PY2017, an increase of 41 projects compared to PY2016's six projects. Table 3-4 shows the disaggregation of total reported energy savings by end use. Lighting, motors, drives and compressors, and building optimization projects accounted for the majority of reported savings, with approximately 91% of the total program savings. Lighting measure consists of 58% of the total program energy savings and 63% of the total program coincidence peak demand savings. Figure 3-1 indicates the comparison of lighting and non-lighting projects between PY2017 and PY2016. Compared to PY2016, the lighting measure constitutes a higher percentage of the GMO Custom program savings in PY2017.

**Table 3-4. Business EER – Custom PY2017 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 | 3 | 954,358 | 16% | 124.30 | 12% |
| HVAC | 5 | 146,008 | 2% | 54.96 | 5% |
| Lighting | 27 | 3,465,864 | 58% | 641.75 | 63% |
| Misc. Custom | 2 | 61,858 | 1% | 18.70 | 2% |
| Motors, Drives & Compressors | 4 | 1,014,639 | 17% | 132.25 | 13% |
| New Construction | 3 | 89,801 | 2% | 13.96 | 1% |
| Refrigeration Upgrade | 3 | 210,309 | 4% | 28.53 | 3% |
| **Total** | **47** | **5,942,836** | **100%** | **1,014.45** | **100%** |

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

**Figure 3-1. Comparison of Lighting and Non-Lighting between PY2017 and PY2016**




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

Navigant determined the following findings 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 PY2017 has both efficient lighting and HVAC measures implemented. The tracking database shows 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. Navigant evaluated a new construction project with both efficient lighting and HVAC measures implemented. However, the tracking database only tracks project savings for lighting measures. The evaluation team confirmed that the HVAC measure was part of the project upgrade through a phone interview with the customer and is not tracked in another project in the tracking database. Additionally, Navigant found that lighting controls were part of a lighting upgrade for two lighting projects, but that the savings were not tracked in the tracking database.

c. The evaluation team found that incremental costs for six projects were missing 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.

**2) Efficient measure categories on the KCP&L Custom program website do not align and need introduction**

a. The evaluation team found that the efficient measure categories on KCP&L'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.

b. KCP&L's Custom program website lists energy efficient measure categories without introduction of what these measures are. Providing a detailed introduction to each measure category on the website enables new customers to better understand the measures and helps in the decision-making process.

#### *3.2.1.2 Sampling*

In PY2017, Navigant drew a sample of Custom projects for engineering review. For the PY2017 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 tiny projects for sampling. The total savings of tiny projects consist of no more than 2% of the GMO Custom program savings in PY2017. Of the GMO projects, 11 tiny projects were removed from the population and 36 projects remained for the final sampling. The certainty strata include the largest projects implemented in PY2017, each of which accounts for 10% or greater of the total GMO Custom program savings. The evaluation team divided remaining lighting projects into large and small strata in 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. A combined sampling approach was performed for GMO and KCP&L-MO. For the GMO Custom program, the evaluation team sampled 11 of 36 projects for engineering review, including three certainty projects, two large lighting projects, two small lighting projects, and four small non-lighting projects, as shown in Table 3-5.

Navigant applied 0.6 of coefficient of variation (CV) for non-lighting projects and 0.3 for lighting projects. The CV of 0.3 for lighting projects was determined from Navigant's study in Cycle 1 for KCP&L's Custom program and 0.6 was decided based on Navigant's experience with similar evaluation tasks.

**Table 3-5. Business EER – Custom Program Population and Sample Sizes: PY2017**

| Program | Stratum | Assumed CV | Estimated Year-End Population | Sample Size |
|---|---|---|---|---|
| Custom | Certainty | 0.6 | 3 | 3 |
| | Large Lighting | 0.3 | 4 | 2 |
| | Small Lighting | 0.3 | 15 | 2 |
| | Small Non-Lighting | 0.6 | 13 | 4 |
| | **Total** | **N/A** | **35** | **11** |

*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 energy efficiency (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 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 program, without considering the realization rate of tiny projects. Navigant did not adjust program savings based on tiny projects because tiny projects only account for the bottom 2% of program savings and Navigant did not sample any tiny projects for evaluation.

Table 3-9 and Table 3-7 show the energy and peak demand impacts at the customer meter side for the sampled projects for the GMO Business EER – Custom program.

**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** | 2,216,621 | 2,179,538 | 98% | 0.0% |
| **Large Lighting** | 1,281,099 | 1,281,099 | 100% | 0.0% |
| **Small Lighting** | 1,138,510 | 1,469,389 | 129% | 20.0% |
| **Small Non-Lighting** | 916,370 | 843,680 | 92% | 11.7% |
| **Total** | **5,552,601** | **5,773,707** | **104%** | **3.5%** |

*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** | 309.82 | 305.55 | 99% | 0.0% |
| **Large Lighting** | 232.45 | 276.56 | 119% | 39.0% |
| **Small Lighting** | 226.84 | 321.05 | 142% | 1.1% |
| **Small Non-Lighting** | 180.99 | 439.24 | 243% | 105.1% |
| **Total** | **950.10** | **1,342.40** | **141%** | **16.7%** |

*Source: Navigant analysis*

Table 3-8 shows the project-level energy and peak demand savings and corresponding realization rates. The evaluation team verified different savings from the reported savings for the 10 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-1008947** | Lighting | 962,959 | 967,370 | 100% | 166.10 | 167.06 | 101% |
| **PRJ-1361873** | Lighting | 180,916 | 248,260 | 137% | 12.70 | 18.09 | 142% |
| **PRJ-939647** | Building Optimization | 147,516 | 121,800 | 83% | 0.00 | 41.75 | NA |
| **PRJ-1066898** | Refrigeration Upgrade | 54,592 | 63,652 | 117% | 7.76 | 4.94 | 64% |
| **PRJ-1262429** | New Construction | 30,717 | 36,461 | 119% | 5.87 | 9.67 | 165% |
| **PRJ-1254773** | Motors, Drives & Compressors | 548,220 | 547,899 | 100% | 67.28 | 69.08 | 103% |
| **PRJ-1439608** | Lighting | 50,806 | 50,806 | 100% | 15.98 | 22.50 | 141% |
| **PRJ-1628401** | HVAC | 49,433 | 37,956 | 77% | 13.08 | 8.47 | 65% |
| **PRJ-1354077** | Building Optimization | 705,442 | 664,270 | 94% | 76.44 | 69.40 | 91% |
| **PRJ-1669592** | Lighting | 316,125 | 316,125 | 100% | 77.20 | 77.20 | 100% |
| **PRJ-1593526** | Lighting | 263,390 | 263,390 | 100% | 19.98 | 38.42 | 192% |

*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 tier 2 lighting project (PRJ-1361873), the difference in energy savings compared to the reported savings was due to the HOU being changed from 3,120 to 8,000 hours. During the phone interview, the customer confirmed that the lighting is operational 24/7, so a value of 8,000 hours was used to be conservative. Additionally, four additional fixtures were verified from the desk review but were not included for the calculation of reported savings. Navigant also confirmed installed lighting operates during the peak demand time period; therefore, verified peak demand savings were higher due to the application of a CF of 1.00.
2. For two building optimization projects (PRJ-939647 and PRJ-1354077), this difference in reported versus verified savings was due to changes made to the billing data analysis, in which regression models were used to predict pre- and post-retrofit hourly billing data. This hourly billing data was combined with the Typical Meteorological Year 3 (TMY3)[24] hourly data to calculate pre- and post-retrofit energy consumption and peak demand. Navigant calculated the peak demand savings by aligning with the peak demand time period. The peak demand time period is 4:00 p.m.-6:00 p.m. on weekdays from June to August, excluding holidays.
3. For a refrigeration upgrade project (PRJ-1066898), Navigant updated the hourly calculations using an updated regression analysis and recreated the peak demand savings by aligning with the peak demand time period. The power that was metered in specific days of pre- and post-retrofit periods was utilized to cap the predicted hourly energy usage for pre- and post-retrofit

[24] Typical Meteorological Year 3 (TMY3). http://rredc.nrel.gov/solar/old_data/nsrdb/1991-2005/tmy3/

periods, respectively. Navigant removed the cap of predicted hourly energy usage because the real-time power is dependent on corresponding outdoor air temperature and should not be capped by the actual power of specific days, and the predicted hourly energy usage was created using the TMY3 weather data.

4. For a new construction project (PRJ-1262429), Navigant verified that HVAC savings were not included in the reported savings through a project file review and a customer interview. Both HVAC and lighting measures were implemented for this project but only lighting savings were claimed. Navigant confirmed the HVAC savings were not claimed through another project or program.
5. For a compressed air upgrade project (PRJ-1254773), Navigant calculated the peak demand savings by correctly aligning with the peak demand time period and verified slightly higher peak demand savings. The peak demand time period is 4:00 p.m.–6:00 p.m. The power at 6:00 p.m. sharp should not be included for the calculation of peak demand savings.
6. For a tier 2 lighting project (PRJ-1439608), Navigant updated the peak demand calculations for occupancy sensor savings using the formulas and inputs defined by the Illinois TRM. According to the Illinois TRM, peak demand savings of installed occupancy sensors are the product of lighting load connected to the control, waste heat factor for demand, and the difference of baseline summer peak CF for the lighting system without occupancy sensors installed and the retrofit summer peak CF for the lighting system with occupancy sensors installed. The reported peak demand savings were calculated without including the baseline summer peak CF for the lighting system without occupancy sensors installed.
7. For a custom packaged RTU project (PRJ-1628401), Navigant calculated verified savings by updating the analysis to include hourly data, used the part-load fan power equation from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 2010, and aligned the peak demand savings calculations with the peak demand time period. The reported savings were estimated using a 2-degree temperature bin analysis and the fan curve from ASHRAE Standard 90.1 1989 which is outdated.
8. For a tier 2 lighting project (PRJ-1593526), Navigant confirmed the installed lighting operates 24/7 annually through a phone interview with the customer. The installed lighting operates during the peak demand time period, therefore verified peak demand savings were higher due to the application of a CF of 1.00.

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

The evaluation team conducted participant and trade ally surveys in PY2017 for research on the NTG ratio. As shown in Table 3-9, 18 of a possible 80 participants completed the online participant survey. Of a possible 56 trade allies, 11 completed the online trade ally surveys.

**Table 3-9. KCP&L Custom Program Survey Sample Size and Responses**

| | Population Size | Completed Surveys | Response Rate |
|---|---|---|---|
| Participant Survey | 80 | 18 | 22.5% |
| Trade Ally Survey | 56 | 11 | 19.6% |

*Source: Navigant Survey Analysis*

Appendix C describes methodologies for calculation of free ridership (FR), spillover (SO) and NTG. Table 3-10 shows the components of the NTG ratio for the Custom program. Survey responses indicated FR of 41% and participant SO (PSO) of 2%, for a program net-to-gross (NTG) ratio of 61%. The moderately high level of FR is consistent with the process findings from trade allies, which indicate that the program's administrative burden to incentive ratio has increased and that trade allies and customers no longer feel the program is driving their participation. This finding is not unexpected based on where the program is in its lifecycle; programs typically see declining NTG ratios as measures become more widely accepted in the market. The light-emitting diode (LED) lighting retrofit measures were moved to the Business EER – Standard program in Cycle 2 as is appropriate for a measure that is well understood and accepted in the market. The Custom program could limit FR by cultivating a market for new and innovative technologies. Furthermore, the team anticipates an uptake in the Custom program as new, emerging measures and technologies are added in MEEIA Cycle 3.

Navigant's approach to incorporating trade ally NTG values into the overall program NTG value is consistent with prior year's evaluations. We use trade ally free ridership (FR) as a cap on participant FR (meaning, if the TA FR estimate is lower than the participant FR estimate, we use the TA value), and we add the TA non-participant spillover (NPSO) value to any participant spillover (PSO). In equation form, this is represented by the following:

$$NTG = 1 - MINIMUM(Part\ FR, TA\ FR) + PSO + NPSO$$

In PY2017, TA FR was not used in the calculation of NTG, as the participant score was used, per the above guidelines.

Navigant will field surveys with participants on a quarterly basis in PY2018. This will allow the evaluation team to capture customer feedback closer to the time of decision making and obtain a good representation of responses by stratum in the sample.

**Table 3-10. Business EER – Custom Program NTG Components and Ratio: PY2017**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| 2017 | 0.41 | 0.02 | 0 | 61% |

FR = free ridership, PSO = participant spillover, NPSO = nonparticipant spillover, NTG = net-to-gross
*Source: Navigant's NTG ratio research in PY2017 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 as well as the sources for the benefit and cost input assumptions.

Table 3-11 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. Based on Navigant's 2017 benefit-cost analysis, the program does not reach 1.0 in the TRC, societal cost test (SCT), utility cost test (UCT), or ratepayer impact measure (RIM) test, while the participant cost test (PCT) exceeds 1.0. Navigant's analysis resulted in a TRC ratio that is similar to that filed by GMO.

**Table 3-11. Business EER – Custom Program Benefit-Cost Ratios: PY2017**

| Program Year | TRC Test[25] | 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 |
| **Program Overall** | **N/A** | **0.77** | **0.97** | **1.23** | **1.08** | **0.64** |

*Source: Navigant analysis*

### *3.2.3 Process*

Navigant conducted the PY2017 process evaluation by reviewing program materials, conducting interviews with program staff, including the KCP&L program manager and implementation staff at CLEAResult, and fielding surveys to customers and program trade allies. Table 3-12 includes process evaluation questions and the corresponding evaluation activities. The process evaluation questions include general questions and the five Missouri-required questions.

**Table 3-12. 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** | |
| 1. What are the primary market imperfections that are common to the target market segment? | • Program staff interviews<br>• Materials review<br>• Customer and TA 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 TA 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 TA survey |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews<br>• Materials review<br>• Customer and TA survey |

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

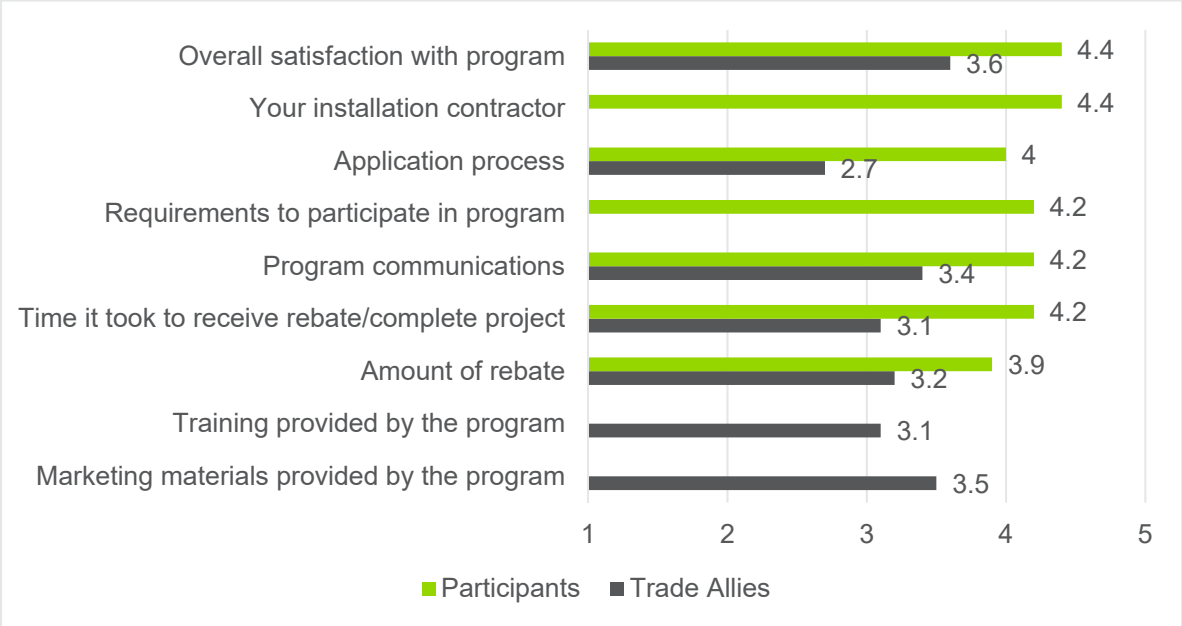
| Process Evaluation Research Question | Evaluation Activity |
|---|---|
| 5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program? | • Program staff interviews<br>• Materials review<br>• Customer and TA survey |

*Source: Navigant analysis*

The team's findings are provided below. Recommendations for consideration in relation to these findings are provided in Section 3.3.

Navigant attempted to survey 80 participants and 56 trade allies and received 18 participant survey completes and 11 trade ally survey completes in PY2017, respectively. Figure 3-2 indicates the participants' and trade allies' overall satisfaction with the Custom program and aspects of the Custom program in PY2017. End-user participant satisfaction remains high and 80% of participants said they are very likely to participate in future KCP&L programs. Some trade allies are dissatisfied with the project application process and the time required to complete a project through the Custom program. Specific findings and recommendations are outlined below. The satisfaction level is rated on a scale of 1-5 where 1 means not at all satisfied and 5 means highly satisfied.

**Figure 3-2. Custom Program Participant and Trade Ally Satisfaction**




*Source: Navigant Survey Analysis*

#### *3.2.3.1 General Process Evaluation Questions*

Navigant reviewed the status of last year's recommendations and discussed plans for PY2018 as part of the phone interviews conducted with the program staff at KCP&L and CLEAResult. 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 PY2016 Navigant made 5 process improvement recommendations for the Custom program. In its review in PY2017, Navigant found that GMO has implemented all of the five recommendations.**

- Focus on increasing awareness of non-lighting projects by engaging customers in the early planning phases and increasing outreach efforts to large customers, trade allies, design professionals, and architects.

  **STATUS:** Through new construction, KCP&L plans to be more involved in the planning stage of the design process in PY2018. GMO focused on recruitment of new trade allies as existing trade allies still favored Standard lighting solutions.
- Introduce a building controls program for the medium to larger customers and continue engagement for those customers who have already made energy efficiency improvements.

  **STATUS:** GMO offered rebates for efficient building controls in PY2017. Building control projects have been implemented, including HVAC controls and lighting controls.

- Maintain flexibility on adjusting the incentive structure to best balance participation with Block Bidding.

  **STATUS:** KCP&L has demonstrated flexibility in reconstructing Custom incentives. A new incentive structure, which lowered base incentive rates and added kilowatt-based bonuses, was implemented in October 2017. A new incentive structure will be implemented in PY2018.
- Continue previous efforts of defining the target markets and meeting with large customers, trade allies, and design professionals through dedicated events or specific program outreach.

  **STATUS:** In PY2017, KCP&L focused on understanding the end-use needs of K-12 schools and used this to target and acquire new customers in the sector. One GMO Custom customer was a school in PY2017. These types of marketing campaigns may not create an immediate impact and could take several years before seeing the effect.
- Engage in outreach and training to smooth the application process for customers and trade allies and continue to expand the customer express application offerings for straightforward or replicable measures.

  **STATUS:** KCP&L implemented an Excel-based tool aiding trade allies in calculating savings for more straightforward measures and conducted more trainings at the beginning of PY2017.

**QUESTION 2: What changes have been made to the program in PY2017, and what changes are planned for PY2018?**

**FINDING 2: Three major changes to the program's incentive structure took place in PY2017 and several measures moved from Standard into Custom. These changes are to provide greater incentives based on demand savings and to drive participation to the Custom program from Standard program to maximize savings while meeting budget and savings targets.**

- KCP&L lowered the maximum incentive amount a customer can receive in one year from $500,000 to $100,000 per service territory for Custom program.
- KCP&L changed the incentive structure for projects with an application date of October 2, 2017–March 31, 2018, lowering the base incentive amount but adding bonuses for projects with high peak demand savings. This bonus structure works as follows:

  - Custom rebates receive a flat rate of $0.07/kWh saved (lighting) and $0.10/kWh saved (non-lighting).
  - Projects with high demand savings receive additional bonus rebates based on the ratio of kWh saved to coincidence peak kW reduced, as follows:
    - $0.02/kWh saved bonus for projects with 4,500-3,501 kWh:kW ratio
    - $0.03/kWh saved bonus for projects with 3,500-3,001 kWh:kW ratio
    - $0.04/kWh saved bonus for projects with < 3,000 kWh:kW ratio

- KCP&L made the following changes to the list of measures eligible for the Custom program:
  - Moved the following measures from the Standard to the Custom program:
    - Rooftop controls
    - Air Source air conditioning and heat pump
    - LED exit signs
    - Heat pump water heater
    - Pool pump variable speed drive (VSD)
    - Pre-rinse spray valves
    - High efficiency pool pump
    - All variable speed electronically commutated motors (ECM) pump in heating water circulation
    - All exterior lighting
  - High volume fans were moved to Custom as almost all installations were considered new construction.
- KCP&L made the following changes to the incentive structure that will be implemented in PY2018.
  - The incentive is calculated at the $550/coincidence peak kilowatt saved.
  - Custom participants get paid a maximum of $0.40 per first-year kilowatt-hour saved and a minimum of $0.06 per first-year kilowatt-hour saved.
  - Custom incentives are capped at 75% of the incremental project costs.
- In PY2018, the implementation contractor will calculate demand savings using the demand factor approach, as prescribed in the Ameren MO TRM[26].
- Finally, KCP&L will offer a mid-stream HVAC program offering through the Custom program.

#### *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 and CLEAResult and the online participant and trade ally surveys. The

[26] https://energy.mo.gov/about/trm

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: KCP&L is narrowing its target market segment for the purpose of new customer acquisition. The program would benefit from continued alignment of its trade ally network with these efforts.**

- KCP&L identified K-12 schools, data centers, and new construction projects as its target market segments for the Custom program in PY2017.
    - One customer was a school and one customer was a data center in PY2017.
    - Navigant confirmed with CLEAResult that new construction projects are tracked within the program tracking system. Navigant will request this information in PY2018 to better understand whether new construction participation is increasing in response to program efforts.
- Activities directed toward these segments in PY2017 included a targeted campaign to K-12, greater outreach to contractors and design professionals in new construction, and one-on-one discussions and education efforts for trade allies.
    - Fewer than half of surveyed trade allies identified K-12 schools as part of their target market segment.
    - One surveyed trade ally listed new construction projects as a customer that would particularly benefit from participating, but felt that they did not know how to engage new construction customers.
- KCP&L should consider increasing training and support to help trade allies better engage KCP&L's target market segments as well as continue efforts to recruit trade allies already active in the target market segments.

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

**FINDING 2: The custom program targets various, complex projects that require concerted effort beyond those in the standard program. In doing so, it rewards participants with greater savings and value by going beyond the lowest price point or fastest payback.**

- Projects can be varied and diverse in both potential end use measures and project implementation, making it difficult to reach the correct decision maker when selling the Custom program.
- The HVAC sector has been a challenge due to timing of replace on burnout. Often replacement is urgent and the amount of time to process the rebate is a negative selling point. Additionally, the Custom program in its current design is not able to influence the stocking patterns of distributors. KCP&L is launching its mid-stream program in an attempt to increase HVAC measure participation in the Custom program through direct engagement with distributors.
- Customers and trade allies are unaccustomed to thinking of EE as an investment in benefits other than the direct savings and payback from reduced operational costs and utility bills.
- Customers are most motivated by the direct financial benefits of EE and in response trade allies are relying on the incentive to sell the measures.
    - Over 75% of the 18 surveyed customers were motivated to do their project by either reduced operating costs, lower utility bills, or the availability of the rebate. Over half of the

11 surveyed trade allies were not satisfied with the rebate amount. This can help explain low participation if trade allies are relying on the rebate itself as a motivating factor, yet feel it is too low to properly incentivize customers. TAs can help increase participation by emphasizing other project benefits, in addition to the rebate amount, that were found to resonate with customers, such as lower operating costs and utility bills.

  - About 39% of the 18 customers surveyed listed non-financial benefits as motivation for energy efficiency projects.

- The chance to make the company more green and reduce carbon emissions was the leading non-financial motive for surveyed customers to engage in energy efficiency.
  - About 18% of the 11 surveyed trade allies felt being green might influence a customer's decision to choose high efficiency, and 27% typically discuss this benefit with customers when selling efficiency projects.
  - As KCP&L looks to help the market understand the holistic benefits of energy efficiency, educating trade allies to sell the environmental benefit would be most in alignment with customers' current motivations.

**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 Custom program complements the Standard program and provides a diverse mix of end-use measures that do not qualify for Standard rebates. Projects with incentives of more than $100,000 exceed the Custom cap and will be eligible for the Block Bidding program.**

- KCP&L moved LED exit signs and several non-lighting measures from the Standard to the Custom program, further diversifying the end-use mix.
- While the diversity of measures currently in the Custom program is necessary to complement the Standard program, the open-endedness means customers and trade allies require additional training and awareness to take full advantage of its offerings.
- Current trade allies still skew heavily toward lighting solutions. Of the 11 trade allies surveyed, nine implement lighting solutions.
  - Non-lighting trade allies *(n=2)* were more satisfied overall (average satisfaction score of 5/5) than lighting customers *(n=9)* (average satisfaction score of 3.33/5).

