NAVIGANT

GMO Evaluation, Measurement, and Verification Report – FINAL

Program Year 2016

Prepared for:

KCP&L – Greater Missouri Operations

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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 analysis and findings by program
- Appendices: The appendices are composed of an excel file that provides detailed cost effectiveness results word document that provides:
    - Survey instruments used in PY2016 surveys fielded by the Navigant team
    - Process Maps that identify the key steps of each program
    - Methodology sections for each program that explains in greater detail than in the main report the Navigant team's approach to analyzing each program
- Databook based in excel that provides enhanced detail on midstream calculations and inputs used in the engineering analysis.

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 net-to-gross (NTG) adjustments. Reported savings presented throughout this report are representative of gross savings and may have been adjusted from net savings for comparison purposes. In previous evaluation, measurement, and verification (EM&V) reports, reported values were referred to as ex ante.

Gross Verified Savings
Savings verified through Navigant's impact evaluation methods prior to NTG adjustments. In previous EM&V reports, verified values were referred to as ex post.

Gross Realization Rates

The ratio of verified gross savings to reported gross savings; indicates the accuracy of deemed savings tracked by GMO.

Missouri Energy Efficiency Investment Act (MEEIA) Target
Three-year savings target for a given program exclusive of any NTG adjustments.

Net Verified Savings
Savings verified through Navigant's impact evaluation methods and inclusive of NTG adjustments.

Percentage of MEEIA Target Achieved
The ratio of verified net savings to the MEEIA savings target; reflects GMO's overall achievement toward the goal.

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 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), 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.

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

AC	Air Conditioning
ACUR	Air Conditioning Upgrade Rebate
AMI	Advanced Metering Infrastructure
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BOEA	Business Online Energy Audit
BYON	Bring Your Own Nest
CAP	Community Action Program
CBL	Customer Baseline
C&I	Commercial & Industrial
CET	Customer Engagement Tracker
CF	Coincident Factor
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
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
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
HVAC	Heating, Ventilation, and Air Conditioning
IC	Implementation Contractor
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
MEEIA	Missouri Energy Efficiency Investment Act
MO	Missouri
MOU	Memorandum of Understanding
MW	Megawatt
MWh	Megawatt-Hour
NTG	Net-to-Gross
NPSO	Nonparticipant Spillover
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
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
TRC	Total Resource Cost
TRM	Technical Reference Manual
UCT	Utility Cost Test

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

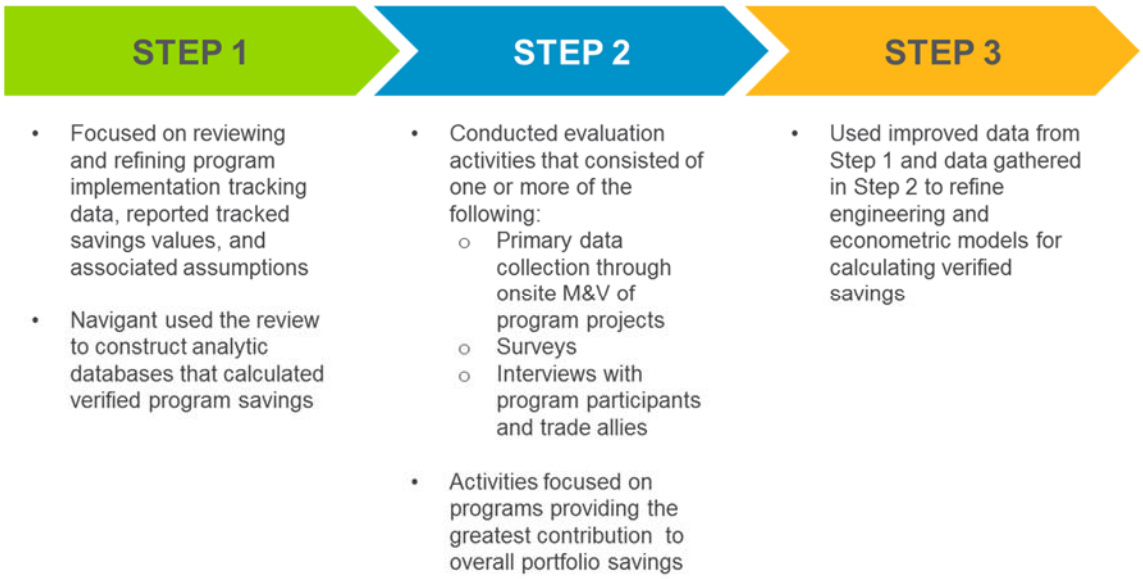
EXECUTIVE SUMMARY

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) 2016.

The evaluation team consisted of Navigant Consulting, Inc. (Navigant), Illume Advising LLC (Illume), and NMR Group, Inc. (NMR). As the prime contractor, Navigant is the primary 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 their recognized national expertise in behavioral research and evaluation to lead the evaluation of the Home Energy Report and Online Energy Audit programs. NMR led the Home Lighting Rebate 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 has not yet been implemented by KCP&L—though it was part of the original filing—and is not counted in this number of active programs.

In PY2016, Navigant used three primary methods to develop net savings for each program:

- **NTG ratios,** which involved the derivation of NTG components including FR and SO
- **Direct estimation** of net savings, which involved conducting billing 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) (MO 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 MO 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 PY2016 evaluation.

Overall Findings and Evaluation Results

This section summarizes the gross and net savings achievements for the GMO portfolio for PY2016. Navigant notes that KCP&L chose not to implement the Home Appliance Recycling Rebate (HARR) program yet within this cycle; thus, an evaluation was not conducted for the program, and it does not have a breakout section in this document.

Key points:

- In PY2016, the portfolio overall achieved 69,277,069 kWh and 25,927 kW in **gross energy and demand** savings at the customer meter. This corresponds to gross realization rates of 77% and 62%, respectively.
    - PY2016 portfolio's energy and demand realization rates of 77% and 62% were caused primarily by the low realized savings for the Business Energy Efficiency Rebate (EER) –Standard program, which represented approximately 43% of verified portfolio energy savings and approximately 17% of verified portfolio demand savings.
        - Realization rates for the Business EER – Standard program were 61% and 52% for energy and demand, respectively; these are largely driven by inaccurate baseline fixture wattages for the largest total savings measure (high-bay lighting). Navigant notes that the implementer for the program proactively identified this issue and updated the field data input tool to help trade allies better understand which baseline was being selected as a corrective action for projects moving forward.

GROSS ENERGY SAVINGS:
69,277,069 kWh

GROSS DEMAND SAVINGS:
25,927 kW

    - The portfolio's suite of residential energy efficiency programs performed well, with energy realization rates ranging from 77% (Income-Eligible Multifamily) to 113% (Whole House Efficiency). Demand realization rates ranged from 57% (Income-Eligible Weatherization) to 143% (Whole House Efficiency).
    - The Demand Response Incentive (DRI) program—representing approximately 38% of total portfolio verified demand savings—achieved a realization rate of approximately 48%, which contributed to the portfolio's lower than expected demand realization rate.
        - 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.
- The portfolio achieved 65,053,224 kWh and 24,933 kW in verified net energy and demand savings. This corresponds to the portfolio achieving approximately 35% and 24% of its cumulative 3-year MEEIA Cycle 2 energy and demand targets, respectively.

- The Business EER – Standard program achieved 74% and 66% of its 3-year MEEIA Cycle 2 target for energy and demand, respectively. This program represented 44% of total portfolio verified net energy savings and approximately 17% of verified net demand savings.
    - High participation in the Business EER – Standard program is a contributing factor in the program's achievement of its MEEIA Cycle 2 target. This is largely being driven by the installation of LED lighting measures.
- The Business EER – Custom program achieved approximately 2% and 1% of its 3-year MEEIA Cycle 2 energy and demand targets, respectively.
    - Two primary factors influenced the Custom program's MEEIA Cycle 2 verified net savings:
        - Carryover projects from Cycle 1 reduced the Custom program's pipeline of available projects.
        - 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 DRI program achieved approximately 18% of its 3-year MEEIA Cycle 2 target and represented approximately 40% of total portfolio verified net demand savings.

Gross and Net Savings Summary

Navigant's PY2016 impact evaluation focused primarily on verifying savings while refining high impact measure savings. As a follow-on to the work completed in MEEIA Cycle 1, Navigant 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 Home Lighting Rebate (HLR) programs. The evaluation team also conducted a regression analysis of participant usage data to support evaluation of the Home Energy Report (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 1 and Table 2 summarize the gross and net verified energy and demand savings at the customer meter for GMO's programs and the overall portfolio for PY2016. 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 verified gross savings to reported gross savings, indicating the accuracy of deemed savings tracked by GMO
- **MEEIA Target:** Three-year savings target for a given program exclusive of any NTG adjustments
- **Net Verified Savings:** Savings verified through Navigant's impact evaluation methods and inclusive of NTG adjustments

- **Percentage of MEEIA Target Achieved:** The ratio of verified net savings to the MEEIA savings target, reflecting GMO's overall achievement toward the Cycle 2 goal

Table 1. Energy Savings at the Customer Meter: PY2016

Sector	Program	Gross			Net		
		Reported Savings (kWh)	Verified Savings (kWh)	Realization Rate (%)	3-Year MEEIA Target (kWh)	Verified Savings (kWh)	Percentage of MEEIA Target Achieved
Commercial Energy Efficiency (EE) Programs	Business EER – Standard	48,659,656	29,859,640	61%	38,710,762	28,665,254	74%
	Business EER – Custom	664,528	658,739	99%	30,079,932	704,850	2%
	Block Bidding	436,324	467,490	107%	17,603,947	467,490	3%
	Strategic Energy Management	N/A	N/A	N/A	12,127,508	N/A	N/A
	Small Business Lighting	1,689,659	1,307,522	77%	3,569,963	1,140,159	32%
Residential EE Programs	Income-Eligible Weatherization	304,972	309,812	102%	143,458	309,812	216%
	Whole House Efficiency[2]	4,917,214	5,536,777	113%	19,717,746	4,429,421	22%
	Income-Eligible Multifamily	2,309,219	1,780,322	77%	10,014,278	1,780,322	18%
	Home Lighting Rebate	12,708,827	11,128,338	88%	25,288,145	9,327,485	37%
Educational Programs	Home Energy Report	16,454,246	16,307,486	99%	21,070,772	16,307,486	77%
	Home Online Energy Audit	Educational programs are not part of the MEEIA targets for energy or demand savings.					
	Business Online Energy Audit						
Demand Response (DR) Programs	Business Programmable Thermostat	26,796	24,087	90%	79,002	24,087	30%
	Residential Programmable Thermostat	2,180,178	1,896,858	87%	6,144,138	1,896,858	31%
	Demand Response Incentive	The DRI program did not claim any energy savings.					
GMO Total		**90,351,618**	**69,277,069**	**77%**	**184,549,652**	**65,053,224**	**35%**

Source: Navigant analysis

[2] Savings targets for the HARR program (approximately 8,105,510 kWh and 1,352 kW) have been incorporated into the MEEIA target for the Whole House Efficiency program.

Table 2. Coincident Demand Savings at the Customer Meter: PY2016

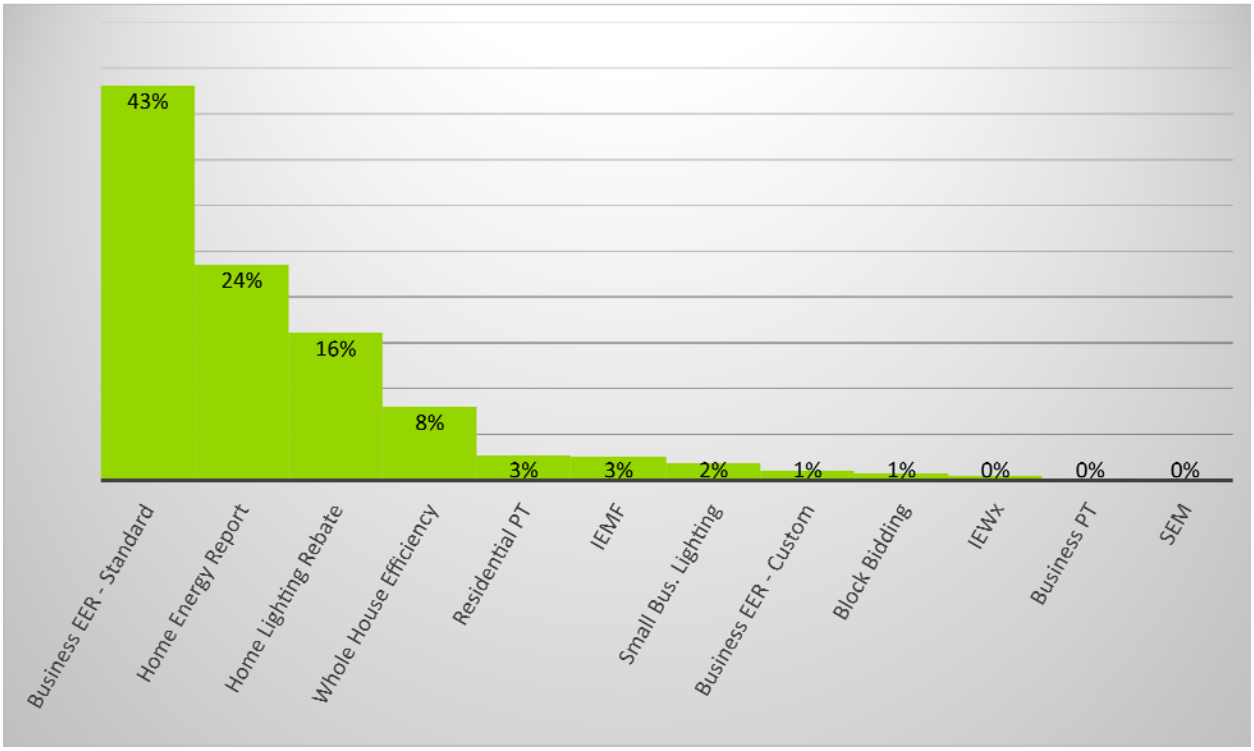
Sector	Program	Gross			Net		
		Reported Savings (kW)	Verified Savings (kW)	Realization Rate (%)	3-Year MEEIA Target (kW)	Verified Savings (kW)	Percentage of MEEIA Target Achieved
Commercial EE Programs	Business EER – Standard	8,429	4,360	52%	6,385	4,186	66%
	Business EER – Custom	92.32	92.32	100%	7,758.09	99	1%
	Block Bidding	55	55	100%	3,052	55	2%
	Strategic Energy Management	0	0	--	2,842	0	0%
	Small Business Lighting	276	189	69%	592	165	28%
Residential EE Programs	Income-Eligible Weatherization	226	128	57%	53	128	244%
	Whole House Efficiency[3]	2,072	2,961	143%	5,072	2,369	47%
	Income-Eligible Multifamily	234	189	81%	1,357	189	14%
	Home Lighting Rebate	1,273	1,296	102%	2,558	1,086	42%
Educational Programs	Home Energy Report	2,252	2,232	99%	4,215	2,232	53%
	Home Online Energy Audit	Educational programs are not part of MEEIA targets for energy or demand savings.					
	Business Online Energy Audit						
DR Programs	Business Programmable Thermostat	73	63	86%	215	63	29%
	Residential Programmable Thermostat	5,961	4,478	75%	16,757	4,478	27%
	Demand Response Incentive	20,664	9,883	48%	55,000	9,883	18%
GMO Total		**41,606**	**25,927**	**62%**	**105,855**	**24,933**	**24%**

Source: Navigant analysis

[3] Savings targets for the HARR program (approximately 8,105,510 kWh and 1,352 kW) have been incorporated into the MEEIA target for the Whole House Efficiency program.

Figure 1 presents each program's contribution to the overall portfolio energy savings for PY2016. Approximately 43% of total energy savings come from the Business EER – Standard program, with an additional 24% contribution by the HER program. The HLR and Whole House Efficiency (WHE) programs combined contributed approximately 24% to the total portfolio verified energy savings.

Figure 1. Distribution of Energy Savings by Program: PY2016



Source: Navigant analysis

Net-to-Gross

Navigant used the following definitions, provided by the Uniform Methods Project,[4] to calculate net savings. See the introduction section for more details on our approach.

Table 3 provides a summary of the final FR, PSO, and NPSO estimates for each applicable 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 chapters.

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:

[4] 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.

- Programs inherently have no FR (e.g., DRI, Programmable Thermostat, Income-Eligible Weatherization)
- Programs did not claim any savings (e.g., Strategic Energy Management, 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 PY, though we note this will not necessarily be the case for the future PY (e.g., Block Bidding, Business EER – Custom, Income-Eligible Multifamily)

Table 3. NTG Components by Program

Program Name*	FR	PSO	NPSO	NTG Ratio*
Business EER – Standard	**0.05**	**0.002**	**0.004**	**96%**
Business EER – Custom[5]	**0.11**	**0.04**	**0.14**	**107%**
Block Bidding	Deemed 1.0 pending future research.			100%
Strategic Energy Management	N/A – Savings not claimed in PY2016			
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	**0.16**	**0.00**	**0.00**	**84%**
Home Energy Report	1.0 based on analysis approach generating net results			
Home Online Energy Audit	N/A – Savings not claimed in PY2016			
Business Online Energy Audit	N/A – Savings not claimed in PY2016			
Residential Programmable Thermostat	1.0 based on analysis approach generating net results			
Business Programmable Thermostat				
Demand Response Incentive				

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

[5] The Business EER – Custom program utilized FR and SO data collected in MEEIA Cycle 1. New NTG research is planned for PY2017.

Cost-Effectiveness Summary

Navigant evaluated the cost-effectiveness of each of GMO's EE and DR programs. The evaluation team did not evaluate the Home Online Energy Audit, Business Online Energy Audit, Strategic Energy Management (SEM), and Income-Eligible HER programs for cost-effectiveness because no energy or peak demand savings have been claimed for these programs. However, the cost-effectiveness of the entire portfolio does include costs associated with these programs.

Table 4 shows Navigant's evaluation of cost-effectiveness by program and cost test for PY2016. Portfolio level results are shown in Table 5. Navigant calculated the five-standard benefit-cost ratios: 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 in that they show the value of monetary benefits relative to the value of monetary costs as seen from various stakeholder perspectives. In this analysis, the TRC test and SCT test only differ in the discount rate assumed (i.e., externalities are not included in this SCT analysis), which is consistent with the 2001 California Standard Practice Manual (SPM).[6] Table 6 provides costs and benefits data in USD terms rather than the ratio. For program level details, please refer to the Overall Results sheet within the GMO Databook.

[6] 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.

Table 4. Benefit-Cost Ratios by Program and Cost Test: PY2016**

Sector	Program	TRC Test[7]	TRC	SCT	UCT	PCT	RIM
		GMO			Navigant		
Commercial EE Programs	Business EER – Standard	2.49	1.37	1.58	2.29	1.86	0.69
	Business EER – Custom	0.32	0.38	0.47	0.49	1.30	0.33
	Block Bidding	0.44	0.59	0.71	0.64	3.55	0.38
	Strategic Energy Management	N/A	N/A	N/A	N/A	N/A	N/A
	Small Business Lighting	1.25	0.78	0.88	0.91	1.75	0.47
Residential EE Programs	Income-Eligible Weatherization	4.42	1.15	1.45	1.15	INF*	0.59
	Whole House Efficiency	0.78	0.94	1.17	1.60	1.19	0.71
	Income-Eligible Multifamily	0.92	0.90	1.01	0.90	INF*	0.36
	Home Lighting Rebate***	1.45	1.73	2.02	2.14	4.39	0.52
Educational/ Behavioral Programs	Home Energy Report	0.79	0.71	0.71	0.71	INF*	0.32
	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	2.42	2.06	2.39	2.82	0.93	1.98
	Residential Programmable Thermostat	1.95	1.54	1.79	1.83	1.29	1.29
	Demand Response Incentive	6.24	3.09	3.09	1.73	433.33	1.73

*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

[7] 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. Benefit -Cost Ratios by Program Groups and Cost Test – PY2016

	Total Resource Cost Test	Societal Cost Test	Utility Cost Test	Participant Cost Test	Rate Impact Measure Test
Portfolio	1.25	1.44	1.69	2.05	0.68
EE Programs*	1.21	1.42	1.81	2.03	0.62
Residential EE Programs	1.21	1.46	1.71	2.40	0.58
C&I EE Programs	1.22	1.40	1.88	1.85	0.65
DR Programs**	1.70	1.93	1.82	1.50	1.36

**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 6. Portfolio Level Costs and Benefits Summary (USD) – PY2016

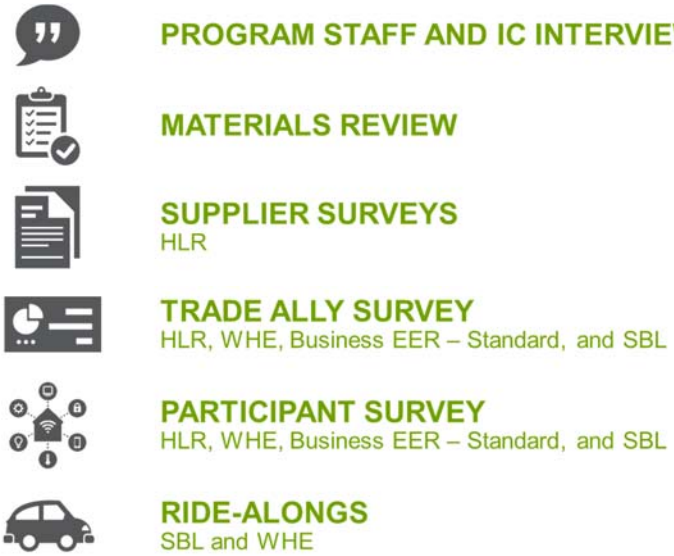
Sector	Rebate Costs	Direct Program Admin Costs	Indirect Program Admin Costs	Total Costs	Benefits from Energy Savings	Benefits from Demand Savings	Total Benefits	Total Net Benefits
Portfolio	**$7,511,336**	**$10,196,859**	*****	**$17,708,195**	**$15,218,619**	**$14,751,120**	**$29,969,739**	**$12,261,544**

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's discussion of the process evaluation activities and findings provides an overview that focuses on the general approach and broader findings that apply to the most impactful programs in GMO's portfolio, namely the Business EER – Standard, HLR, HER, DRI, and Programmable Thermostat programs. Together these programs represented verified energy savings of approximately 84% 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.

Business EER – Standard Program

Overall, the Business EER – Standard program continues to meet the needs of the GMO market. Navigant assessed customer satisfaction through multiple questions and found that:

- The program continues to have high customer satisfaction even with a large increase in participation due mainly to lighting measures, with 89% of the participant respondents rating it a 4 or 5 on a 5-point scale.
    - This represents an increase of 13% from last year.
- Trade allies also are very satisfied with the program, with an average rating of 4.7 out of 5.0.
- Participant dissatisfaction with the application process improved, with less than 6% of participants rating the application process a 1 or 2 (n=3) as compared to PY2015's dissatisfaction rating of 10%.

HLR Program

Overall, the HLR program, which represents approximately 16% of total portfolio verified gross energy savings, continues to meet program participant needs. The evaluation team assessed program satisfaction through surveys with eight partnering suppliers and found the following:

- The team suppliers rated their satisfaction as 7.8, with the six manufacturers giving an average rating of 7.6 and the two retailers an average of 8.5. They rated their satisfaction with the program on a scale of 0 to 10, where 0 is very dissatisfied and 10 is very satisfied.
- While suppliers infrequently provided low ratings, those that did attributed their dissatisfaction to their perception that HLR incentives are slightly lower than other comparable programs.
- When asked for suggestions for program improvements, suppliers most often suggested adding budget, increasing incentive levels, and offering more flexibility in terms of the timing of incentives and the products those incentives go toward.

The evaluation team also completed web and telephone consumer surveys with 250 GMO customers. The surveys measured, among other areas, the customer's familiarity and experience with LED lighting technologies. The survey found the following:

- Consumer experience with LEDs is positive: most survey respondents who had used LEDs (86%) confirmed that they would purchase them again, and consumer survey respondents who had used them most often preferred LEDs over halogens (56%) and CFLs (58%).
- Consumer survey respondents who purchased bulbs in the past 6 months purchased more LEDs (10.6) than CFLs (6.0) or halogens (4.6), on average. However, consumers cannot distinguish between ENERGY STAR and non-ENERGY STAR models.

HER Program

The HER program represents approximately 23% of total portfolio verified gross energy savings and 9% of total portfolio verified gross demand savings. In collaboration with the IC, the evaluation team fielded the Customer Engagement Tracker (CET) survey to 700 HER recipients and 302 non-recipient control group customers. The survey found the following:

- Most customers read the home energy reports, and nearly one-quarter report taking an energy-saving action, including the following:
  - 94% of GMO customers responding to the CET survey who recall receiving the home energy report stated that they read some or all of the report or glance at the pictures; 61% report talking to others within or outside their household about the report.
  - 23% of GMO customers responding to the CET who recall receiving the home energy report stated that they took an action after reading the report. The most common actions were adjusting lighting habits and adjusting or replacing thermostats.

Most customers read the home energy reports, with ~25% reporting taking an energy-saving action.

Among GMO customers responding to the CET survey who looked at the reports, 79% agree or strongly agree that they like the reports. Treatment customers are equally likely as control customers to agree or strongly agree to statements that KCP&L helps customers manage their energy use and save money, with more than half of both groups expressing agreement.

Residential and Business Programmable Thermostat Programs

Overall, Navigant's process research found that the Residential and Business Programmable Thermostat (PT) programs ramped up quickly in the first PY, surpassing their enrollment targets and reaching strong customer satisfaction in thermostat installations. The programs represent approximately 3% of total verified gross energy savings and 18% of verified gross demand savings. KCP&L redesigned the program from PY2015 to PY2016. This included bringing in a new thermostat provider and IC to grow both energy and demand savings. Navigant conducted in-depth interviews with GMO's product manager and the IC to better understand the Residential and Business PT programs and to try and investigate the key considerations:

- Transition from Honeywell to Nest thermostats
- Issues or challenges faced
- Opportunities for improvement and efficiencies
- Participant recruitment and communication
- Internal program partnerships
- Upcoming program changes

Key Findings include:

- Because Nest took over being the thermostat provider, a range of installation and corresponding incentive options were offered to customers (do it yourself, direct install, and Bring Your Own Nest). These options allowed customers to participate in whichever way they preferred.
- Monthly surveys from the call center indicate high satisfaction with experiences relating to the direct install process and customer call center, which indicates that the processes for the revamped program are meeting customer expectations.

DRI Program

The evaluation team found that the DRI program has potential for improving the program processes to better align with GMO's goals. Through the in-depth interviews with the program's product manager and the IC, the evaluation team found the following:

- Customer participation incentives changed from PY2015 to PY2016.
    - In PY2015, participants received incentive rebate checks or bill credits equal to (1) $2.50 per kW of curtailable load for monthly program enrollment during the curtailment season independent of any events being called, and (2) $0.35 per actual kW of curtailed load during each event.
    - In PY2016, participants received (1) a one-time payment of $32.50 per participating kW, (2) an additional payment per curtailment event of $0.075 per kW per hour curtailed up to

the first 30 hours of dispatch, and (3) $0.25 per kW for the remaining 50 hours of dispatch.

  - In PY2016, the program did not reach the third tier of payment. Savings in PY2016 were smaller than those in PY2015. Navigant will investigate customer perception of incentives in the PY2017 surveys to see whether incentives correlate with observing contracted curtailable load.

- Most customers were under their contracted EPD during event periods on days with a similar temperature to event days.
  - These customers are easily able to meet contractual FPL indicating that their FPL and EPD do not fully reflect the load reductions needed during a demand response event.
  - KCP&L is working on a new calculation for estimating customer peak demand and establishing FPLs during events, which should address this issue.

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 focus on improving program tracking records to facilitate evaluation efforts and to better align reported and verified savings.

- Consider implementing a process to verify the alignment of savings values within the electronic program tracking database with the supporting project files. This could help correct misalignments between the two systems which Navigant encountered during our evaluation.
- Continue to verify that tracking databases contain all data needed to track installed measures and calculate program savings, including equipment capacity, efficiency, baseline information when available, and quantity.

- Consider including the incremental cost in the tracking database. The incremental cost[8] for the installed measures is useful in calculating the benefit-cost ratios for the measures. This information, if available, is usually easiest to capture at project initiation; if not available, capturing the incremental costs assumptions could suffice.
- Establish and use a NTG ratio for all programs that are not inherently net or have valid reasons for a deemed 1.0 approach. Further suggest documenting logic behind the value used to help resolve discrepancies versus evaluated values.

Consider including incremental cost in the tracking database as it is useful in calculating benefit-cost ratios.

- Navigant suggests tracking savings based on variations in equipment performance for different building types. Where primary data is not available, the team suggests using a look-up table to get the values pertinent to each individual building type from the Illinois Technical Reference Manual (TRM) Version 5.0.
- Consider using a single authoritative reference to look up the various values used in the savings calculations (for example, waste heat factors, coincidence factors, etc.). The evaluation team recognizes MO is currently working on a state-wide TRM, but it is not the active reference for the state. Until that time, Navigant suggests using the Illinois TRM as a neighboring state's TRM to ensure a consistent reference source.
- To the extent possible, track hours of operation and occupancy of buildings and residences before and after program participation to support potential additional impact measurement through billing analysis.

Process Evaluation Recommendations

This section presents the most impactful findings and recommendations resulting from Navigant's process evaluation activities for PY2016. A complete description of the findings and recommendations of Navigant's process evaluation is presented in the program-specific sections that follow.

- Consider the continuation of education and awareness efforts, particularly with new trade allies entering the programs.
- Continue the process of understanding customer needs and potential end-use measures relatable to their needs through dedicated events or specific program outreach.
- Continue to develop and periodically review best practices of the current outreach efforts to maintain and increase current program engagement.
- Consider providing turnkey marketing assets that trade allies and partners can use to create their own promotional outreach efforts.

Monitor savings targets and enrollment goals to ensure the cost-effectiveness of each program.

[8] Incremental cost is defined as the difference between the cost of the efficient measure and the cost of the most relevant baseline measure that would have been installed, if any, in the absence of the efficiency program.

- Encourage trade allies to cross-promote other KCP&L programs. One potential option could be offering trade allies a small bonus for encouraging their customers to participate in other KCP&L programs.
- Monitor savings targets and enrollment goals to ensure the cost-effectiveness of each program. This is a key consideration for programs that have a low participation target that may be quickly surpassed.

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) 2016.

Navigant conducted the following tasks as part of its impact evaluation, process evaluation, and cost-effectiveness analysis for PY2016:

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

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

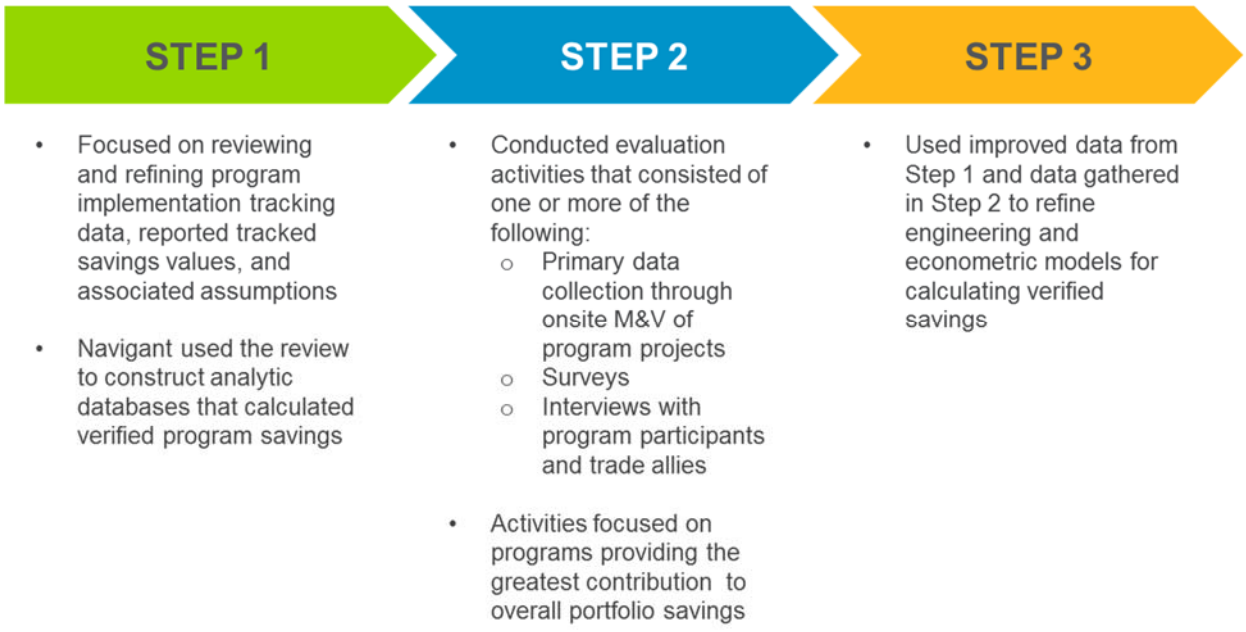
1.1 Impact Evaluation Approach

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

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

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

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



In accordance with Missouri (MO) regulations,[11] 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.

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

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

Program		Impact Evaluation Method	Impact Evaluation Protocol
Commercial and Industrial (C&I) EE Programs	Business EER – Standard Program	1a	2a and 2b
	Business EER – Custom Program	1a	2b
	Block Bidding	1a	2b
	Strategic Energy Management* (SEM)	N/A	N/A
	Small Business Lighting (SBL)	1a	2a and 2b
Residential EE Programs	Income-Eligible Weatherization** (IEW)	1a	2b
	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

*Navigant did not conduct any impact evaluation activity for SEM in 2016 as it did not report any energy savings in 2016.

**Savings are only claimed for IEW for GMO in 2016. Given that the program was evaluated in previous cycles with realization rates of close to 100%, Navigant recommends limiting impact evaluation for this program to ensure KCP&L's reported savings reflect values tracked in its program databases.

***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.

NOTE: The Home Appliance Recycling Rebate (HARR) program ended and was superseded by the WHE program; thus, savings attributed to the HARR program are added to the WHE targets.

Source: Navigant analysis

1.1.1 Net-to-Gross

The NTG components are either based on data collected in PY2016 from participants and, where appropriate, from trade allies, or utilize NTG research from Cycle 1 for programs that have similar program designs. Navigant used the following definitions, provided by the Uniform Methods Project,[12] to calculate net savings:

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

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

- **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 =	Non-participant 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., DRI, Programmable Thermostat, IEW)
- Programs did not claim any savings (e.g., SEM, HOEA, BOEA)
- 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 PY (e.g., Block Bidding, Business EER – Custom, IEMF)

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[13]	**0.11**	**0.04**	**0.14**	**107%**
Block Bidding	Deemed 1.0 pending future research.			100%
Strategic Energy Management	N/A – Savings not claimed in PY2016			
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	**0.16**	**0.00**	**0.00**	**84%**
Home Energy Report	1.0 based on analysis approach generating net results			
Home Online Energy Audit	N/A – Savings not claimed in PY2016			
Business Online Energy Audit	N/A – Savings not claimed in PY2016			
Residential Programmable Thermostat	1.0 based on analysis approach generating net results			
Business Programmable Thermostat				
Demand Response Incentive				

Source: Navigant analysis

1.2 Cost-Effectiveness Approach

Navigant calculated five standard benefit-cost ratios: 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. The evaluation team's formulation of the benefit-cost tests followed the 2001 California Standard Practice Manual (SPM)[14] and does not account for the subsequent 2007 SPM Clarification Memo.[15] Navigant will provide KCP&L with the evaluated savings included in this analysis to support their performance incentive calculation.

Navigant's benefit-cost analysis explicitly accounts for the following cash flows:

- Avoided energy costs
- Avoided capacity costs

[13] The Business EER – Custom program utilized FR and SO data collected in MEEIA Cycle 1. NTG research is planned for PY2017.

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

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

- Incentives
- Lost revenue/bill reductions
- Administrative costs[16]
- Participant equipment costs

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

Table 1-3. Cost and Benefit Assignments by Cost Test

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

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[17]	Source
Avoided energy costs	Provided by GMO
Avoided capacity costs	Provided by GMO
Retail rates	Provided by GMO
Load shapes	Navigant developed model load shapes with input from GMO.

[16] Including portfolio-level costs related to EE and DR programs, software development costs, EM&V costs, and educational program costs.

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

Data[17]	Source
Discount rates	Weighted average cost of capital (WACC)—provided by GMO and classified by GMO as highly confidential—used for TRC, UCT, and RIM tests. SCT used a value of 3%, whereas PCT used a value of 10% consistent with discount rates used by GMO in its cost-effectiveness analysis presented in its Annual Progress Report.
Participant equipment costs	Illinois Technical Reference Manual (TRM), GMO assumptions
Energy and peak demand savings	Navigant engineering analyses
EUL	Illinois TRM, program tracking data, GMO Assumptions
RUL	Navigant analysis based on lifetime of replaced equipment and related mortality analysis techniques.
NTG	Navigant NTG analysis
Line loss factors	Provided by GMO
Incentives	Program tracking database
Participation	Program tracking database
Administrative costs	Provided by GMO

Source: Navigant analysis

1.2.2 Early Retirements

Navigant analyzed early retirement measures in the Whole Home Efficiency (WHE) program using a two-part savings stream (i.e., a dual baseline approach) and accounting for the adjustments in equipment investment timing due to early retirement of functional equipment. This approach was necessary to ensure that early retirement measures were not unfairly 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.[18] The description below provides a high level summary of this approach.

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 RUL, and the other in which the baseline equipment replacement is deferred by the 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.

[18] 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.

The evaluation team applied a dual baseline approach to energy and demand savings for retrofit measures to capture the effect of changing baselines, codes, and standards. The dual baseline approach is broken into two periods: a pre-RUL period and a post-RUL period. 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.

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?

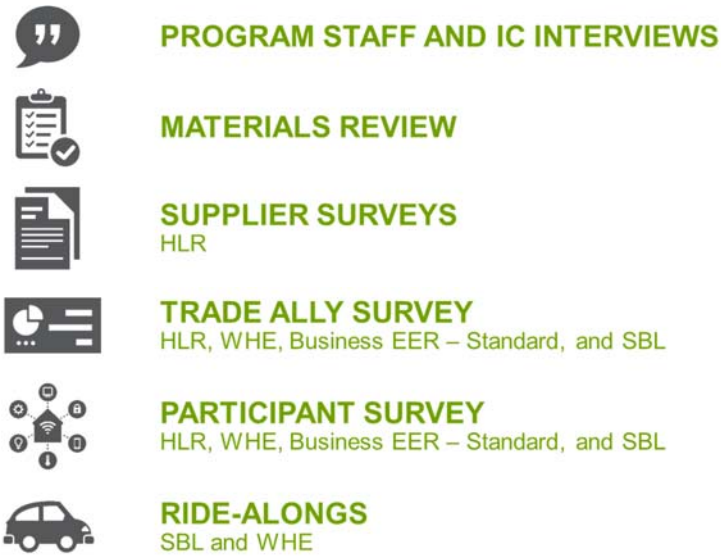
QUESTION 4

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 PY2016 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. Load shape profiles broken out by months and load periods
    c. Program-level administrative costs incurred by the program administrator
    d. Electricity retail rates by sector
    e. Discount rates, line loss factors, and inflation rates
    f. 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 helps to improve accessibility to the customer. This helps increase the number of participants in the program for a broad segment of KCP&L's customers, with more complex projects utilizing the Business EER – Custom program to tailor the upgrades to a customer's needs. Any KCP&L GMO C&I customer is eligible to participate in the program. Program measures include the more typical EE projects such as lighting, motors, and HVAC. Table 2-1 provides more detail on the Standard program.

Table 2-1. Business EER – Standard Program Description

Business EER – Standard Program Key Details	
Sector	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: • Air conditioners (ACs), heat pumps, and advanced rooftop unit controls • Energy efficient lighting and controls • Refrigeration/food service • Water heating • Appliances • Standard process equipment (e.g., barrel wraps, insulated pellet dryer ducts)
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. Pre-approval 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, but the check is still sent in the customer's name. The total amount a participant can receive is limited to $500,000 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.
Project Reporting	The IC populates the database as projects are completed. There is a monthly upload from CLEAResult to the GMO data warehouse for reconciliation.

Source: Evaluation team analysis

2.2 Evaluation Findings

In PY2016, Navigant evaluated the Standard program and found that the program is performing well in the territory, meeting 74% and 65% of their 3-year energy and demand savings targets, respectively, in the first year. Also, overall participant satisfaction with the program averaged 4.5 out of 5.0 based on the process evaluation.

For the Standard program's impact evaluation, Navigant performed a deemed measure savings review, tracking database review, and onsite fieldwork 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 it for the reasonability of the algorithms and assumptions used (see Appendix E.2). The team performed onsite verification at 40 sites across KCP&L-MO and GMO territories, 17 of which were in GMO territory. (For sampling efficiency, Navigant combined KCP&L-MO and GMO territories and drew samples together.) Onsite inspections verified installed measure quantities, equipment specifications (i.e., size, capacity, wattage), and operating parameters (i.e., observed building type, hours of use, coincidence factor). Overall, there were 1,022 projects that participated in the Business EER – Standard program; among those, 507 projects were from the GMO territory.

For the process evaluation, Navigant conducted program staff interviews and participant and trade ally web surveys to measure program satisfaction and identify opportunities to improve program processes. The evaluation team completed 56 web surveys among participants and trade allies, 27 of which were from the GMO territory.