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

**FINDING 4: Marketing and outreach in PY2017 refocused and emphasized training and awareness in a few key target market segments over broader sales messaging. KCP&L should continue these efforts as trade allies feel there is still room for improvement in training and support for new customer acquisition.**

- KCP&L created a more targeted marketing campaign for PY2017, based on identified industries with the most potential for new Custom projects. The results of marketing to often take time to materialize, yet the efforts are worthwhile even if results are not immediately seen. Targeting new sectors with awareness and marketing is valuable and important for maintaining high net savings and program staff feel they are seeing responses that will translate into future projects in the pipeline.

  - Outreach efforts to engineering and design firms began in PY2017 and educated new construction customers and contractors, while creating awareness of the Custom program's offerings.
  - KCP&L ran an awareness campaign targeting K-12 schools that included premium mailers, digital ads, and video testimony, coupled with a dedicated K-12 outreach specialist.
  - KCP&L program staff felt that results from these marketing efforts are being realized, with an uptick in Custom applications in the last few months of PY2017. In PY2017, one K-12 customers completed a project.

- Marketing strategies included one-on-one trade ally trainings, sector-specific fact sheets, attending trade shows, new customer cold calls, and joint sales calls, however, trade allies felt they still needed more support to persuade new customers to pursue energy efficiency through the Custom program.
  - About 36% of the 11 trade allies surveyed were satisfied with the amount and type of training provided and 45% were satisfied with their communication from KCP&L.
- A challenge for any custom program is striking a balance between the data collected for each project and the ease of the application process for the customers and trade allies. To the extent possible, the application process should be streamlined to minimize the back-and-forth between customers, trade allies, and the implementation contractor to ensure the greatest number of completed projects. is
  - Trade allies felt that the application process was at times cumbersome and not worth the time for smaller projects.
  - The IC found that trade allies can be unresponsive to incomplete application notices and requests for application updates. KCP&L should work with the IC on ways to improve the application process and these communication channels and make them a better experience for all involved.
- Planned future efforts include greater support for HVAC customers, such as walkthroughs, and sponsoring design meetings to facilitate conversation between architects, design teams, trade allies, customers, and the KCP&L Custom program team. These efforts will likely increase trade ally satisfaction and address the need for additional support in bringing new, non-lighting customers into the program

**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 is opportunity for KCP&L to address the market imperfections identified in the previous questions by leveraging last year's outreach efforts, tailoring the project sales pitch, and providing greater support for trade allies.**

- Customer and trade ally feedback indicated that the rebate amount paid out was not always worth the effort the process required. To address this, as stated in Question 2, KCP&L wants increased emphasis on the non-energy benefits of a project, to sell the solution, not just the incentive.
  - KCP&L and the implementation contractor have initiated a mid-stream HVAC program offering in PY2018. This should help remove the admirative burden to trade allies.

- Tailoring the outreach and sales proposition language based on the type of customer and measure will help attract customers with non-lighting projects. For example, KCP&L finds that these projects are typically assessed in terms of ROI and payback instead of kWh and kW savings.
- In addition to the non-energy benefits, emphasizing ROI, reduced lifecycle operating costs, and payback instead of just energy savings or incentive amounts.
- As already planned, improving relationships with the trade allies in the Custom program should be a focus for PY2018. Trade allies were dissatisfied with multiple aspects of the program. By giving trade allies the tools they need to sell Custom jobs, such as ongoing training, materials, and support throughout the rebate process, KCP&L can better leverage the trade ally network to increase program participation and reach new customers.
    - About 27% of the 11 trade allies surveyed were satisfied or very satisfied with the application process
    - About 36% of the 11 trade allies surveyed were satisfied or very satisfied with the amount and type of training
    - Fewer than half were satisfied or very satisfied with the time to complete the project
    - Fewer than half were satisfied or very satisfied with the amount of program incentive
- To increase new customer acquisition, KCP&L can seek to benefit from the relationships they have developed with mechanical, electrical, and plumbing firms and contractors, such as facilitating partnerships between industry and the trade allies currently in the program. Additionally, KCP&L should continue strategizing how to better align its marketing cycle with new construction sector project timelines, as noted by the program manager.
- 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 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 3-3.

**Figure 3-3. Business EER – Custom Program Impact Recommendations: PY2017**

| 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 savings values for all the implemented eligible measures.<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 a detailed introduction to each measure category on the website. | • Continue to submit well-organized project files to help the impact evaluation process.<br>• Monitor project files for consistency when more projects enter in PY2018. | • Align the peak demand calculations with the KCP&L C&I 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 a detailed operating schedules (8:00 a.m.-7:00 p.m. on weekdays et al.). This helps determine the coincidence factors and creation of lighting operating hours.<br>• For projects that lighting fixtures operate 24/7 annually, make sure use 1.0 as the coincidence factor.<br>• If occupancy sensors or special lighting controls are installed as part of the lighting upgrade, make sure claim additional savings for the installation of lighting controls.<br>• If hourly data analysis could be performed, better to not use 2-degree interval of temperature or other bin data analysis approach. |

*Source: Navigant Analysis*

The evaluation team proposed the following recommendations for improvement of NTG in PY2018.

- Navigant suggests conducting online participant surveys on a quarterly basis in PY2018 which should help with recalling issues, increasing response rates, and obtaining a good representation of responses by stratum in the sample.
- Navigant realizes that KCP&L adjusted the Custom program incentive structure in PY2018. Due to the feedback that incentives provided in PY2017 were too low, Navigant recommends monitoring the impact of the adjusted incentive structure and keeping the flexibility of adjusting it.
- Navigant recognizes that new construction is a target market for Custom program. Navigant understands that the CLEAResult team tracks new construction projects (including the major renovation projects) in the program data. The evaluation team will request the new construction tracking data in PY2018 so it can research the participation of new construction projects. Additionally, Navigant recommends considering a design-specific incentive structure for promotion of new construction projects.
- Navigant recommends promoting new and innovative technologies via the Custom program, such as building controls, lighting controls, energy storage, EV chargers, et al. The Custom customers would not install these technologies without the program incentives which leads to less FR.

### *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 3-13 includes the research question-based recommendations, and Table 3-14 summarizes the recommendations for the five Missouri-required questions.

**Table 3-13. 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 progress that has been made to increase awareness of the Custom program and suggests that KCP&L apply the successful strategies employed in the K-12 campaign to other market segments. By focusing on a few key market segments, KCP&L will better understand customer needs, more precisely define the value the Custom program brings to those customers, and funnel resources toward progressing energy efficiency market transformation in the KCP&L service area. |
| 2. What changes have been made to the program in PY2017, and what changes are planned for PY2018? | Since the incentive structure update occurred late in PY2017, Navigant will follow up with KCP&L in the next program year to assess the results of the change. |

*Source: Navigant analysis*

**Table 3-14. 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? | To address the deficit in customer awareness regarding the non-energy benefits of energy efficiency measures, Navigant suggests that KCP&L help trade allies include these benefits in their sales propositions. Strategies could include hosting training sessions, developing informational materials and handouts, and participating in more joint sales calls. Additionally, KCP&L should continue targeting new construction and large retrofit projects and market EE as a smart business investment. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | Navigant recommends that KCP&L continue defining market segments within the Custom program and choose two or three segments as the focus of PY2018 outreach and sales efforts. This will allow KCP&L to better distill and align its outreach, education, marketing, trade ally support, and sales efforts to best fit the needs of the target market segments. |
| 3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment? | New customer procurement will hinge on KCP&L establishing the Custom program as a way for its larger, more sophisticated customers to explore emerging EE technology that they otherwise would not consider. Part of the role of a Custom program is to give customers the opportunities to explore those newer efficiency technologies, and as they become better understood they move into the standard program. This will help define the Custom program. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | Navigant encourages KCP&L to pursue creative and directed marketing campaigns, modeled off of the K-12 marketing efforts. Additionally, KCP&L has recognized the need to reach the right project decision-maker, especially in new construction projects, and should persist in building relationships with design professionals, building architects, and project engineers. |

| 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? | As KCP&L's awareness efforts are realized, Navigant recommends that KCP&L transitions from the current awareness-based objectives and into sales-generating activities. This will be accomplished by further developing methods for tracking customers through all stages of the program pipeline, from outreach to, if accomplished, project completion. Metrics to consider recording include customer type, outreach method or specific marketing campaign, project size, measure end-use, and the date at which the customer enters each stage. Data-driven analysis could then yield insight into the customer journey and allow KCP&L to pinpoint areas of success and improvement. |

*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 cap set by the Custom or Standard programs. Also, with Block Bidding, participants lock in the block of energy savings at a rate of cents per kilowatt-hour or per kilowatt. A participant can aggregate the projects over different technology types and multiple sites.

*For example: Participant X is meeting the cap of $400,000 from the Standard program in PY2017 but has more EE projects estimated to save 1,000,000 kWh more in the same program year. In this case, Participant X can bid in the auction offered under Block Bidding and lock in the incentive at $0.07/kWh, which means Participant X now has $70,000 reserved for PY2017 from which they can draw the incentives as they finish up those additional projects beyond the $400,000 cap for the Standard program.*

Kansas City Power and Light (KCP&L) offers these 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 lowest proposed incentive per kilowatt-hour saved or per kilowatt is the winning bid. 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. |
| **Program Description** | Commercial customers, trade allies and energy service companies (ESCOs) can participate in the Block Bidding program after passing the rebate threshold in the Custom, Standard, and other commercial programs. Block Bidding is a reverse auction where the participants reverse bid the incentive per kilowatt-hour or per kilowatt down from the starting price. The lowest proposed incentive per kilowatt-hour 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. |

| Block Bidding Key Details | |
|---|---|
| **Application Process** | To participate in Block Bidding, 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 kilowatt-hour or per kilowatt amount 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** | KCP&L grants rebates to completed projects in the bid amount—dollars per kilowatt-hour or per kilowatt saved. Customers and trade allies are eligible to receive a $28 per kilowatt bonus for Block Bidding projects that are implemented by December 31, 2018. |
| **Disputes, Rejected Applications** | Applications are rejected if the project is not completed per the bid. There were no disputes in PY2017. |
| **Project Reporting** | CLEAResult treats Block Bidding projects the same as Custom projects. There is not yet a project reporting schedule because the program is new. |

*Source: Navigant analysis*

## 4.2 Evaluation Findings

In PY2017, Navigant conducted interviews with program staff and reviewed program materials to identify opportunities to improve Block Bidding program processes. No impact evaluation was conducted due to no program participation in PY2017.

The following sections summarize Navigant's PY2017 findings for the 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*

No projects were completed in PY2017 for GMO Block Bidding program. Table 4-3 shows the program's savings summary to date for the Block Bidding program. To date, the program has achieved 3% of energy and 3% of coincidence peak demand savings for the MEEIA Cycle 2 target.

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

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 436,324 | 467,490 | 107% | 17,603,947 | 467,490 | 3% |
| Coinc Demand at Customer Meter (kW) | 55 | 55 | 100% | 3,052 | 55 | 2% |

*Source: Navigant analysis*

#### *4.2.1.1 Tracking Database Review*

Navigant did not review the tracking database for GMO Block Bidding program since no projects were implemented in PY2017.

#### *4.2.1.2 Sampling*

Navigant did not perform sampling due to no participants in GMO Block Bidding program in PY2017.

#### *4.2.1.3 Engineering Review*

The evaluation team did not estimate verified savings for any GMO Block Bidding project due to no participation in PY2017.

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

The Block Bidding program is new and began in MEEIA Cycle 2. The evaluation has planned full-scale process research activities, including net-to-gross (NTG) research for the program for PY2018. For PY2017, Navigant assumed a 1.0 NTG value, as presented in Table 4-4.

**Table 4-3. Block Bidding NTG Components and Ratio: PY2017**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| | Deemed 1.0 pending future research | | | 100% |

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 4-4 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, and program to date, and the total resource cost (TRC) test filed by Greater Missouri Operations (GMO). In 2017, GMO did not achieve any savings in the Block Bidding program, however, did accrue program administrative costs. Due to this, the program to date TRC, societal cost test (SCT), utility cost test (UCT), and rate impact measure (RIM) test are lower than the PY2016 results.

**Table 4-4. Block Bidding Benefit-Cost Ratios: PY2016**

| Program Year | TRC Test[27] | 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 |
| **Program Overall** | **N/A** | **0.37** | **0.44** | **0.40** | **3.55** | **0.28** |

*Source: Navigant analysis*

### *4.2.3 Process*

Navigant reviewed program materials and conducted interviews with the program manager and the implementation contractor (IC) to support its evaluation of the two general process and five Missouri (MO)-required questions. Table 4-5 includes process evaluation questions and the corresponding evaluation activities.

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

**Table 4-5. 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 PY2017, and what changes are planned for PY2018? | • 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 below. 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 PY2018 as part of phone interviews conducted with the program staff at KCP&L and CLEAResult. 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 PY2016 Navigant made four process improvement recommendations for the Block Bidding program. In its review in PY2017, Navigant found that GMO has implemented all four recommendations to varying degrees.

- Keep in communication with trade allies (TAs) and large customers and give adequate notice about upcoming Block Bidding auctions to better fit the long lead times of larger projects.

  **STATUS:** KCP&L is actively engaging its large Custom customers to bring them into the Block Bidding program while trying to better understand customer project timelines.

- Monitor the PY2017 participation and consider expanding the Block Bidding program to encompass mid-sized customers if kilowatt-hour goals for PY2017 are not met.

**STATUS:** KCP&L split the incentive cap in PY2017 between Standard and Custom, which allows more customers to meet the eligibility requirements. Additionally, KCP&L is engaging Tier 2 customers as they make up a large portion of new construction projects.

- Assess the balance between Block Bidding and other KCP&L programs, potentially through a mid-year review, to ensure that the program is capturing a new market.

  **STATUS:** The PY2018 evaluation will focus on researching the effects of the split incentive cap.

- Conduct periodic reviews with customers to ensure that direct contact remains the best communication channel.

  **STATUS:** KCP&L conducts monthly meetings and other regular communications with its Block Bidding customers and large TAs.

**QUESTION 2: What changes have been made to the program in PY2017, and what changes are planned for PY2018?**

**FINDING 2: To address low participation in PY2016, KCP&L restructured its eligibility requirements and added program offerings.**

- The incentive cap for Block Bidding eligibility was changed from a total rebate amount of $500,000 to a split incentive cap of $400,000 for Standard projects and $100,000 for Custom projects.
- KCP&L now offers a Buy-Now option, where customers or trade allies who missed the initial auction can secure Block Bidding funding, with six customers awarded this option in PY2017.
  - The Buy-Now price is negotiated with each customer based on their willingness and ability to accept a certain rebate amount, up to the lowest bid amount from the last auction.
- New construction was added as a targeted market segment, with plans for a new construction-only auction in PY2018.

#### *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 CLEAResult. 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 in addition to lack of program awareness, which KCP&L is actively trying to address. First, large customers have opted out of KCP&L's rebate programs because incentive caps precluded them from getting out the same value that they are putting in to the program, limiting the pool of Block Bidding-eligible customers. Second, large projects are complex and have long lead times (often 18+ months) that do not fit into annual rebate program timelines. KCP&L took the following steps to address these problems:**

- For PY2017, KCP&L used a split cap, meaning that projects that are over the Custom program's incentive cap of $100,000 or the Standard program's incentive cap of $400,000 will be eligible to participate in the Block Bidding program.
- A new component, the Buy-Now option, helps overcome the second barrier by allowing customers whose project timelines do not align with the scheduled auction dates to still take advantage of Block Bidding funds.
- KCP&L is flexible in extending project completion dates if the project or TA demonstrates sufficient movement toward completion.

**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 a large enough capacity to exceed the Custom or Standard incentive cap and achieve 1 million kWh in savings. However, KCP&L saw limited participation amongst existing customers in past years and is looking to update the Block Bidding target market to increase participation.**

- The majority of the winning Block Bidding customers in PY2017 were not able to utilize the entirety of their funds, either due to too-long project lead times or not enough savings capacity. This suggests that the 1 million kWh savings requirement may be unnecessarily limiting eligible participants.
- KCP&L considered outreach to mid-sized customers to increase participation. However, this is not recommended unless KCP&L also lowers the minimum 1 million kWh savings requirement. As noted, large customers had trouble utilizing the entirety of their Block Bidding funds, and it is likely that smaller customers will see even less success and fewer project completions.
- In PY2017 KCP&L reached out to new customers in four key market segments: large industrial, property management firms, new construction projects, and national TAs.
- In addition to capitalizing on the Custom program pipeline, KCP&L sought to fast track new large customers directly into the Block Bidding 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 Block Bidding program addresses participants' need for large energy efficient projects that exceed the financial caps of KCP&L's other C&I programs. While the program should remain open-ended in terms of the measures that are eligible, KCP&L 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 that save more than 1 million kWh per year. Projects can be implemented across multiple buildings or properties to allow for greater savings.

- KCP&L initiated informal conversations with new TAs and players in the aforementioned target segments, and past customers, to better understand which end use measures fit these customers' specific needs.

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

**FINDING 4: In PY2017, KCP&L refocused its outreach efforts from one-on-one communication with existing large customers, to generating more awareness and interest in the program from new customers and trade allies. It still conducts much of its project-generating outreach through the RFQ process.**

- Overlay, the subcontracted auction company, executes the marketing efforts directed toward existing customers through RFQ announcements, call center direct phone calls, and the KCP&L website. Once a bid is won, Overlay conducts monthly touchpoints with the winner to monitor and support the project's progression.
- For auction participants, KCP&L holds a mandatory pre-RFQ training session to educate customers on the Block Bidding process, which was attended by three customers for the 2017 RFQ cycle. The presentation was clear and well-organized, and the winning bid savings chart was valuable in understanding how bids are calculated.
    - Overlay Consulting updated the winning bid savings chart in response to an error in the winning bid savings chart and communicated that to KCP&L and sent that to the bid winners. The updated winning bid savings chart will be applied for future auctions in MEEIA Cycle 3.
- KCP&L's main form of project-generating outreach is through the RFQ process. It is important that potential Block Bidding customers are aware of the RFQ requirements and timeline for planning purposes, however this form of outreach has the unintended consequence of highlighting the work that goes into applying for the rebate and not the benefits of the program. Marketing should extend beyond recruiting for the RFQ and include more general informational materials about the Block Bidding program and the value it can bring to large customers or TAs.
- In PY2017, KCP&L attended several industry events, including an industrial summit event and a real estate forum, which generated awareness and networking opportunities. KCP&L began reaching out to large, national TAs who already have experience with the reverse auction process in other service regions (e.g., AEP).
- Aligning the Block Bidding outreach with KCP&L's business development and new service requests generated several Buy-Now projects.

**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: Now in its second year, the Block Bidding program can begin to address some of the challenges encountered in the past years. Continuing to fine-tune the eligibility requirements will ensure greater, more successful participation.**

- KCP&L should continue its customized, one-on-one outreach efforts targeting new Block Bidding customers, but should also apply this individualized approach to current large customers using other rebate programs to understand how they can better utilize the Block Bidding program.
- As outlined in Question 1, KCP&L discovered that one of the biggest drivers of participation is a proper incentive cap on the Standard and Custom programs. KCP&L can use the PY2017 cap adjustment 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. While the Block Bidding program is more cost effective in terms of $/kWh, the right balance must be struck so customers still feel they are getting enough value out of the program.
- KCP&L recognizes the need to sell the program value to large customers that previously opted out of KCP&L's rebate programs. Other, more mature markets possess this large customer buy-in and can serve to guide KCP&L 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*

The GMO Block Bidding program did not have any participation in PY 2017, therefore there are no impact related recommendations.

### *4.3.2 Process*

Navigant conducted phone interviews with the KCP&L product manager and CLEAResult on October 4, 2017 and October 6, 2017. The recommendations that correspond to Navigant's findings on the process evaluation are provided to improve the Block Bidding program. Table 4-6 includes the research question-based recommendations, and Table 4-7 summarizes the recommendations for the five Missouri-required questions.

**Table 4-6. 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 PY2017 KCP&L acted on several recommendations to improve its new Block Bidding program. Navigant recommends that KCP&L continue its new customer acquisition efforts in the selected target market segments and further its understanding of project processes and timelines and the organizational structures of its larger customers. Additionally, KCP&L should monitor the impacts of its adjusted rebate incentive cap and determine whether it strikes the intended balance between Block Bidding and other programs. Finally, KCP&L should continue to offer training and support for its trade allies as a way to decrease the barrier to entry. |
| 2. What changes have been made to the program in PY2017, and what changes are planned for PY2018? | PY2017 saw substantial progress as KCP&L gained a better understanding of the niche that the Block Bidding program will serve. Navigant suggests KCP&L continue to be flexible in updating the program's eligibility requirements and program timing to best fit customers' needs. Navigant also recommends that the application process remain the same, but with more support, to help TAs grow more comfortable with updates to the program from previous years. |

*Source: Navigant analysis*

**Table 4-7. 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 KCP&L continue to better align its program with the project timelines of its largest customers and TAs. These customers often require more time, and face complexities not found in Custom or Standard projects. Giving adequate notice of auctions, as well as establishing consistency in program rollouts, will help customers better plan for and incorporate Block Bidding rebates into future projects. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | Because KCP&L has been forced to partially pull back funds for many of the Block Bidding projects due to the customer not being able to use them to their entirety, Navigant does not suggest expanding the program to mid-sized customers (outside of new construction), without considering a lower kilowatt-hour minimum. Instead, KCP&L should focus on either recruiting more high capacity customers or narrowing its target market segments to better provide the awareness, support, and flexibility they need to utilize the entirety of their awarded funds. |
| 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, as well as tracking the implemented measure types from past auctions, will inform KCP&L on which 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 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. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | KCP&L's communication strategy is more defined in the program's second year. 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, and piggyback off successful Custom projects. KCP&L 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. Additionally, Navigant suggests decoupling outreach from the RFQ process in order to highlight the benefits of the program instead of the effort of an RFQ. |

| Missouri Question | Navigant Recommendation |
|---|---|
| 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 tracking and analyzing the customer journey to identify successful customer acquisition strategies, understand project timelines, and identify key individuals for buy-in. Additionally, KCP&L 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. Finally, outreach efforts should continue to target the current customers who have exceeded their rebate caps and new customers in promising industries but should rely less on the RFQ announcement and instead focus more on the opportunity for these customers to save. |

*Source: Navigant analysis*

# 5. STRATEGIC ENERGY MANAGEMENT

## 5.1 Program Description

The goal of the Strategic Energy Management (SEM) program is 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 are incentivized at $0.02 per kWh and are expected to be achieved through operational and maintenance (O&M) improvements, incremental increases in capital energy efficiency projects, additional capital projects that would not otherwise have been considered (e.g., process changes, consideration of energy efficiency in all capital efforts), and improved persistence for O&M and capital projects. The program seeks 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 achieves these goals through a 2-year engagement of workshops and one-on-one coaching conducted by CLEAResult. It provides 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 is 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 identify and introduce potential participants with usage of 10 GWh or more to the program. While customers can apply to the program without the assistance of an account manager, most applicants work with one. |
| **Verification of Purchase/Project** | The program provides detailed energy models that calculate energy savings based on whole building energy usage. Savings that occur from other KCP&L programs are identified and removed from the final claimed SEM savings. |
| **Rebate Process** | Incentives are set at $0.02/kWh and paid over the first year's modeled energy savings. Any incremental energy savings identified in years two or three will be paid out at the same rate. |
| **Disputes, Rejected Applications** | The CLEAResult program team handles potential disputes in modeled energy savings calculations with escalations forwarded to the KCP&L program manager. Mediation and resolution to escalated disputes are 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 are not properly accounted for, the models will misestimate the savings realized by the SEM program. These energy modeling issues are handled by CLEAResult's program team with history of the correspondence archived in their CRM system, Catalyst. |

| SEM Program Key Detail | |
|---|---|
| **Project Reporting** | CLEAResult provides 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 KCP&L's Business Energy Efficiency Rebate (EER) – Custom and Standard programs is reported on a weekly to monthly basis. Finalized energy and demand savings are reported in Catalyst and uploaded into the Nexant database on an annual basis. KCP&L receives monthly and quarterly updates outside the electronic tracking systems via communications between the CLEAResult 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 program year (PY) 2017 included reviewing the reported energy models for 11 sites and conducting in-depth interviews with the program manager, the implementation contractor, CLEAResult, and seven participants. The program achieved a verified energy savings of 5.1 GWh, or 42% of the 3-year goal.

The following sections summarize Navigant's PY2017 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*

Kansas City Power and Light (KCP&L) calculates savings for the SEM program by creating a multi regression model that represents energy use activities before the program was present. These models estimate energy use based on a variety of collected variables such as weather, production, and building occupancy. Once these models are created, the same variables are used to establish a baseline of energy use for the site after the program has begun. The program estimates savings by comparing the modeled baseline energy use to the actual site usage, and the difference between the two represents the savings due to the SEM program. KCP&L identified and removed the impact of any non-SEM activities, such as measures installed through other programs and results of the SEM models. These activities could include measures rebated through other programs, new equipment installation, equipment issues, or process changes.

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

- **Engineering reviews for a representative sample of projects models** to verify gross reported savings and calculate gross verified savings to develop a program-level realization rate at a confidence and precision level of 90/10.
- **Detailed review of reporting documentation for each sampled site** 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.

Table 5-2 and Table 5-3 summarizes the energy savings and corresponding realization rates for the SEM program for PY2017 and the program to date, respectively. KCP&L did not claim energy savings in PY2016. KCP&L spent the first program year training participants and collecting sufficient data to calculate savings at those sites. Therefore, PY2017 savings estimates include saving for 2 years of program activity.

No demand savings were claimed or reported in PY2016 or PY2017. KCP&L and the implementation contractor (IC) are currently developing models to estimate demand savings in PY2018.

**Table 5-2. SEM Program PY2017 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings[28] | Verified Savings[29] | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 5,863,545 | 5,120,961 | 87% | 12,127,508 | 5,120,961 | 42% |
| Coinc Demand at Customer Meter (kW) | 0.00 | 0.00 | 0% | 2,842 | 0.00 | 0% |

*Source: Navigant analysis*

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

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 5,863,545 | 5,120,961 | 87% | 12,127,508 | 5,120,961 | 42% |
| Coinc Demand at Customer Meter (kW) | 0.00 | 0.00 | 0% | 2,842 | 0.00 | 0% |

*Source: Navigant analysis*

[28] 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.

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

The following factors influenced the energy savings realization rates in PY2017:

1. Navigant **annualized models** to a 12-month period for consistency with savings verified for other programs. Reported savings are based on models with time frames ranging from 9 to 13 months and sometimes included savings from previous years.
2. Navigant **adjusted variables and the model structure** including:
    a. Removal or adjustments for data points that were outside the bounds of reasonable site operation parameters.
    b. Navigant adjusted the models as needed to include variable that were dynamic in the post condition and were not the same for every time period.
    c. Eliminating duplicative variables (such as two variables for temperature dependency).
    d. Inclusion of important variables (such as production) that influence site usage that may have been overlooked.

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. Navigant used this data to develop a sampling methodology, as detailed below.

#### *5.2.1.2 Sampling and Engineering Review*

For the PY2017 sample, Navigant segmented the existing population of projects within the SEM program into four primary strata of participants based on the magnitude of energy savings: zero, small, medium, and large. Models that claimed zero savings in PY2017 were included in their own strata as it was unclear if these models were unable to save energy from lack of participation or issues related to how reported savings were calculated. Table 5-4 shows the sample chosen for each stratum and the resulting reported and verified savings.

The sample, which was designed to achieve 90 percent confidence and 10 percent precision at the program level, did not include zero savings projects. The zero savings projects were handled separately from projects that reported savings. Navigant reviewed a small sample of these zero savings projects to confirm that these projects produced zero impacts.

**Table 5-4.SEM Population and Sample Sizes: PY2016 and PY2017**

| Program | Stratum | Reported Energy Savings (kWh) | Verified Energy Savings (kWh) | Realization Rate PY2017 | Total Number of Projects | Projects in Sample |
|---|---|---|---|---|---|---|
| SEM | PY2017 Zero* | 2,665,958 | 2,665,958 | 100% | 3 | 1 |
| | Small (0 to 300 MWh) | 1,532,955 | 873,874 | 57% | 2 | 1 |
| | Medium (300 to 900 MWh) | 399,492 | 462,215 | 116% | 2 | 1 |
| | Large (above 900 MWh) | 1,265,140 | 1,118,914 | 88% | 1 | 1 |
| | **Total** | **5,863,545** | **5,120,961** | **87%** | **8** | **4** |

*These sites had zero savings in PY2017 but did show savings in PY2016 resulting in both reported and verified savings
*Source: GMO SEM Program Tracking Database and Navigant analysis*

Navigant performed a detailed review of all project documentation for each site including:

- Reviewed 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 model data.
- Identification and adjustments made for any variables that were outliers. This includes any variables that are 110% or more than the maximum or 90% or less of the minimum for that variable in the baseline model.
- Adjusting 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.

The evaluation team combined individual project realization rates in the same stratum into an overall realization rate for the corresponding stratum. Navigant reviewed SEM year 2 models and applied the stratum realization rate found in year 2 to both year 1's and year 2's reported savings. Navigant then used the overall realization rate for each stratum to extrapolate to the entire program. Navigant has reviewed similar projects in the past and felt that applying the year 2 realization rate to year 1 was appropriate as realization rates of these program have shown to be stable year-over-year and the program participants did not change from year 1 to year 2.

#### *5.2.1.3 Verification*

Navigant evaluated four sampled projects. Table 5-5 shows the project-level energy savings, corresponding realization rates, and reasons for these discrepancies in savings. In instances where a project had multiple models, such as Site D, 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 5-5.

Navigant's impact model is created for each site that estimates energy use based on variables, such as, production, weather and seasonal operation and 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 savings are calculated using whole building billing data and is 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 impact 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.

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

| Navigant Site ID | Stratum | Reported kWh | Verified kWh | Energy RR (%) | Number of Models | Reason for Discrepancy |
|---|---|---|---|---|---|---|
| **Site A** | Zero | 0 | 0 | N/A | 1 | Low customer participation resulted in no savings. |
| **Site B** | Small | 593,039 | 338,067 | 57% | 1 | Production issues in the post condition caused the model to overestimate savings for one month. |
| **Site C** | Large | 1,265,140 | 1,118,914 | 88% | 1 | Reported savings for PY2016 were added to the reported savings for PY2017. Verified savings for PY2017 were annualized to 12 months and did not include savings from PY2016. |
| **Site D** | Medium | 132,001 | 152,726 | 116% | 2 | Site A used 13 months to calculate year two savings and the Site B model used 10 months. In the verified calculations both models were annualized to represent a 12-month period. |

*Source: Navigant analysis*

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

Navigant assumed a NTG value of 1.0 for the SEM program. The nature of SEM programs focusses on behavioral changes. SEM Programs are delivered in a series of training sessions that educate the customer/participant to identify and address potential energy efficiency 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 and would have continued to operate in the same manner as the baseline operation. 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 Strategic Energy Management 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 5-6 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. Based on Navigant's 2017 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 higher than that filed by GMO due to the use of 5-year useful measure life where GMO used a 3-year measure life. The resulting increase in lifetime benefits outweighed the evaluated energy realization rate of 87%.

**Table 5-6. SEM Program Benefit-Cost Ratios: PY2017**

| Program Year | TRC Test[30] | 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 |
| **Program Overall** | **1.50** | **2.17** | **2.33** | **2.17** | **12.06** | **0.57** |

*Source: Navigant analysis*

### 5.2.3 Process

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

The average overall satisfaction with the SEM program was 7.6 (on a 0-10 scale, n=7), with participants appreciating the training and support received but also needing further help with the program. Creating a Shared Energy Manager position will help ease the burden and create opportunities for both behavioral and capital measures.

Navigant addressed one process evaluation research question and the five Missouri (MO)-required questions for process evaluation through in-depth interviews with program staff, CLEAResult and participants. Table 5-7 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

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

**Table 5-7. 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>• CLEAResult 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>• CLEAResult interview<br>• Participant 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 interview<br>• CLEAResult interview<br>• Participant interviews |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interview<br>• CLEAResult interview<br>• Participant interviews |
| 5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program? | • Program staff interview<br>• CLEAResult interview<br>• Participant interviews |

*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, the IC, and program participants. The process evaluation also included a review of KCP&L's progress on previous recommendations. Below is a list of the PY2016 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 PY2016 report, there were four findings and recommendations for the SEM program. Below is a restatement of the PY2016 process evaluation recommendations and corresponding updates for those findings:

- The market imperfections identified through this program were the time and money needed to participate in energy saving behaviors. This program addresses the barrier of cost by providing technical staff, training, and support at little-to-no cost for participating customers.

The barrier of time is something that can likely be better addressed through this program in several ways:

  - There is an opportunity for KCP&L to take advantage of the access to these sites by identifying and suggesting measures that fall into KCP&L programs beyond just the SEM program. These opportunities could be recognized during the site audits, through IC interactions, and presented during onsite training.
  - The program may want to consider recording all training and providing this information to sites in case they are unable to attend training in person due to a variety of factors.
  - KCP&L should consider what additional utility or program support the sites may need and make it clear to the sites what options are available. This could include additional site audits, rebating and paperwork support, support regarding the purchase of new high efficiency equipment, and providing end-use monitoring equipment.

- **STATUS:** To help the customer be successful in the program, CLEAResult provided the following support:
  - Assisting the participant in maintaining their models.
  - CLEAResult's Energy Advisors worked with the companies to move projects forward and support the companies' energy reduction goals by identifying opportunities, explaining solutions and the rebate applications.
  - Aligning the participant's Opportunity Register with their timeframe or budget cycle to include the behavioral or capital changes or upgrades.
  - Energy engineering support was provided to review projects and go onsite to give advice on a project.

- The program currently targets the largest (20 MWh and up) C&I clients to participate in the program. This limited market fits well with the program structure; it also helps facilitate group training and the ability for sites to interact at a similar level during the training. In the future, the program may have to target smaller customers with a more diverse mixture of building types and operations.
  - As this occurs, the program should carefully construct the cohorts so that customers with similar operations are grouped together. This will allow the implementer to target training to meet the needs of these customers; and, the peer discussions of efficiency measures being considered or implemented will be more valuable for the participants.

- **STATUS:** C&I sectors each had their own cohorts with training focused on their specific needs, which the participants appreciated. In addition, both cohorts participated in joint workshops and each cohort appreciated hearing different perspectives.

- The program identifies and addresses the major end uses for these sites, but several end-uses may need special attention to maintain the program savings realized. Navigant suggests that KCP&L consider creating a program that could address measures that require regular maintenance or upkeep to realize savings. These measures include air compressor leak

detection and repair and boiler tune-ups. These measures have significant effects on the site's energy usage; however, due to their short measure life, they need to be maintained on a regular basis.

- **STATUS:** When CLEAResult conducted its walk-through audit (also known as an Energy Scan) measures such as compressed air savings opportunities, which included leak detection and repair, were identified. However, there is not a formal maintenance program to support participants in the development of their own leak detection and sealing efforts.
- The current model of account managers introducing the customers to the program has worked well with these large clients and marketing for this program is limited. When the program considers expanding to a larger number of customers, a more proactive approach may need to be considered to meet program goals.

- **STATUS:** The current promotion and recruitment approach aligns with the programs savings goals of 10 MWh.

#### *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: A market imperfection identified in this program was the time and money needed to participate in these types of activities. KCP&L is considering creating a Shared Energy Manager position to help the customers save both time and money.**

**FINDING 2: Some participants were uncertain about the continuation of the program. This may affect the persistence of the energy savings achieved and the promotion of the program.**

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

**FINDING 3: KCP&L 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.**

- To achieve this ideal megawatt-hour threshold, KCP&L targets customers from the industrial, commercial, and public (customers with multiple sites that have shared knowledge and experiences between their sites, including healthcare, municipalities, and schools) sectors.

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

- The SEM program focuses on behavior-based and no-cost/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/low cost measures available. Other Business EER programs like Standard and Custom are available to address non-behavior-based needs.

**FINDING 5: Overall, the program addresses most of its customers' energy saving opportunities. However, one participant noted that the recommendations provided did not achieve their expected level of savings.**

- Navigant will work with KCP&L and CLEAResult to address these concerns.

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

**FINDING 6: KCP&L 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.
- KCP&L's approach for the program successfully recruited 16 participants for PY2017.

**FINDING 7: The SEM program delivery is varied to meet the diverse needs of the participant, these included:**

- Training workshops.
- Workbooks tailored specifically to the industrial or commercial participant guiding the participants throughout the training and implementation of the program.
- Onsite Energy Scans provided by the IC to identify low cost energy saving measures and opportunities to save energy through participation in KCP&L's other EE programs.

**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 8: Three of the seven participants interviewed felt the rebates received do not offset the Energy Efficiency rider making it difficult for the large customers to cost-justify participating in KCP&L's Business Energy Efficiency programs.**

## 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 KCP&L Business EER – SEM

program forward and meet the Missouri Energy Efficiency Investment Act (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 to better align reported and verified savings.

1. Navigant recommends annualizing energy savings for each SEM model. Savings should be estimated based on the most recent 12 months or be adjusted to represent a 12-month period. Since this is a multiyear program, savings for each year should be included separately and steps should be taken to only count the savings found in the reported program year.
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 as discussed above. 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 variable 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 variable should be independent variables to not count the impact of certain changes multiple times.

### *5.3.2 Process*

The SEM achieved a significant portion of the 3-year MEEIA target over the past 2 years.

**Table -5-8. 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 limited amount of time customers have to focus on energy efficiency (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.<br><br>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. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | KCP&L has a well-defined target market for the SEM program and should continue its marketing approach. KCP&L's SEM team works with its key accounts team to identify high energy usage industrial, commercial, and public (customers with multiple sites that have shared knowledge and experiences between their sites, including healthcare, municipalities, and schools) sectors 10 MWh of annual consumption. The key account team works one-on-one personally promoting the program. |
| 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 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, KCP&L should ensure there is an understanding of the energy end-uses of these customers so that energy-savings recommendations can be given. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | The delivery of the program is varied to meet the diverse needs of the participant and includes separate training workshops, workbooks designed specifically for the industrial and commercial customer. CLEAResult provides Onsite Energy Scans identify low cost energy saving measures and opportunities to save energy through participation in KCP&L's other EE programs. This delivery method is successful and should be continued. |
| 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? | 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 CLEAResult, KCP&L 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. |

*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. 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 similar lighting measures as 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 |
| **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. |

| SBL Key Details | |
|---|---|
| **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 starting in PY2016. Navigant's findings indicate the SBL program is performing well in the territory. It almost surpassed the 3-year Missouri Energy Efficiency Act (MEEIA) Cycle 2 target by the end of PY2017, with verified savings at 96% and 90% of energy and demand savings target, respectively. The program achieved 64% of the energy savings and 62% of the demand savings from the 3-year MEEIA Cycle 2 target for the program in PY2017 alone. Navigant's process research indicates that the program was very successful in the second year of the program, it exhausted all funding in KCP&L-MO and almost all in Greater Missouri Operations (GMO) before the end of PY2017. Navigant also found a relatively high realization rate of energy and demand savings (96% and 89%, respectively) through its impact evaluation of tracking data.

For the impact evaluation, Navigant performed a tracking database review, a deemed measure savings review, and completed the lighting study to capture improved primary inputs for the engineering analysis equations as described in Appendix I. 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. 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 were updated based on the long-term onsite data and Navigant used them to recalculate the energy and demand savings (see Appendix I for methodology).

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

The following sections summarize Navigant's PY2017 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 PY2017. Overall, the program achieved a 96% realization rate for energy savings and an 89% 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. As a result of the engineering analysis, Navigant included waste heat factors (WHFs) in the verified savings calculation. In addition, based on the results of the long-term lighting study, Navigant adjusted the in-service rate (ISR), HOU, CFs.

The only measure that reduced the realization rate for the SBL program by more than 1% was the LED high bay 176 W-350 W measure. This measure represents 8% of reported program-level savings, much lower than the 46% reported in PY2016. Navigant's onsite findings show that the actual difference in wattages between baseline and efficient case lighting for this measure is approximately 40% lower than estimated. However, Navigant notes this discrepancy was proactively identified by KCP&L's implementation team in PY2016 and was only approved in April 2017 before switching to a measure that includes the replacement wattage. Approval of this measure did not continue far into PY2017 in the SBL program and therefore had a much smaller impact on realization rate when compared to the Standard program. Additionally, 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 limited instances of FR (14%) and SO (0.2%). Based on these findings, Navigant applied a NTG ratio of 0.87.

**Table 6-2. SBL PY2017 Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 2,720,537 | 2,619,095 | 96% | 3,569,963 | 2,283,851 | 64% |
| Coinc Demand at Customer Meter (kW) | 471 | 421 | 89% | 592 | 367 | 62% |
| Energy at Customer Meter (kWh) – With High Bay Removed | 2,339,513 | 2,408,768 | 103% | 3,569,963 | 2,095,628 | 59% |
| Coinc Demand at Customer Meter (kW) – With High Bay Removed | 402 | 376 | 94% | 592 | 327 | 55% |

*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.

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

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 4,410,196 | 3,926,617 | 89% | 3,569,963 | 3,424,010 | 96% |
| Coinc Demand at Customer Meter (kW) | 747 | 610 | 82% | 592 | 532 | 90% |

*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 PY2017 Summary by Measure Type**

| Measure Type | Reported Energy Savings (kWh) | Percentage of Total | Reported Demand Savings (kW) | Percentage of Total |
|---|---|---|---|---|
| LED Low/High Bay | 988,157 | 36% | 178 | 38% |
| LED Linear | 934,305 | 34% | 212 | 45% |
| LED Exterior | 361,574 | 13% | 0 | 0% |
| LED Screw In | 218,719 | 8% | 39 | 8% |
| Lighting Optimization | 173,988 | 6% | 34 | 7% |
| LED Other | 37,979 | 1% | 6 | 1% |
| Lighting Control | 5,815 | 0% | 1 | 0% |
| **Total** | **2,720,537** | **100%** | **471** | **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.
- **Some of the reported efficient wattages did not match the wattages based on the product IDs listed in the efficient measure column**: In many instances when this happened, the reported efficient wattage matched the equivalent lamp type, i.e., 65 W, and not the efficient wattage, i.e., 9 W.
- **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 the realization rate 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 KCP&L service territory using onsite verification results. Navigant's review found the following:

- Navigant found that KCP&L uses industry-standard algorithms for all 55 SBL lighting measures.
- However, assumptions for WHFs, CFs, and HOU are used from four different sources and do not vary by building type. This limits KCP&L's ability to effectively capture the effects of variation in program activity across different building types. For example, a grocery store may have longer hours than an office building, and a church may have a low number of HOU. Navigant recognizes that the Illinois TRM used by KCP&L is focused on forecast and thus the mix of building types is unknown at that stage. For evaluation purposes, Navigant created building type-specific values using the onsite verification results described below as an improved approach.

#### *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 this year's evaluation. The evaluation team used lighting loggers to capture improved inputs for the lighting measures because the program only had lighting measures. 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 KCP&L, 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 and found 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. Additionally, 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 commercial and industrial (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, some 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, SBL, and Cycle 2 Standard. This is discussed in more detail in Appendix I.

Navigant used the findings from the onsite measurement and verification (M&V) to calculate verified savings for SBL measures. Adjustments include:

- Based on the onsite findings, the average baseline wattage for the LED high bay 176 W-350 W measure was 736 W. However, in the deemed measure savings, the baseline wattage was 1,078 W and the efficient wattage was 350 W. The onsite findings of the lower baseline wattage led to a lowering of the realization rate. Navigant also used the reported efficient wattage for all lighting measures, and for the efficient high bay measure it was approximately 208 W for the SBL program. The LED high bay 176 W-350 W made up 8% of all PY2017 reported kilowatt-hour savings even though applications were no longer received in PY2017 and it was only installed through the beginning of April 2017 based on prior applications.

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 to the inputs used in the PY2017 evaluation.
- Navigant also used the WHF energy (WHFe) and WHF demand (WHFd) based on actual building types from the Illinois TRM, similar to the analysis in PY2016. Table 6-7 shows the WHFs used for PY2017. Table 6-8 shows 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 | PY2017 CF | PY2016 HOU | PY2017 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 PY2017 Evaluation**

| Building Type | PY2017 WHFe | PY2017 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 and PY2017. The NTG ratio of 87% is driven primarily by low free ridership (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: PY2017**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| 2017 | 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 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 SBL program. This adjustment reflects a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA)[31]. The IL TRM V7.0 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.

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. Based on Navigant's 2017 benefit-cost analysis, the program achieves a cost test ratio of greater than 1.0 for the TRC, societal cost test (SCT), utility cost test (UCT), and participant cost test (PCT). Navigant's analysis resulted in a TRC ratio slightly lower than that filed by GMO due to an energy realization rate of 96%, a coincident demand realization rate of 89%, and a NTG ratio of 0.87.

[31] The cost effectiveness results should be considered conservative due to the application of the mid-life adjustment to both standard and specialty light bulbs. The most recent information available suggests that it is highly unlikely that the Department of Energy (DOE) will expand the 45 lumens per watt provision of EISA to specialty light bulbs. At the time of writing (November 9, 2018), a notice on the Office and Management and Budget's website indicates that the DOE will soon issue a ruling to rescind its December 2016 expanded definition of a general service lamp (https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=1904-AE26). If this happens, reflector, globe, candelabra, and many other specialty light bulbs will continue as exempt to EISA (their current status) and their baseline bulb will remain a halogen bulb. This stands in contrast to assumptions that underlie the mid-life adjustment included in the IL TRM V7.0, which applies a specialty mid-life adjustment starting in January 2024 (as reflected in the cost effectiveness calculations). Bulbs with the A-line shape will likely remain subject to the 45 lumens per watt efficiency standard named in EISA with delayed implementation until January 2021 (as assumed in the IL TRM and in the cost effectiveness calculations).

**Table 6-10. SBL Benefit-Cost Ratios: PY2017**

| Program Year | TRC Test[32] | 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 |
| **Program Overall** | **N/A** | **0.95** | **1.13** | **1.44** | **1.47** | **0.64** |

*Source: Navigant analysis*

### *6.2.3 Process*

In PY2017, Navigant addressed three process evaluation research questions and the five Missouri (MO)-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.

[32] 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. 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. How satisfied are trade allies and participants with the program overall? | • Program staff interviews<br>• Implementer administered participant surveys |
| 3. 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: 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: The PY2016 EM&V report made three recommendations for the SBL program: 1) provide more marketing materials to participants and trade allies, 2) increase the rebate cap, and 3) offer ongoing OPEN field tool training. Navigant found that KCP&L worked toward the first and third recommendation, but did not address the second due to limited funding.**

- **STATUS:** The IC continued marketing and outreach to additional trade allies, but found that most of the SBL projects came through a small set of loyal trade allies that had found a way to make the program work for them. The implementer also found that issues with the OPEN field tool were reduced with additional experience. Since most of the projects came from a small

group of experienced trade allies, there were less issues with the OPEN field tool this year compared to last year.

- **STATUS:** The rebate cap was not increased due to limited funding since the program exhausted most of the available funding by the end of the second program year in a 3-year program.

**QUESTION 2: How satisfied are trade allies and participants with the program overall?**

**FINDING 2: Navigant's review of the implementer administered participant surveys indicated that there is a high satisfaction among the participants for the SBL program. Also, many of the trade-allies increased participation in the second year, indicating a continued high satisfaction with the program. Both of these findings align with the customer and trade-ally surveys conducted in PY2016.**

- Six customers responded to the implementer administered customer survey during PY2017. While this is a small sample, these six customers gave an average score over 9 with 10 being extremely satisfied when asked how satisfied they were with KCP&L's SBL program.
- In PY2017, on average each contractor had more than 50 measures installed with an average of more than 10 measures installed per site. In PY2016, on average each contractor installed 36 measures with an average of more than 12 measures installed per site.

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

**FINDING 3: KCP&L would consider expanding the program to other end uses beyond lighting based on the success seen with the lighting program.**

- KCP&L 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*

**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: KCP&L made some small adjustments in PY2017 to the qualification criteria to further define the customer segment for the SBL program.**

- The SBL program targets small business customers who have an average monthly coincident peak demand of 100 kW or lower. This kilowatt cap applies if it is a single account and single meter, or if there is a single account with multiple meters, or if the customer has multiple accounts and multiple meters. The previous threshold was 250 kW for multiple meters or multiple accounts, but KCP&L and the implementer changed this to better target the small business customer. 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 energy efficiency (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 only 2 years. Also, KCP&L clearly communicated the amount of remaining funding on the webpage when the programs started to get close to exhausting funds near the end of PY2017. Finally, the webpage clearly indicated the availability of other programs, such as the Standard program, if the projects did not meet the SBL eligibility criteria. The implementer reached out to all SBL customers and communicated about the early ending of the program and gave them directions on when they needed to submit projects for inclusion.

- For the SBL program, KCP&L 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 KCP&L 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 below 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, if available at project initiation, is easier to track and include in the database from the beginning.
- Navigant recommends that additional review of the efficient wattage is conducted to ensure that it matches the efficient product installed. During the review of tracking data, the evaluation team found that some of the reported efficient wattages did not match the wattages based on the product IDs listed in the efficient measure column. Navigant reviewed all instances where the reported efficient wattage did not align closely with the efficient wattage assumed for the deemed

savings. Navigant used a corrected efficient wattage when necessary to match the manufacturer listed wattage for the reported efficient measure product ID.

**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.
- Also, as recommended in PY2016, KCP&L could consider creating deemed savings by measure and building type using the HOU and CF by building type determined from the analysis of the lighting logger data as part of the onsite verification.

**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.<br>• Consider creating deemed savings by measure and building type using the HOU and CF by building type determined from onsite verification. |

*Source: Navigant analysis*

### *6.3.2 Process*

The SBL program had a successful second year in PY2017, almost surpassing the 3-year target. 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, program managers should consider for future direct install programs 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 KCP&L 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 our process recommendations that could be applied if the program were to start again in Cycle 3.

**Figure 6-2. SBL General Process Recommendations: PY2017**


*Source: Navigant analysis*

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

Navigant added three 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 three research questions (Table 6-12).

**Table 6-12. SBL 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? | While the program did well implementing process recommendations form PY2017, if the program expands to include other end-use categories in Cycle 3, KCP&L should confirm that the incentive levels will encourage small businesses to participate in the small business program and not in the Standard program. |

| Research Question | Navigant Recommendation |
|---|---|
| 2. How satisfied are trade allies and participants with the program overall? | Given the information on satisfaction from trade allies provided through the program interviews, if new trade-allies join in Cycle 3 to represent the other end-use categories, the implementation contractor should try to limit issues with initial use of the OPEN field tool. |
| 3. What changes would be made if the program were to restart in Cycle 3? | If the program were to restart in Cycle 3, KCP&L could consider conducting an analysis of end-use energy use in the small business sector using a vendor that specializes in energy use itemization. |

*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[33] 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.