The following sections summarize Navigant's PY2016 findings for the Business EER – Standard program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

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

2.2.1 Impact

This section provides Navigant's findings from the Standard program impact evaluation, shown in Table 2-2. Overall, the Standard program achieved a 61% realization rate for energy savings and a 52% realization rate for demand savings. Variations in the gross realization rate were due to adjustments based on Navigant's engineering analysis and onsite verification work. Specifically, the drop in realization rate for the Standard program is largely due to the reduction in the energy savings in the High Bay LED lighting measure. This measure represents 81% of program level savings. 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. (Please see 2.2.1.3 for more details). However, Navigant notes this discrepancy was proactively identified by KCP&L's implementation team and has been corrected for future program years. We do not anticipate similar drops in realization rate due to this measure in PY 2 and 3 for MEEIA cycle 2. Additionally, Navigant adjusted the in-service rate (ISR), hours of operation (HOU), coincidence factors (CFs), and included waste heat factors (WHFs) in the verified

savings calculation. Navigant's NTG analysis indicates limited instances of FR (5%) and SO (0.5%) for a NTG ratio of 0.96.

Navigant's adjustments to the baseline wattage for high-bay lighting measures account for the differences between reported and verified savings. The following sections presents results of the database review, deemed savings review, and onsite M&V

Table 2-2. Business EER – Standard PY2016 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)	48,659,656	29,859,640	61%	38,710,762	28,665,254	74%
Coinc Demand at Customer Meter (kW)	8,429	4,360	52%	6,385	4,186	66%

*The team applied 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 507 projects in PY2016. Table 2-3 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 2-3. Business EER – Standard PY2016 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	474	48,396,340	99%	8,347.02	99%
HVAC	14	140,099	0%	60.90	1%
Motors, Drives, and Compressors	4	26,507	0%	8.10	0%
Compressed Air Upgrade	15	96,709	0%	13.15	0%
Total	**507**	**48,659,656**	**100%**	**8,429.17**	**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 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.
- **Missing/Limited incremental measure cost information:** This information is required to determine cost-effectiveness of the measures and program, but Navigant recognizes the challenge in collecting the information and proposes to work with KCP&L and the IC to identify potential opportunities and methods to better capture this important information.
- **Incorrect or missing data fields**: Several projects' measure names did not align to the KCP&L deemed measure savings because of typos or different names. Also, Navigant found measure categories were misidentified on some measures and a small number of measures contained a blank category section. The evaluator notes that KCP&L implemented the primary key from the KCP&L TRM for program year 2 which will address the above finding.

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 47 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 the 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.
- Overall, the non-lighting measures also use the industry standard algorithms.

2.2.1.3 Onsite Verification

Navigant conducted onsite verification and a lighting logger study to capture improved primary inputs for the engineering analysis equations as part of this year's evaluation. The evaluation team used lighting loggers to capture improved inputs for the lighting measures due to lighting measures' high proportion of program savings (99+%). The information captured during the on sites included:

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

Navigant then updated the WHF based on the Illinois TRM using actual building types and used the lighting logger data from this year's onsites in combination with Cycle 1 lighting logger data to create a more complete picture of lighting inputs, such as HOU and CF values. Other notable adjustments include:

- LED high bay 176W-350W makes up 79% of all reported savings. In the KCP&L deemed measure savings, the baseline wattage of this measure was 1,078W and the efficient wattage was 350W. However, based on the onsite findings, the average baseline wattage was 736W and the average efficient wattage was 288W, which led to a lowering of the realization rate.
- After the logger data analysis, Navigant found that the HOU and CF for peak demand savings were different than the KCP&L deemed measure savings. Navigant analysis showed a 13% reduction in CF and 16% increase in HOU. Navigant also sourced new WHF energy (WHFe) and WHF demand (WHFd) based on actual building types from the Illinois TRM. Table 2-4 shows the revised calculation parameters. Table 2-5 shows the input assumptions that were used to develop reported savings.

It should be noted, Navigant has worked with the implementation contractor and KCP&L Product Managers to develop a parallel review process that will mitigate any future potential for low realization rates. These actions include:

- Updating estimated reported values in the KCP&L TRM
- For large C&I projects, working on a parallel path approach that allows Navigant to provide early feedback on large reported savings measures.

Based on these actions, Navigant believes that reported values will be more closely aligned with evaluated savings in PY2 and PY3.

Table 2-4. Business EER – Standard Updated Calculation Parameters from Onsite Findings

Building Type	Revised WHFe	Revised WHFd	Revised CF	Revised HOU
Industrial	1.02	1.04	0.62	5,144
Office	1.21	1.44	0.75	4,484
Other	1.09	1.36	0.67	5,280
Retail	1.12	1.29	0.83	5,662
School	1.18	1.35	0.59	4,074
Warehouse	1.00	1.22	0.64	4,110

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

Table 2-5. 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

Source: KCP&L TRM

- During onsite verification, 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

For both the Standard and SBL programs, Navigant stratified results by building type and applied those results using the original reported savings weighting from the original population. For the PY2016 sample, Navigant stratified the Standard program population by building type, including “Industrial”, “Office”, “Retail”, “School”, “Warehouse”, and “Other”. Navigant developed the sample by building type to capture the hours of operation (HOU) and coincident demand factors (CF) by building type for the lighting measures installed in the Standard program.

To maximize evaluation resources, Navigant evaluated both service territories in a combined sample based on discussions with implementer and KCP&L product managers, this was found to be a reasonable approach due to similarities in program execution.

Navigant also looked at the representativeness of the combined territory sample by measure type and project size. Navigant analyzed relative precision for measure type, project size and building type and found the relative precision and confidence for each of the above scenarios fell within the target range of 90/20 confidence and precision for combined GMO and KCP&L-MO program level results. Table 2-6 and Table 2-7 summarize the relative precision and confidence by building type for energy and demand.

Table 2-6. Standard & SBL Program Sampling for GMO and KCP&L-MO Combined - Energy Savings

Program	Stratum	Population			Sample			
		Year-End Population	Reported kWh Savings	% of Total	Sample Size	Reported kWh Savings	% of Total	Relative Precision at 90% Confidence (one-tailed)
Standard & SBL	Industrial	163	28,276,549	23%	7	1,731,701	15%	7.3%
	Office	144	3,320,072	3%	5	284,047	2%	34.6%
	Other	262	21,648,972	18%	9	5,713,106	49%	27.8%
	Retail	251	10,839,101	9%	12	666,771	6%	34.6%
	School	94	7,959,338	7%	8	688,798	6%	9.5%
	Warehouse	206	48,509,157	40%	9	2,650,037	23%	13.9%
	Total	**1,120**	**120,553,190**	**100%**	**50**	**11,734,460**	**100%**	**13.5%**

Source: C&I Standard and SBL Program Tracking Databases and Navigant analysis

Table 2-7. Standard & SBL Program Sampling for GMO and KCP&L-MO Combined - Demand Savings

Program	Stratum	Population			Sample			
		Year-End Population	Reported kW Savings	% of Total	Sample Size	Reported kW Savings	% of Total	Relative Precision at 90% Confidence (one-tailed)
Standard & SBL	Industrial	163	5,129.19	24%	7	314.40	14%	5.9%
	Office	144	626.23	3%	5	57.87	3%	29.9%
	Other	262	3,576.61	17%	9	1,031.24	48%	22.2%
	Retail	251	1,647.13	8%	12	114.09	5%	17.4%
	School	94	1,511.47	7%	8	136.89	6%	14.5%
	Warehouse	206	8,798.74	41%	9	515.12	24%	10.9%
	Total	**1,120**	**21,289.36**	**100%**	**50**	**2,169.61**	**100%**	**10.4%**

Source: C&I Standard and SBL Program Tracking Databases and Navigant analysis

Navigant reviewed the measures rebated through each program and found that, based on reported savings, the distribution of savings was similar between the programs. High Bay lighting measures represented the majority of savings (GMO = 81% for the Standard program and 46% for the SBL program, KCP&L – MO = 78% for the standard program and 59% 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 identical reported savings as Standard program. The primary difference in these measures is that the SBL program offers a higher incentive structure, for some measures, than the Standard program. The SBL program also serves smaller commercial and industrial customers (below 100 kW). However, the operating characteristics for these customer types from SBL and Standard programs are still quite similar. For example, a smaller office building and a medium sized office building with more than 100 kW connected load will still run 8 to 5, five days a week. Apart from the size of the fixtures, operating characteristics of the HID fixtures are likely to be similar for both the programs. Therefore, Navigant applied the results from the onsite verification efforts to both the Standard and Small Business Lighting programs.

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 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 2-8 summarizes the components of the NTG ratio. The NTG ratio of 96% was driven primarily by limited FR found in the participant survey. 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 be a reflection of 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 2-8. Business EER – Standard NTG Components and Ratio: PY2016

Program Year	FR	PSO	NPSO	NTG Ratio
2016	0.05	0.002	0.004	96%

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.

Table 2-9 presents the benefit-cost ratios for the five-standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program achieves a cost test ratio of 1.0 in the TRC, SCT, UCT, and PCT. The team's analysis resulted in a TRC ratio lower than that filed by GMO due to an energy realization rate of 61% and a coincident demand realization rate of 52%.

Table 2-9. Business EER – Standard Benefit-Cost Ratios: PY2016

Program Year	TRC Test[19]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	2.49	1.37	1.58	2.29	1.86	0.69
Program Overall	**2.49**	**1.37**	**1.58**	**2.29**	**1.86**	**0.69**

Source: Navigant analysis

2.2.3 Process

As the Standard program is a synergistic component of KCP&L's Business EER program, the process results for it were considered along with the results for the Small Business Lighting, Custom, and Strategic Energy Management programs. Overall, Navigant's process research found that the Standard program is well received by the participants who took the Navigant-fielded survey, rating it 4.5 out of 5.0 in terms of overall program satisfaction.

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

Navigant addressed three process evaluation research questions and the five MO-required questions for process evaluation through program staff interviews, participant surveys, and trade ally surveys in PY2016 for the Standard program. Table 2-10 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

Table 2-10. Business EER – Standard 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 PY2016, and what changes are planned for PY2017?	• Program staff interviews
3. How satisfied are customers and trade allies with the program?	• Participant survey • Trade ally 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 • Trade-ally survey
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Trade ally survey • Participant 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 • Trade ally survey • Participant survey
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Trade ally survey • Participant survey
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Trade ally survey • Participant survey

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 and sent online surveys to participants and trade allies to address the three general questions. The process evaluation also included a review of KCP&L's progress on previous recommendations. Overall, participants were happy with the program and gave positive ratings. However, a slight weakness was found in the rebate process. Suggested recommendations included improving the application process and reducing the time needed to receive a rebate check.

KCP&L made two significant changes to help the Standard program achieve its energy goals while making rebates more accessible for common C&I measures. First, KCP&L included LED lighting incentives into the Standard program, which helped to shift participation from the Custom program to the Standard program. Second, KCP&L lowered the incentives (lighting and non-lighting) for the Custom program from 50% of incremental cost to $0.10 per kWh saved to better align these two programs.

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 PY2015 GMO report, there were four findings and recommendations for the Standard programs. Below is a restatement of the PY2015 process evaluation recommendations along with status updates of those findings:

1. Continue current customer engagement processes. The programs are producing high levels of satisfaction.

   STATUS: KCP&L continues to have high satisfaction, with 89% of the participant respondents rating it a 4 or 5 on a 5-point scale; this is an increase of 13% from PY2015.

2. GMO could consider offering additional training for customers on the applications. This could reduce the number of rejected applications and the perceived length of application processing times from customers. Additionally, equalizing the incentive value to the customer across programs could help increase uptake in the Standard program and reduce processing times.

   STATUS: Participant satisfaction with the application process improved, with less than 6% of participants rating the application process a 1 or 2 (n=3) out of 5 as compared to the PY2015 rating result of 10%. One of the participants felt the directions were not clear as to what equipment was eligible.

   Trade allies were satisfied with the application process and the time needed to complete the project. Only 5% of participants rated a 1 or 2 (n=1) out of 5. However, 13% of participants rated a 1 or 2 (n=7) out of 5 for satisfaction with the amount of time it took to receive the rebate check. The time it took to receive the check was reported to be a range of 6 weeks to 6 months.

   While this program element had the lowest satisfaction, there were relatively few participants who responded with a lower ranking, the weighted average for the question was 4.25 on a scale of 1-5. The following seven participant responses support the lower satisfaction rating for the time it took to receive a rebate:

   - "I thought the communication could be better. I emailed in my rebate, but have nothing to show for it (after 2+ weeks)."
   - "It seemed to take a while to receive the rebate."
   - "It took six weeks."
   - "It took upwards of a year to finally receive the rebate check. Not sure if that was the fault of KCPL or my contractor who handled the rebate process for me."
   - "[I] never received [the rebate]."

- [Respondent indicated a seven-month lag]. "I had to follow up numerous times and paperwork had been set aside. I have 4 rebates all taking a long time to get. And not the first time either. Previous rebates took up to a year."
- "[It] took way too long to get rebate money back."

3. GMO could consider adjusting the incentive design between the two programs for consistency.

   STATUS: In MEEIA Cycle 2, GMO redesigned the incentive structures to ensure similar measures receive similar incentives across both programs. In comparison, the incentive for all Custom program projects is a flat incentive of $0.10/kWh.

4. GMO could increase outreach to end-use customers and create additional key performance indicators (KPIs) to track this effort. Possible outreach activities could include onsite meetings with large customers (KPI = number of meetings) or bill inserts for smaller commercial customers (KPI = number of bill inserts).

   STATUS: KCP&L currently works directly with top tier customers, and Tier 2 customers are prioritized based on the energy consumption. KCP&L's effort to utilize the trade allies in program promotion has been successful, with 68% of participants learning of the program through a trade ally. This shows the customer outreach has improved via the trade ally network.

QUESTION 2: What changes have been made to the program in PY2016, and what changes are planned for PY2017?

FINDING 2: In PY2016, the major rebates for LED lighting were added to the Standard program.

- For PY2017, KCP&L is updating measure descriptions to clearly provide context to help ensure an accurate baseline selection to avoid encountering another high-bay lighting-like issue where the baseline was incorrect.

QUESTION 3: How satisfied are customers/trade-allies with the program?

FINDING 3: Most customers and trade allies are satisfied with the program.

- Participants gave an average rating of 4.5 out of 5 (with 5 being the highest) when asked about overall satisfaction with the program. Navigant assessed the customer satisfaction through multiple questions in the Navigant-fielded survey (e.g., amount of rebate, process time, requirement to participate, application process, and overall satisfaction).
- Overall, trade allies are very satisfied with the program, rating it a 4.7 out of 5.0.

2.2.3.2 Missouri-Required Questions for Process Evaluation

In answering the MO requirements for process evaluation, Navigant interviewed the Standard program's key staff and sent online surveys to participants and trade allies. The evaluation team found that KCP&L's Standard program has a well-defined customer base that is benefiting from an increased awareness of their energy efficient options. Trade allies play a major role in the education and promotion of energy efficient measures to these customers.

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

- All three of KCP&L's C&I customer classes have participated in the Standard program.
- KCP&L has made a concerted effort to engage trade allies, as this group interacts with the customer in the early stages of a new project. Engaging the customer early in the process has been a key goal for all the C&I programs.
- Contractors (68%) and the KCP&L website (11%) are the primary sources from which participants are learning about the Standard program's measures. These resources and self-outreach are promising, though they indicate there is a potential opportunity to increase cross-program promotion (4%) as a way for customers to gain awareness about the program.

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

FINDING 2: The C&I customer—and especially the smaller customer—has limited resources to devote to researching and implementing energy conservation.

- The Standard program is successfully building market awareness of energy efficiency options: 76% of survey respondents were not originally planning to implement energy efficient measures, and 87% indicated that without the program they would have chosen less efficient options. Further, almost half (48%) of respondents indicated they went on to purchase additional energy efficient measures due to program participation and rebates.
- KCP&L is successfully engaging the smaller C&I customers; the participant survey indicated that 78% of participants had less than 100 employees. The participant survey also indicated that many customers rely on the trade ally's advice regarding energy efficiency as 68% of customers heard about the rebate through their contractor. And finally, 76% of the customers had not selected the purchased equipment prior to learning about the program.
- The Standard program has influenced the trade allies: 53% of respondents showed that they now offer higher efficiency equipment as their first recommendation to their customers, and 63% of the respondents are adding new high efficiency products to their offerings.

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 HVAC, lighting, and refrigeration energy end-uses, 89% of the rebate activity in PY2016 was for lighting measures.

- The Standard program complements the other Business EER programs by providing rebates for the more typical capital projects.
- Almost three-quarters of trade allies surveyed (72%) replied with no additional measures suggested. For those suggesting measures (two out of 19), there was no clear overlap in

suggestions, with one suggesting only including lighting controls (dimmers) and the other suggesting low volume HVAC measures for consideration.

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

FINDING 4: The Standard program primarily marketed to and recruited customers through one-on-one conversations with the larger customers and working with the trade ally network for medium to smaller customers. High participant satisfaction is one indication that the program's communication channels and delivery mechanisms are generally appropriate for the target market segment.

- Of the trade ally respondents, 60% were somewhat to extremely satisfied with the marketing materials they received, 72% were satisfied with the training they received, and 82% felt the training was of the right length (not too long or too short).

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's success with lighting within the Standard program is strong. The effect from other end uses was 11%, which could indicate an opportunity to further expand non-lighting measure usage through follow-ups with trade allies to identify measures to consider for a marketing and education push.

- KCP&L has had great success with the lighting rebates, and 82% of surveyed trade allies had the same or increased satisfaction with the program in PY2016 versus previous years. Additionally, 87% of participants have recommended the program to friends and/or colleagues. This shows the program is achieving savings while receiving high marks for satisfaction.

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 and meet the MEEIA target. 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)

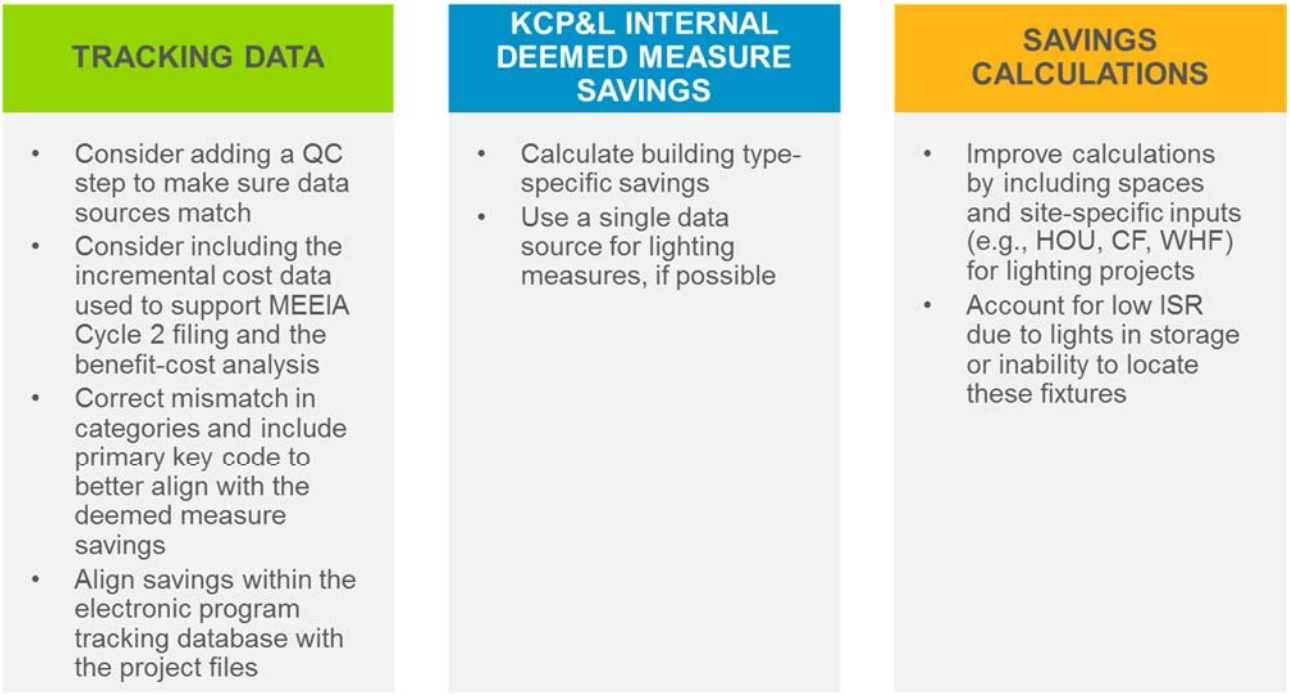
2.3.1 Impact

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.