[33] 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? | KCP&L 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 the target market is well defined, KCP&L 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? | Navigant suggests if the program moves beyond a lighting only program that is 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. |
| 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? | 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 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) 2017, 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 (ESK):** 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 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 (ECMs), 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 system. |

| 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 93% realization rate for gross energy savings and 147% realization rate for gross coincident demand savings. This means that in PY2017 the program achieved 38% of the 3-year Missouri Energy Efficiency Investment Act (MEEIA) target for net energy savings and 92% of the target for net coincident demand savings. Combining these results with PY2016 shows that the program is well under way to achieving its 3-year MEEIA net energy savings target and to exceeding its net coincident demand savings target, having achieved 60% and 139% of the 3-year MEEIA target for energy and demand savings, respectively, between PY2016 and PY2017.

The program had more participation in PY2017 due to increased customer outreach via email campaigns and social media marketing, as well as growing partnerships with trade allies. In addition, the program worked on better targeting of potential program participants whose homes have large savings potential, such as older homes. Finally, the program did not exceed 1.0 for its cost-effectiveness for PY2017.

The following sections present Navigant's PY2017 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 (TRM) v5. In cases where the measure was not included in that 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 Illinois TRM 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 PY2017. The cumulative energy and demand savings achieved by the program in PY2016 and PY2017 are presented in Table 7-3. The program has achieved 60%, or about two-thirds, of its 3-year MEEIA energy savings target between PY2016 and PY2017. The 3-year target for net coincident demand has already been met with the program achieving 139% of the target by the end of PY2017.

**Table 7-2. WHE Program PY2017 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 10,069,992 | 9,360,707 | 93% | 19,717,746 | 7,488,566 | 38% |
| Coinc Demand at Customer Meter (kW) | 3,977 | 5,828 | 147% | 5,072 | 4,662 | 92% |

*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 | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 14,987,205 | 14,897,484 | 99% | 19,717,746 | 11,917,987 | 60% |
| Coinc Demand at Customer Meter (kW) | 6,049 | 8,789 | 145% | 5,072 | 7,031 | 139% |

*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 PY2017.

#### *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 were tracked in the database. Some information, however, was not. For cases where needed information was not present in the tracking data, Navigant used industry-accepted references, such as Illinois TRM default values, to calculate the program's verified savings (see more about this in Section 7.2.1.2). Navigant discussed with KCP&L the need to record the information in future program years.

In addition, Navigant found that three Tier 3 HVAC baseline units (less than 1% of units) did not comply with the WHE Operations Manual in PY2017. The Operations Manual requires that the maximum Seasonal Energy Efficiency Ratio (SEER) value of the baseline unit be 10. This was also a finding in PY2016.

#### *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 Illinois 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 PY2016, Navigant referenced the Illinois TRM, except where otherwise noted.[34] 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) sourced from the Illinois TRM that were reflective of the KCP&L climate. Navigant chose this TRM given its geographic proximity to the KCP&L 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 combined achieved 9,361 MWh of verified gross energy savings in PY2017 for a realization rate of 93%. The program achieved a combined total of 7,489 MWh of verified net energy savings, 38% of the PY2016-PY2018 MEEIA target. The program also achieved a total of 5.83 MW of verified gross coincident demand savings in PY2017 for a realization rate of 147%. The program achieved a total of 4.66 MW of verified net coincident demand savings, 92% 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.

[34] The algorithms for each measure evaluated in this analysis are detailed in Appendix J.

**Table 7-4. WHE Program PY2017 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 | 377,881 | 393,251 | 104% |
| Tier 2: Building Shell Measures | 335,879 | 174,659 | 52% |
| Tier 3: HVAC Measures | 9,356,232 | 8,792,797 | 94% |
| **Total** | **10,069,992** | **9,360,707** | **93%** |

*Source: WHE program tracking database and Navigant analysis*

**Table 7-5. WHE Program PY2017 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 | 38 | 51 | 135% |
| Tier 2: Building Shell Measures | 144 | 102 | 71% |
| Tier 3: HVAC Measures | 3,795 | 5,675 | 150% |
| **Total** | **3,977** | **5,828** | **147%** |

*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 94% of the verified gross energy savings and 97% of the verified gross coincident demand savings. Navigant adjusted the SEER and energy efficiency ratio of units that were removed for subsequent installation of Tier 3 early retirement air conditioners and heat pumps during the verification process. The SEER and energy efficiency ratio values recorded in the program tracker for these units were a mix of blanks, zeroes, nameplate values, and measured values. Given the variety and uncertainty in these data points, Navigant made adjustments to estimate the existing SEER and energy efficiency ratio values in the market using early retirement data from the PY2015 evaluation of KCP&L's Air Conditioning Upgrade Rebate (ACUR) program, but unit-specific data is preferable as the market continues to evolve. The program implementer should consider ways to accurately track these values for removed units and identify whether those values are nameplate or measured. Measured SEER and energy efficiency ratio values are preferable. However, if nameplate values are tracked, Navigant will consider approaches to leverage those SEER and energy efficiency ratio values to reflect measured values through the application of an adjustment factor.

Navigant notes that PY2018 will include research to investigate the reasonableness of the early retirement cooling measure savings, which could include billing analysis, secondary literature review, primary collected customer data, or a combination of the above.

Table 7-6 shows the differences in the SEER and energy efficiency ratio baseline values used for reported and verified savings.

**Table 7-6. WHE Program PY2017 HVAC Baseline SEER and Energy Efficiency Ratio Adjustments**

| Tier 3 Early Retirement HVAC Measure | Reported Baseline SEER* | Verified Baseline SEER | Reported Baseline Energy Efficiency Ratio * | Verified Baseline Energy Efficiency Ratio |
|---|---|---|---|---|
| Air Conditioning Units | 9.38 | 6.82 | 8.75 | 6.00 |
| Heat Pumps | 9.62 | 6.82 | 8.92 | 6.00 |

*These are the average SEER and energy efficiency ratio values based on non-blank and non-zero values recorded in the program tracker. Non-zero values include measured and nameplate data.

*Source: WHE program tracking database and Navigant analysis*

The other two program tiers contributed the remaining 6% of the verified gross energy savings and 3% of the verified gross coincident demand savings. Tier 1 contributed 4% and 1% 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 more than double the participation in PY2017 compared to PY2016, accounting for 60% of verified gross energy savings and 46% of verified gross coincident demand savings of Tier 1 measures. Navigant adjusted values for hours of use (HOU) to align with the hours for residential use in the Illinois TRM. In addition, baseline wattages were updated to reflect the results of a study detailed in the PY2016 evaluation report during which the average baseline for bulbs in the market was determined. In addition, the program-wide in-service rate (ISR) value was adjusted from 99% to 94.2% based on PY2016 evaluation research results. These adjustments had an effect on overall results for the tier, which achieved realization rates of 104% for gross energy savings and 135% for gross demand savings.

The main drivers for the Tier 2 realization rates were verification updates to the savings for the insulation measures. Insulation measures had more than triple the participation in PY2017 compared to PY2016, accounting for 44% of verified gross energy savings and 41% of verified gross coincident demand savings of Tier 2. Navigant updated the savings methodology to reflect the heating type of each home based on data available in the program tracker. This update had an effect on overall results for the tier, which achieved realization rates of 52% for gross energy savings and 71% for gross demand savings.

#### *7.2.1.3 Net-to-Gross*

Navigant conducted NTG research in PY2016 and applied the results to the PY2017 program year. 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 |
|---|---|---|---|---|
| 2017* | 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, and program to date, and the total resource cost (TRC) test filed by GMO. Based on Navigant's 2017 benefit-cost analysis, the program achieves a cost test ratio of 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 higher than that filed by GMO due to an energy realization rate of 93% and a demand realization rate of 147%.

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[35]. The description below gives a high-level summary of this approach. The reader can refer to the referenced memo by Brailove et al. for additional detail.

The incremental cost assumed in the early retirement analysis consists of the full material and installation cost of the efficient equipment less a calculated deferred replacement credit. This approach contrasts with that of new or replace-on-burnout measures, whereby the incremental cost is assumed to be the difference between the full cost of the efficient equipment and the baseline equipment. The deferred replacement credit is calculated based on the present value of the difference between two infinite streams of replacement costs: one in which the baseline equipment is first replaced after the equipment's remaining useful life (RUL) and the other in which the baseline equipment replacement is deferred by the expected useful life (EUL) of the retrofit measure less the RUL of the early retired equipment. When replacement costs are not deferred at all (i.e., when the efficient EUL is equal to the early retired equipment's RUL), the deferred credit is zero and the participant costs for the retrofit measure are equal to the full costs of the efficient equipment. When the replacement costs are deferred by many years (i.e., when the efficient EUL is significantly large relative to the early retired equipment's RUL), the deferred credit is appreciable and the participant costs for the retrofit measure will be significantly less than the full costs of the efficient equipment.

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

[35] 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.

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.

Additionally, the Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the WHE program. This adjustment reflects a potential change to federal bulb efficiency standards stemming from the Energy Independence and Security Act (EISA)[36]. The IL TRM V7.0 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. Navigant applied mid-life adjustments for specialty lamps in Appendix R. Appendix R contains one line-item for "Screw In – LED's". 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: PY2017**

| Program Year | TRC Test[37] | 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 |
| **Program Overall** | **N/A** | **0.97** | **1.16** | **1.87** | **1.28** | **0.70** |

*Source: Navigant analysis*

### *7.2.3 Process*

Navigant addressed the five Missouri (MO)-required questions for process evaluation in PY2017 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.

[36] The cost effectiveness results should be considered conservative due to the application of the mid-life adjustment to both standard and specialty light bulbs. The most recent information available suggests that it is highly unlikely that the Department of Energy (DOE) will expand the 45 lumens per watt provision of EISA to specialty light bulbs. At the time of writing (November 9, 2018), a notice on the Office and Management and Budget's website indicates that the DOE will soon issue a ruling to rescind its December 2016 expanded definition of a general service lamp (https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=1904-AE26). If this happens, reflector, globe, candelabra, and many other specialty light bulbs will continue as exempt to EISA (their current status) and their baseline bulb will remain a halogen bulb. This stands in contrast to assumptions that underlie the mid-life adjustment included in the IL TRM V7.0, which applies a specialty mid-life adjustment starting in January 2024 (as reflected in the cost effectiveness calculations). Bulbs with the A-line shape will likely remain subject to the 45 lumens per watt efficiency standard named in EISA with delayed implementation until January 2021 (as assumed in the IL TRM and in the cost effectiveness calculations).

[37] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

**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 |
| 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 PY2017. 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 energy efficiency upgrades, along with high upfront costs—particularly for HVAC purchases. PY2016 surveyed participants and trade allies alike support that view.**

**STATUS:** Cost continues to be a barrier to residential energy efficiency upgrades, especially for HVAC purchases. However, increased Tier 3 participation may be an indicator that the program is having some success addressing this barrier by affecting customers' willingness to replace still-functioning equipment. This aligns with the reports from trade allies during the PY2016 surveys and with input provided by the program's product manager and implementation manager in PY2017.

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

**FINDING 2: KCP&L's primary target audience for the program is broadly defined as owners of single-family homes, although 2-unit to 4-unit residences and renters are also eligible.**

**STATUS:** The program continues to target single-family homes and 2-unit to 4-unit residences. The implementation team has employed participant targeting techniques to identify homes with large savings potential based on the concentration of single-family homes within a community, the age of those homes, previous program participation patterns in the community, and demographics.

**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: Across the three program tiers, the program offers measures that cover most of the common energy end uses in residential homes. However, most energy savings and participation comes from air conditioning units and heat pumps, with little participation in the heat pump water heater, air sealing, or insulation measures.**

**STATUS:** Participation across all measure tiers increased in PY2017, including more than triple participation in Tier 3 measures in PY2017 compared to PY2016. This increase resulted in PY2017 verified energy savings that were more than double the amount in PY2016.

The WHE program added several new measures in PY2017 and phased out others.

- **Tier 1:** LED bulbs of varying wattage values contributed 2.5% and 0.4% of verified gross energy and demand savings, respectively, in PY2017. A new furnace filter alarm measure contributed an additional 0.02% and 0.01% of verified gross energy and demand savings, respectively.
- **Tier 2:** Window measures were phased out completely in PY2017. The 17 windows that came through the program during the phase out contributed 0.01% and 0.001% of verified gross energy and demand savings, respectively.
- **Tier 3:** The program added new HVAC tune-up, refrigerant charge adjustment, and coil cleaning measures. These new measures contributed 10.8% of energy savings and 11.3% of demand savings in PY2017.

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

**FINDING 4: Participating customers report a high level of overall satisfaction with the program, with some variations based on the program track in which they participated.**

A summary of PY2016 findings by tier is included below:

- **ESK:** Participants had an average satisfaction rating of 4.2 (on 1-5 scale, with 5 as the highest possible rating).
- **Insulation and Air Sealing Rebates:** Participants who installed insulation had the highest overall program satisfaction (4.7 out of 5) and air sealing participants had the lowest (4.1).
- **Heating and Cooling Rebates:** Participants had high overall satisfaction, with averages of 4.4 and 4.6 (out of 5) for air conditioning participants and heat pump recipients, respectively. Participants were especially satisfied with their contractors and the contractor communications; they were less satisfied with the amount of the rebate and the participation requirements.
- **Intra-Program Interactions:** One of the primary findings of the process evaluation is that few participants in the ESK went on to perform more substantial energy efficiency upgrades through the rebate programs, even though over half of the tier's participants expressed an intent to do more efficiency upgrades in the future. The KCP&L product manager noted that they intend to do additional follow-up marketing to past participants to encourage further participation in other KCP&L programs.

  **STATUS:** The WHE program continued to market the measures to the target market of single-family homes and 2-unit to 4-unit residences, and participation has more than doubled since PY2016. KCP&L's product manager indicated that relationships with trade allies have continued

to strengthen, which is an indicator of continued focus on increasing participation and ensuring high customer satisfaction.

In addition, the program has been marketing to participating customers by email. The campaign consists of a series of emails that guide customers that participated in one tier through the steps, and benefits of participating in other program tiers. The program has also been marketing on social media websites and conducting in-store product demonstrations at home improvement stores.

**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: Based on the participant survey, one of the most common suggested improvements was advertising the WHE program more so that more customers could benefit from it. This reflects the overall high level of program satisfaction. Some participants specifically mentioned television and radio advertising as an effective way to reach other customers like them.**

**STATUS:** The program explored strategies in PY2017 to increase customer participation in more than one program tier. Increased marketing, in-store promotions, and increased collaboration with trade allies have all led to higher participation and savings. The program encouraged Tier 3 trade allies to promote Tier 2 building shell measures to their customers toward the end of PY2017. The program's largest trade ally company began implementing that initiative and it is expected to expand in PY2018, potentially increasing participation in Tier 2.

## 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.[38] 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

[38] The WHE program has exceeded the MEEIA target for net verified demand savings, with 7,031 kW (139% of target) achieved by the end of PY2017.

all equipment specifications and household characteristics for baseline and efficient measure installations.

- Accurately tracking equipment specifications is especially important for Tier 3 HVAC units. Two significant drivers of HVAC savings, and therefore program savings, are the SEER and energy efficiency ratio ratings of all HVAC equipment removed through the program. Navigant used KCP&L's PY2015 ACUR program evaluation values to estimate the existing SEER and energy efficiency ratio values in the market, but unit-specific data is preferable as the market continues to evolve. The program implementer should consider ways to accurately track these values for removed units and identify whether those values are nameplate or measured. Measured SEER and energy efficiency ratio values are preferable. However, if nameplate values are tracked, Navigant will consider approaches to leverage those SEER and energy efficiency ratio values to reflect measured values through the application of an adjustment factor.

**Program Offerings:**

- Navigant also recommends that the program implementer consider ways to ensure that participating HVAC units comply with the program's Operations Manual, particularly the SEER values of units to be removed by the program. The program's Operations Manual limits the maximum SEER rating for units that can be removed and participate in the program to 10. In some instances (less than 1% of units) the removed units had SEER ratings higher than 10. Consider options to limit this such as additional staff training to thoroughly review applications and a quality control checklist to verify this data point.

**Savings Calculations:**

- Finally, 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? | Navigant does not have any recommendations related to this research question since the target market is well defined and the program has implemented strategies to identify customers with high savings potentials to increase targeted outreach. |
| 2. What are the primary market imperfections that are common to the target market? | The program should continue working closely with trade allies so the program can continue having success influencing customer decision-making when considering upgrades from still-functioning, high cost equipment to efficient equipment, particularly for HVAC units. |
| 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? | 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 whose buildings have income-eligible residents. The program consists of three different tracks:

- **Track 1:** Efficiency kits that are installed directly into tenant residences and energy efficient measures that are installed in multifamily common areas.
- **Track 2:** Custom program option for measures that fall outside of those offered as part of the efficiency kits or measures for common areas
- **Track 3:** 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** | Multifamily housing |
| **Implementation Contractor** | ICF International (ICF) |
| **Program Description** | The IEMF program provides home energy efficiency direct install (DI) measures including lighting, aerators, low flow showerheads, power strips, and pipe insulation. The program also provides a custom option, which allows KCP&L to propose other measures not part of the predefined 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 the IC directly or by visiting the KCP&L website. Once a customer completes the application, the implementation contractor (IC) visits the site to install the DI measures. Custom measures are incented via a $0.12/kWh rebate. |
| **Verification of Purchase/ Project** | The program manager at IC 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 IEMF program manager is also present for the installation of DI equipment at a sampling of units. For Custom rebates, project verification is completed at the site pre- and post- upgrade. |
| **Rebate Process** | Eligible tenants participate in this program free of charge. Food banks distribute LEDs as well. 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 customer (property owner/manager). The customer may elect to have the rebate check issued to themselves (KCP&L customer) or to the contractor performing the energy conservation measures (service provider). |

| IEMF Key Details | |
|---|---|
| **Disputes, Rejected Applications** | The IC program manager handles disputes and rejected applications. The most common, which is typically resolved quickly, is from a tenant directly to IC employees performing DI. The next path is tenant complaint to property management. Property management typically handles these complaints directly. For complaints that cannot be handled directly onsite at the time of the complaint, property management contacts the IEMF program manager by phone or email. |
| **Project Reporting** | The IC stores data on completed projects in its project tracking database intermittently as projects are completed and shares with KCP&L on a regular cadence. |

*Source: Evaluation team analysis*

## 8.2 Evaluation Findings

The impact and process evaluations for the IEMF program are detailed in this section, which covers the gross impact findings, net-to-gross (NTG) analysis, and planned activities for PY2017.

The evaluation team reviewed the IEMF program database to confirm that the savings methodology was implemented correctly and the savings reported are accurate and reflect the likely savings from the installed measures. Navigant found the tracking database sufficiently detailed to conduct an evaluation of the program, with the exception of the custom measures. Detailed information pertaining to the custom measures was requested subsequently. The evaluation team then verified the savings using the tracking database to re-calculate measure savings for each installed measure.

The following sections present Navigant's PY2017 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:

- 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 (TRM) v5 and reflective of the GMO climate. Navigant chose this TRM given its geographic proximity to the GMO service territory.

Navigant's verification methods indicate that the GMO IEMF program achieved 4,353,777 kWh and 548 kW in energy and demand savings at the customer meter, resulting in realization rates of 85% for energy and 105% for coincident demand.

**Table 8-2. IEMF Program PY2017 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 5,148,381 | 4,353,777 | 85% | 10,014,278 | 4,353,777 | 43% |
| Coinc Demand at Customer Meter (kW) | 523 | 548 | 105% | 1,357 | 548 | 40% |

*Source: Program tracking database and Navigant analysis*

As seen in Table 8-3, to date the IEMF program has achieved 61% of its kWh savings goals (PY2016 and PY2017) and 54% of its kW savings goals. The percentage of the Missouri Energy Efficiency Investment Act (MEEIA) target achieved for both kWh and kW savings increased from PY2016 to PYP2017. During PY2016, the program achieved 18% of its kWh MEEIA target, compared to 43% during PY2017. Similarly, during PY2017, the program achieved 14% of its kW MEEIA target, compared to 40% during PY2017.

**Table 8-3. IEMF Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 7,457,599 | 6,134,100 | 82% | 10,014,278 | 6,134,099 | 61% |
| Coinc Demand at Customer Meter (kW) | 756 | 737 | 97% | 1,357 | 737 | 54% |

*Source: Program tracking database and Navigant analysis*

Most PY2017 IEMF program savings came from lighting measures via LED distribution at food banks. This measure drove the savings and the realization rate for both energy and demand. Navigant applied lower in-service rate (ISR) and hours of use (HOU) values to the LED measure, leading to the lower realization rate. Navigant sourced these values from the Illinois TRM, with values of 83% for the ISR and 847 hours for the HOU.

**Table 8-4. IEMF Savings Summary by Measure**

| Measure Category | Gross | | | | | |
|---|---|---|---|---|---|---|
| | Reported kWh | Verified kWh | Realization Rate | Reported kW | Verified kW | Realization Rate |
| Lighting | 4,786,630 | 3,692,351 | 77% | 490.67 | 367.94 | 75% |
| Aerators | 101,623 | 268,493 | 264% | 12.74 | 135.87 | 1067% |
| Power Strips | 17,548 | 24,514 | 140% | 1.24 | 2.75 | 222% |
| Pipe Insulation | 74 | 103 | 139% | 0.01 | 0.01 | 138% |
| Low Flow Shower Head | 241,182 | 366,993 | 152% | 17.68 | 41.14 | 233% |
| Custom | 1324 | 1,324 | 100% | 0.21 | 0.20 | 94% |

*Source: Program tracking database and Navigant analysis*

As indicated by the proportion of savings numbers in the preceding table, lighting drove the realization rates for the program. Additionally, the realization rates for other measures were different than expected:

- Kitchen and bath faucet aerators previously used the deemed HOU for single-family residences. For PY2017, the evaluation team applied Illinois TRM v5 HOU for multifamily dwellings (77 for kitchen and 22 for bath). The team also applied the federal gallons per minute (GPM) base of 2.2 and the actual GPM of 1.0 for bath aerators.
- Low flow showerheads used the deemed HOU for single-family residences. For PY2017, Navigant applied Illinois TRM v5 HOU for multifamily dwellings (248).
- One custom measure that included a refrigerator replacement was installed during PY2017.

#### *8.2.1.1 Net-to-Gross*

As shown in Table 8-5, for PY2017, Navigant assumed a net-to-gross (NTG) value of 1.0 for the IEMF program.

**Table 8-5. IEMF NTG Components and Ratio: PY2016**

| 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. Please refer to the 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 reflects a potential change to federal bulb efficiency standards stemming

from the Energy Independence and Security Act (EISA)[39]. The IL TRM V7.0 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.

Table 8-6 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, PY2017, 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). The participant cost test (PCT) benefit-cost ratio is infinite (INF) indicating that there are program benefits to participants but no costs. Navigant's analysis resulted in a TRC ratio that is greater than that filed 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 8-6. IEMF Benefit-Cost Ratios: PY2017**

| Program Year | TRC Test[40] | 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 |
| **Program Overall** | **N/A** | **1.37** | **1.54** | **1.38** | **INF*** | **0.43** |

*Source: Navigant analysis*

### *8.2.3 Process*

Navigant addressed one process evaluation research question and the five Missouri (MO)-required questions for process evaluation through staff interviews and a program materials review. The evaluation team interviewed the KCP&L program manager for IEMF and the IC, reviewed the program materials on the KCP&L website, and emailed with the program manager and IC to inform the process evaluation.

[39] The cost effectiveness results should be considered conservative due to the application of the mid-life adjustment to both standard and specialty light bulbs. The most recent information available suggests that it is highly unlikely that the Department of Energy (DOE) will expand the 45 lumens per watt provision of EISA to specialty light bulbs. At the time of writing (November 9, 2018), a notice on the Office and Management and Budget's website indicates that the DOE will soon issue a ruling to rescind its December 2016 expanded definition of a general service lamp (https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=1904-AE26). If this happens, reflector, globe, candelabra, and many other specialty light bulbs will continue as exempt to EISA (their current status) and their baseline bulb will remain a halogen bulb. This stands in contrast to assumptions that underlie the mid-life adjustment included in the IL TRM V7.0, which applies a specialty mid-life adjustment starting in January 2024 (as reflected in the cost effectiveness calculations). Bulbs with the A-line shape will likely remain subject to the 45 lumens per watt efficiency standard named in EISA with delayed implementation until January 2021 (as assumed in the IL TRM and in the cost effectiveness calculations).

[40] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

**Table 8-7. 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 PY2017, and what changes are planned for PY2018? | • 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 below. 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 PY2017, and what changes are planned for PY2018?**

**FINDING 1: The IEMF program underwent a major change this year with the removal of the Missouri Low Income Housing Tax Credit (LIHTC) restriction.** Previously, Missouri legislation included a restriction such that properties receiving low income tax credits or historical tax preservation credits could not participate in the IEMF program. Per program implementation staff, this was a significant barrier to participation in the IEMF program, largely because low income housing tax credits are, and have been for a long time, the primary funding source for affordable multifamily housing.

- The removal of this legislative restriction became effective August 28, 2017 and was posted in the revised Missouri statues on September 21, 2017.
- The removal of the LIHTC restriction has allowed the IEMF program to change its outreach and partnering strategies. The program is now working closely with the Missouri Housing Commission, the regulatory body for low income housing in Missouri. Program implementation staff have met with the Missouri Housing Commission multiple times, and the Housing Commission has informed IEMF staff about properties that have received funding in recent years. IEMF has been able to target outreach to these properties and the contractors who have worked on these properties.

- To extend outreach, IEMF staff also presented at a Missouri Housing and Development Commission (MHDC) pre-applications meeting, which was attended by approximately 100-120 architects, developers, and other parties interested in applying for LIHTC funding for construction and housing projects.
- There is some evidence to suggest that the removal of the LIHTC restriction combined with the revised outreach strategies recommended during PY2016 has been effective. First, program staff have noted that their revised outreach strategies have been more effective in reaching building owners and managers, those most likely to make efficiency decisions and investments in their properties. In addition, both kilowatt-hour and kilowatt savings achieved during PY2017 were higher than savings achieved during PY2016. Recommendations related to better understanding the effectiveness of targeted outreach are discussed in the following section.
- Plan to increase the $/kWh to $.28/kWh to influence a greater amount of deep retrofit projects in PY2018.
- LED lighting upgrades in Common areas will be included as an option and a focus for upgrades through this program in PY2018.

#### *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 is low-income, multifamily residents, targeting both owners and tenants. Program implementation staff report that a key barrier to penetrating the target market is the ability to identify qualifying properties (discussed in more detail in question 2.) In addition, as found in the PY2016 evaluation, the target market generally has limited capital availability and low awareness of energy efficiency options.**

- The program has prioritized direct outreach to building owners/managers to increase awareness of the IEMF program and energy efficiency opportunities. Program staff report that the direct outreach and in-person efforts have been the most effective outreach strategy to increase program awareness and encourage participation among this customer segment.

**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 income-eligible multifamily is currently defined using the federal poverty level income guidelines and is largely limited to federally subsidized properties as identified in the National Housing Preservation database. Program staff report that a key barrier to participation is determining other non-subsidized properties that might be eligible for participation in the IEMF program.**

- GMO defines the target market of income-eligible customers as multifamily properties that are either subsidized or occupied by more than 50% tenants who have household incomes below 200% of federal poverty level income guidelines, which translates to less than $23,760 per year for a single person or $48,600 per year for a family of four.
- When non-subsidized properties have contacted the IEMF program regarding participation, the program requires the property owner/manager to verify the income level of all tenants. A total of 50% of all tenants residing in the property must be at or below the 200% federal poverty income

level. Program staff report that they do not have the resources to assist property owners/managers with this process.

- Program staff report interest in alternative methodologies for identifying income-eligible multifamily units.
- An alternative methodology to identify income-eligible multifamily units is by using MHDC rent equivalent values and/or the US Department of Housing and Urban Development (HUD) fair market rent values that are published annually.

**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: As in PY2016, Navigant found that the program includes appropriate measures for its current targets.**

- The program includes the following end-use measures: aerators, low flow showerheads, water pipe insulation, lighting, and smart power strips.
- Common area measures include lighting and an option for Custom program measures for measures deemed appropriate for that property.
- The custom program encompasses all end uses and, therefore, addresses all energy efficiency potential in the target market segment.

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

**FINDING 4: Communication channels focus largely on direct outreach and in-person contacts. Several additional communication and outreach channels are used, including leveraging partnerships with the MHDC, USDA, and other organizations involved in low income housing.**

- Communication channels and delivery are appropriate given the direct interaction with property owners/managers and tenants.
- The program also works with MHDC, US Department of Agriculture (USDA), and other organizations to identify potential building owners and/or buildings eligible to participate in the program.
- Program staff report that direct outreach has been the most effective method of increasing awareness about the IEMF program.

**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: As noted in PY2016, multifamily is a difficult segment to target in most jurisdictions. However, the program has taken steps to overcome these difficulties, including new outreach/targeting strategies and the addition of the custom program path during PY2016; these steps have opened up energy efficiency opportunities for customers interested in end uses beyond the standard measures offered in the IEMF program.**

- The first custom measures installed in the IEMF program occurred during PY2017 and included refrigerator replacements.
- Program staff report that they would like to prioritize the custom program path during PY2018 to drive greater participation in custom measures.

## 8.3 Recommendations

The evaluation team developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to move the GMO IEMF program forward and 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)

As found in PY2016, the IEMF program functions smoothly, is viewed positively by customers, provides valuable energy savings and increased comfort for income-eligible 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 KCP&L and Nexant are appropriate for the program. The tracking data included type, quantity, and location of measures, which was sufficient to review the measures. Detailed information for the two custom measures (combined for GMO and KCP&L-MO) was not included in the original tracking data; instead, measures were simply listed as custom. Navigant recommends that detailed custom measure data is captured in the tracking data moving forward.

### *8.3.2 Process*

Drawing on the materials review and staff interviews, the evaluation team developed recommendations to enhance the success of the program, which 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[41] for the IEMF program.

[41] 4 CFR- 240-22.070(8)

**Table 8-8. 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 already addressing the market imperfections in an appropriate way; it is focused on targeted and direct outreach and in-person interactions with building owners/managers and collaborating with the Missouri Housing Commission and other housing organizations. PY2018 research activities could include an assessment of the effectiveness of these targeted outreach strategies. GIS mapping could be used to map buildings that were targeted with outreach versus those that ended up participating. This type of analysis would provide more detail as to whether these targeted outreach efforts are effective. |
| 2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | Alternative methods, such as the MHDC rent equivalent value, could be leveraged to further identify low-income eligible properties. Future evaluation research tasks could include using GIS to map income-eligible properties within the GMO territory, using both the federal poverty level and alternative methodologies to identify 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 this program are appropriate for in-unit DI and common area DI. Navigant recommends that KCP&L identify commonly installed custom measures as these grow over the next program year and consider including these as prescriptive measures moving forward to ease implementation. These measures could also be linked directly to the Business Energy Efficiency Rebate (Business EER) program. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | Working with the property owners/managers directly is an appropriate communication mechanism. Several additional communication and outreach channels are used, including leveraging partnerships with the MHDC, USDA, and other organizations involved in low income housing. The program should continue leveraging these partnerships as a method to identify possible housing developments to participate in the program. |
| 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 is an opportunity for increased market research and identifying new measures as the custom program grows in PY2018. In addition, Navigant recommends including high frequency custom measures in a prescriptive manner in future program years to ease implementation. |

*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 (KCP&L)  Missouri Operations Company (MO) and Greater Missouri Operations (GMO) service territories. In turn, the manufacturers and retailers discount the shelf price of 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) 2016 and PY2017, the program supported standard A-line general service, medium screw base LEDs, and specialty LEDs (reflectors, floods, candelabras, and globe lamps, among others). In PY2017, the GMO HLR program paid an average markdown discount of about $1.49 per standard LED bulb and $2.66 per specialty LED bulb. In PY2017, 13 manufacturers and 14 retailers sold 339,545 standard LEDs and 86,653 specialty LEDs through the GMO program. Comparatively, in PY2016, 13 manufacturers and 13 retailers sold 305,375 standard LEDs and 77,411 specialty LEDs through the GMO program. To date, cumulative programs sales for Missouri Energy Efficiency Investment Act (MEEIA) Cycle 2 stand at 668,413 standard LEDs and 168,367 specialty LEDs.

The HLR program experienced a substantial program design change in PY2017. Due to the program's success at being so close to its 3-year net-savings targets in only 2 years and a portfolio shift toward programs with more concentrated demand savings, KCP&L reduced the PY2017 HLR program incentive budget from $1,044,000 to $733,533. Likewise, incentives decreased from an average of $1.89 in the first half of the year to $0.91 in the second half of the year for standard LEDs and $3.15 to $1.76 for specialty LEDs. The HLR program will continue to operate on a reduced incentive budget of $522,379 in PY2018, or 58% lower than the planned amount of $1,230,000. The incentive budget for the 3-year cycle decreased from $3,187,500 to $2,286,500, or 28% lower than planned. For this reason, the HLR program will primarily support specialty bulbs in PY2018, although the program will continue to offer standard bulbs in some discount channel (e.g., dollar) stores. The evaluation team discusses the implications of these program changes when addressing the HLR evaluation findings and recommendations in Section 9.3.

**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 (KCP&L). |
| **Program Description** | The HLR program pays incentives to manufacturers and retailers for documented sales of ENERGY STAR-qualified light-emitting diodes (LED) bulbs. 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 ICF. Manufacturers identify retail partners and propose sales of specific bulb types and incentive levels. ICF selects the winning manufacturers and retailers, and KCP&L signs the Memoranda of Understanding (MOU) with them. Customers do not apply to participate but instead buy discounted bulbs without the need for rebate coupons. |

| HLR Program Key Details | |
|---|---|
| **Verification of Purchase/Project** | Manufacturers and retailers provide invoices and proof of sale to ICF, 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. |
| **Disputes, Rejected Applications** | Customers can contact the KCP&L Home Energy Programs Line (staffed by ICF) with concerns. Manufacturers and retailers work directly with ICF representatives. |
| **Project Reporting** | ICF provides weekly sales reports to KCP&L. |

*Source: Evaluation team analysis*

## 9.2 Evaluation Findings

The following sections present Navigant's PY2017 findings for the HLR 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 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, Navigant reviewed tracking databases to assess the thoroughness, clarity, and accuracy of the information provided on program sales, bulb characteristics, and savings assumptions. The team also performed an engineering desk review, comparing GMO's energy and demand savings assumptions to those used by other program administrators in the Midwest and the results for GMO in MEEIA Cycle 1. The evaluation team also calculated an in-service rate (ISR) based on primary research conducted during onsite saturation visits to customers' homes.

The HLR program performed strongly in PY2017. The GMO verified energy savings were close to reported values (95%), and the program made substantial progress toward the 3-year net energy savings target (42%) (Table 9-2). Cumulatively, the HLR program has achieved a realization rate of 91% for gross energy savings and secured 79% of the 3-year MEEIA net energy savings target (Table 9-3). Similarly, Navigant verified a gross demand realization rate of 108% for PY2017, and the program secured 45% of its net demand savings target. The 2-year demand savings realization rate stands at 105%, and the program has reached 85% of its net demand savings target.

Two factors, both explored in PY2017 through in-store intercept surveys, largely drove the realization rates. The first factor, leakage, served to reduce savings. Leakage occurs when customers who live outside of the KCP&L-MO or GMO service territories buy HLR program-supported bulbs. Navigant estimated 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). As explained more in Appendix L, Navigant estimated leakage by asking in-store intercept respondents if they were a KCP&L electric customer. If not, the interviewer asked respondents which utility provided their electric service. Navigant weighted the data so that it more closely matched the geographic program sales distribution.

Leaked sales can be considered a form of spillover (SO). Purchasers from outside the GMO and KCP&L-MO service territories still save energy and reduce demand when they use those bulbs. However, another electric service territory in Missouri, Kansas, or perhaps another state reaps the savings. The regulations that guide energy and demand savings preclude KCP&L from claiming credit for SO to other service territories, but it is important to recognize that leaked sales have a positive societal benefit to area residents and to the regional electric grid.

Cross-sector sales to commercial and industrial (C&I) customers serve as the second factor that drove realization rates and increased savings, particularly demand savings. 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 vs. 840 hours) and coincidence factors (0.6 vs. 0.08). In-store intercepts and program staff interviews confirmed the cross-sector sales rate to be 4%, the value estimated by Navigant in MEEIA Cycle I.

**Table 9-2. HLR Program PY2017 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 13,192,192 | 12,519,138 | 95% | 25,288,145 | 10,537,931 | 42% |
| Coinc Demand at Customer Meter (kW) | 1,321 | 1,421 | 108% | 2,669 | 1,202 | 45% |

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 83% 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 | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 25,901,019 | 23,647,476 | 91% | 25,288,145 | 19,865,416 | 79% |
| Coinc Demand at Customer Meter (kW) | 2,594 | 2,717 | 105% | 2,669 | 2,288 | 86% |

*Source: Program tracking database and Navigant analysis*

#### *9.2.1.1 Net-to-Gross Analysis*

Navigant developed the recommended net-to-gross (NTG) ratios—88% for standard LEDs and 71% for specialty LEDs—based on the results of in-store intercepts and demand elasticity modeling (DEM). In-store intercepts included a series of questions designed to understand the influence of the HLR program

on purchases of HLR LEDs and non-program LEDs. As described more in the appendix, Navigant estimated free ridership (FR), spillover (SO), and NTG ratios for the program overall, including both the GMO and KCP&L-MO service territories and specialty and standard bulb types. Because sample sizes were small, the SO estimate covers both participants (only 3 program participants exhibited spillover) and non-participants (n= 21) as well as both standard and specialty bulbs. The in-store intercepts resulted in a FR value of 0.39 and SO of 0.21. Navigant calculated a NTG ratio of 0.80 for the program overall using Equation 9-1.

**Equation 9-1. Net-to-Gross Ratio**

$$Net\ to\ Gross\ Ratio = 1 - Free\ Riders + Spillover$$

Navigant also explored NTG ratios using DEM. This second approach provided additional estimates of FR, including estimates for standard and specialty bulbs (using both GMO and KCP&L-MO service territories). The DEM approach used in PY2017 is the same as that used in PY2016. The analysis in both years produced FR estimates for standard, specialty LEDs, and all LEDs. The DEM method relies solely on program sales data and is, therefore, unable to provide SO estimates. DEM uses program tracking information to determine the lift in program sales attributed to program incentives and activities through estimating customer sensitivity to prices, also known as price or demand elasticity. The more sensitive customers are to pricing—determined by changes in program sales as prices change—the lower the FR. Because the effort relies only on program data, it cannot predict program SO.

The model Navigant developed concluded that the number of LEDs sold depended on price, lumens (i.e., brightness), and promotional events. The evaluation team ran this model with actual program incentives and then again assuming KCP&L (both service territories) did not offer incentives, Thus, the model predicts sales in the presence and absence of program incentives. The FR rate is defined in Equation 9-2.

**Equation 9-2. Free Ridership**

$$Free\ Riders = \frac{Modeled\ Sales\ Without\ Program}{Modeled\ Sales\ With\ Program}$$

Navigant calculated FR to be 0.38 for all LEDs using DEM, compared to the 0.39 yielded from the in-store intercepts. FR for standard LEDs stood at 0.33, while for specialty LEDs it was 0.50 (in-store intercept sample sizes were too small to offer type-specific FR and SO estimates). Specialty LEDs often display less elasticity because customers require the differently shaped or functioning LED for a specific application (e.g., candelabra bases). Compared to standard applications, the requirement for a specialty shaped or functioning bulb reduces the options available to customers, so price becomes less important in the buying decision.

As the FR rates for all LEDs align closely between the in-store intercepts and DEM: 0.39 and 0.38, respectively, Navigant opted to apply the FR from the DEM to maintain comparability to the PY2016 estimate. Lacking a SO estimate from DEM, the team layered the SO from the in-store intercepts to the DEM-derived FR rates to estimate NTG ratios for standard, specialty, and all LEDs supported by the program. As shown in Table 9-4, the final NTG ratios are 88% for standard LEDs, 71% for specialty LEDs, and 83% for both types combined. Applying the individual rates and rolling the savings up, as reported in Table 9-2, leads to a slightly different (84%) GMO-specific overall NTG. The net energy savings totaled 10,537 MWh, or 42% of the 3-year MEEIA Cycle 2 target. The net demand savings totaled 1,202 kW, or 45% of the 3-year MEEIA Cycle 2 target. The program net savings reflect the sum of

the standard and specialty net savings rather than the application of the sales-weighted NTG. Appendix C and the accompanying databook contain additional details on the methodology and results.

**Table 9-4. HLR NTG Components and Ratio: PY2017**

| Stratum | FR | SO | Net of FR |
|---|---|---|---|
| Standard LEDs | 0.33 | 0.21 | 88% |
| Specialty LEDs | 0.50 | 0.21 | 71% |
| **Total** | **0.38** | **0.21** | **83%** |

*Source: Evaluation team analysis*

Although the PY2 estimate is acceptable for the PY2 Final Report results, Navigant and the EM&V Auditor agree that further research into the HLR program's SO is required in PY3. In PY3 of MEEIA Cycle 2, the Navigant team will convene a stakeholder consensus process to update the SO estimate. The use of a consensus process recognizes both the rapid change in the lighting market (e.g., widespread adoption of LEDs, lower LED prices, and regulatory uncertainties) as well as the challenges of SO estimation for upstream programs. Navigant will gather market trend information and SO ratios (likely FR and NTG ratios as well) from various sources and present them to stakeholders. Navigant will lead an iterative process, similar to a Delphi Panel, in which stakeholders weigh in on what they believe the true SO value is and why. Stakeholders will review each other's estimate and, if needed, provide revisions to their own values. In the end, the stakeholders will reach consensus on a SO value to apply to PY3.

### *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. Please refer to the 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 and 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 69% lower incremental costs.

The Navigant team applied a mid-life adjustment to both standard and specialty lamps offered through the HLR program. This adjustment reflects a potential change to federal bulb efficiency standards stemming

from the Energy Independence and Security Act (EISA)[42]. The IL TRM V7.0 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.

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: PY207**

| Program Year | TRC Test[43] | 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 |
| **Program Overall** | **N/A** | **1.50** | **1.71** | **2.03** | **3.94** | **0.49** |

*Source: Navigant analysis*

### *9.2.3 Process*

The HLR program's process evaluation focused on understanding program design and revisions, marketing and outreach, and what factors drive consumer bulb purchases. The upstream nature of the HLR program makes it difficult to identify program participants because the program does not collect contact information for customers who buy a discounted bulb from participating retailers. Thus, in-store intercept surveys conducted in the KCP&L-MO and GMO service territories addressed factors that influence lighting purchases and exposure to program marketing and outreach, as well as impact and NTG elements described above.

Navigant addressed four process evaluation research questions and the five Missouri-required questions[44] for process evaluation through program and implementation staff interviews and in-store intercept surveys. Table 9-6 provides a summary of the research questions and activities.

[42] The cost effectiveness results should be considered conservative due to the application of the mid-life adjustment to both standard and specialty light bulbs. The most recent information available suggests that it is highly unlikely that the Department of Energy (DOE) will expand the 45 lumens per watt provision of EISA to specialty light bulbs. At the time of writing (November 9, 2018), a notice on the Office and Management and Budget's website indicates that the DOE will soon issue a ruling to rescind its December 2016 expanded definition of a general service lamp (https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=1904-AE26). If this happens, reflector, globe, candelabra, and many other specialty light bulbs will continue as exempt to EISA (their current status) and their baseline bulb will remain a halogen bulb. This stands in contrast to assumptions that underlie the mid-life adjustment included in the IL TRM V7.0, which applies a specialty mid-life adjustment starting in January 2024 (as reflected in the cost effectiveness calculations). Bulbs with the A-line shape will likely remain subject to the 45 lumens per watt efficiency standard named in EISA with delayed implementation until January 2021 (as assumed in the IL TRM and in the cost effectiveness calculations).

[43] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

[44] 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** | |
| 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 PY2017, and what changes are planned for PY2018? | • Program staff interviews |
| 3. How influential are program marketing and outreach on consumer lighting purchases? | • In-store intercept surveys |
| 4. What non-program factors influence consumer lighting purchases? | • In-store intercept surveys |
| **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<br>• In-store intercepts |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | • Program staff interviews |
| 5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program? | • Program staff interviews<br>• In-store intercept surveys |

*Source: Navigant analysis*

The team's findings are provided below. 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 PY2016 report, there were five findings and recommendations for the HLR program. Below is a restatement of the PY2016 process evaluation recommendations along with status updates of those findings:**

1. KCP&L should monitor the effects of further expanding program offerings in grocery stores and drugstores and on-line and continue regular and open communications with the implementation contractor (IC).

   **STATUS:** GMO tracked the impact of expanding sales to grocery stores, drugstores, and online, selling 9,610 standard LEDs through one grocery store and two drugstore chains. The program ultimately stopped the expansion during the program year due to incentive budget reductions, as described more below.

2. Monitor the cost-effectiveness of the newly added component incorporating grocery store, drugstore, and online retailers.

**STATUS:** GMO did not monitor the cost-effectiveness of this expansion given that it was short-lived due to the incentive budget reductions.

3. While satisfaction is high, the program might benchmark its incentive levels to comparable programs in other jurisdictions and/or explore the cost-effectiveness of raising incentives.

   **STATUS:** The IC benchmarked GMO LED incentive levels both before and after the incentive reductions in the middle of the program year. They concluded that incentives among other program administrators varied, but GMO's incentives prior to the adjustment were on the higher end of the range. After the incentive adjustment, the incentives were in the middle of the range.

4. Marketing materials could be improved to distinguish and explain the differences between ENERGY STAR and non-ENERGY STAR LEDs and consistently use the ENERGY STAR logo and highlight the benefits of ENERGY STAR.

   **STATUS:** The program did not update marketing materials in PY2017 and does not plan to do so in PY2018. However, during in-store intercept visits, the team found the ENERGY STAR logo to be present on nearly all marketing materials.

5. Ensure that retailers are training their employees and encourage that they are actively educating customers about ENERGY STAR LEDs and how to select the correct bulb for their needs.

   **STATUS:** The IC continued to work with manufacturers and retailers to make sure sales staff were familiar with program offerings and the benefits of ENERGY STAR LEDs over other bulb types.

**QUESTION 2: What changes have been made to the program in PY2017, and what changes are planned for PY2018?**

**FINDING 2: GMO substantially revised the program in PY2017, with additional changes planned for PY2018. The changes reflect the continually changing lighting market (e.g., reduced prices for LEDs before applying incentives) and the fact that the program was nearing its 3-year net savings target in only 2 years.**

- In 2017, the program reduced the HLR incentive budget by 30% from planned PY2017 values and 58% from planned PY2018 values.
- In 2017, the program reduced incentives on both standard and specialty bulbs throughout the year. Incentives decreased from an average of $1.89 in the first half of the year to $0.91 in the second half of the year for standard LEDs and $3.15 to $1.76 for specialty LEDs.
- In 2017, the program curtailed its expansion to grocery store, drugstore, and online retailers.
- In 2017, the program did not update marketing materials and does not plan to update them in PY2018.
- In 2018, the program will primarily support specialty LEDs, providing incentives for standard bulbs only in a certain discount channels (e.g., dollar stores).
- In 2018, the program will reduce the number of in-store promotional events, again reflecting overall program success in PY2016 and PY2017 but also the reduced incentive budget for PY2018.

**QUESTION 3: How influential are program marketing and outreach materials on consumer lighting purchases?**

**FINDING 3: The program marketing and outreach materials, including promotion events, in-store displays, and partnership with ENERGY STAR serve to increase purchasers of LEDs, including both ENERGY STAR and non-ENERGY STAR models.**

- Of in-store intercept respondents (including both GMO and KCP&L-MO respondents) who bought any light bulbs, 31% noticed program materials in the store, while 40% of program LED purchasers noticed the materials.
- More than one-half of program bulb purchasers who saw the materials (56%) said the in-store information was extremely influential in their decision to buy the LED (on a 5-point scale where 0 was not at all influential and 5 was extremely influential). In comparison, only 16% of non-LED purchasers who saw the materials said they were extremely influential on their purchase.
- Just over one-half (51%) of the in-store intercept surveys occurred on promotional event days in which the IC demonstrated program-supported LEDs and educated consumers about ENERGY STAR LEDs. Of the 38 respondents who noticed the demonstration and bought a program-supported LED, one-half (50%) said the demonstration was extremely influential in their decision, and another 18% said it was very influential.
- The DEM results also found that promotional events increase program sales (see Appendix L, section L.1.2).
- Nearly all in-store intercept respondents had heard of the ENERGY STAR label prior to the interview (88%), but program bulb purchasers (94%) were more likely to have heard of the label compared to non-program LED purchasers (89%) and non-LED purchasers (78%).
- The ENERGY STAR label was very influential or extremely to 40% of program LED purchasers and 42% of non-program LED purchasers compared to only 15% of non-LED purchasers. This suggests that knowledge of the ENERGY STAR label leads to more efficient choices, even if the choice is not always ENERGY STAR-qualified.
- Despite the relationship between awareness of the ENERGY STAR label and efficient bulb purchasers, only 10 of the 80 program bulb purchasers who noticed in-store signage also noticed the ENERGY STAR label on the signs. This suggests that the general promotion of ENERGY STAR products may be a more motivating influence than displaying the label on program materials.