During the tracking data review, the evaluation team found that the IC's project files had a difference in quantity and savings versus KCP&L's electronic tracking database. Moving forward, Navigant suggests KCP&L consider adding quality control (QC) steps to make sure these two data sources have the same

data to ensure accuracy of the program evaluation and to ensure KCP&L's ability to track program achievements is consistent[20]. Additionally, Navigant recommends accounting for actual building types to accurately predict the savings. Currently, all tracked savings assume performance variables that reflect operation of an office building. Figure 2-1 details Navigant's recommendations from its impact evaluation.

Figure 2-1. Business EER – Standard Program Impact Recommendations: PY2016



Source: Navigant analysis

2.3.2 Process

The Standard program has made great progress on the 3-year MEEIA target, primarily through significant participation in lighting measures. The program achieved this while maintaining high participant and trade ally satisfaction.

An overall recommendation is to work with the trade allies to increase participant awareness of the non-lighting measures. As the Standard program matures, KCP&L may wish to specialize its training to specific markets such as property management and data centers. KCP&L may also want to consider providing trade ally training for the under-performing end uses such as HVAC, motors, and building controls.

[20] Navigant notes that the IC added additional QC steps in the final month of PY2016 (March 2017) to use moving forward.

Figure 2-2. Business EER – Standard Program Process Recommendations: PY2016

Source: Navigant analysis

2.3.2.1 Recommendations Based on the Research Questions

The evaluation team examined two research questions in addition to the five MO-required questions.

Overall, Navigant found that many participants are satisfied with the current program. While the current process has high participant satisfaction (4.5 out of 5.0), there are potential improvements that could increase the savings of under-performing measures.

Table 2-11. Business EER – Standard 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?	Of participants, 5.7% rated a 1 or 2 out of 5.0 for the rebate application process and the amount of time needed to receive the rebate check. KCP&L could consider reviewing the application process for clarity and establish a metric measuring the time needed to process a rebate from the receipt of the application to the rebate distribution.
2. What changes have been made to the program in PY2016, and what changes are planned for PY2017?	Including more LED lighting rebates to the Standard program provided significant savings, making up 89% of rebate activity. Having such reliance on one market area leaves the Standard program vulnerable to market shifts and changes. KCP&L could explore monitoring the diversity of the program's end-use measures with a KPI toward monitoring participation in the non-lighting measures.

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[21] for the Standard program. Table 2-12 describes Navigant's recommendations based on each question. Overall, Navigant found that KCP&L could provide additional effort or training to increase the participation and savings of under-performing measures (e.g., non-lighting). This could help the Standard program continue its improvement.

Table 2-12. 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?	Continue strong efforts to engage trade allies toward getting the program considered at early stages of potential projects.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Continue education and outreach efforts with trade allies as current efforts are showing traction with both trade allies and participants. As the Standard program matures, KCP&L may wish to specialize its training to specific markets such as property management and data centers.
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?	Consider monitoring trade allies' efforts and actively soliciting additional feedback toward improving non-lighting measure project participation.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Monitor marketing efforts by trade allies and consider opportunities for co-promotion with other programs and across measures within the Standard program to amplify marketing messages during targeted promotional periods.
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?	Of the 19 trade allies surveyed, 17 respondents had lighting as their primary measure. Consider trade ally training specifically for the non-lighting end uses such as HVAC, motors, and building controls. Increasing trade ally awareness of the other measures in the Standard program could increase the number of trade allies that specialize in non-lighting equipment.
	Consider establishing an online tracking system for customers and trade allies to monitor the status of the application and rebate check.

Source: Navigant analysis

[21] 4 CFR- 240-22.070(8)

3. BUSINESS ENERGY EFFICIENCY REBATE – CUSTOM PROGRAM

3.1 Program Description

The GMO Business Energy Efficiency Rebate (EER) – Custom program provides incentives for energy efficient upgrades for business customers. This program is available to all 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:

- Provides incentives for equipment not included in list of measures rebated by the Business EER – Standard program
- Delivers rebates—available for both existing and new facilities—only to those projects that achieve a TRC score of 1.0 or higher
- Calculates rebates based on following:
    - o $0.10 per first-year kWh saved
    - o Up to 50% of project incremental costs
    - o Up to $500,000 of maximum annual cap per customer per service territory[22]
- Requires pre-approval 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 Details
Sector	C&I
Implementation Contractor	CLEAResult
Program Description	KCP&L designed the GMO Business 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: compressors, HVAC, variable speed drives and pumps, lighting, refrigeration, and building controls. The Custom program also serves new construction projects. Beginning in PY2016, LED retrofit lighting projects were moved from the Custom program to the Standard program. The Custom program still serves new construction LED lighting projects.

[22] Starting in PY2017, the amount of incentive a customer could receive for one PY was reduced from $500,000 to $100,000 per service territory.

Business EER – Custom Program Key Details	
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 IC then reviews the submitted applications and makes a pre-approval decision if the application meets the requirements. Program trade allies are sometimes a liaison between customers and the IC. Program participants then have 90 days from the project application approval date to submit proof of project completion. Waivers are granted for participants who cannot meet this deadline and show progress toward measure installations.
Verification of Purchase/Project	Projects must pass the TRC 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 and up to 50% of the project's incremental cost, with $500,000 the maximum annual cap per customer per service territory. Starting in PY2017, the $500,000 maximum annual cap was updated to $100,000 for Custom projects and $400,000 for Standard; all other C&I programs have a total of $500,000 per customer per territory. 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 pre-approved.
Disputes, Rejected Applications	Projects are rejected because they do not meet the benefit-cost ratio of at least 1.0 in the TRC test or project information is insufficient. Applicants may re-engineer and resubmit their projects for re-evaluation. Information about disputed and rejected applications is stored in the IC database. Disputes are escalated from the IC's outreach and administration teams to GMO program management. Final resolutions are documented in the IC database.
Project Reporting	The IC populates the database as participants complete projects. There is a weekly upload from CLEAResult to the GMO data warehouse for reconciliation. Beginning in PY2016, GMO transitioned to using Nexant's tracking database.

Source: Navigant interview of GMO and CLEAResult staff on April 11 and April 24, 2017, respectively

Table 3-2 presents the Custom program's savings target as set by MEEIA for PY2016-PY2018. For PY2016, the Custom program had net energy savings and net peak demand savings targets of 9,754 MWh and 2.52 MW, respectively.

Table 3-2. Business EER – Custom Program Net Savings Targets: PY2016-PY2018

Net Energy Savings (MWh)			Net Peak Demand Savings (MW)		
PY2016	PY2017	PY2018	PY2016	PY2017	PY2018
9,754	10,089	10,237	2.52	2.60	2.64

Source: Appendix F GMO Program Description MEEIA Cycle 2

3.2 Evaluation Findings

The following sections summarize Navigant's PY2016 findings for the GMO Business EER – Custom 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 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 90/20

The above approach meets the requirements of method 1a and protocol 2b. Navigant plans to conduct phone interview verification and onsite visits in PY2017 and PY2018. Table 3-3 summarizes the energy and peak demand savings and corresponding realization rates for the Custom program.

Table 3-3. Business EER – Custom Program PY2016 Energy and Demand Savings Summary

	Gross			Net[23]		
	Reported Savings[24]	Verified Savings[25]	Realization Rate	3-Year MEEIA Target	Verified Savings	Percentage of MEEIA Target Achieved
Energy at Customer Meter (kWh)	664,528	658,739	99%	30,079,932	704,850	2%
Coinc Demand at Customer Meter (kW)	92.32	92.32	100%	7,758.09	98.78	1%

Source: Navigant analysis

PY2016 realized 2% of the Cycle 2 MEEIA target for energy savings and 1% of the coincident peak demand savings. The target achievement is low due to the shifting of LED lighting projects from the Custom program to the Standard program and limited awareness of non-lighting opportunities.

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

[24] 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.

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

The verified realization rate for energy savings is 99% and 100% for peak demand savings. The energy savings realization rate is slightly lower than 100% due to adjustments to a single, new construction lighting project. The adjustments made include:

1. Applying a WHFe of 1.00 [26] instead of 1.12 used for the deemed savings because this is an exterior lighting project
2. Applying the International Energy Conservation Code (IECC) 2012 baseline for lighting power density based on building area approach

3.2.1.1 Tracking Database Review

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 Custom program had six projects in PY2016. Table 3-4 shows the disaggregation of total reported energy savings by end use. HVAC, lighting, motors, drives, and compressors, and new construction projects accounted for the majority of reported savings, with approximately 96% of the total program savings. Based on interviews with the GMO program manager and CLEAResult staff, there will be more non-lighting projects for the Custom program in PY2017 and PY2018, which is key to moving the Custom program forward and making it successful.

Table 3-4. Business EER – Custom PY2016 Summary by Measure Type

Measure Type	Total No. of Projects	Reported Energy Savings (kWh)	Percentage of Total	Reported Demand Savings (kW)	Percentage of Total
HVAC	1	174,874	26%	0.00	0%
Lighting	2	147,080	22%	0.00	0%
Motors, Drives, and Compressors	1	106,908	16%	17.52	19%
New Construction	1	211,260	32%	74.80	81%
Refrigeration	1	24,406	4%	0.00	0%
Total	**6**	**664,528**	**100%**	**92.32**	**100%**

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

3.2.1.2 Sampling and Engineering Review

For the PY2016 sample, Navigant segmented the existing population of projects within the Custom program into two primary strata of participants: large and small projects. The evaluation team sampled four projects for engineering reviews from the six projects, including three large projects and one small project, as shown in Table 3-5.

[26] Section 4.5, Lighting End Use. Illinois Technical Reference Manual Version 5.0, February 11, 2016.

Table 3-5. Business EER – Custom Program Population and Sample Sizes in PY2016

Program	Stratum	Assumed CV	Estimated Year-End Population	Sample Size
Custom	Large	0.3	4	3
	Small	0.3	2	1
	Total	**N/A**	**6**	**4**

Source: GMO Business EER Program Tracking Database and Navigant analysis

Navigant performed a desk review and engineering analysis for a representative sample of projects. The objectives behind these activities include the following:

- Developing a program-level realization rate at a confidence and precision level of 90/20
- Verifying operating characteristics
- Determining gross energy and peak demand savings

The evaluation team researched the following technical issues to determine gross program impacts and realization rates:

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

3.2.1.3 Net-to-Gross

Navigant will conduct NTG research in PY2017 as the evaluation plan requires for the Business EER – Custom program. Table 3-6 shows the NTG ratio for the GMO Business EER – Custom program from the PY2015 NTG ratio research. The team used a NTG ratio of 1.07 to create the net verified savings for PY2016.

Table 3-6. Business EER – Custom Program NTG Components and Ratio: PY2016

Program Year	FR	PSO	NPSO	NTG Ratio
2016 (using PY2015's NTG data)	0.11	0.04	0.14	107%

Source: Navigant's NTG ratio research in PY2015 for the Business EER – Custom program

3.2.1.4 Verification

The following tables show energy and peak demand impacts at the customer meter side for the sampled projects for the GMO Business EER – Custom program. The verified energy realization rate is slightly lower than 100% for large stratum projects. The reason is stated in detail in Section 3.2.1.

Table 3-7. 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)
Large	507,177	502,395	99%	0.8%
Small	24,406	24,406	100%	0.0%
Total	**531,583**	**526,801**	**99%**	**0.7%**

Source: Navigant analysis

Table 3-8. 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)
Large	74.80	74.80	100%	0.0%
Small	0.00	0.00	100%	0.0%
Total	**74.80**	**74.80**	**100%**	**0.0%**

Source: Navigant analysis

Table 3-9 shows the project-level energy and peak demand savings and corresponding realization rates. The energy savings realization rate of project PRJ-1030090 is less than 100%, which is explained in Section 3.2.1.

Table 3-9. 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-829576	New Construction	211,260	211,260	100%	74.8	74.8	100%
PRJ-1039794	HVAC	174,874	174,874	100%	0.00	0.00	100%
PRJ-1030090	Lighting	121,042	116,261	96%	0.00	0.00	100%
PRJ-795982	Refrigeration	24,406	24,406	100%	0.00	0.00	100%

Source: Navigant analysis

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. 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.

Table 3-10 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program does not reach 1.0 in the TRC, SCT, UCT, or RIM tests, while the PCT exceeds 1.0. Navigant's analysis resulted in a TRC ratio that is similar to that filed by GMO. The GMO Business EER – Custom TRC is significantly lower than KCP&L-MO's Business EER – Custom TRC because its coincident demand realization rate is 100% while KCP&L-MO's is 120%.

The TRC ratio below 1.0 is due to an incentive change between program cycles. There was a high volume of projects in PY2015 that took advantage of last cycle's higher incentive. This pulled ahead many projects, emptying out the pipeline of potential projects for PY2016. With less projects in the pipeline, there was lower participation in PY2016 even though the cost to run the program remained similar.

Table 3-10. Business EER – Custom Program Benefit-Cost Ratios: PY2016

Program Year	TRC Test[27]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	0.32	0.38	0.47	0.49	1.30	0.33
Program Overall	**0.32**	**0.38**	**0.47**	**0.49**	**1.30**	**0.33**

Source: Navigant analysis

3.2.3 Process

Navigant conducted the PY2016 process evaluation by reviewing program materials and through interviews with the program manager and IC. The evaluation team will conduct further research regarding

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

customer participation in PY2017. Table 3-11 includes process evaluation questions and the corresponding evaluation activities. The process evaluation questions include general process evaluation questions and the five MO-required questions.

Table 3-11. 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 • Materials review
2. What changes have been made to the program in PY2016, and what changes are planned for PY2017?	• Program staff interviews • Materials review
Missouri-Required Questions for Process Evaluation	
6. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews • Materials review
7. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review
8. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Materials review
9. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review
10. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review

Source: Navigant analysis

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

3.2.3.1 General Process Evaluation Questions

Navigant reviewed the status of last year's recommendations and discussed plans for PY2017 as part of phone interviews conducted with the program managers 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 PY2015, Navigant made four process improvement recommendations for the Custom program:

1. Continue current customer engagement processes. The programs are producing high levels of satisfaction.

2. GMO could consider offering additional training for customers on the applications.[28] This could reduce the number of rejected applications and the perceived length of application processing times from customers. Additionally, equalizing the incentive value to the customer across programs (Finding 3) could help increase uptake in the Standard program versus other C&I programs and could reduce processing times.
3. The Custom program exceeded savings targets while the Standard program did not meet its goal, which may be driven by lighting measures receiving higher incentives through the Custom program. GMO is addressing this finding: In MEEIA Cycle 2, GMO redesigned incentive structures to ensure similar measures receive similar incentives across both programs.
4. GMO could increase outreach to end-use customers and create additional KPIs to track this effort. Possible outreach activities could include onsite meetings with large customers (KPI = number of meetings) or bill inserts for smaller commercial customers (KPI = number of bill inserts).

FINDING 1: In its review, Navigant found that GMO has implemented recommendations two and three (summarized in table below). Navigant will evaluate recommendations one and four in the PY2017 customer survey.

Table 3-12. Business EER – Custom Progress on Past Recommendations

Past Recommendation		Progress Toward Implementation
Recommendation No. 2	GMO could consider offering additional training for customers on the applications. This could reduce the number of rejected applications and the perceived length of application processing times from customers. Additionally, equalizing the incentive value to the customer across programs (Finding 3) could help increase uptake in the Standard program versus other C&I programs and could reduce processing times.	GMO provided engineer-taught training sessions to explain the completion of the Custom form and the methodology used to calculate the incentives to trade allies.
Recommendation No. 3	The Custom program exceeded savings targets while the Standard program did not meet its goal, which may be driven by lighting measures receiving higher incentives through the Custom program. GMO is addressing this finding: In MEEIA Cycle 2, GMO redesigned incentive structures to ensure similar measures receive similar incentives across both programs.	GMO changed the incentive structure from project-cost based to $0.10 per kWh saved to be equivalent with rebates offered through the Standard program.

Source: Navigant analysis

QUESTION 2: What changes have been made to the program in PY2016, and what changes are planned for PY2017?

FINDING 2: GMO made two substantial changes to the Custom program in PY2016.

- KCP&L changed the methodology for calculating the incentive from being based on the project costs to an incentive of $0.10 per first-year kWh saved.

[28] In PY2015, the program offered application training to trade allies during forums, small group training, and one-on-one training. For MEEIA Cycle 2, application training is required as part of the process to join the program's trade ally alliance.

- KCP&L transferred the incentive for the installation of retrofit LED lighting projects to the Standard program.

For PY2017, the incentive amount a customer could receive for one PY was reduced from $500,000 to $100,000 per service territory.

3.2.3.2 Missouri-Required Questions for Process Evaluation

The evaluation team asked the five MO-required questions during the phone interviews with the program managers at KCP&L and CLEAResult. The team summarizes its findings that correspond to the questions in this section. Navigant developed recommendations based on these findings; these can be found in the next section.

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

FINDING 1: GMO has a well-defined target market for the Custom program.

- All three of GMO's C&I customer classes have participated in the Custom program. The program does have more participants from the Tier 1 industrial and large commercial sectors due to their ability to implement larger projects with end uses not captured in the Standard program.
- GMO has made a concerted effort to engage trade allies and design professionals as these two groups interact with the customer in the early stages of new construction or facility expansion. Engaging the customer as early in their design process as possible has been a key goal for the C&I programs.
- GMO has been identifying the four greatest vertical sectors for opportunities; these are data centers, manufacturing, K-12 schools, and municipalities.

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

FINDING 2: Customers have a limited awareness of the breadth of end uses and projects that qualify for Custom incentives.

- GMO acted on the need to increase awareness of the Custom program through increased meetings and information sessions with trade allies and design professionals.

Navigant has planned further research regarding market imperfections for PY2017.

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 addresses the participant's energy end uses that do not fall under GMO's other C&I programs.

- There is an interrelationship between the Custom program and GMO's Strategic Energy Management, Standard, and Block Bidding rebate programs. The Custom program complements these other programs by offering customers opportunities to save money on energy efficient measures that are not in the scope of the other programs.

Navigant has planned further research regarding the mix of end-use measures for PY2017.

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

FINDING 4: In PY2016, there was an increase in the program's outreach efforts. The marketing or recruitment of the Custom program was conducted through face-to-face interactions with customers, trade allies, energy consultants, and design firms, with the focus to increase participant awareness of the program in the early stages of a project. As mentioned above, PY2016 was a transition year for the Custom program; therefore, it is unclear if the low actual savings were caused by this transition or the marketing efforts. Some of GMO's outreach efforts included the following:

- GMO's key account managers met with the largest customers to increase the program's awareness level and align it with the customer's capital opportunities and timelines.
- GMO developed a required training program for trade allies that explained the criteria needed to participate in the program.
- The IC's engineers conducted training for trade allies on the methodology and best practices for calculating the savings for energy efficient measures. The purpose of these educational sessions was to reduce confusion regarding the custom form as well as to address trade allies' concerns.
- The IC's outreach team met with customers and trade allies on a regular basis to provide program information and ensure the savings potential of the GMO C&I programs. These outreach efforts have helped customers and trade allies understand program changes and increased the participation levels of Tier 2 customers.
- GMO worked with past participants of the Standard program as an outreach target for Custom. These experienced customers were a market that understood the savings potential of EE changes and were open to conducting facility wide energy savings measures.
- GMO targeted both end uses and customer types in its outreach efforts. Presentations to data center vendors and professionals and to the K-12 education segment explained how the Custom program could help them save energy.

GMO expects these efforts will provide strong participation and savings in PY2017 and will be a focus of further research regarding the mix of end-use measures that Navigant will address in PY2017.

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: This will be a focus for 2017 as participation ramps up. Low participation due to carryover from MEEIA Cycle 1 did not provide sufficient information to draw conclusions for this question.

- This will be the focus for future research in PY2017. The planned PY2017 process evaluation will include market research in the form of trade ally and participant surveys.