**QUESTION 4: What non-program factors influence consumer lighting purchases?**

**FINDING 4: Consumers select particular bulbs for many reasons, with certain features (including shape), familiarity, price, brightness, and energy savings being among the most commonly mentioned. The factors that motivate bulb purchasers vary between LED and non-LED purchasers.**

- About one-half of all bulb purchasers (51%) interviewed during in-store intercepts choose their selected bulbs because of their specific features (e.g., shape or brightness). This percentage was higher (60%) for non-program LED purchasers. Consumers who bought non-LEDs most often selected a bulb because it had the same shape as the one they were replacing (59%).
- When asked to name the most important bulb feature guiding their bulb selection, 22% of all in-store intercept respondents named bulb shape. However, the responses varied by the type of bulb purchased. Shape was the most important factor to non-LED purchasers (41%), compared to 9% of standard program LED purchasers and 6% of specialty program LED purchasers. Instead, standard program LED purchasers selected bulbs based largely on energy use/savings

(30%) and price (22%). Specialty program LED purchasers selected bulbs based on brightness (26%), price (24%), and energy use/savings (23%). Non-program LED purchasers did not demonstrate strong preferences for features.

- Price did not serve as the most important consideration when selecting a bulb for any of the purchasing groups. This may reflect the convergence of bulb prices over time, as the price of LEDs (especially those with program incentives) has dropped to levels similar to halogens and incandescents. With less variation in price, consumers now focus more on other bulb features.

#### *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 led to budget reductions to maintain Cycle 2 portfolio spending caps. Therefore, the program now focuses primarily on reducing the shelf price and increasing the availability of specialty LEDs.**

- The HLR program reduced the shelf price of standard LEDs by $1.49 from $3.76 to $2.27. For specialty LEDs, the program reduced the price by $2.66 from $7.38 to $4.72. Manufacturers and retailers sometimes added their own discounts to reduce the shelf price further.
- The HLR program expanded to grocery and drug stores in PY2017, signing MOUs with these retailers to sell LEDs in these sectors and achieving the sales described above. Typically, the program will extend MOUs when program partners achieve initial sales targets. However, when KCP&L reduced the program incentive budget, ICF and KCP&L decided not to extend MOUs with grocery and drugstore retailers and decided not to issue new MOUs in these sectors. Plans to open an online store were also put on hold.
- GMO included the HLR program in portfolio-wide marketing efforts in the mass media. The HLR program specific marketing and outreach occurred at the point of sale through educational signage that explained the benefits of LEDs and small in-store promotional 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 program appropriately defines the target market as all residential customers. PY2016 results suggested that targeted marketing may help recruit additional hard-to-reach (HTR) customers (i.e., income-eligible households, renters, non-English speaking households, bargain store shoppers), but the recent incentive budget reductions have limited the ability of GMO and the IC to expand outreach to HTR customers.**

- Although many materials are available in both English and Spanish, the program did not develop marketing that specifically targeted HTR customers. This is appropriate given the need to manage HTR program expenditures to the remaining budget. The program will continue to provide incentives and marketing support for standard LEDs in the discount channel, which disproportionately serves the HTR population.

**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 supported standard and specialty LEDs through PY2017, but it will focus mainly on specialty bulbs in PY2018 to maintain budget integrity. This design makes sense given the budget constraints.**

- 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.
- The program budgetary constraints mean that GMO must decide how to spend limited funds in an efficient manner. However, the focus on specialty bulbs may strain GMO's ability to achieve gross and net savings targets given lower specialty sales and NTG ratios. If this occurs, KCP&L could provide a special offer on standard LEDs in PY2018 to meet overall MEEIA Cycle 2 targets, although this is unlikely, as KCP&L's Product Manager has indicated, based on portfolio performance, they are unlikely to invest further funds towards the HLR program in MEEIA Cycle 2.

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

**FINDING 4: GMO and the IC market the program widely through mass media (including the internet) and within retail stores. This strategy matches the current program budget and has been suitable to meet sales and savings targets through PY2017.**

- The program has met—and sometimes exceeds—sales and savings targets with their current HLR marketing efforts. As described above, these efforts have served to increase sales of program-supported bulbs.
- Budget constraints advise against revising the marketing efforts for PY2018.

**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 90% of reported savings and 75% of its MEEIA Cycle 2 net savings targets cumulatively over PY2016 and PY2017.**

- 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

Navigant 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 two 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. Given the reduced program incentive budget, Navigant concurs with GMO's decision to support primarily specialty LEDs in PY2018 and to reduce the number of promotion events. However, the smaller sales volume and lower NTG ratios for specialty bulbs coupled with the loss of the positive influence of promotional events on sales could strain the HLR program's ability to meet MEEIA Cycle 2 targets despite strong program performance in PY2016 and PY2017.

### *9.3.1 Impact*

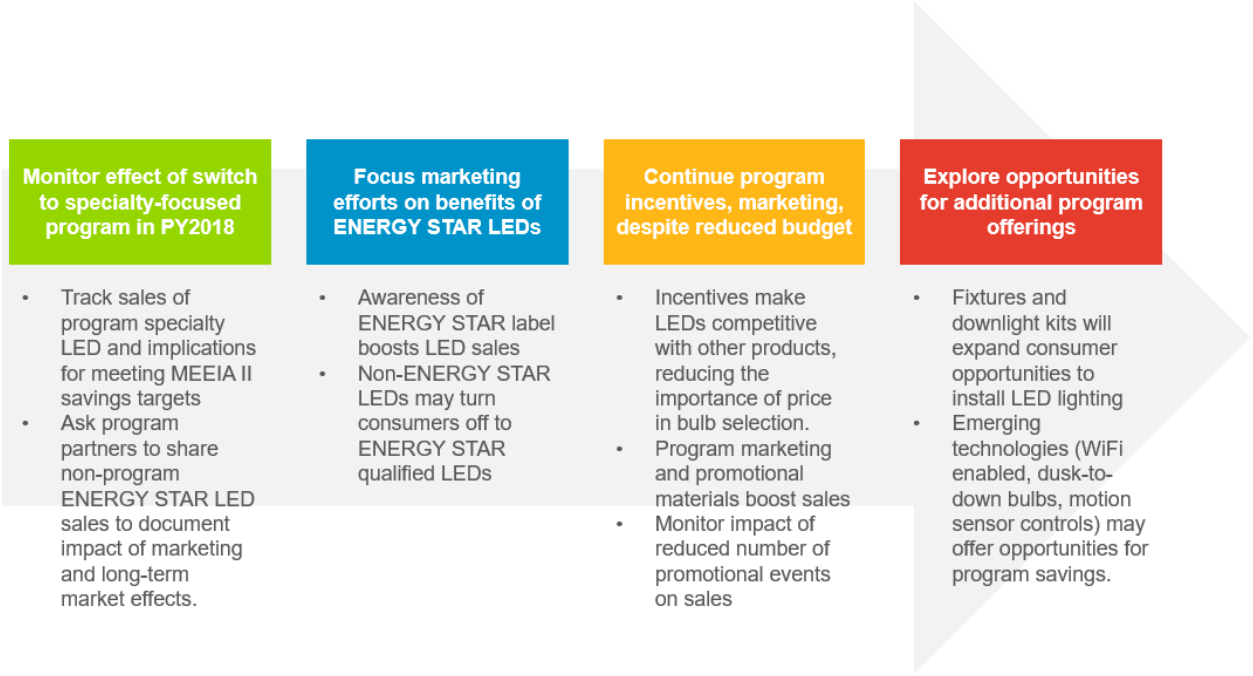
Navigant suggests revising energy and demand savings calculations to reflect the following:

- Account for leakage, assumed to be 14% of HLR LED bulb sales (GMO currently makes no adjustment for leakage)
- Retain an annual HOU of 840 hours for HLR standard LED bulb sales installed in residential settings
- Adopt an annual HOU of 986 for HLR specialty LED bulb sales installed in residential settings
- 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 88% for standard LEDs and 71% for specialty LEDs

### *9.3.2 Process*

Drawing on the findings from interviews with program and implementation staff and suppliers, onsite saturation visits to customer homes, consumer surveys, and a marketing materials review, Navigant developed recommendations to enhance the success of the program.

**Figure 9-1. Summary of HLR Program Process Recommendations: PY2017**




*Source: Navigant analysis*

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

The process evaluation found that the HLR program has shown a strong ability to change in the face of the rapidly changing lighting market, including incorporating newly qualified ENERGY STAR LEDs and adjusting to continual LED price decreases. Table 9-7 summarizes recommendations based on the four 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 program has made appropriate progress on prior recommendations given recent reductions to the HLR program incentive budget. |
| 2. What changes have been made to the program in PY2017 and what changes are planned for PY2018? | GMO and the IC should monitor the effect of supporting mainly 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. |
| 3. How influential are program marketing and outreach on consumer lighting purchases? | KCP&L 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. |
| 4. What non-program factors influence consumer lighting purchases? | 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. |

*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[45] 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, Navigant makes only a few recommendations regarding the required process evaluation questions.

[45] 4 CFR- 240-22.070(8)

**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 support mainly higher cost specialty bulbs in PY2018 given the limited incentive budget. |
| 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. Likewise, the evaluation team concurs with the decision to continue to support standard LEDs in discount stores in PY2018, increasing the availability of these bulbs to HLR 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? | While Navigant agrees with the decision to focus mainly on specialty bulbs in PY2018, the 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. |
| 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 PY2016 and PY2017. Navigant concludes that they are appropriate for the current program design and scope. |
| 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. |

*Source: Navigant analysis*

# 10. HOME ENERGY REPORTS

## 10.1 Program Description

Through the Home Energy Reports (HER) program, Kansas City Power and Light (KCP&L) 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 KCP&L 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) 2 included four waves:

- KCP&L 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 PY2017 unless otherwise noted.

Customers in the 2013, 2015, and 2016 waves received reports in April, July, and October 2017 and in January 2018. Customers in the 2017 wave received an initial burst of reports in June, July, and August 2017 and then received reports in October 2017 and January 2018 with the other waves. Customers with email addresses on file (about 12% 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 programs as a result of the reports.[46] |
| **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, Navigant conducted a billing analysis in PY2016 for each program wave of customers. The evaluation team calculated a 99% realization rate and concluded that the evaluated net verified savings were equivalent to the implementer-reported savings. Given that the PY2016 analysis validated the implementer-reported savings, the team is reporting the implementer-reported numbers for 2017 for verified savings. Navigant is scheduled to conduct another billing analysis for PY2018 as a consistency check to ensure the models uses are still accurate. This approach (every other year billing analysis) ensures efficient use of evaluation resources for the 3-year cycle.

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. 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 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 PY2017 findings for the HER program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files.

[46] 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.

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*

In PY2016 Navigant conducted a billing analysis for each program wave of customers to verify program impacts. In the PY2016 evaluation, the evaluation team calculated a 99% realization rate and concluded that the evaluated verified net savings were equivalent to the implementer-reported savings. Since the PY2017 evaluation does not include billing analysis and since the PY2016 final, approved impact analysis validated the PY2016 implementer-reported savings, the team is reporting the PY2017 implementer-reported numbers for PY2017 for verified savings. For PY2017, the team reviewed the metrics (household savings, household usage, total savings and usage, savings percent) provided by Oracle in monthly reports to KCP&L. The team reviewed the metrics for consistency with PY 2016, outlier values or patterns, and month-to-month variation in metrics. Navigant is scheduled to conduct another billing analysis for PY2018 as a consistency check to ensure the models used are still accurate. This approach (every other year billing analysis) ensures efficient use of evaluation resources for the 3-year cycle.

The HER program achieved 21,011,479 kWh of verified gross and net incremental energy savings at the customer meter in PY2017. This represents the combined savings from the four waves of customers. The program achieved 100% of the 3-year Cycle 2 Missouri Energy Efficiency Investment Act (MEEIA) target.

The program achieved 3,808 kW of verified gross and net coincident demand savings at the customer meter in PY2017. This represents the combined coincident saving from all four waves of customers. The program achieved 90% of the 3-year Cycle 2 MEEIA target.

The verified coincident demand savings include a small adjustment from the implementer-reported demand savings. Coincident demand savings are calculated by the implementer by taking energy savings from August and dividing it by the number of hours in August times a factor of 1.5 (see Methodology Appendix M for detail on the calculation). The reported coincident demand savings used the wrong factor. The implementer has corrected the calculation error. Verified coincident demand savings are 98% of implementer-reported savings for the HER program.

Households in the 2016 Expansion and 2017 waves experienced lower savings (0.6% and 0.7% of baseline usage, respectively), while households in the 2013 and 2015 waves experienced higher savings (2.3% and 1.7% of baseline usage, respectively). Typically, new waves do start with lower savings and then ramp up in subsequent years. However, the 2016 wave savings remain lower than other waves in the second year of the program. Notably, households in the 2016 Expansion and the 2017 waves have lower average baseline energy use (32 kWh per day) than the 2015 wave (58 kWh per day) and the 2013 wave (42 kWh per day), so the 2016 Expansion wave may have less opportunity to reduce energy use. Differences between the 2016 Expansion wave and the other treatment waves are discussed further in section 10.2.3. Table 10-3 provides a summary of the program-to-date savings.

**Table 10-2. HER Program PY2017 Energy and Demand Savings Summary**

| | Gross | Net |
|---|---|---|

| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
|---|---|---|---|---|---|---|
| Energy at Customer Meter (kWh) | 21,011,479 | 21,011,479 | 100% | 21,070,772 | 21,011,479 | 100% |
| Coinc Demand at Customer Meter (kW) | 3,905 | 3,808 | 98% | 4,215 | 3,808 | 90% |

*Source: Navigant analysis*

**Table 10-3. HER Program Program-to-Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 21,011,479 | 21,011,479 | 100% | 21,070,772 | 21,011,479 | 100% |
| Coinc Demand at Customer Meter (kW) | 3,905 | 3,808 | 98% | 4,215 | 3,808 | 90% |

*Source: Navigant analysis*

#### *10.2.1.1 Net-to-Gross*

As shown in Table 10-4, for PY2017, Navigant assumed a NTG value of 1.0 for the HER program.

**Table 10-4. HER NTG Components and Ratio: PY2017**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| PY2017 | 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. 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 10-5 presents the benefit-cost ratios for the five standard benefit-cost tests for PY206, PY2017, and program to date, as well as the total resource cost (TRC) test filed by GMO. Based on Navigant's 2017 benefit-cost analysis, the program did not reach 1.0 in the TRC, societal cost test (SCT), utility cost test (UCT), or ratepayer impact measure (RIM) test. 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 similar to that filed by GMO.

**Table 10-5. HER Benefit-Cost Ratios: PY2017**

| Program Year | TRC Test[47] | 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 |
| **Program Overall** | **N/A** | **0.84** | **0.84** | **0.84** | **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, a process evaluation survey of treatment and control group customers, and a review of the program implementation contractor's (IC's) PY2017 Customer Engagement Tracker (CET) survey results. Note that CET results report combined GMO and KCP&L Missouri Operations Company (KCP&L-MO) results. The PY2017 CET included customers from the 2016 Expansion wave.

[47] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

**Table 10-6. HER 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 PY2017, and what changes are planned for PY2018? | • Program staff interviews<br>• Materials review |
| 2. How are customers engaging with the program through the reports and energy-saving actions? | • CET survey<br>• HER process evaluation survey |
| 3. How satisfied are customers with the reports? Do reports impact their satisfaction with KCP&L? | • Evaluation survey<br>• CET survey |
| 4. Are there any differences between the 2016 Expansion customers and other program customers that help us understand the lower savings among the 2016 Expansion wave? | • Evaluation survey<br>• 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 below. Recommendations for consideration in relation to these findings are in Section 10.3.

#### *10.2.3.1 General Process Evaluation Questions*

**QUESTION 1: What changes have been made to the program in PY2017 and what changes are planned for PY2018?**

**FINDING 1: To address lower than expected savings in PY2016, the program added a new wave of 26,000 treatment customers and 12,000 control customers in PY2017.**

- The marketing modules (messaging specific to GMO program offerings) change from year to year, but the basic report format was unchanged in PY2017 and will not change in PY2018.

- In May 2018, KCP&L will be upgrading its customer information system (CIS), which will result in one missed electronic HER and will require updates to the Oracle data ingest process. There will be no changes to customer-facing materials.
- Oracle continues to work with KCP&L to boost the number of email address on file for the electronic reports, including exploring processes for KCP&L to send the electronic reports to address concerns about transmitting email addresses from KCP&L to Oracle.

**QUESTION 2: How are customers engaging with the program through the reports and energy-saving actions?**

**FINDING 2: Most customers (81%) read the report and 27% report taking an energy-saving action.**

- Of KCP&L customers responding to the CET who recall receiving the HER, 95% state that they read some or all of the report or glanced at the pictures and 65% report talking to others within or outside their household about the report.
- Of KCP&L customers responding to the CET who recall receiving the HER, 27% said they took an action after reading the report. The most common actions were adjusting lighting habits and adjusting or replacing thermostats.

**QUESTION 3: How satisfied are customers with the reports? Do reports impact their satisfaction with KCP&L?**

**FINDING 3: Among KCP&L customers responding to the CET survey who have looked at the reports, 80% agree or strongly agree that they like the reports.**

- Treatment customers are more likely than control customers to agree with the following statements:
    - KCP&L wants to help me save money: 65% of treatment customers agree compared to 54% of control customers.
    - KCP&L provides customers with useful tools to learn about energy usage: 73% of treatment customers agree compared to 65% of control customers.
    - KCP&L provides useful suggestions on ways I can lower my energy usage and reduce my bill: 75% of treatment customers agree compared to 67% of control customers.
- Customer suggestions 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.

**QUESTION 4: Are there any differences between the 2016 Expansion customers and other program customers that help us understand the lower savings among the 2016 Expansion wave?**

**FINDING 4: As a group, the 2016 Expansion wave differs from earlier waves in ways that may limit savings.**

- As noted, baseline energy use for the 2016 Expansion wave is much lower than for earlier waves.
- Customers in the 2016 Expansion wave are more likely to report that the report showed them that they use less or about the same as their neighbors (59% compared to 47% of all other waves).

- Customers in the 2016 Expansion wave are less likely to read or skim the report than customers in other waves (58% compared to 72%).
- Customers in the 2016 Expansion wave are less likely to be familiar with rebates on Nest thermostats (17%) compared to other customers (30%) and report lower levels of interest in energy-saving tips.
- Customers in the 2016 Expansion wave are more likely to rent versus own their home and they are slightly less likely to live in a single-family home: 35% of 2016 Expansion wave customers rent their home compared to 20% of other wave treatment customers, and 73% of 2016 Expansion wave customers live in single-family homes compared to 81% of other treatment customers.
- Customers in the 2016 Expansion wave are more likely to be younger: 36% of the 2016 Expansion wave are under 44 years old compared to 36% of other treatment groups. They also have smaller household sizes.

#### *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 PY2017 program targeted over 150,000 customers to receive five HERs. An additional 50,000 customers served as a control group in the experimental design.
- Based on responses to the CET, 73% of treatment customers agree that KCP&L provides tools to help customers learn about energy use. Furthermore, 71% of treatment customers report that the energy efficiency tips on the report are useful, while 61% 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 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 KCP&L 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.
- The print reports also cross-promoted Nest thermostats and rebates for air conditioners or heat pumps through GMO programs. The email reports included messaging on Energy Analyzer, air conditioner tune-ups, rebates on a new air conditioners or heat pumps, seasonal umbrella messaging about KCP&L programs, Nest thermostats, and in-home assessments.
- Based on the evaluation survey, 10%-20% of treatment customers own smart home assistants, home security, smart light bulbs, or smart appliances.

**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 or five paper reports in PY2017.
- Customers with email addresses on file (about 12%) 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. However, there may be an opportunity to engage the 29% of customers who either did not recall the report or did not look at the report.**

- Of CET respondents, 29% either did not recall receiving the report or did not read the report.
- Of CET respondents who recall the reports, 72% like the reports and 61% talk to other people about the reports.
- Based on responses to the evaluation survey, customers are most likely to recall the neighbor comparison (92%) and then energy-savings tip (62%) but give higher ratings to the tips (7.1 on a 10-point scale) compared to the neighbor comparison (6.2).

**FINDING 6: Customers in the 2016 Expansion wave differ from customers in other waves in baseline energy use and demographics.**

## 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*

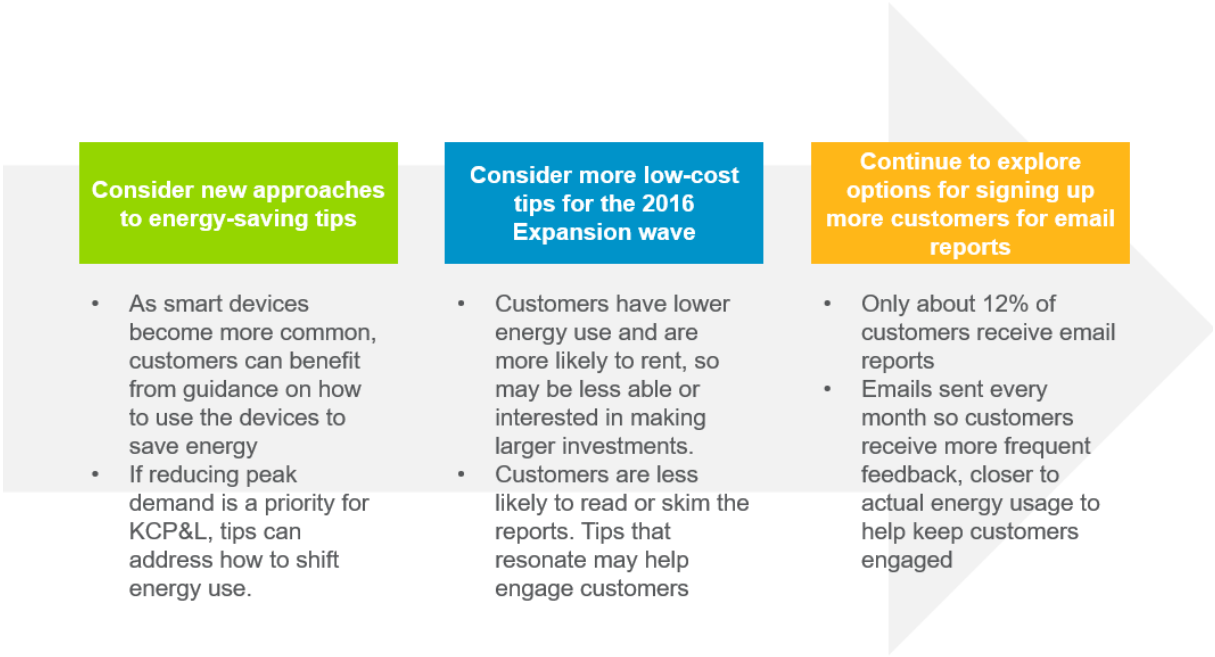
The tracking data and savings calculations provided by Oracle are appropriate for billing analysis of an RCT. Initial kilowatt (kW) reduction values provided by Oracle did not use the correct multiplier of 1.5 for all waves (see methodology for calculation details), but Oracle identified and corrected the error. Navigant makes the following recommendations related to the impact evaluation:

- Continue to use Oracle-reported savings for tracking purposes.
- Evaluate the reported savings every 2-3 years to monitor continued consistency between evaluated savings and implementer-reported savings.
- Conduct an analysis of demand impacts using advanced metering infrastructure (AMI) data from a sample of treatment and control customers. While the Oracle methodology is robust, it does not include customers from KCP&L. Navigant suggests using a post-only difference approach (most customers will not have AMI data available for the pre-period) to confirm the applicability of Oracle's demand reduction estimate to the KCP&L program.

### *10.3.2 Process*

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

**Figure 10-1. HER Program Process Recommendations: PY2017**




*Source: Navigant analysis*

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

The team examined four research questions in addition to the Missouri-based evaluation research questions. Based on its research question-based findings, the evaluation team suggests recommendations to improve customer satisfaction and engagement.

**Table 10-7. HER Research Question-Based Recommendations**

| Research Question | Navigant Recommendation |
|---|---|
| 1. What changes have been made to the program in PY2017, and what changes are planned for PY2018? | The program added an additional wave of almost 26,000 customers and is exploring ways to increase the number of customers who receive email reports. Navigant recommends that efforts to increase email reports continue. |
| 2. How are customers engaging with the program through the reports and energy-saving actions? | In PY2017, the HER program promoted other KCP&L energy efficiency programs through the HER marketing modules and campaigns. Because energy-saving actions are difficult to ascertain through telephone surveys, KCP&L may want to consider more in-depth qualitative research such as in-depth interviews or ethnographic research independent from Oracle. This may help the utility to understand what changes customers are making in response to the reports and why some customers do not read the reports. |
| 3. How satisfied are customers with the reports? Do reports impact their satisfaction with KCP&L? | Reports have a positive impact on customer satisfaction. No further recommendations are suggested. |
| 4. Are there any differences between the 2016 Expansion customers and other program customers that help us understand the lower savings among the 2016 Expansion wave? | KCP&L could consider emphasizing low cost energy-saving actions or tips geared toward lower energy users on reports sent to the 2016 Expansion wave. For example, customers in that wave might be less likely to have central air conditioning (given lower baseline usage) so tips on managing fan use or plug loads may be more relevant to some members of the wave than upgrading a central air conditioner. |

*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[48] for the HER program. Overall, the evaluation team found that the program meets the requirements. Below the team offers suggestions to further enhance the program.

[48] 4 CFR- 240-22.070(8)

**Table 10-8. HER Missouri Requirement-Based Recommendations**

| Missouri Question | Navigant Recommendation |
|---|---|
| 1. What are the primary market imperfections that are common to the target market? | KCP&L should continue providing reports and encouraging customers to log into the Online Energy Analyzer 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. |
| 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. While penetration of smart technologies among treatment customers is still low, as more customers adopt these technologies, the reports should include tips on how to use these technologies to manage energy use. If reducing peak demand is a priority for KCP&L, the program could add tips to encourage shifting of energy use. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | The program may want to consider signing up more customers for email reports so that customers can receive messaging from both channels. Navigant notes that this would require capturing and sharing more customer emails with Oracle, which may or may not be feasible given program resources. The program may want to continue exploring the possible option of KCP&L sending email reports so that email addresses are not given to Oracle. |
| 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? | Increasing email distribution of reports may help some customers who are not currently reading the report and thus encourage more energy-saving actions. The program may also want to consider modifying tips and messaging for the 2016 Expansion wave. |

*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 with access to the internet to track and analyze their energy use and receive educational materials on energy savings for heating, cooling, lighting, and other electrical equipment.

Residential customers in the Kansas City Power and Light (KCP&L) 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 have access to more limited functionality. Business customers that are billed based on energy use (kWh) and not demand (kW) can access the tool through My Account. Business customers can track their energy and access tips for saving energy. However, business customers 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 implements the program. |
| **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 changes have been made to the program in program year (PY) 2017, and what changes are planned for PY2018? | • Program staff interviews<br>• Materials review |
| 2. How are residential customers engaging with Energy Audit and energy-saving actions? | • CET survey<br>• HER Evaluation survey |
| 3. How satisfied are residential customers with Energy Audit? Does this tool impact their satisfaction with KCP&L? | • 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 below. 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 changes have been made to the program in program year (PY) 2017, and what changes are planned for PY2018?**

**FINDING 1: In PY2017, the program employed new marketing campaigns and tactics in addition to traditional bill inserts to guide customers to the WUM page. These efforts included the following:**

- Messaging on the HER
- Targeted email communications
- Facebook ads and boosted posts
- My Account banner ads
- Website promotions

Changes for PY2018 include new colors and style sheets for the portal in April 2018. In the third quarter of 2018 a new platform that will embed Oracle widgets on the KCP&L's webpage will allow for a single sign-on experience for customers.

**QUESTION 2: How are residential and small business customers engaging with the Energy Audit tool and energy-saving actions?**

**FINDING 2: 14,235 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 2017. Across all KCP&L territory, 14% of My Account users completed WUM in calendar year 2017, meeting the program manger's goal.**

- According to the implementer, 45% of page views in 2017 were on the My Energy Use page, while 13% of page views were on WUM and another 13% were on the dashboard.
- On the process evaluation survey, 25 customers (out of 225) reported using the Energy Analyzer tool.
- However, 84% of customers logins in 2017 were unique, suggesting that there are opportunities to encourage customers to return to the tools.

**QUESTION 3: How satisfied are residential customers with the Energy Analyzer?**

**FINDING 3: Most HER customers who have also used the Energy Analyzer tool report high levels of satisfaction.**

- 73% of CET respondents who have used Energy Analyzer are satisfied with it.
- 55% of CET respondents who have used Energy Analyzer find the neighbor comparison most useful, while 22% of respondents find the WUM page most 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 PY2017, 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 PY2017.**

- In 2017, the HOEA used multiple communication channels including targeted emails, Facebook ads and boosted posts, banner ads on the KCP&L website, messaging on HERs, and bill inserts to guide residential customers to the tools, particularly the WUM section. Completions of WUM increased substantially in 2017 to nearly 38,000 cumulative completions from Missouri customers (combined territories), with over 14,000 of those completions occurring in 2017.
- Page view results show spikes in views after the “Know it And show it” campaign on the electronic home energy report (eHER) and after the June heating and cooling rebate campaign.

- BOEA did not do any targeted communications in PY2017. However, some business customers could have received the broader communications to My Account customers.

**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 KCP&L 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: 27% of views in 2017 were on smartphones.
- A potential barrier for some customers could be knowledge of the tools and uncertainty around how to use the tools. KCP&L has tried to address this by guiding customers to start with the WUM online audit.
- 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. A non-experimental comparison of HOEA users to non-HOEA users suggests that HOEA users are more likely to participate in energy efficiency programs, and limited survey data suggests customers are satisfied with the tools. The evaluation team's recommendations are considerations to ensure the tools remain available, relevant, and impactful for customers.

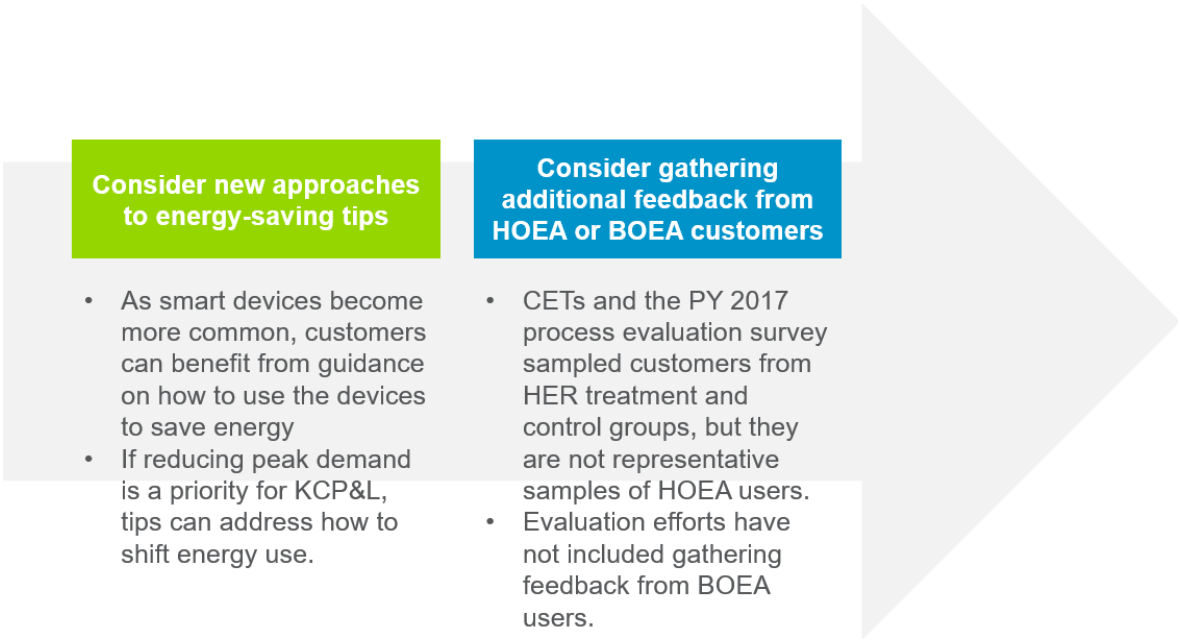
### *11.3.1 Impact*

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. The evaluation team offers suggestions to help keep customers engaged with the tools and to increase access to additional customers.

**Figure 11-1. HOEA and BOEA Process Recommendations: PY2017**




*Source: Navigant analysis*

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

Based on its research question findings, the evaluation team suggests two recommendations to further understand customer engagement with HOEA and BOEA.

Note that because the evaluation did not include any surveys of HOEA or BOEA customers (survey efforts were aimed at the HER treatment and control customers, some of whom also used HOEA), the team did not have any feedback from small and medium businesses on the 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? | KCP&L 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? Does this tool impact their satisfaction with KCP&L? | |

*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[49] for HOEA and BOEA. Overall, the evaluation team found that the program meets the requirements. Below the team offers suggestions to further enhance the program.

**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? | KCP&L 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? | KCP&L should continue to monitor the effectiveness of outreach to ensure residential and small business customers learn about the tools. The utility may want to gather feedback from small businesses to consider whether messaging for this group should be targeted by business type. |
| 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. For example, as connected devices become more common, Energy Analyzer could include tips on how to use connected devices to reduce and manage energy use. If reducing peak demand is a priority for KCP&L, the program could add tips to encourage shifting of energy use. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | Navigant suggests KCP&L continue trying to reach customers through the existing approaches and also consider additional approaches such as bill inserts or email blasts. The program could consider cross-promoting through other energy efficiency programs such as the Residential Programmable Thermostat program to reach customers who may be looking for a next step in managing their energy use. The program could also consider cross-promoting through non-energy efficiency programs such as financial 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? | KCP&L could consider promoting the tools at public libraries or community centers that provide access to computers and the internet. Collecting additional customer feedback from efforts suggested in no. 1 and no. 2 can also inform efforts to encourage customers to return to the tools frequently. |

[49] 4 CFR- 240-22.070(8)

*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 a rebate on their previously owned Nest thermostat. By participating, customers allow Kansas City Power and Light (KCP&L) to remotely operate their HVAC system during peak demand periods by sending a signal to participating thermostats. This program is called Rush Hour Rewards (RHR). Additionally, 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 program year (PY) 2017, 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 upon installation receive a $50 rebate. These customers receive a $25 incentive each year they remain in the program. DIY participants are the most common type of thermostat participant.
2. **Direct Install (DI):** These participants sign up for the program, and CLEAResult sends technicians to install the free thermostat. These customers 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.

KCP&L is close to meeting its enrollment targets. In an effort to limit program enrollment, the utility shut down the DIY portal on January 9, 2017. 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 commercial and industrial (C&I) |
| **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, Kansas City Power and Life (KCP&L) 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.<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 KCP&L's RHR is also eligible to receive the seasonal savings (SS) program. |
| **Rebate 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 KCP&L's product manager handle disputes if and when they arise. |
| **Project Reporting** | Following DR events, Nest provides an estimate of achieved demand reductions to KCP&L. |

*Source: Navigant interview of KCP&L product manager*

## 12.2 Evaluation Findings

In PY2017, Navigant calculated new deemed savings values for annual energy savings and demand impact per thermostat. Navigant reviewed Nest's SS analysis and used an adjusted version of its analysis to identify annual SS energy savings. The values found in these analyses will serve as the deemed savings values used in the PY2017 and PY2018 evaluations. 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 KCP&L 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.
- **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.[50]

[50] Nest found that SS customers annually saved an additional 144 kWh based on an air conditioning unit system size of 3.8 kW. In the 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 detailed in Appendix O.

- **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, on average, each thermostat achieved 1.40 kW in DR impact. This value is in line with what Nest found in its analysis of the PY2017 event season.

The newly identified deemed savings values were multiplied by specific quantities of 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 PY2017 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*

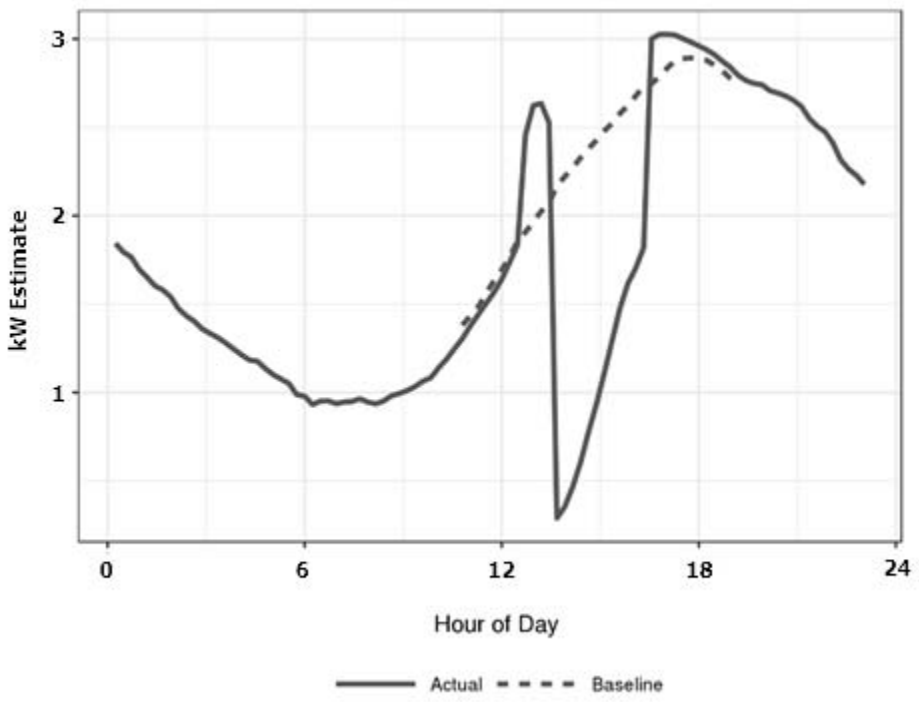
As shown in Table 12-2 and Table 12-3, the Residential PT program achieved 3,193,544 kWh of energy savings at the customer meter in PY2017 for a realization rate of 56%. The program achieved 52% of the 3-year MEEIA target. The program achieved 15,609 kW of demand impact in PY2017 for a realization rate of 101%, meeting 93% of the 3-year MEEIA target.

As shown in Table 12-4 and Table 12-5, the Business PT program achieved 73,990 kWh of energy savings at the customer meter in PY2017 for a realization rate of 52%. The program achieved 94% of the 3-year MEEIA target. The program achieved 463 kW of demand impact in PY2017 for a realization rate of 118%, meeting 215% of the 3-year MEEIA target.

Realization rates in PY2017 are a result of updated per device 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. The deemed energy savings per thermostat was reduced from 462 kWh in PY2016 to 197 kWh in PY2017. The demand impact per thermostat increased from 1.26 kW in PY2016 to 1.40 kW in PY2017. Navigant believes the baseline thermostats used in the PY2017 analysis were more efficient than the thermostats used to find the PY2016 energy savings value because the program targeted existing customers with programmable thermostats.

Figure 12-1 demonstrates the regression method used to determine demand savings for RHR events. The dotted 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.

**Figure 12-1. Event Usage vs. Regression-Predicted Baseline**




The amount of demand reduction throughout an RHR event is not constant due to each home or business warming at different rates during the time that air conditioning is turned off. The thermostat runs the air conditioning during an event after the home or business has warmed to a point where cooling is needed to keep the temperature at a point where the air conditioning system can return the home or business to the desired setpoint within 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, and each thermostat can provide a greater average demand reduction for a longer period than without precooling. 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.

**Table 12-2. Residential PT PY2017 Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 5,656,266 | 3,193,544 | 56% | 6,144,138 | 3,193,544 | 52% |
| Coinc Demand at Customer Meter (kW) | 15,441 | 15,609 | 101% | 16,757 | 15,609 | 93% |

*Source: Navigant analysis*

**Table 12-3. Residential PT Program to Date Energy and Demand Savings Summary**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 7,836,444 | 5,090,402 | 65% | 6,144,138 | 5,090,402 | 83% |
| Coinc Demand at Customer Meter (kW) | 15,441 | 20,584 | 133% | 16,757 | 20,584 | 123% |

*Source: Navigant analysis*

**Table 12-4. Business PT PY2017 Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 143,220 | 73,990 | 52% | 79,002 | 73,990 | 94% |
| Coinc Demand at Customer Meter (kW) | 393 | 463 | 118% | 215 | 463 | 215% |

*Source: Navigant analysis*

**Table 12-5. Business PT Program to Date Energy and Demand Savings Summary***

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | 3-Year MEEIA Target | Verified Savings | Percentage of MEEIA Target Achieved |
| Energy at Customer Meter (kWh) | 170,016 | 98,077 | 58% | 79,002 | 98,077 | 124% |
| Coinc Demand at Customer Meter (kW) | 466 | 533 | 114% | 215 | 533 | 248% |

*Source: Navigant analysis*

#### *12.2.1.1 Net-to-Gross*

For Rush Hour Rewards (RHR), free ridership and spillover 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 ratio of 1. For Seasonal Savings, free ridership and spillover 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 net-to-gross ratio of 1. However, there could be free ridership associated with the annual energy savings because the thermostats were offered for free. Navigant is using the working KCP&L assumption for NTG (1.0) and has highlighted this as an area for future research.

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**Table 12-6. PT NTG Components and Ratio: PY2017**

| Program Year | FR | PSO | NPSO | NTG Ratio |
|---|---|---|---|---|
| PY2017 | | Assumed to be zero pending future research. | | 100% |

FR = free ridership; PSO = participant spillover; NPSO = nonparticipant spillover

*Source: Navigant analysis*

### *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. Please refer to the 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, and program to date for the Residential and Business PT programs, respectively, and the total resource cost (TRC) test filed by GMO. Based on Navigant's benefit-cost analysis, all cost tests exceed 1.0 for both programs except for the participant cost test (PCT). Navigant's 2017 Residential PT analysis resulted in a TRC ratio similar to that filed by GMO while the Business PT analysis resulted in a TRC ratio slightly higher than that filed by GMO. The Residential PT program has an energy realization rate of 56% and a coincident demand realization rate of 104%. The Business PT program has an energy realization rate of 52% and a coincident demand realization rate of 121%.

**Table 12-7. Residential PT Benefit-Cost Ratios: PY2017**

| Program Year | TRC Test[51] | 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 |
| **Program Overall** | **N/A** | **2.04** | **2.38** | **3.44** | **0.87** | **2.06** |

*Source: Navigant analysis*

**Table 12-8. Business PT Benefit-Cost Ratios: PY2017**

| Program Year | TRC Test[52] | 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 |
| **Program Overall** | **N/A** | **1.83** | **2.12** | **2.82** | **0.40** | **2.32** |

*Source: Navigant analysis*

### *12.2.3 Process*

Navigant's process research consisted of survey analysis, program materials review, and an interview with the product manager. The following sections present the findings from these research activities.

**Survey Findings**

The evaluation team executed post-event customer surveys and a post-season survey to assess participant satisfaction, event and program awareness among participants, and participant behavior during events.

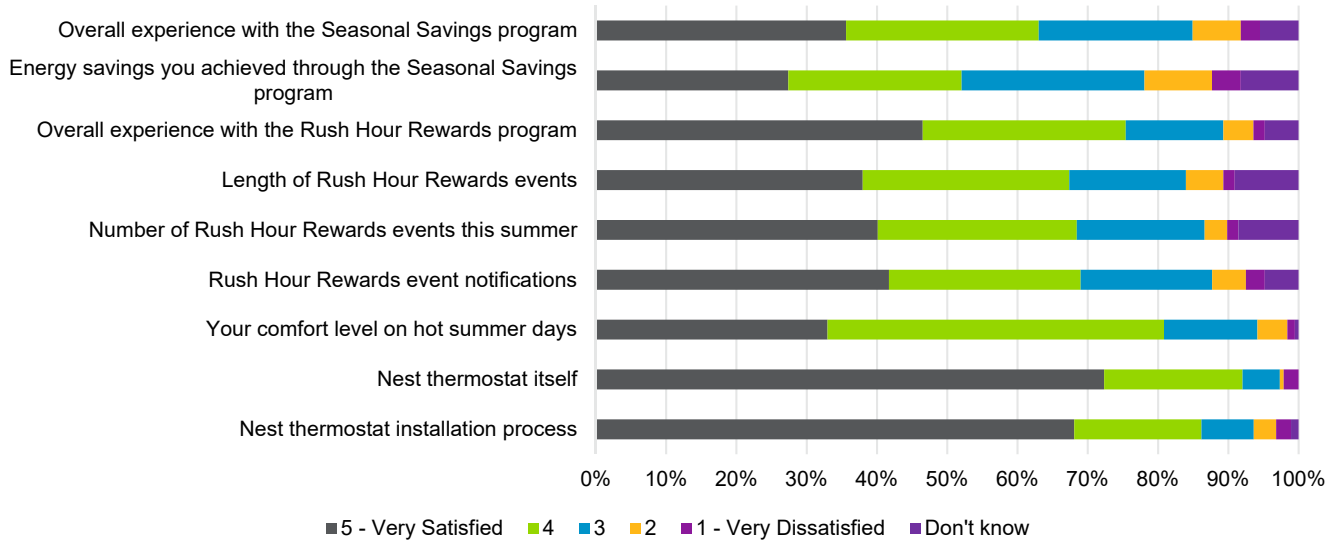
*Participant Satisfaction*

As illustrated in Figure 12-2, program satisfaction was relatively high in PY2017. More than half (76% and 63%) of respondents rated their overall experiences with RHR and SS, respectively, as satisfied and very satisfied. Participants were highly satisfied with their Nest thermostats and were generally satisfied with various program experiences; however, room for improvement remains, particularly for SS. When asked why they rated their overall experience as 1-2 or Don't Know, many customers indicated they were uninformed or had a misconception about program purpose and operation. For example, some customers suggested moving event hours to the first half of the day, demonstrating a lack of understanding the program's objective. This apparent confusion or lack of awareness of program purpose may also contribute to the sizable number of participants who rated their satisfaction as a neutral 3 (neither satisfied nor dissatisfied).

[51] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

[52] The TRC Test GMO column provides the TEC test results based on reported values provided by KCP&L staff.

**Figure 12-2. Satisfaction as Reported in the Post-Season Survey**

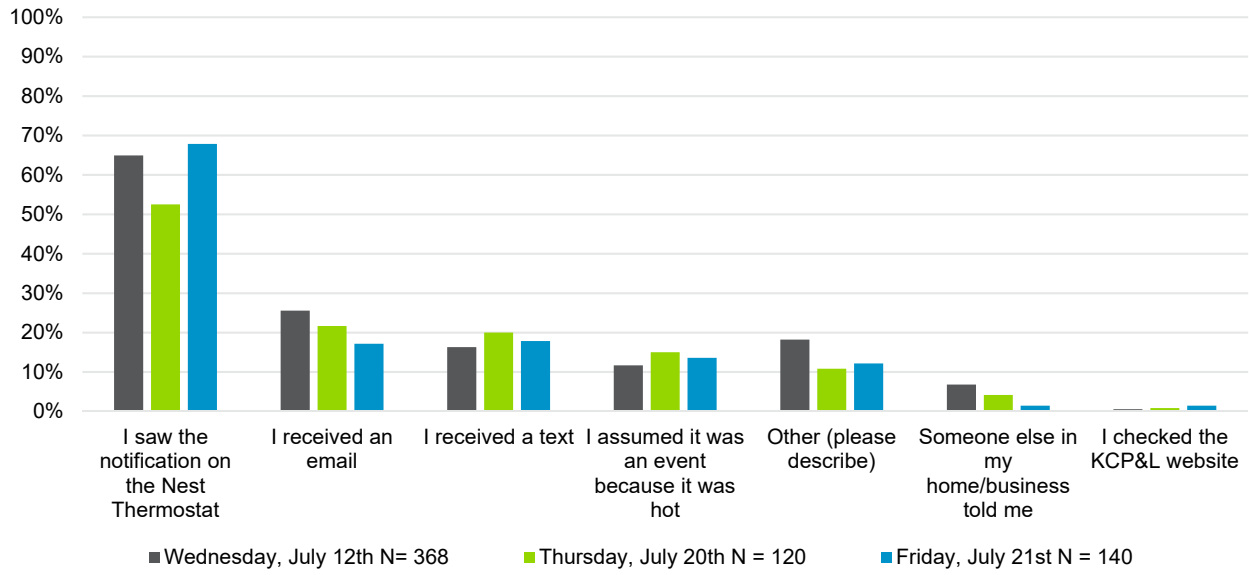



*Source: Navigant post-season survey analysis*

*Participant Event and Program Awareness*

Across the three post-event surveys, between 80% and86% of customers were aware of the event occurring. As shown in Figure 12-6, most customers became aware of the event through a notification on the Nest Thermostat. Open-ended responses indicated that some customers were unaware of the ability to get text message notifications and push notifications from the Nest app on their phone to notify them about events set to occur. Navigant recommends further exploring communication options to improve customer awareness of events.

**Figure 12-3. Event Notification as Reported in the Post-Event Surveys**

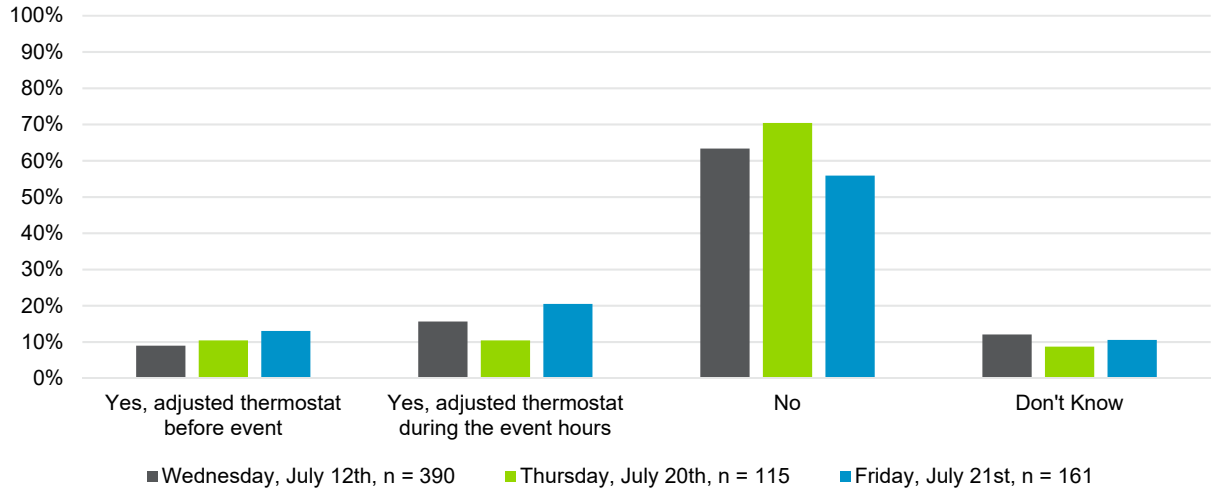



*Source: Navigant post-event survey analysis*

*Participant Event Behavior*

An important aspect of the RHR program is whether customers adjusted their thermostats during the event. Overriding the thermostat is one of several reasons a thermostat may not participate in an RHR event. As shown in Figure 12-4, the bulk of participants did not override their thermostats during event hours. However, as the DR season progressed the reported adjustments before the event occurred increased indicating program fatigue, a common pattern in thermostat programs.