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:

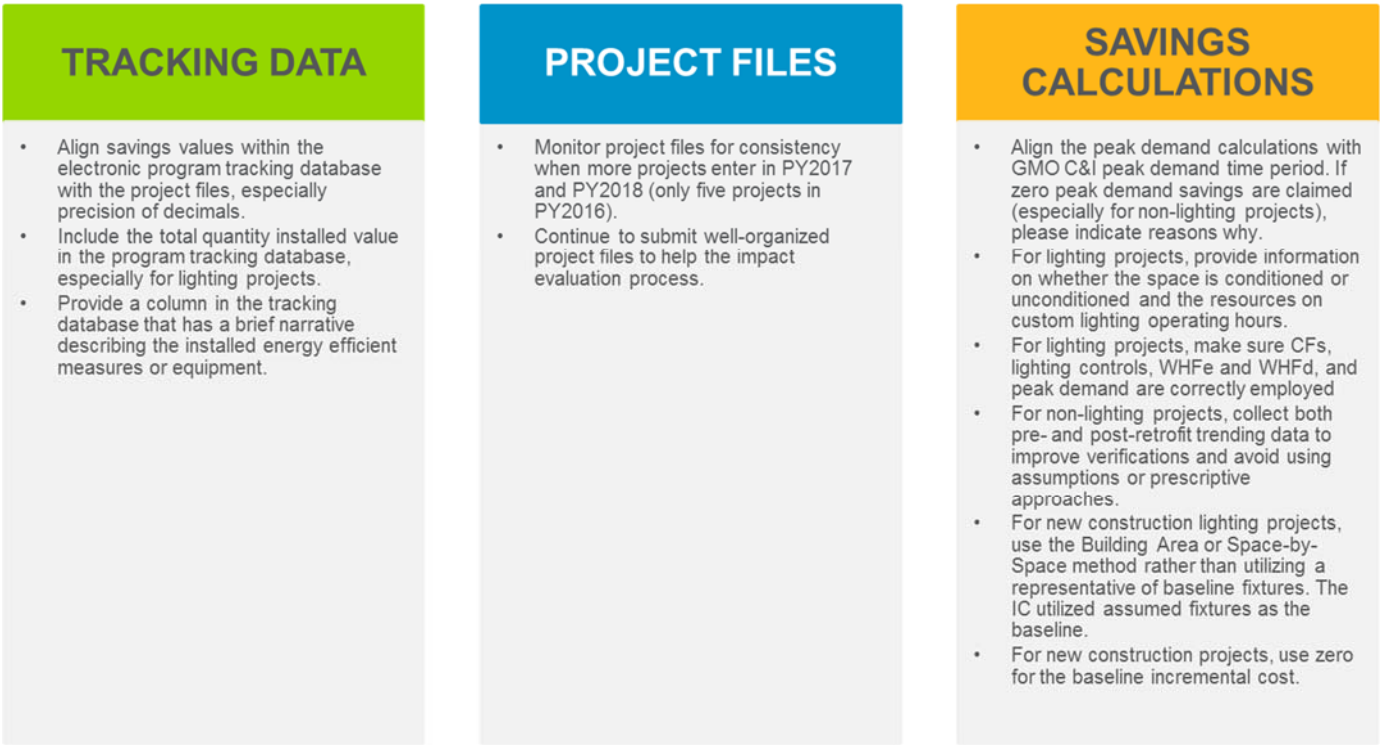
- Recommendations from the impact evaluation (Section 3.3.1)
- Recommendations from the process evaluation (Section 3.3.2).

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 to facilitate evaluation efforts and to better align reported and verified savings.

Overall, Navigant recommends maintaining the International Energy Conservation Code (IECC) 2012 baseline for lighting power density based on building area approach. The program tracking database lists projects completed during the PY and includes site 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 IC or site personnel to calculate energy and peak demand savings. Navigant's recommendations on the GMO Business EER – Custom program implementation components are provided in Figure 3-1.

Figure 3-1. GMO Business EER – Custom Program Impact Recommendations: PY2016



Source: Navigant analysis

3.3.2 Process

Navigant conducted phone interviews with GMO and CLEAResult on April 11, 2017 and April 24, 2017, respectively. The recommendations corresponding to Navigant's findings on the process evaluation are provided to improve the Custom program. Table 3-13 includes the research question-based recommendations, and Table 3-14 summarizes the recommendations for the five MO-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 suggests considering a focus on increasing the awareness of non-lighting project opportunities. This could potentially include: engaging with customers in an earlier phase to understand their needs and potential non-lighting opportunities; increasing outreach efforts to customers (especially larger customers); and/or introducing a building controls program for the medium to larger customers. Navigant has found that once a participant has made energy efficient improvements, their next step is to control the use of it. A building controls program could cross-cut with the Standard program's HVAC and lighting measures to add further savings opportunities.
2. What changes have been made to the program in PY2016, and what changes are planned for PY2017?	Navigant will evaluate the incentive structure in the PY2017 customer survey and provide GMO feedback from customers and trade allies on incentives. Navigant understands this is to balance participation with Block Bidding and recommends GMO continue to maintain flexibility on adjusting the incentive structure.

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?	Navigant recognizes that GMO is applying marketing strategies to better define the target market, increase the awareness level of the Custom program, and move the Custom program forward. Navigant recommends GMO continue to integrate and highlight the marketing strategies, with periodic reviews to ensure a best practice approach.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Navigant recommends GMO continue its process of understanding customer needs and potential end-use measures (particularly non-lighting end uses). Previous efforts of meeting with customers, trade allies, and design professionals through dedicated events or specific program outreach are excellent examples of this type of activity.
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?	
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Navigant recognizes that GMO creates a custom express application process for certain straightforward and replicable measures. GMO also focuses on smoothing the application process through outreach and training efforts. Navigant recommends continuing these efforts with more customers and contractors, especially non-lighting contractors.
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 continuing to develop and periodically review best practices of the current outreach efforts to maintain momentum.

Source: Navigant analysis

4. BUSINESS ENERGY EFFICIENCY REBATE – BLOCK BIDDING

4.1 Program Description

The Block Bidding program is new for the PY2016-PY2018 implementation cycle. It offers an opportunity to large C&I customers and trade allies to reserve financial incentives ranging from $50,000 to $1 million for planned EE projects. In the absence of this program, each of these participants would be capped at $500,000 for the Custom or Standard programs.[29]

With the Block Bidding program, participants can complete bigger projects that may go above the cap set by the traditional Custom or Standard programs. Also, with Block Bidding, participants lock in the block of energy savings at a rate of cents per kWh. A participant can aggregate the projects over different technology types and multiple sites.

For example: Participant X is meeting the cap of $500,000 from the Standard program in PY2016 but has more EE projects estimated to save 1,000,000 kWh more in the same PY. 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 PY2016 from which he/she can draw the incentives as he/she finishes up those additional projects beyond the $500,000 cap for the Standard program.

KCP&L offers these blocks of electric savings by issuing a request for proposal (RFP) to eligible customers and third-party suppliers. The RFP details the proposal requirements and the electric savings that must be achieved. Customers and/or third parties submit proposals to deliver the requested block of cost-effective electric savings. After the proposals are submitted, the participants of the program participate in a reverse auction where the lowest proposed incentive per kilowatt-hour saved is the winning bid. The other auction participants can participate in the Block Bidding program at an incentive $0.01/kWh 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	C&I
Implementation Contractor	Overlay conducts the auctions and monitors winning projects' progress through to completion. Similar to the other C&I programs, CLEAResult tracks completed projects and issues incentives.

[29] This cap has been revised to $400,000 for Business EER – Standard and $100,000 for Business EER – Custom starting in PY2017.

Block Bidding Key Details	
Program Description	Commercial customers, trade allies, and energy service companies (ESCOs) can participate in the Block Bidding program after passing the $500,000 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 down from the starting price. The lowest proposed incentive per kilowatt-hour saved wins the auction. The other auction participants can participate in the Block Bidding program at an incentive $0.01 lower than the winning bid.
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 pre-approval 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 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 pre-approval. Participants provide project documents for pre-approval and can start implementing the project only after the pre-approval. A project may also get selected for onsite verification for pre-approval. 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 saved.
Disputes, Rejected Applications	Applications are rejected if the project is not completed per the bid or if the project is not completed on time. There were no disputes in PY2016.
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

Navigant's evaluation of the Block Bidding program in PY2016 indicated that it is still in the early stages but offers a great potential for Years 2 and 3. Block Bidding had one participant in GMO territory, as PY2016 was the first year of the program.

To verify program impact, the evaluation team reviewed the tracking database and then conducted an engineering desk review of the one completed PY2016 project.

Navigant conducted the PY2016 process evaluation by reviewing program materials and through interviews with the program manager and IC. Navigant will conduct further research regarding customer participation in PY2017; this will include the trade ally and participant surveys and customer journey mapping activity.

In future years with more Block Bidding participation, Navigant will conduct engineering desk reviews on a representative sample of completed projects. The team will evaluate custom projects using a method outlined in the Appendix methodology.

The following sections summarize Navigant's PY2016 findings for the 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

The Block Bidding program achieved 0.4 MWh of verified gross energy savings at the customer meter in PY2016 for a realization rate of 107%. The evaluation team used a 1.0 NTG value, making the verified net savings the same as the gross verified savings. (For detail on why the team used 1.0 as the NTG value for the Block Bidding program for PY 2016, see Section 4.2.1.1.) The program achieved 3% of the MEEIA Cycle 2 target.

The program achieved 0.05 MW of verified gross and net coincident demand savings at the customer meter in PY2016 for a realization rate of 100%. Navigant used a 1.0 NTG value for demand savings calculations. (For detail on why 1.0 was used as the NTG value for the Block Bidding program for PY 2016, see Section 4.2.1.1.) The program achieved 2% of the MEEIA Cycle 2 target.

The only PY2016 project was a lighting upgrade similar to the lighting projects included in the Custom program. Navigant evaluated this project using the methodology written for the Business EER – Standard program in the Appendix E, as the algorithm outlined for lighting projects from the Standard program is an industry standard algorithm used to calculate lighting projects' energy and demand savings. Deemed inputs for WHFs and CFs are sourced from the Illinois TRM Version 5. For the baseline and efficient case wattages and HOUs, Navigant used the data provided in the project files.

The differences in verified and reported savings are due to applying sector-specific performance variables (i.e., CF and WHF). The slightly higher realization rate for energy savings is due to Navigant's use of a 1.2 WHF for the space type where the fixtures were installed.[30] The reported savings calculations use a 1.12 WHF, but Navigant was not able to find the source behind the 1.12 assumption. The evaluated WHF of 1.2 corresponds to the "Hotel/Motel – Common" space in the Illinois TRM.

The demand savings realization rate is 100%. Navigant used a CF of 1 for demand savings, as these fixtures have 8,760 HOU. The reported savings calculation uses a CF of 0.95, but Navigant was not able to verify the source behind this value. The evaluation team used a WHF of 1.24 for verified demand savings calculations. The reported savings used a WHF of 1.31.

[30] The project was implemented at a transportation facility that operates lighting 24/7. This space type is not available in the Illinois TRM Version 5; however Navigant used the "Hotel/Motel – Common" space type to obtain the WHFs from Illinois TRM as that space type resembles the space type where these lighting fixtures are installed.

Table 4-2. Block Bidding PY2016 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 Net-to-Gross

The Block Bidding program is a new program that started in MEEIA Cycle 2. The evaluation has planned full-scale process research activities, including NTG research for the program, for PY2017. For PY2016, Navigant assumed a 1.0 NTG value, as presented in Table 4-3.

Table 4-3. Block Bidding NTG Components and Ratio: PY2016

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

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. Please refer to the 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 4-4 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program does not reach 1.0 in the TRC, SCT, UCT, or RIM test. Navigant's analysis resulted in a TRC ratio that is higher than that filed by GMO due to an energy realization rate of 107%. Additionally, Navigant's analysis of program documentation resulted in an incremental cost that is about 40% lower than that used by GMO. As the program continues to grow with more participants in PY2017, Navigant expects the cost-effectiveness to improve due to more projects to spread out the allocation of administrative program costs.

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

Program Year	TRC Test[31]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	0.44	0.59	0.71	0.64	3.55	0.38
Program Overall	**0.44**	**0.59**	**0.71**	**0.64**	**3.55**	**0.38**

Source: Navigant analysis

4.2.3 Process

Navigant reviewed program materials and conducted interviews with the program manager and IC to support its evaluation. The evaluation team has planned further research through participant and trade ally surveys for PY2017. Table 4-5 includes process evaluation questions and the corresponding evaluation activities.

Table 4-5. Block Bidding Process Evaluation Questions and Activities

Process Evaluation Research Question	Evaluation Activity
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews • Materials review
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Materials review
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review

Source: Navigant analysis

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?

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

FINDING 1: The caps for the Standard and Custom programs create a barrier for large customers whose projects could be into the millions of dollars.

- There is an interrelationship between the Block Bidding program and KCP&L's Strategic Energy Management, Business EER – Custom, and Business EER – Standard rebate programs. In PY2016, the Block Bidding program offset these other programs by offering customers whose project rebates were over $500,000 the ability to save money on energy efficient measures that were not in the scope of the other programs.
- For PY2017, projects that are over the Custom program's rebate cap of $100,000 or the Standard program's rebate cap of $400,000 will be eligible to participate in the Block Bidding program.
- This program provides the large energy-consuming customer with an incentive to pursue EE on a large volume scale.
- Further research in PY2017 will determine if this approach has the intended effect.

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

FINDING 2: While a participant may win a bid, they may not be able to implement energy efficient projects.

- In PY2016, there were three winning bids out of five auctions. However, only one customer successfully implemented their project.

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 participant energy end uses for energy efficient projects that exceed the financial caps of KCP&L's other C&I programs.

- The Block Bidding program encompasses all end uses and addresses projects saving more than 1 million kWh per year. These projects could possibly go across multiple buildings or properties to allow for greater savings.
- For PY2017, projects that are over the Custom program's rebate cap of $100,000 or the Standard program's rebate cap of $400,000 will be eligible to participate in the Block Bidding program.

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

FINDING 4: Commercial customers with identified savings of 1 GWh or more per year prefer a direct marketing approach.

- An auction house conducted the marketing and recruitment of the Block Bidding program; this is consistent with other similar programs nationally.
- The Block Bidding program defines the program eligibility to KCP&L's commercial customers, trade allies, or ESCOs who have identified savings of 1 GWh or more per year. As such, Overlay's direct contact to these market segments was an appropriate delivery mechanism.

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: PY2016 provided a winning bid and valuable insight into the needed characteristics of a successful auction for the Block Bidding program.

- The research planned for 2017, as participation builds, will focus on identifying the effectiveness of the program's ability to overcome the market imperfections noted in Question 1.

4.3 Recommendations

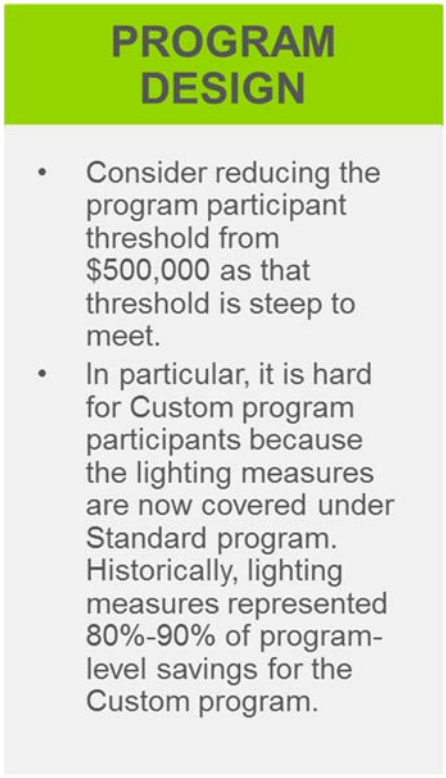
Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to move the GMO Block Bidding program forward and meet the MEEIA target. The recommendations are divided into two parts:

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

4.3.1 Impact

For the GMO territory, only one project was completed in PY2016. However, the tracking data and savings calculations were appropriate for analysis. To increase participation in the program, Navigant recommends lowering the program participation threshold, which is currently at $500,000. This means a customer/trade ally can only participate in the Block Bidding program once their project exceeds the $500,000 cap in the Custom, Standard, or any other commercial program.

Figure 4-1. Block Bidding Impact Recommendations: PY2016



Source: Navigant analysis

Navigant does want to acknowledge that the KCP&L Block Bidding team has already identified this issue, and starting in PY2017, the Block Bidding participation threshold was revised to $400,000 for the Standard program and $100,000 for the Custom program.

4.3.2 Process

As Block Bidding was just launched in PY2016, Navigant focused its research for this program on interviews with the program manager and the IC.

4.3.2.1 Recommendations Based on Missouri's Requirements for Process Evaluation

Navigant addressed the five required process evaluation questions set forth in the MO regulations[32] for the Block Bidding program.

[32] 4 CFR- 240-22.070(8)

Table 4-6. Block Bidding Missouri Requirement-Based Recommendations

Missouri Question	Navigant Recommendation
1. What are the primary market imperfections that are common to the target market?	The Block Bidding program's target market is KCP&L's largest customers. These customers tend to have larger projects that have a high capital investment and long lead times. As such, it is difficult for these customers to react quickly to offerings. Navigant recommends remaining in communication with trade allies on the appropriate amount of notification needed for their participation.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Navigant recommends monitoring customer participation for PY2017. If the initial bidding processes do result in the level of kilowatt-hour savings anticipated, KCP&L could expand the marketing of this program to the medium-sized customer.
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 recommends monitoring the balance between programs to ensure goals are continuously being met. The Block Bidding program is a complement to KCP&L's Business EER – Custom and Standard programs. As a combination, these three programs will address the EE needs of the large C&I customer. KCP&L could monitor the end uses and the quantity of savings in these three programs to ensure the program is capturing a new market.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	The main communication channel for the Block Bidding program is direct contact with the large customer by KCP&L, its IC, or the auctioneer. Navigant feels this is appropriate given the diversity and needs of the large customer base and suggests periodic reviews with customers to ensure participants indicate this is the best communication pathway.
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 remaining in communication with customers on the appropriate amount of notification time needed for their participation. Block Bidding participants tend to have larger projects with a high capital investment and long lead times. As such, it is difficult for these customers to react quickly to offerings. In PY2017, KCP&L lowered the incentive caps for Custom to $100,000 and Standard to $400,000, which may increase the participation for Block Bidding. KCP&L may consider a mid-year review to see how effective this change is on Block Bidding and adjust the caps accordingly.

Source: Navigant analysis

5. STRATEGIC ENERGY MANAGMENT

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 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 industrial 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. It provides tools, expertise, and technical resources to help sites set and achieve their energy goals. Multiple participating customers are grouped together in cohorts. Through these cohorts, group training is completed and peer relationships are developed from customer to customer. By implementing organizational structures, behavior changes, and systematic practices learned through the program, sites can reduce their electricity costs by 5% to 25%.[33]

Table 5-1. SEM Program Description

SEM Program Key Details	
Sector	C&I
Implementation Contractor	CLEAResult
Program Description	The SEM program is designed to help C&I customers identify behavior and low-cost measures through training, onsite audits, and technical staff support.
Application Process	KCP&L account managers identify and introduce potential participants to the program. While customers can apply to the program without the assistance of an account manager, most applicants work with one. The IC then reviews submitted applications and makes a pre-approval decision if an application meets the requirements.
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	Rebates are set at $0.02/kWh 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.

[33] The SEM program flyer was provided by KCP&L's product manager.

SEM Program Key Details	
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 would be handled in-person after review of any supporting documents provided by the customer or their contractor on the customer's behalf. Modeling issues could 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.
Project Reporting	CLEAResult provides project forecast data for 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 EER – Custom and Standard programs is reported on a weekly to monthly basis. Finalized energy and demand savings are reported in Catalyst and loaded 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 did not complete a full evaluation of the SEM program for PY2016 because there were no reported savings. The sites included in the SEM program had not completed 12 months of training and had not claimed any reported savings up to this point.

Navigant completed interviews with the program manager and IC as a part of its process evaluation and plans additional evaluation activities for PY2017. The evaluation team has previously evaluated SEM-type programs for several utilities and identified several recommendations based on this experience as well as an interview that was completed with the program manager and IC.

The following sections summarize Navigant's PY2016 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)
- Process evaluation findings (Section 5.2.2)

5.2.1 Impact

Navigant did not complete an impact evaluation in PY2016 due to no reported savings.

5.2.2 Process

The SEM program is a systematic approach to delivering persistent energy savings to organizations by integrating energy management into regular business practices. The program involves forming an energy team within participating organizations that regularly correspond with program representatives. KCP&L's

SEM program began in April 2016 with a 3-year goal of 20 GWh in energy savings and a 1.6 MW in demand savings.

The following are the team's findings regarding the MO requirements for process evaluation:

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 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 20 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 sector and commercial customers from the public sector (customers with multiple sites that have shared knowledge and experiences between their sites, such as healthcare, municipalities, and schools).

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

FINDING 2: The primary market imperfections are that customers have a limited amount of time and money to devote to energy conservation.

- There are number of factors that are cost or time prohibitive for many C&I customers:
    - The cost of having an outside expert perform an extensive onsite assessment
    - The cost and time to submit a report outlining identified measures
    - The cost and time to develop the onsite expertise on how to implement the recommended measures

In addition, many C&I customers do not have the time needed to oversee or facilitate an effort such as SEM.

QUESTION 3: Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?

FINDING 3: The SEM program addresses all the major energy end uses for a participant.

- The SEM program focuses on behavior-based and no cost/low cost measures that may fall under any major end use. For the SEM program, it is difficult to answer this question as the measures implemented are on a case-by-case basis.
- 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.

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

FINDING 4: 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 passive approach for the program has been successful in recruiting 16 participants for the 2016 program year.
- No participant interviews were slated for the SEM program for PY2016 evaluation. However, this will be a focus of the team's PY2017 process evaluation activities.