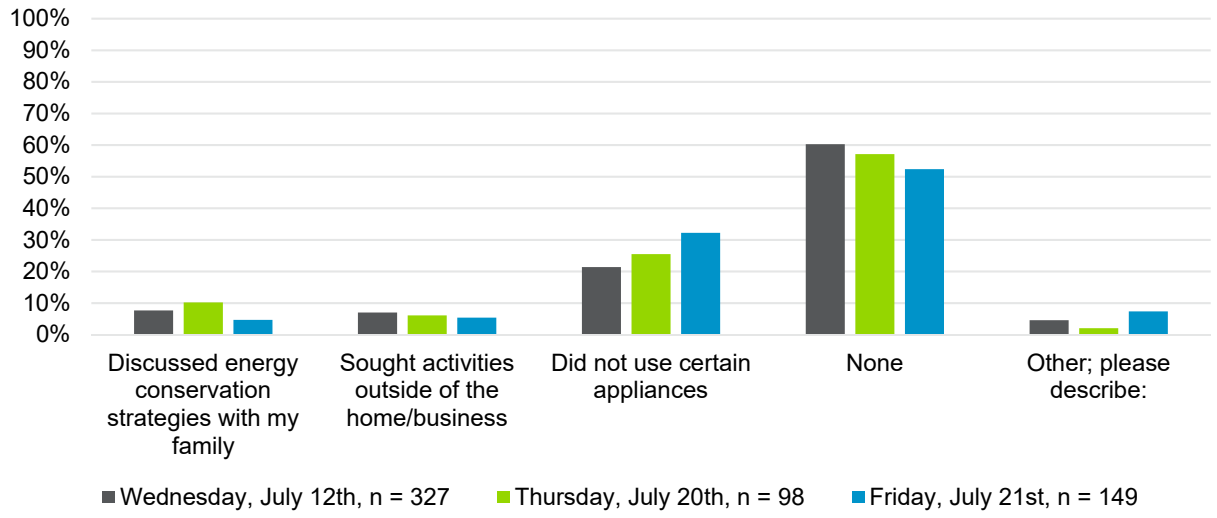
**Figure 12-4. Thermostat Adjustments as Reported in the Post-Event Surveys**




*Source: Navigant post-event survey analysis*

As shown in Figure 12-5 as the RHR season progressed, an increasing number of respondents did not use certain appliances during curtailment hours. This is an example of unintended form of conservation behavior indirectly associated with the RHR event. In future years, these additional conservation efforts can be quantified using advanced metering infrastructure (AMI) data. Ultimately, when survey respondents were asked in the post-season survey whether they would continue participating the RHR program, over 80% reported they would continue participation.

**Figure 12-5. Event Behavior as Reported in the Post-Event Surveys**




Navigant addressed two process evaluation research questions and the five Missouri-required questions for process evaluation through the staff interviews and program materials review. A summary of the team's process activity is provided in Table 12-9.

**Table 12-9. 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 PY2016, and how have these changes affected program satisfaction, participation, savings, and costs? | • Program staff interviews |
| 2. Are there additional changes to the program that would be useful in future years or are planned for 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<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<br>• Customer 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>• Materials review |

*Source: Navigant analysis*

The team's findings are provided below. 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 PY2016, and how have these changes affected program satisfaction, participation, savings, and costs?**

**FINDING 1: A new product manager took over the Residential and Business PT programs 2 months into PY2017. The new product manager brought in several new processes and program changes.**

- In PY2017, the program focused marketing efforts on increasing DIY thermostat activation for the RHR program through language on the online portal, email reminders, and phone reminders, if necessary. DIY customers install their own thermostats. After installation, there are additional steps required to activate into the RHR program so that Nest can control the thermostat during event periods. Historically, there are a subset of customers that delay or do not take the additional activation step. KCP&L focused on increasing RHR activation in PY2017.
- In January 2018, the program began distributing the Thermostat E to compatible customers. The Nest E uses six wires compared to more complex systems that use 10 wires. More than 80% of customers are compatible with the Nest E. The suggested retail price for the Thermostat E is $169, while it is $249 for the third generation Nest Thermostat.
- Customer experience and communication no longer focuses on marketing new enrollment due to GMO approaching enrollment targets.
- The new product manager improved tracking data quality and data management processes, which eased data processing in PY2017. Continuing these efforts in PY2018 will make the tracking database more valuable and help Navigant's PY2018 evaluation.

**QUESTION 2: Are there additional changes to the program that would be useful in future years or are planned for PY2018?**

**FINDING 2: GMO will eliminate nearly all marketing in PY2018 because they are close to the program's enrollment cap. KCP&L is establishing processes to track thermostats that belong to customers who move out of their home.**

#### *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.**

- KCP&L calls curtailment events during which Nest cycles participants' HVAC systems 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.

**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 evaluation report and found to be consistent in PY2017.**

- In the future, competition among PT vendors and evolving technological developments could lead to the market shifting from one vendor toward another. Navigant suggests KCP&L monitor the market to avoid missing market trends. The BYOD segment of the RHR population is small. KCP&L 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.

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

**FINDING 4: KCP&L has successfully reached enrollment targets. In fact, in PY2017, marketing ramped down a bit to reduce new enrollment. Marketing efforts in PY2017 focused on increasing thermostat activation for the Rush Hour Rewards program.**

- As in PY2016, the CLEAResult technicians cross-promoted the Residential PT program with the Whole House Efficiency's (WHE's) Energy Savings Kit program but ceased promotion through HER program mailers in November 2017 due to intended enrollment slowdown.
- Other methods of communication have been through social media and participant promotion through peer-to-peer word-of-mouth communication between customers.
- Many survey respondents who were dissatisfied with event notification channels requested notification through means that are already available (such as text or push notifications). Navigant recommends re-educating customers on notification channels for the upcoming DR season.
- Additionally, evaluation surveys revealed that additional education and communication regarding program goals and purposes would be useful to customers.

**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: KCP&L is close to reaching enrollment goals for Cycle 2; thus, it is redirecting efforts from enrollment to continuing thermostat activation and designing a process to handle thermostat participants that move out of their home.**

- As noted in the PY2016 findings, KCP&L emphasized RHR activation in PY2017 and will continue this effort in PY2018.

## 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 KCP&L 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)

KCP&L 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 PY2016 centered around data quality and availability. Overall, Navigant found data processing in PY2017 simpler than in PY2016 due to the improvements made in tracking data quality.

The program recommendations listed in Figure 12-6 could help program processes in PY2018 as well as in MEEIA Cycle 3.

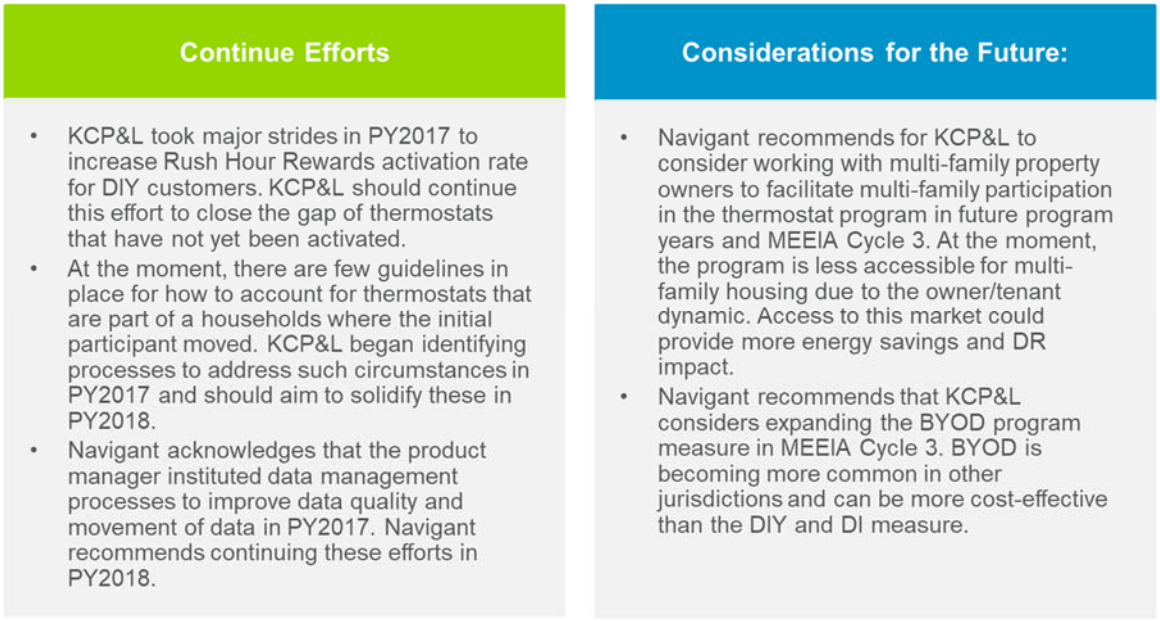
**Figure 12-6. PT Impact Recommendations: PY2017**


*Source: Navigant analysis*

### *12.3.2 Process*

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.

**Figure 12-7. PT Process Recommendations: PY2017**




*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[53] for the Residential and Business PT programs. The following section details recommendations surrounding these questions.

**Table 12-10. 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 PY2016 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? | KCP&L is no longer targeting or actively recruiting customers for Cycle 2 because it has met enrollment targets. Navigant agrees this is an appropriate approach after reaching the enrollment target. In MEEIA Cycle 3, KCP&L 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. KCP&L could consider expanding the program to include customers that have already purchased other brands of smart/connected thermostats. In addition, KCP&L 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? | KCP&L 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 PY2016, KCP&L should monitor program savings targets in addition to enrollment goals to ensure that program cost-effectiveness remains high. Navigant acknowledges KCP&L addressed this issue in PY2017, identifying the need to limit program enrollment in PY2017 and PY2018. |

*Source: Navigant analysis*

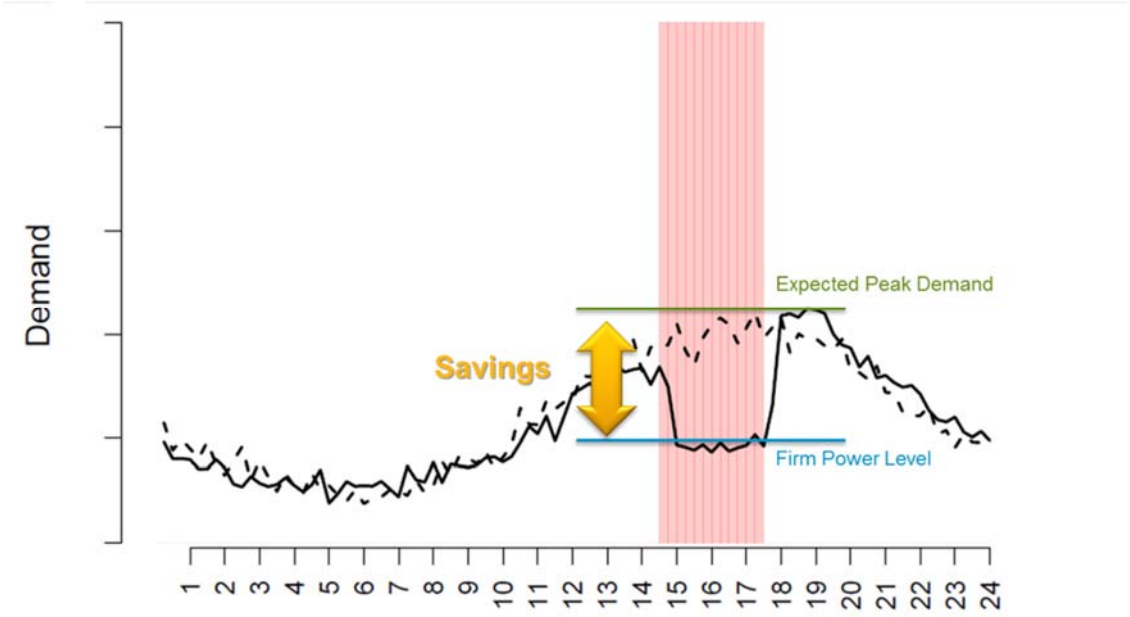
[53] 4 CFR- 240-22.070(8)

# 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 Kansas City Power and Light (KCP&L) 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 obligating them to reduce electric load to a predefined firm power level (FPL) during curtailment events. As illustrated in Figure 13-1, KCP&L 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 KCP&L 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*

KCP&L agrees to limit curtailment events during the season to a maximum of 10 events. 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. KCP&L contracts with A2A to perform event notifications and to analyze participant meter data to verify performance. The KCP&L meter data management (MDM) 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 kilowatt (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. Note: 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 per kW per hour curtailed up to the first 30 hours of dispatch and $0.25 per 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 [54] 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 and 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 in which they review a questionnaire to identify whether the customer would be able to 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 KCP&L 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. |

[54] 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 KCP&L), which includes contracted curtailable load. Second, the team executed an econometric analysis and customer baseline (CBL)[55] analysis to verify program demand impact. Third, the team interviewed the KCP&L product manager to review program process flow.

KCP&L worked hard in program year 2017 (PY2017) to recalculate EPD values by using interval data during potential event hours as opposed to the monthly billing data previously used. During PY2017, KCP&L also redefined contracted curtailable load (CL) through thorough onsite visits. The EPD and CL are primary factors in potential impacts; the reformulation of these numbers will allow program performance to be assessed more accurately. Navigant looks forward to reviewing program performance in PY2018 with the recalculated EPD values.

The following sections present Navigant's PY2017 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

Navigant verified impacts for 55 out of the 60 Greater Missouri Operations (GMO) customers. Five of the customers did not have sufficient data for analysis.[56] The evaluation team verified impacts for 40

[55] The CBL 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.

[56] Two customers lacked billing data for one of the two events, and three customers lacked sufficient pre-event billing data.

customers using a customer-specific regression analysis using participant interval data from May 2017 through September 2017. The team employed a CBL approach for 15 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. 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. In addition, the evaluation team assessed the reasonability of the EPD values by observing customer peak usage 2 days[57] before each event occurred (excluding weekends or event days).

The DRI program achieved 19,522 kW of gross and net demand impacts in PY2017 for a realization rate of 52%. In PY2017, the program achieved 35% 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. KCP&L 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 PY2017 from PY2016, it is worth noting that the majority of customers did not meet their contracted curtailable load. Navigant found that, on average, across events:

- Forty-seven of the 55 customers performed at less than 80% of their contracted curtailable load during event hours.
- Two of the 55 customers performed at more than 120% of their contracted curtailable load during event hours.
- Seven of the 55 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 as well as a need to recalculate EPD and CL—both of which the KCP&L product manager prioritized for PY2018 participants. Process improvements are detailed in Section 13.2.3.

[57] 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.

**Table 13-2. DRI PY2017 Demand Impact Summary[58]**

| | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | Reported Savings | Verified Savings | Realization Rate | MEEIA 3-Year Target | Verified Savings | % of MEEIA Target Achieved |
| MEEIA Participant Demand Savings (kW) | 36,397 | 18,588 | 51% | - | - | - |
| Opt-Out Demand Savings (kW) | 1,300 | 934 | 72% | | | |
| **Total Demand Savings (kW)** | **37,697** | **19,522** | **52%** | **55,000** | **19,522** | **35%** |

*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: PY2017**

| 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, and program to date, and the total resource cost (TRC) test filed by GMO. Navigant's analysis resulted in a total resource cost (TRC) ratio that is lower than that filed by GMO due to its coincident demand realization rate of 50%. The participant cost test (PCT) in PY2017 is infinite (INF), indicating that there is no cost to participants. This is a change in methodology from PY2016 as a very small incremental cost was included in previous years yielding a PCT of 433.33.

**Table 13-4. DRI Benefit-Cost Ratios: PY2017**

| | TRC Test[59] | TRC Test | SCT | UCT | PCT | RIM Test |
|---|---|---|---|---|---|---|

[58] 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..

[59] The TRC Test GMO column provides the TRC test results based on reported values provided by KCP&L staff.

| Program Year | 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 |
| **Program Overall** | **N/A** | **3.20** | **3.21** | **1.40** | **1800.21** | **1.40** |

*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 and a program materials review. A summary is provided in Table 13-5.

**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 PY2016, and how have these changes affected program satisfaction, participation, savings, and costs? | • Program staff interviews |
| 2. Are there additional changes to the program that would be useful in future years or are planned for 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<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 |
| 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 below. 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 PY2016, and how have these changes affected program satisfaction, participation, savings, and costs?**

**FINDING 1: The previous product manager implemented propensity modeling to recruit new participants for the program.**

- The program began using propensity modeling to recruit customers in PY2017 and continued to refine the model throughout the year for PY2018 recruiting. A new product manager began leading the program at the start of the PY2017 DR season and implemented many changes that have yet to be recognized but are expected in the PY2018 evaluation.

- **STATUS:** Navigant planned to do customer surveys in PY2017 to assess customer satisfaction but agreed with KCP&L to eliminate this from evaluation plans. Originally the surveys were pushed from PY2017 to PY2018; however, survey findings would not be available until after Cycle 3 planning ends. As a result, surveys will not be conducted as part of the process evaluation for Cycle 2.

**QUESTION 2: Are there additional changes to the program that would be useful in future years or are planned for PY2018?**

**FINDING 2: The product manager made many changes to the program in PY2017 that are expected to affect PY2018 program performance.**

- The product manager made significant process changes in communication channels and delivery mechanisms. These changes are detailed in Question 4.
- 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 addition, the program manager improved the process to calculate the EPD values and FPLs of new customers. These efforts should make PY2018 curtailable loads more attainable, which should in turn improve program performance.
- **STATUS:** As mentioned above, KCP&L reworked many existing customers' EPD values and FPLs.

#### *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: Two main barriers for participating in the DRI program are: (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 on to the individual who can manually curtail load at the customer site.**

- 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 currently 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.
- 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 has confirmed that a customer's point of contact is aware of the responsibilities associated with being a DRI participant. Thus, Navigant expects to see this barrier of participation reduced for PY2018.

**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 for PY2017 recruitment and continues to refine it through PY2017 and into PY2018. For PY2018, the DRI product manager emphasized improving the accuracy of EPD and FPL calculations. Much of these efforts went into redefining EPD values and FPLs for existing customer contracts. Through a planned increase in recruitment efforts, KCP&L anticipates an increase in program participation beginning 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 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 PY2017. 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 PY2017, 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: Although room for improvement exists, KCP&L's product manager has taken great efforts to improve communication channels and ensure delivery mechanisms are appropriate for the DRI program.**

- **STATUS:** The following topics were identified in the product manager interview as areas that have been improved for PY2018:
    - In PY2017, the product manager initiated 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. KCP&L does not partake in blind prospecting when recruiting participants. Instead, KCP&L recruits customers for the DRI program using customer contacts from other energy efficiency programs such as KCP&L's suite of C&I programs. In PY2017, with the introduction of customer propensity modeling by the program implementer, KCP&L expanded the pool of potential participants outside of existing energy efficiency programs.
    - Targeted email marketing was executed in PY2017. High usage customers were identified through CLEAResult's propensity modeling and received emails asking them to inquire about the DRI program. The product manager has a full marketing plan for PY2018 that includes targeted email and direct mail marketing. The marketing plan also includes DR forums in which potential customers and participating customers are invited to a lunch forum to learn about the program. The product manager expects to recruit new participants through the forum.
    - 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 utilizes 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.
        - For PY2018, KCP&L 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 PY2018 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 KCP&L 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: KCP&L has implemented targeted marketing to recruit new customers. In addition, KCP&L has refined curtailment plans and expectations (i.e., the EPD values and FPLs) with current customers.**

- **STATUS:** As mentioned in the PY2016 EM&V report, KCP&L recruited smaller customers in PY2017. In addition, KCP&L is updating the EPD and FPL calculation for existing customers for PY2018. CLEAResult will use interval data during potential peak hours during weekdays to identify a more accurate EPD value. During PY2017, KCP&L also redefined contracted CL for many existing customers through thorough onsite visits.

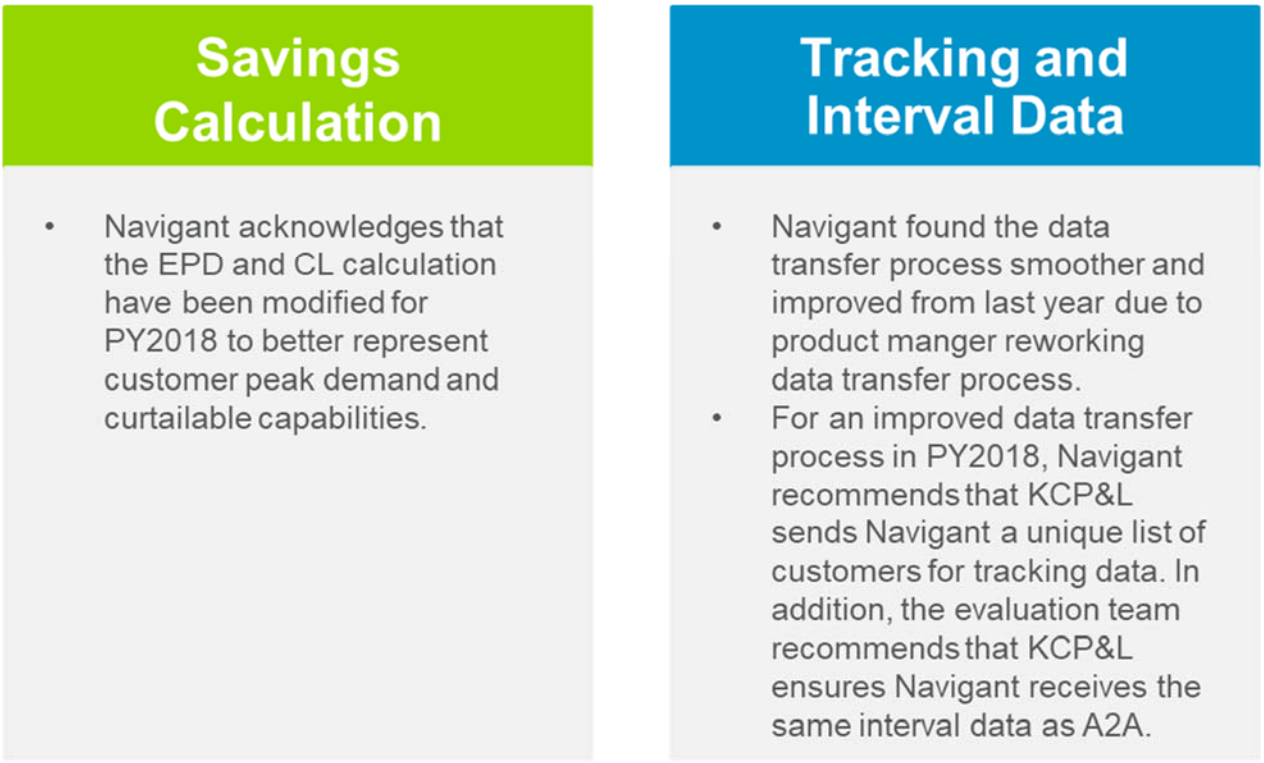
## 13.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations, which are found in Section 13.3.1.

### *13.3.1 Impact and Process Recommendations*

Overall, Navigant found that KCP&L is on its way to meet the 3-year program target because of the many process improvements the product manager made during PY2017. The following impact and process recommendations, in Figure 13-2, are based on the evaluation team's analysis of program interval and tracking data, an interview with the KCP&L product manager, and a program materials review.

**Figure 13-2. DRI Program Impact and Process Recommendations: PY2017**




*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[60] for the DRI program.

**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 began using propensity modeling in PY2017 to select customers to recruit. KCP&L should continue to refine propensity modeling to select customers for the program. |
| 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. |

[60] 4 CFR- 240-22.070(8)

| Missouri Question | Navigant Recommendation |
|---|---|
| 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? | KCP&L was able to include net power in PY2017 data, which was a recommendation in the PY2016 report. KCP&L should continue to provide net power.<br><br>Per PY2016 recommendation, as the DRI program continues to grow, KCP&L should keep in mind that having both very large and smaller customers can lead to a dilution of focus and specific feedback to both customer groups. KCP&L is actively addressing this issue by implementing account managers who check in with program participants throughout the program year. |
| 4. Are the communication channels and delivery mechanisms appropriate for the target market segment? | As the program continues to grow in PY2018, Navigant recommends continuing efforts to have individualized program assistance for participants. In addition, the evaluation team encourages continued internal partnership with the other commercial energy efficiency programs to cross-promote programs.<br><br>Finally, as AMI becomes more prevalent, KCP&L should consider investigating ways to provide more consistent updates to participants regarding their program performance. Additionally, because this performance data would be captured, it would also allow for more periodic updates of participants' event target values (FPLs). |
| 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 PY2017, the DRI product manager developed methods to better manage participants' event behavior. Navigant recommends continuing to work on event behavior management in PY2018. |

*Source: Navigant analysis*