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 program needs more time to complete training and other activities before Navigant can appropriately answer this question.

- The processes and approaches are consistent with other programs evaluated by Navigant. However, because savings have yet to be reported, the evaluation team is waiting to collect more data before providing input on this issue. This will be the focus for PY2017 research.

5.3 Recommendations

Although only a limited evaluation was completed in PY2016, Navigant completed an interview with the program manager and IC. The evaluation team then combined this primary program research with its experience from evaluating other SEM programs to provide a clear set of recommendations.

5.3.1 Impact

Navigant did not conduct an impact evaluation in PY2016.

5.3.2 Process

Navigant addressed the five required process evaluation questions set forth in MO regulations[34] for the SEM program. The evaluation team will make further recommendations regarding the SEM program in PY2017 when program savings have been claimed and more program data is available. Navigant did identify several recommendations based on the process approach above.

[34] 4 CFR- 240-22.070(8)

Table 5-2. 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 major market imperfections identified through this program were the time and money needed to participate in these types of activities. 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 purchasing new high efficiency equipment, and providing end-use monitoring equipment.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	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 way training can be targeted to meet the needs of these customers and peer interaction will be more valuable for the participants.
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, 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 a site's energy usage; however, due to their short measure life, they need to be maintained on a regular basis.

Missouri Question	Navigant Recommendation
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Marketing for this program is extremely limited, and the current model of account mangers introducing the customers to the program has worked well with these large clients. When the program considers expanding to a larger number of customers, a more proactive approach may need to be considered to meet program goals.
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 does not have enough data from this year's program evaluation to make any recommendations regarding this issue. During the PY2017 evaluation, the team will explore these issues further.

Source: Navigant analysis

6. SMALL BUSINESS LIGHTING

6.1 Program Description

The Small Business Lighting (SBL) program, a new program for the PY2016-PY2018 implementation cycle, offers small business customers an energy assessment that includes information on potential energy savings and anticipated payback. The SBL program offers similar lighting measures as most of the Standard program measures; however, the program offers higher incentives/ per measure on some measures than the Standard program. This is to help small business customers overcome the financial hurdle to implement the energy efficiency measures. However, to ensure only small business customers benefit from these higher incentives, customers must have an average monthly demand below 100 kW at one location, or if they have more than one location, an aggregate demand below 250 kW to qualify for the program. For PY2016, the program capped the total incentive that can be received for a project at 70% of total project cost (equipment and installation). Eligible measures include but are not limited to occupancy sensors, LED exit signs, and T5 lamps.

Table 6-1. SBL Program Description

SBL Key Details	
Sector	C&I
Implementation Contractor	CLEAResult
Program Description	The SBL program provides the smaller customer (with demands less than 100 kW per month) an opportunity to lower their lighting bills through a low-cost turnkey direct install (DI) program. 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: • LED exit sign • Directional/omni-directional LED lamps • High-bay/low-bay fluorescent fixtures • Lighting controls (daylighting/occupancy) • Parking garage LED lamps • Linear/troffer LED lamps • Refrigerator/freezer case lighting • Exterior LEDs • 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 pre-approval for the project and complete the work. The contractor will receive the rebate directly from the program so the customer will need to pay for any remaining project costs.
Verification of Purchase/Project	Upon completion of the project, CLEAResult performs full site pre and post inspections on the first three rebate applications submitted by each new contractor for quality assurance in addition to projects with greater than average scope or perceived variability. After the first three projects, CLEAResult reviews every application before granting pre-approval for project to move forward.

SBL Key Details	
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 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 CLEAResult to the KCP&L data warehouse for reconciliation.

Source: Program staff and supporting documents

6.2 Evaluation Findings

KCP&L introduced SBL as a new program starting in PY2016. However, Navigant's findings indicate the SBL program is performing well in the territory, surpassing the PY2016 MEEIA targets for Year 1 of Cycle 2.[35] The program achieved 32% of the energy savings and 28% of the demand savings from the 3-year MEEIA Cycle 2 target for the program. Navigant's process research indicates that even though the program is new to KCP&L customers, it is working well and is well-received by customers. Therefore, Navigant believes that the program has the potential to meet its overall 3-year target in the remaining 2 years. Navigant also found, through its impact evaluation of tracking data, a reasonable realization rate of energy and demand savings (77% and 68%, respectively).

For the impact evaluation, Navigant performed a tracking database review, a deemed measure savings review, and onsite fieldwork as described in the methodology in Appendix I. The evaluation team reviewed the tracking database to verify its validity and ensure that it contains 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 HOUs and CFs by building type. Navigant verified installed measure quantities, equipment specifications (i.e., size, capacity, wattage), and operating parameters (i.e., observed building type, HOU, CF). Navigant used onsite data to re-calculate the energy and demand savings (see Appendix I for methodology).

Additionally, Navigant conducted program staff interviews, trade ally web surveys, and participant web surveys. The evaluation team also conducted three ride-along visits with the IC's team in September 2016 to understand the program process and customer experience.

The following sections summarize Navigant's PY2016 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)

[35] MEEIA Cycle 2 targets for the SBL program for Year 1 were 20% of the 3-year target energy and demand savings.

6.2.1 Impact

This section provides Navigant's findings from the SBL program impact evaluation. Overall, the program achieved a 77% realization rate for energy savings and a 69% realization rate for demand savings (as shown in Table 6-2). Variations in the gross realization rate were due to adjustments based on Navigant's engineering analysis and onsite verification work. Specifically, the drop in realization rate for the SBL program is largely due to the reduction in the energy savings in the High Bay LED lighting measure. This measure represents 46% of reported program level savings. 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. (Please check 6.2.1.3 for more details). However, Navigant notes this discrepancy was proactively identified by KCP&L's implementation team and has been corrected for future program years. We do not anticipate similar drops in realization rate due to this measure in PY 2 and 3 for MEEIA cycle 2. Additionally, Navigant adjusted the ISR, HOU, CFs, and WHFs in the verified savings calculation. Navigant's NTG analysis indicates limited instances of FR (14%) and SO (0.2%), for a NTG ratio of 0.87.

Table 6-2. SBL PY2016 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)	1,689,659	1,307,522	77%	3,569,963	1,140,159	32%
Coinc Demand at Customer Meter (kW)	276	189	69%	592	165	28%

*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 6-3 shows the disaggregation of total reported energy savings by lighting measure types.

Table 6-3. SBL PY2016 Summary by Measure Type

Measure Type	Reported Energy Savings (kWh)	Percentage of Total	Reported Demand Savings (kW)	Percentage of Total
LED Replacing Interior HID	832,268	49%	150	55%
LED Linear	289,243	17%	64	23%
LED Screw In	266,585	16%	45	16%
LED Exterior	212,596	13%	-	0%
Light Optimization	88,967	5%	17	6%
Total	**1,689,659**	**100%**	**276**	**100%**

Source: C&I SBL 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 includes project applications, invoices, site visit notes, and savings calculation files. 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:

- **Database contains sufficient information:** Overall, Navigant found that the database and project files contain sufficient information to support the impact evaluation.
- **Missing/Limited incremental measure cost information:** Incremental measure cost information available in the MEEIA TRM is not currently tracked in the program tracking database. This information is required to determine cost-effectiveness of the measures and program, but Navigant recognizes the challenge in collecting the information and proposes to work with KCP&L and the IC to identify potential opportunities and methods to better capture this important information.
- **Missing data fields**: Several projects' measure names did not align to the KCP&L deemed measure savings because of typos or different names.

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 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 41 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 the 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 conducted onsite verification and a lighting logger study to capture improved primary inputs for the engineering analysis equations as part of this year's evaluation. The evaluation team used lighting loggers to capture improved inputs for the lighting savings calculations. Navigant combined the Standard and SBL samples to derive these inputs. This combined study was possible because both programs offer similar lighting measures and cater to C&I customers. The information captured during the onsite visits included the following:

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

Navigant then updated the WHF based on Illinois TRM Version 5 using actual building types and used the lighting logger data from this year's onsite visits in combination with Cycle 1 lighting logger data to create a more complete picture of lighting inputs such as HOU and CF values. Other notable adjustments include the following:

- LED high bay 176W-350W makes up 37% of all reported savings (LED high bay 111W-175W attribute an additional 9% of reported savings, for a total combined contribution of 46%). In the KCP&L deemed measure savings, the baseline wattage of this measure was 1,078W, and the efficient wattage was 350W. However, based on the onsite findings, the average baseline wattage was 736W and the average efficient wattage was 288W, which led to a lowering of the realization rate.
- After the logger data analysis, Navigant found that the HOU and CF for peak demand savings were different than the KCP&L deemed measure savings. Navigant analysis showed a 12% reduction in CF and a 19% increase in HOU. Navigant also sourced new WHFe and WHFd based on actual building types from the Illinois TRM Version 5. Table 6-4 shows the revised calculation parameters. Table 6-5 shows the input assumptions that were used to develop reported savings.

Table 6-4. SBL Updated Calculation Parameters from Onsite Findings

Building Type	Revised WHFe	Revised WHFd	Revised CF	Revised HOU
Industrial	1.02	1.04	0.62	5,144
Office	1.21	1.44	0.75	4,484
Other	1.09	1.36	0.67	5,280
Retail	1.12	1.29	0.83	5,662
School	1.18	1.35	0.59	4,074
Warehouse	1.00	1.22	0.64	4,110

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

Table 6-5. 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

- During onsite verification, Navigant verified about 1% 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 the location instead

For both the Standard and SBL programs, Navigant stratified results by building type and applied those results using the original reported savings weighting from the original population. For the PY2016 sample, Navigant stratified the Standard program population by building type, including “Industrial”, “Office”, “Retail”, “School”, “Warehouse”, and “Other”. Navigant developed the sample by building type to capture the hours of operation (HOU) and coincident demand factors (CF) by building type for the lighting measures installed in the Standard program.

To maximize evaluation resources, Navigant evaluated both service territories in a combined sample based on discussions with implementer and KCP&L product managers, this was found to be a reasonable approach due to similarities in program execution.

Navigant also looked at the representativeness of the combined territory sample by measure type and project size. Navigant analyzed relative precision for measure type, project size and building type and found the relative precision and confidence for each of the above scenarios fell within the target range of 90/20 confidence and precision for combined GMO and KCP&L-MO program level results. Table 6-6 and Table 6-7 summarize the relative precision and confidence by building type for energy and demand.

Table 6-6. Standard & SBL Program Sampling for GMO and KCP&L-MO Combined - Energy Savings

Program	Stratum	Population			Sample			
		Year-End Population	Reported kWh Savings	% of Total	Sample Size	Reported kWh Savings	% of Total	Relative Precision at 90% Confidence (one-tailed)
Standard & SBL	Industrial	163	28,276,549	23%	7	1,731,701	15%	7.3%
	Office	144	3,320,072	3%	5	284,047	2%	34.6%
	Other	262	21,648,972	18%	9	5,713,106	49%	27.8%
	Retail	251	10,839,101	9%	12	666,771	6%	34.6%
	School	94	7,959,338	7%	8	688,798	6%	9.5%
	Warehouse	206	48,509,157	40%	9	2,650,037	23%	13.9%
	Total	**1,120**	**120,553,190**	**100%**	**50**	**11,734,460**	**100%**	**13.5%**

Source: C&I Standard and SBL Program Tracking Databases and Navigant analysis

Table 6-7. Standard & SBL Program Sampling for GMO and KCP&L-MO Combined - Demand Savings

Program	Stratum	Population			Sample			
		Year-End Population	Reported kW Savings	% of Total	Sample Size	Reported kW Savings	% of Total	Relative Precision at 90% Confidence (one-tailed)
Standard & SBL	Industrial	163	5,129.19	24%	7	314.40	14%	5.9%
	Office	144	626.23	3%	5	57.87	3%	29.9%
	Other	262	3,576.61	17%	9	1,031.24	48%	22.2%
	Retail	251	1,647.13	8%	12	114.09	5%	17.4%
	School	94	1,511.47	7%	8	136.89	6%	14.5%
	Warehouse	206	8,798.74	41%	9	515.12	24%	10.9%
	Total	**1,120**	**21,289.36**	**100%**	**50**	**2,169.61**	**100%**	**10.4%**

Source: C&I Standard and SBL Program Tracking Databases and Navigant analysis

Navigant reviewed the measures rebated through each program and found that, based on reported savings, the distribution of savings was similar between the programs. High Bay lighting measures represented the majority of savings (GMO = 81% for the Standard program and 46% for the SBL program, KCP&L – MO = 78% for the standard program and 59% 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 identical reported savings as Standard program. The primary difference in these measures is that the SBL program offers a higher incentive structure, for some measures, than the Standard program. The SBL program also serves smaller commercial and industrial customers (below 100 kW). However, the operating characteristics for these customer types from SBL and Standard programs are still quite similar. For example, a smaller office building and a medium sized office building with more than 100 kW connected load will still run 8 to 5, five days a week. Apart from the size of the fixtures, operating characteristics of the HID fixtures are likely to be similar for both the

programs. Therefore, Navigant applied the results from the onsite verification efforts to both the Standard and Small Business Lighting programs.

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 there are no discrepancies between these two datasets.

6.2.1.5 Net-to-Gross

Table 6-8 summarizes the components of the NTG ratio. The NTG ratio of 87% is driven primarily by low FR found in the participant survey. FR is low mainly due to high reported program influence and the fact that nearly two-thirds of participants indicated they would have canceled or postponed the project in the absence of the program. Low SO may be a reflection of the wide variety of lighting upgrade rebates available through the program that are meeting participants' lighting needs, as well as the overall satisfaction of participants and trade allies with the ease of participation in the program.

Table 6-8. SBL NTG Components and Ratio: PY2016

Program Year	FR	PSO	NPSO	NTG Ratio
2016	0.14	0.002	0.01	87%

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.

Table 6-9 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program does not achieve a cost test ratio of 1.0 for the TRC, SCT, UCT, and RIM tests. Navigant's analysis resulted in a TRC ratio that is lower than that filed by GMO due to an energy realization rate of 77%, a coincident demand realization rate of 69%, and a NTG ratio of 0.87. Due to improvements made by KCP&L and the IC, Navigant expects the realization rates to better align for PY2017. This should narrow the gap in filed vs. evaluated savings.

Table 6-9. SBL Benefit-Cost Ratios: PY2016

Program Year	TRC Test[36]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	1.25	0.78	0.88	0.91	1.75	0.47
Program Overall	**1.25**	**0.78**	**0.88**	**0.91**	**1.75**	**0.47**

Source: Navigant analysis

6.2.3 Process

In PY2016, Navigant addressed two process evaluation research questions and the five MO-required questions for process evaluation through staff interviews, a program materials review, ride-along visits, trade ally surveys, and participant surveys.

Table 6-10 displays the evaluation team's key process research questions and the evaluation activities conducted to address these questions.

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

Table 6-10. SBL Process Evaluation Research Questions and Approaches

Process Evaluation Research Question	Evaluation Activities
General Process Evaluation Questions	
1. How satisfied are trade allies and participants with the program overall?	• Program staff interviews • Trade ally surveys • Participant surveys • Ride-along visits
2. How do trade allies decide to pursue a rebate through the SBL program as opposed to the Business EER – Standard program?	• Program staff interviews • Trade ally interviews • Ride-along visits
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews • Market actor surveys
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Market actor surveys
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Market actor surveys
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Market actor surveys • Ride-along visits • 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 • Market actor surveys • Ride-along visits • Participant surveys

Source: Navigant analysis

The team's findings are provided below. Recommendations for consideration in relation to these findings are provided in Section 6.3.

6.2.3.1 General Process Evaluation Questions

QUESTION 1: How satisfied are trade allies and participants with the program overall?

FINDING 1: Navigant's process evaluation research indicated that there is a high satisfaction among the trade allies and participants for the SBL program.

- 100% of participant survey respondents indicated that they were satisfied with the SBL program. Of those participants, 76% were very satisfied, whereas the remaining 24% indicated that they were somewhat satisfied, ranking their satisfaction a 4 on a 5-point scale.
- 82% (9 out of 11) of the trade ally survey respondents (n=12) indicated that they were satisfied with the SBL program. One participant was neutral; one survey respondent indicated

dissatisfaction stating the application process was convoluted and time consuming; and one respondent opted out of the question.

- 27% of the trade allies increased the ranking of their confidence in using the Open Field tool from not confident to moderately confident. While this increase is a positive change, there is still an opportunity for KCP&L to improve the accuracy of the data collection through additional trade ally training.

QUESTION 2: How do trade allies decide to pursue a rebate through the SBL program as opposed to the Business EER – Standard program?

FINDING 2: The majority of trade ally survey respondents indicated that the amount of incentives available for the project is the primary reason behind which program they choose to pursue the rebate.

- This is a typical finding for any EE rebate program that shares measures with another program, as the financial incentive is one of the main factors behind the projects and the program in which a trade ally or participant selects. SBL's incentive being higher than Standard's helps address the capital on hand issue for small businesses but does lead to preferential selection for SBL versus Standard when a participant qualifies.
- One out of 12 respondents also indicated that they decide which program they should submit the project through by checking with the IC on the eligibility of the site. However, only one respondent indicated that they prefer the Standard program over the SBL program as the program has a commitment to pay within 30 days after signing the contract.

6.2.3.2 Missouri-Required Questions for Process Evaluation

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 has a well-defined target market for the SBL program.

- The SBL program targets small business customers who have a peak demand of 100 kW or lower at a single site[37]. Targeting customers with this lower demand identifies the small business owner who characteristically has limited resources in time and money. The SBL program removes these obstacles to encourage participation.
- Additionally, when a trade ally applies for an incentive through the SBL program, their application goes through a pre-approval process where a program team checks the eligibility of the project. This way the program team makes sure the projects coming through are eligible for the SBL program.

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

FINDING 2: The primary market imperfection common to the target market for this program is that most SBL customers have less resources and money to pursue the EE projects.

[37] Or less than 250 kW total peak demand across multiple sites/meters.

- Typically, small business customers tend to be on fixed budget and cannot afford to spend extra resources, time, and money on EE projects. Participant survey results support this, as 70% of the survey respondents suggested that they would have either not installed efficient lights or would have postponed the installation by at least a year in the absence of the 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 SBL program provides a wide range of lighting measures for small business customers, with 62% of the trade ally survey respondents indicating they were happy with the program offerings.

- For trade allies providing suggestions for other measures, there was not a clear, consistent suggestion. Suggestions included breaking out exterior to more detailed measures, specifically targeting plug-in CFLs, and allowing all linear replacement lengths instead of the current limited categories.

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.

- Over 90% of participants surveyed indicated no other methods of learning about the program were needed. However, trade ally survey participants identified opportunities for potential marketing and communication improvements, with only 50% indicating they were aware of and had received program marketing materials.
- Five out of 12 trade ally survey respondents suggested that there should be more direct marketing to customers. Another five out of 12 respondents suggested that more marketing support should be provided to trade allies and contractors.
- This is a typical finding in a process evaluation—trade allies almost always recommend additional marketing efforts. Further, all participant respondents except one said that they do not think that any improvements are needed. However, with only 50% of the trade allies aware of the marketing materials, KCP&L has an opportunity to provide additional training and marketing materials to the trade ally network toward boosting awareness.

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 is running smooth and as intended.

- Both the participant and trade ally surveys indicated high satisfaction with the SBL program. The program offers higher rebates than the Business EER – Standard program for the same lighting measures, which helps small business customers overcome the barrier of the cost of efficient lighting.
- Specific recommendations for potential consideration on improving the program's operation are provided in the following section.

6.3 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 SBL program forward and meet the MEEIA target. 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 found that the project files had a difference in quantity and savings versus the electronic tracking database. Confirming these two data sources have the same data will help the accuracy of the program evaluation.
- In Navigant's review of this year's tracking data, the team identified an opportunity to include a primary key code that will link directly to the KCP&L deemed measure savings database used to support the MEEIA Cycle 2 reported savings filed for the program. Since there is a transfer of data from the IC's database to the Nexant database, several project measure names were not consistent within these databases because of typos or different names. Navigant understands KCP&L and the IC have now implemented a primary key field, which is a numeric value that will help link these measures within the databases and enhance the progress of the evaluation effort moving forward.

Deemed Measure Savings:

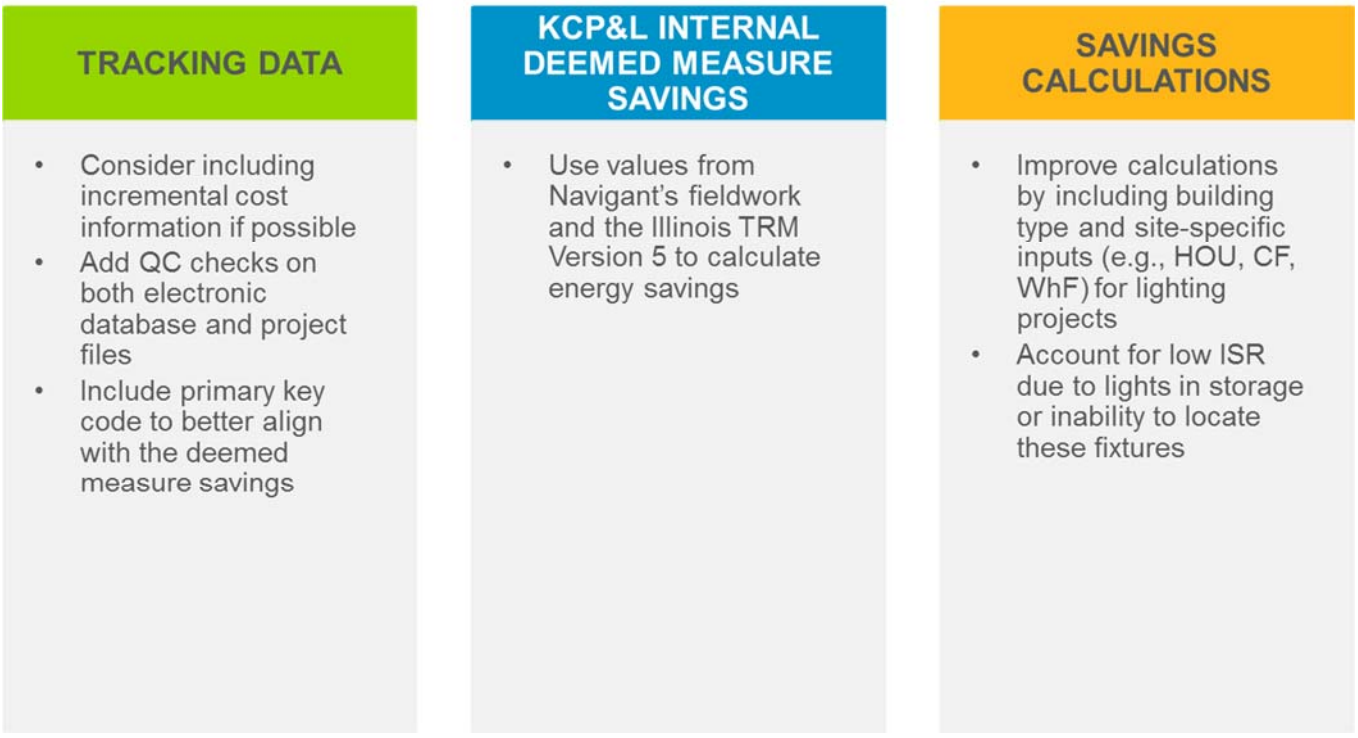
- Navigant recommends using a single authoritative reference to look up the various values used in the calculations (for example, WHFs, CFs, etc.). The evaluation team recognizes MO is currently working on a TRM, but it is not the active reference for the state. Until that time, Navigant suggests using the Illinois TRM to ensure a consistent reference source.
- Currently, most interior measures use the office-midrise category as the space type to look up key input variables. Navigant recommends accounting for actual building types to accurately predict the savings. The evaluation team suggests using a look-up table to get the values pertinent to each individual building type from Navigant's fieldwork effort (see Table 6-4). For the space types not covered in this table, Navigant recommends sourcing values from the Illinois TRM Version 5.0.

Onsite Verification:

- Navigant recommends using an ISR of 99% while calculating the reported savings.

- Navigant used an ISR of 99% based on findings from the onsite verification. This was mainly due to lights in storage or an inability to locate the fixtures.

Figure 6-1. SBL Program Impact Recommendations: PY2016



Source: Navigant analysis

6.3.2 Process

The SBL program had reasonable participation and energy savings in PY2016, which is impressive for a first-year program. While Navigant views SBL as a strong program, an overall recommendation is for SBL to work with the trade allies to increase potential participant awareness of lighting measures. This can be through either direct marketing to the small business customer or through a joint marketing effort with the trade allies. Also in its research, Navigant found that due to the SBL incentive cap of 70% of projects costs, trade allies will utilize the Standard program if that is more financially beneficial to the customer. To eliminate this self-correcting of the two program's rebates, KCP&L could raise the cap of the SBL rebates to 100% of project costs. Though Navigant recognizes there are budget implications to increasing participation in the program given its current trend above target.

Figure 6-2. SBL Process Recommendations: PY2016

Source: Navigant analysis

6.3.2.1 Recommendations Based on the Research Questions

Navigant added two research questions to the five MO-required questions. After interviews with the program manager and IC, the evaluation team examined the overall satisfaction of the trade allies and participants as provided in the survey results and the criteria used by trade allies to determine which rebate to apply for: Standard or SBL.

Table 6-11. SBL Research Question-Based Recommendations

Research Question	Navigant Recommendation
1. How satisfied are trade allies and participants with the program overall?	Consider additional training on program application and the OPEN tool. This could increase trade ally satisfaction toward the application process.
2. How do trade allies decide on pursuing a rebate through the SBL program as opposed to the Business EER – Standard program?	Trade allies often determine whether to pursue a Standard versus SBL rebate based on the monthly demand of a customer. Sometimes a customer is designated as small business, but their business has increased enough in demand that they do not qualify for SBL rebates.

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[38] for the SBL program. Navigant's recommendations based on these questions are provided in Table 6-12.

Table 6-12. SBL Missouri Requirement-Based Recommendations

Missouri Question	Navigant Recommendation
1. What are the primary market imperfections that are common to the target market segment?	Continue strong efforts to reduce the time commitment to pursue and the financial burden of EE projects for small businesses.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Continue current efforts as they are showing traction with both trade allies and participants.
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?	Continue with lighting as the only end use at this time, as it is a significant end use for small businesses. Continue to monitor trade ally feedback for potential additional measures that should be considered for program inclusion.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Navigant suggests monitoring marketing efforts by trade allies and consider opportunities for further encouraging copromotion to amplify marketing messages during targeted promotional periods to drive responses.
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?	Consider increasing the 70% cap on the total incentives to better align with the Standard rebate. This could potentially decrease the crossover of the projects from the SBL program to the Standard program. Navigant notes this would have a negative impact on program budget however given the progress to date that is exceeding target.

Source: Navigant analysis

[38] 4 CFR- 240-22.070(8)

7. INCOME-ELIGIBLE WEATHERIZATION

7.1 Program Description

GMO's Income-Eligible Weatherization (IEW) program provides EE services to GMO's residential customers who meet the program's income eligibility requirements. The program assists income-eligible customers in reducing energy use and bills by weatherizing their homes. GMO partners with non-profit, income-eligible advocacy groups called Community Action Programs (CAPs) to implement the program. Weatherization crews hired by CAPs perform site visits at the request of income-eligible customers to complete home energy audits, identifying opportunities for shell and HVAC system efficiency improvements. In response to audit findings, pending approval by the program manager, the program may finance air sealing, ceiling insulation, wall insulation, window replacement, and heating or cooling system repairs to effectively weatherize the home.

An official program IC does not manage this program; rather, customers apply through CAPs. Because these CAPs act as a liaison between participants and the program, they are considered a quasi-implementer for the program. CAPs recruit customers into the program, help customers through the application and screening process, and hire the weatherization crews that perform audits and install measures.

Descriptions of the application process, verification, rebate process, dispute process, and project tracking and reporting are provided in Table 7-1.

Table 7-1. IEW Program Description

IEW Program Key Details	
Sector	Residential
Implementation Contractor	CAPs are quasi-implementers, and the US Department of Energy (DOE) partially funds and manages this program.
Program Description	The IEW program receives funding through the US DOE and provides home weatherization audits and services to income-eligible utility customers to reduce energy use and bills.
Application Process	Customers apply to the program through a participating CAP. Once accepted into the program, the participant schedules a home visit by a weatherization crew, which performs a weatherization audit. Installation of weatherization measures follows the audit such as windows, insulation, and heating or cooling system repairs, pending program approval.
Verification of Purchase/Project	Program manager at GMO verifies project completion.
Rebate Process	Eligible customers participate in this program free of charge, and weatherization contractors are reimbursed through GMO and US DOE grant funding.
Disputes, Rejected Applications	Disputes and rejected applications are handled by the GMO program manager.
Project Reporting	Data on completed projects is stored in GMO's project tracking database.

Source: Evaluation team analysis

7.2 Evaluation Findings

The impact evaluation for the IEW program is detailed in this section and covers the gross impact findings and NTG analysis for PY2016. The evaluation team used method 1a and protocol 2b of the MO regulations to evaluate this program.

The evaluation team completed a thorough tracking database review and found that the tracking database did not contain sufficient measure information to fully recalculate and verify measure savings for the IEW program. The tracking database contained only information about the location of the house, the incentives given, and the total kilowatt-hour and kilowatt savings.

Having completed the tracking database review, Navigant drew a sample of 15 projects in the small, medium, and large strata—five in small, five in medium, and five in large—such that each stratum contributed equally to the total savings. Within these strata, Navigant drew a random sample of projects to ensure the verified savings was within 20% of the actual savings at the 90% confidence interval.

For each of the 15 sampled projects, the evaluation team verified the project savings using the information provided in the NEAT input and recommended measures reports. Further, the evaluation team noted the adopted measures and recalculated the associated savings for each individual measure. Navigant also compared savings values tracked in KCP&L electronic tracking system to those from the NEAT report to identify discrepancies.

The following sections present Navigant's PY2016 findings for the IEW program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into:

- 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's verification methods indicated that the IEW program achieved 309,812 kWh and 128 kW in energy and demand savings at the customer meter, resulting in realization rates of 102% for energy and 57% for coincident demand. The following drove realization rates:

- **An increase in savings from water tank wraps in Navigant's analysis.** KCP&L did not provide the calculation method for the reported savings in the documentation Navigant received. Navigant followed up with the program manager to see if additional detail was available on the calculation method and was not able to get further detail on the sources of the calculations or values within the system used.
- **Lower savings than expected in HVAC measures.** The difference in savings due to HVAC replacement from new AC units and heat pump replacements is due to baseline assumptions. The NEAT input reports, as submitted to Navigant, did not include any information about the efficiency of the existing heat pumps and often did not include information about the existing AC

unit. In these cases, Navigant used the deemed baseline for these measures, which affected the verified savings.

- **Difference in insulation savings.** The difference in insulation savings is because of differences in baseline R-value assumptions between Navigant and the CAPs. Navigant assumed, as detailed in the Illinois TRM Version 5, that no insulation in either the attic or the walls did not represent an R-value of 0 since the wall and attic themselves have insulative properties. Instead, Navigant used an R-value of 5 for an uninsulated wall or attic, as recommended by the Illinois TRM. This reduced overall savings for these measures because of the more efficient baseline condition.

Table 7-2. IEW Energy Realization Rate by Project Size

Stratum	Total Reported Energy Savings (kWh)	Total Verified Energy Savings (kWh)	Energy Realization Rate
Small (<4,000 kWh)	100,946	156,618	155%
Medium (4,000 kWh <=savings < 12,000 kWh)	98,028	88,662	90%
Large (>=12,000 kWh)	105,998	64,531	61%
Total	**304,972**	**309,812**	**102%**

Source: Navigant analysis and tracking database

Table 7-3. IEW Program PY2016 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)	304,972	309,812	102%	143,458	309,812	216%
Coinc Demand at Customer Meter (kW)	226	128	57%	52.60	128	244%

Source: Navigant analysis

7.2.1.1 Net-to-Gross

As shown in Table 7-4, for PY2016, Navigant assumed a NTG value of 1.0 for the IEW program.

Table 7-4. IEW NTG Components and Ratio: PY2016

Program Year	FR	PSO	NPSO	NTG Ratio
		Deemed 1.0		100%

Source: Navigant analysis

7.2.2 Cost-Effectiveness

This section presents Navigant's evaluation of cost-effectiveness for the IEW 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.

Table 7-5 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program exceeds 1.0 in the TRC, SCT, UCT, and PCT tests. The PCT benefit-cost ratio is INF, indicating that there are program benefits to participants but no costs. Navigant's analysis resulted in a TRC ratio that is lower than that filed by GMO due to a coincident demand realization rate of 57%. Additionally, Navigant accounted for incentives to customers in the program administrative costs, while KCPL included these as TRC pass-through costs. Incentives to customers in direct install programs are included as program administrative costs to account for the actual cost of implementing measures in the absence of incremental costs. Reporting this spending as incentives while holding incremental costs at zero artificially increases the TRC ratio.

Table 7-5. IEW Benefit-Cost Ratios: PY2016

Program Year	TRC Test[39]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	4.42	1.15	1.45	1.15	INF*	0.59
Program Overall	**4.42**	**1.15**	**1.45**	**1.15**	**INF***	**0.59**

Source: Navigant analysis

7.2.3 Process

Navigant addressed two process evaluation research questions and the five MO-required questions for process evaluation through staff interviews and program materials review. A summary is provided in the Table 7-6.

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

Table 7-6. IEW 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 • Materials review
2. What changes have been made to the program in PY2016, and what changes are planned for PY2017?	• Program staff interviews • Materials review
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews • Materials review
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Materials review
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review

Source: Navigant analysis

The team's findings are provided below. Recommendations for consideration in relation to these findings are in Section 7.3.

7.2.3.1 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: Table 7-7 summarizes the recommendations from the previous evaluation and progress toward implementing those recommendations.

Table 7-7. IEW Progress on Past Recommendations

Recommendations	Progress Toward Implementation
1. GMO should take advantage of the agencies' quarterly meetings to strategize solutions to the bottlenecks.	This recommendation was in response to low participation. Marketing activities in PY2016 increased participation significantly.
2. GMO should meet with the agencies to streamline reporting processes and to address throughput bottlenecks.	Communications have improved, partially due to increased marketing. There is still only one person at KCP&L responsible for the entire program, but because it is a small program this is not a major barrier.
3. Strategize with agencies on ways to streamline their reporting to make less work and increase data reliability for agencies and GMO.	Data reliability has improved significantly in PY2016. Navigant obtained audit reports and the calculations made to produce demand savings, which was not available in PY2015.

Source: Navigant analysis

QUESTION 2: What changes have been made to the program in PY2016, and what changes are planned for PY2017?

FINDING 2: KCP&L significantly increased marketing activities for this program in PY2016, including Neighborhood Blitz events and billboard advertising, which led to an increase in participation.

- Additionally, KCP&L started tracking heating savings due to electric heat in PY2016, leading directly to increased reported savings that had been unaccounted for in prior years.
- This program will leave MEEIA in PY2017.

7.2.3.2 Missouri-Required Questions for Process Evaluation

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

FINDING 1: Income-eligible consumers and the housing owners for income-eligible residents typically do not have the resources to execute efficiency upgrades. The program helps income-eligible customers lower their utility bill and energy consumption through building shell and HVAC system improvements.

- The primary difficulty in this market is the inability of income-eligible residents to afford professional home weatherization services such as the installation of insulation, efficient windows, and heating and cooling system repairs.
- While income-eligible customers benefit from weatherization due to lower energy bills, they usually cannot afford the upfront costs of home weatherization, and the payback period is too lengthy to make it cost-effective for these customers.
- Another obstacle to this market is lack of knowledge—many customers may not be aware of the extent to which proper weatherization could lower their energy use and their energy bills.

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

FINDING 2: This market for income-eligible home weatherization is well-defined and does not need to be consolidated or expanded because the program explicitly defines the population using Federal Poverty Guidelines.

- GMO defines the target market of income-eligible customers as both homeowning and renting utility customers who have household incomes below 200% of Federal Poverty Income Guidelines, translating to less than $23,340 per year for a single person or $47,700 per year for a family of four.
- Households must have annual energy consumption in excess of 3,000 kWh, have demonstrated attempts to maintain a payment history on utility bills (no matter how small), and if renters, be fully responsible for electricity bills.
- For PY2016, KCP&L allowed tenants, not just homeowners, to participate in the program. This allowed additional households to participate who had not been eligible in the past and expanded the program's reach to cover more of the market need.

QUESTION 3: Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?

FINDING 3: Navigant's review finds the program currently includes all appropriate measures.

- The program includes all home weatherization measures typically completed for non-income-eligible home weatherization projects; thus, they are reflective of the full diversity of services and technologies in the home weatherization market.
- These services include a full-home weatherization energy efficiency audit, followed by appropriate measures including air sealing, ceiling insulation, wall insulation, window replacement, and heating and air conditioning system repairs.

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

FINDING 4: Communication channels and delivery mechanisms are appropriate for the target market: income-eligible customers.

- Income-eligible customers can access program benefits through their local CAPs, which are non-profit agencies dedicated to connecting income-eligible families and individuals to a variety of services. CAPs serve well as liaisons between the communities they serve and the utility. Other communications regarding the program are delivered via the utility's bill messaging, online website messaging, and supplying informative materials to CAPs directly.
- Program delivery is consistent with the needs of the target population. CAPs are the most effective delivery channel for the IEW program because of their broad set of services offered to and existing relationships with income-eligible communities.
- Additionally, having the weatherization crew visit the home to conduct a home weatherization audit and to complete necessary repairs and upgrades is an appropriate delivery mechanism for income-eligible households is an effective approach. This market segment can have limited transportation options and less time available for daily errands; as the program's current execution does not require travel or a large time commitment on the part of the prospective program participant it provides an effective solution to this segment challenge.

- In terms of the final product delivered by the program, professional home weatherization is a highly valuable benefit to income-eligible customers, allowing them to reduce their energy use and consequently their energy bills, freeing up income for other necessities.

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 includes this in the recommendations section below.

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 IEW program forward and meet the MEEIA target. 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)

Overall, the IEW program functions smoothly, is viewed positively by customers, provides valuable energy savings, and increased comfort for income-eligible residents. Navigant provides the following suggestions for consideration to help make the customer experience even better and to increase savings achieved by the program.

7.3.1 Impact

The tracking data and savings calculations provided by KCP&L are not sufficient to transparently reproduce reported savings calculations. Navigant recommends KCP&L consider developing a process to track the NEAT report data in the internal data tracking system (Nexant) if this data will be useful for internal purposes once the program moves outside of MEEIA. Navigant recommends tracking audit information and savings calculations in the tracking system but realizes that the size of the program may make this cost-prohibitive.

7.3.2 Process

Drawing on the materials review and staff interviews, the evaluation team developed recommendations to enhance the success of the program.

7.3.2.1 Recommendations Based on the Research Questions

In addition to the five MO-required questions, the team also examined the following research questions.

Table 7-8. IEW 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?	KCP&L has made significant progress on the recommendations. Navigant recognizes that IEW will leave MEEIA programs starting in PY2017 but recommends that as the database is updated for this program, KCP&L include additional data from the NEAT input reports if that is useful for internal purposes.
2. What changes have been made to the program in PY2016, and what changes are planned for PY2017?	There are no changes planned. This program will leave MEEIA in PY2017.

Source: Navigant analysis

7.3.2.2 Recommendations Based on Missouri's Requirements for Process Evaluation

Navigant addressed the five required process evaluation questions set forth in the MO regulations[40] for the IEW program.

Table 7-9. IEW Missouri Requirement-Based Recommendations

Missouri Question	Navigant Recommendation
1. What are the primary market imperfections that are common to the target market?	The market issue of making improvement options available to income-eligible participants is addressed by this program, so Navigant has no additional recommendations based on this question.
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 all income-eligible customers given the scope of the current measure mix.
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 recommends encouraging implementation of smart thermostats. The smart thermostat measure was not implemented in any of the sampled projects and can provide additional savings. The installed measures are appropriate to the target market segment.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	KCP&L has considerably increased marketing efforts for this program, increasing savings and participation. KCP&L should continue working on Neighborhood Blitz opportunities to encourage participation as this has proven successful.
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 manager indicated that some homes eligible for the program cannot be included due to the unsafe or unhealthy state of the house. KCP&L is looking at working with a Healthy Homes program to address these issues. This may provide additional participants and exposure for KCP&L in this program.

Source: Navigant analysis

[40] 4 CFR- 240-22.070(8)

8. WHOLE HOUSE EFFICIENCY

8.1 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 or are constructing a new 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 installing high efficiency HVAC equipment
- Develop partnerships with HVAC contractors to bring efficient systems to market

In PY2016, customers could participate in the program through three different options, known as tiers. The three tiers are described below.

- **Tier 1 – Home Energy Audit and Energy Savings Kit:** Offers a home energy audit and direct install (DI) measures such as faucet aerators, low-flow showerheads, advanced power strips, water heater tank wrap, hot water pipe insulation, and energy efficient LED lighting
- **Tier 2 – Weatherization Measures:** Offers building shell and weatherization measures including air sealing, ceiling and wall insulation, and ENERGY STAR windows
- **Tier 3 – HVAC Equipment:** Offers HVAC measures such as heat pump water heaters, furnace fans with electronically commutated motors (ECM), ductless mini-split heat pumps, and other efficient AC units and heat pumps

The following table presents additional details about the WHE program.

Table 8-1. WHE Program Description

WHE Key Details	
Sector	Residential
Implementation Contractor	ICF implements the WHE program. For Tier 1, ICF employs energy efficiency professionals (EEPs) who conduct the home energy audits and install the DI measures. For Tier 2 and Tier 3, ICF processes applications.
Program Description	KCP&L offers customers three options, or tiers, to participate in the WHE program. Tier 1 offers home energy audits 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.
Application Process	Residential customers use the KCP&L website to sign up for the free Tier 1 energy audit and DI measures. Trade allies enroll customers into the Tier 2 and Tier 3 options.

WHE Key Details	
Verification of Purchase/Project	The Tier 1 energy audit is conducted by EEPs employed by the 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 audit. Tier 2 and Tier 3 measures are installed by trade allies who lead the rebate process.
Disputes, Rejected Applications	Customers can contact KCP&L's call center for any rebate disputes. The IC handles other 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

8.2 Evaluation Findings

Navigant's impact evaluation found that the WHE program is performing well. Savings were higher than reported by the program, with a 113% realization rate for energy savings and 143% realization rate for demand savings. The program achieved 22% of the 3-year MEEIA target for energy savings and 47% of the demand savings. This means that the program is well under way to achieving its targets. In addition, the program did not exceed 1.0 for its cost-effectiveness for PY2016.

Navigant's process research indicated that the program is well-received by customers. It also showed that few participants are taking a true whole house approach and participating in more than one program tier. Program staff indicated that a major goal for the next PY is to encourage Home Energy Audit and Energy Savings Kit participants to pursue deeper energy savings through one of the rebate program tiers.

The following sections present Navigant's PY2016 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 8.2.1)
- Cost-effectiveness analysis (Section 8.2.2)
- Process evaluation findings (Section 8.2.3)

8.2.1 Impact

Navigant analyzed savings for most measures in the WHE program using Illinois TRM Version 5 algorithms. 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 Version 5 in most cases when the required input values were not present in the program tracking data. The analysis methodology, including algorithms and variable input values, is detailed in the Appendix.

Table 8-2 presents the energy and demand savings summary for WHE in PY2016.

Table 8-2. WHE Program PY2016 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)	4,917,214	5,536,777	113%	19,717,746	4,429,421	22%
Coinc Demand at Customer Meter (kW)	2,072	2,961	143%	5,072	2,369	47%

Source: WHE program tracking database and Navigant analysis

The following sections describe the tracking database review and the verification results from Navigant's evaluation.

8.2.1.1 Tracking Database Review

Navigant conducted a tracking database review to assess the following:

- Ability to verify gross savings by including data about the baseline units removed and efficient units installed
- Level of detail on the characteristics of products sold, including rebate amounts, number of units installed, and measure-specific data such as unit efficiencies, wattage values, operating schedules, nameplate data, and similar specifications
- Possible errors in the data by verifying that the values for each variable fell within reasonable bounds
- 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 data was not present in the tracking data, Navigant used industry-accepted references, such as Illinois TRM Version 5 default values, to calculate the program's verified savings (see more about this in Section 8.2.1.3). Navigant discussed with KCP&L the need to record the information in future PYs and future tracking databases are being updated to include them.

Navigant also found that some data points tracked were general estimates and, therefore, not specific enough to robustly track measures and calculate savings. The tracking database would better track program data if values were recorded more exactly.

In addition, Navigant found that some Tier 3 HVAC units installed did not comply with the WHE Operations Manual. The Operations Manual requires that the maximum Seasonal Energy Efficiency Ratio (SEER) value of the replaced unit be 10. Navigant notes that most complied but that there were some that did not (less than 1% of units) by exceeding this maximum.

8.2.1.2 Net-to-Gross

Table 8-3 summarizes the components of the NTG ratio. The NTG ratio of 80% was driven primarily by relatively high FR in the AC and heat pump measures, which make up 79% of program savings. Trade allies partially offset the FR reporting NPSO that resulted from program influence on their sales of higher SEER heat pumps and ECM furnace fans.

Table 8-3. WHE NTG Components and Ratio

Program Year	FR	PSO	NPSO	NTG Ratio
2016	0.35	0.01	0.14	80%

Source: Navigant analysis

8.2.1.3 Verification

Navigant performed a deemed savings review and began by conducting a thorough engineering desk review of the approaches used to estimate reported gross savings. The analysis consisted of reviewing a sample of WHE project files to verify the following:

- Quantities and type of each measure installed
- Operating status of the measures
- Equipment nameplate data
- Operating schedules
- A careful description of site conditions
- Overall information contained in the program tracking system

The evaluation team then 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, it referenced the Illinois TRM Version 5.0, except where otherwise noted.[41] 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, CFs) sourced from the Illinois TRM Version 5.0 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 energy and coincident demand savings reported by the WHE program.

The WHE program achieved 5,537 MWh of verified gross energy savings in PY2016 for a realization rate of 113%. The program achieved 4,429 MWh of verified net energy savings, 22% of the PY2016-PY2018 MEEIA target. The program also achieved 2.96 MW of verified gross coincident demand savings in PY2016 for a realization rate of 143%. The program achieved 2.37 MW of verified net coincident demand savings, 47% of the PY2016-PY2018 MEEIA target.

The following tables show how each WHE program tier contributed to the overall program savings.

[41] The algorithms for each measure evaluated in this analysis are detailed in the Appendix.

Table 8-4. WHE Program PY2016 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	194,806	233,854	120%
Tier 2: Building Shell Measures	173,785	98,172	56%
Tier 3: HVAC Measures	4,548,424	5,204,750	114%
Total	**4,917,015**	**5,536,777**	**113%**

Source: WHE program tracking database and Navigant analysis

Table 8-5. WHE Program PY2016 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	19	46	240%
Tier 2: Building Shell Measures	64	34	53%
Tier 3: HVAC Measures	1,988	2,881.5	145%
Total	**2,071**	**2,961.3**	**143%**

Source: WHE program tracking database and Navigant analysis

The primary drivers of the verified savings of the WHE program were the Tier 3 HVAC measures, which made up 94% of the verified gross energy savings and 97% of the verified gross coincident demand savings. Navigant's adjustments to baseline efficiencies for early retirement AC and heat pumps led to the overall higher than targeted energy and demand savings. Navigant based its adjustments on early retirement data from its PY2015 evaluation of KCP&L's Air Conditioning Upgrade Rebate (ACUR) program. Table 8-6 shows the differences in the baseline values used for reported and verified savings.

Table 8-6. WHE Program PY2016 HVAC Baseline SEER and Energy Efficiency Ratio Adjustments

Early Retirement HVAC Measure	Reported Baseline SEER	Verified Baseline SEER	Reported Baseline Energy Efficiency Ratio	Verified Baseline Energy Efficiency Ratio
AC Units	10	6.82	9.2	6.00
Heat Pumps	9.12	6.82	8.55	6.00

Source: WHE program tracking database and Navigant analysis

8.2.2 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 as well as the sources for the benefit and cost input assumptions.

Table 8-7 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program does not reach a cost test ratio of 1.0 in the TRC or RIM tests. Navigant's analysis resulted in a TRC ratio that is higher than that filed by GMO due to an energy realization rate of 113% and a demand realization rate of 143%.

Navigant also employed a dual baseline benefit-cost methodology for early replacement measures, as described in Section 1.2. Early replacement measures in the WHE program were analyzed using a two-part savings stream (i.e., a dual baseline approach) and accounting for the adjustments in equipment investment timing due to early replacement of functional equipment. This approach is necessary to ensure that early replacement measures are fairly burdened with the full cost of the efficient equipment and to ensure the savings stream correctly accounts for differences in baseline assumptions over the lifetime of the measure.[42]

Table 8-7. WHE Benefit-Cost Ratios: PY2016

Program Year	TRC Test[43]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	0.78	0.94	1.17	1.60	1.19	0.71
Program Overall	**0.78**	**0.94**	**1.17**	**1.60**	**1.19**	**0.71**

Source: Navigant analysis

8.2.3 Process

The WHE program is an umbrella structure for three distinct program tiers: Home Energy Audit and Energy Savings Kit, Weatherization Measures, and HVAC Equipment. Each of these tiers is served by different trade allies and offers unique customer experiences, so many of the process evaluation findings are specific to one tier rather than the overarching WHE program. Overall, Navigant's process evaluation research found that participants and trade allies are generally very satisfied with each of the program tiers. However, relatively few participants are taking a true whole house approach and participating in more than one program tier. Program staff indicated that a major goal for the next PY is to encourage Home Energy Audit and Energy Savings Kit participants to pursue deeper energy savings through one of the rebate program tiers.

Navigant addressed the five MO-required questions for process evaluation through an interview with the product manager, a review of program documentation and marketing materials, a participant survey, and a trade ally survey. A summary of these research questions is provided in Table 8-8.

[42] 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.

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

Table 8-8. 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 • Materials review • Trade ally surveys
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review • Trade ally surveys • Participant surveys
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Materials review • Trade ally surveys • Participant surveys
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review • Trade ally surveys • Participant surveys
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review • Trade ally surveys • Participant surveys

Source: Navigant analysis

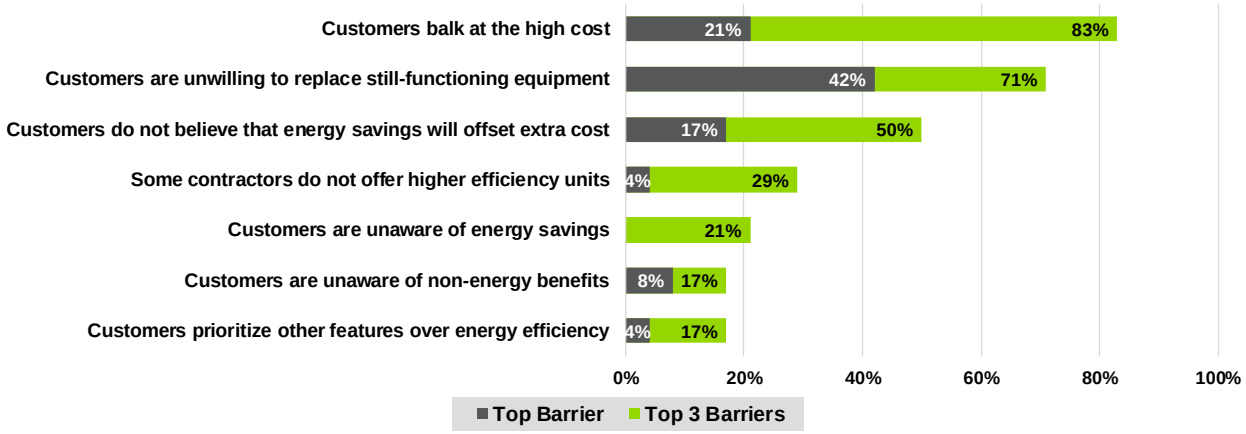
The team's findings are provided below. Recommendations for consideration in relation to these findings are in Section 8.3.

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. Surveyed participants and trade allies alike support that view.

- Some participants in the Home Energy Audit and Energy Savings Kit program tier indicated a desire for more detailed information than is provided in the home assessment report, particularly on measure costs.
- The surveyed HVAC trade allies indicated that the primary barriers to residential customers upgrading to high efficiency HVAC equipment are cost and an unwillingness to replace equipment that is still functioning.
    - As shown in Figure 8-1, while nearly all (83%) trade allies stated that the high cost was one of the top three barriers, most trade allies rated the unwillingness to do an early replacement project as the most significant barrier (42% vs. 21% for high cost).
    - Trade allies also indicated that the program had a significant effect on their customers' willingness to replace still-functioning equipment, indicating that the program is having some success in addressing this barrier.

Figure 8-1. Barriers to High Efficiency HVAC



Source: Navigant survey of participating trade allies

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 2-4 unit residences and renters are also eligible.

- KCP&L's product manager indicated that the program is especially interested in engaging homeowners with older heat pumps because of the high potential for electricity savings.
- Surveyed trade allies note that the customers that participate in EE programs tend to be higher income households in the suburbs. When asked if there are customer types who would benefit from the program but are not currently participating, one trade ally specifically noted neighborhoods with many older homes as a good target for weatherization measures (Brookside, Waldo) and downtown.

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 AC units and heat pumps, with little participation in the heat pump water heater, air sealing, or insulation measures.

- Weatherization trade allies perceive that the program has not provided the same level of marketing support to them as it provided to the HVAC trade allies. Navigant's review of the marketing materials provided by KCP&L supports that perception.
- Weatherization trade allies expressed a desire to see the windows incentive reinstated. A few participants also mentioned that the program would improve by adding incentives for windows and appliances. Navigant recognizes that KCP&L dropped the windows incentives due to cost-effectiveness problems in previous PYs.
- In anticipation of the program possibly adding an HVAC tune-up measure, Navigant asked HVAC trade allies a question about the barriers facing customers regarding HVAC tune-ups. The clear

majority of trade allies agreed that the primary barriers are lack of customer awareness of the need for tune-ups and the perception that their HVAC equipment is still functioning properly.

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. High participant satisfaction is one indication that the program's communication channels and delivery mechanisms are generally appropriate for the target market segment.

Given the substantial role that trade allies play in delivering this program, trade ally satisfaction is another important indicator. Trade allies indicate somewhat lower levels (though ratings are within expected values) of program satisfaction than participants do, particularly regarding rebate amounts and the marketing support provided by the program.

When trade allies were asked how the program could improve, the most common answer was "more marketing directly to customers" (cited by 39% of trade allies), followed by "more marketing support for contractors/trade allies" (21%). These are common responses from trade allies in program evaluation surveys; trade allies frequently perceive that the program can do more marketing and advertising than individual trade allies are capable of funding.

Findings by tier are listed below:

- **Energy Savings Kit:** Participants had an average satisfaction rating of 4.2 (on 1-5 scale, with 5 as the highest possible rating).
    - Participants are most satisfied with the energy-saving items in the kit (4.5) and the EEP who conducted their assessment (4.4).
    - The program element with the lowest satisfaction was the information provided in the assessment report (4.1). Most participants (83%) recalled receiving the report and could recall specific recommendations made in it. However, less than half (48%) of those that recalled the report found it to be very useful, with some noting that they did not read anything that they did not already know. Further, less than half recalled the EEP leaving other materials such as information on program rebates, and almost half (46%) wanted additional information that they did not receive.
    - Participants frequently wanted information on the equipment or systems in their home that used the most energy or more specific information on the cost-effectiveness of the recommendations. These findings indicate that some participants may be expecting a more comprehensive audit than they receive through this program tier.
- **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).
    - Air sealing participants' relative dissatisfaction is driven by dissatisfaction with rebate amounts and participation requirements. A significant number of participants indicated there was room for improvement in program communications regarding program processes and requirements. However, participants in this program tier were more satisfied with the information provided in their home energy audit reports, relative to the participants who received the less comprehensive Energy Savings Kit assessment (4.4 vs. 4.1).

  - Some participants in this program tier expressed frustration that they were limited to prequalified contractors and would have preferred to find their own contractor or conduct the work themselves.
  - Energy Auditors/Insulation and Air Sealing trade allies expressed a desire to see the program provide more marketing assistance to increase customer awareness of the insulation and air sealing rebates.

- **Heating and Cooling Rebates:** Participants had high overall satisfaction, with averages of 4.4 and 4.6 (out of 5) for AC 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.
  - Allowing trade allies to process and deliver rebates to customers appears to be creating some minor dissatisfaction for participants: 10% of the participants suggested that KCP&L needed to reduce the length of time required to receive the rebate. However, some noted they understood it was a new program and others noted they were unclear whether the delay was the fault of KCP&L or the contractor.
  - Trade allies are very satisfied with the program application process and the amount of time it takes to complete a program, indicating that the program mechanics are working well for most trade allies. A few trade allies indicated that the paperwork was burdensome but less so than in previous iterations of the residential rebate programs. Most trade allies believe that there is room for improvement on program marketing, both in terms of direct marketing to customers as well as support for trade allies. As noted above, this is a common response from trade allies, and Navigant's review of marketing materials indicated that the program did a substantial amount of promotion for the HVAC rebates.
- **Intra-Program Interactions:** One of the primary findings of the process evaluation is that few participants in the Energy Savings Kit 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.
  - Most customers learn about the rebate programs through the trade allies rather than through KCP&L-sponsored marketing, particularly HVAC Equipment participants. Trade allies are motivated to promote rebates for measures that they offer; however, they have little incentive to promote participation in other KCP&L offerings. Because trade allies are the primary source of program information for many participants, it is unsurprising that over half of participants are unable to name any other KCP&L EE program besides the one in which they participated.

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 simply 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.

- Some Energy Savings Kit participants indicated lower satisfaction with the quality of information provided in the home energy assessment report, particularly regarding measure costs and cost-effectiveness.
- Some Heating and Cooling Rebate participants expressed minor dissatisfaction with the time it took to receive the rebate, which may be abated with more upfront communication about when to expect the rebate check and who it will be coming from (the program or the trade ally).
- Participants in the Insulation and Air Sealing Rebate expressed confusion about the steps necessary to participate and would benefit from a more detailed explanation of what to expect throughout the program process.

8.3 Recommendations

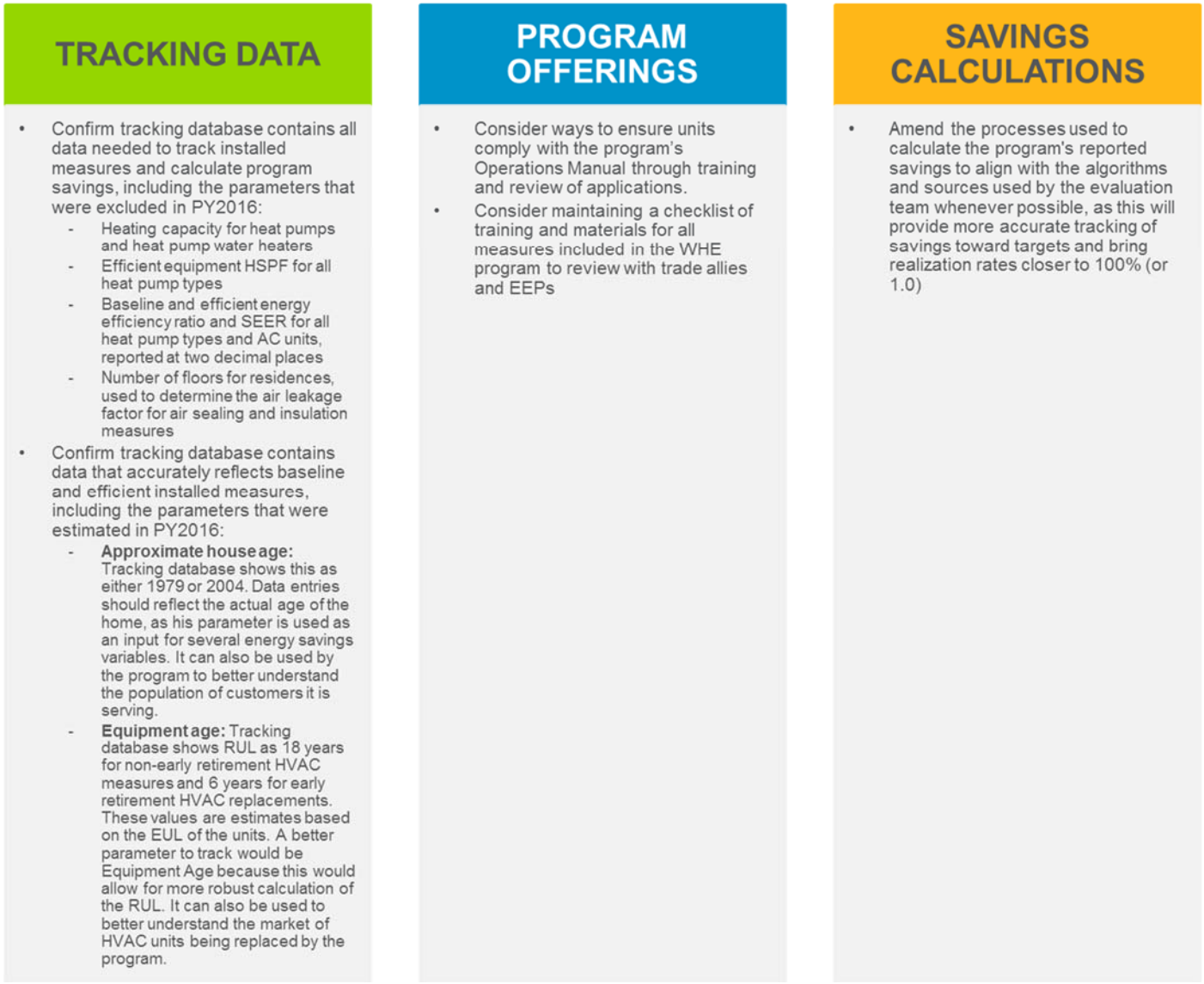
Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are provided based on corresponding findings to move the GMO WHE program forward and meet the MEEIA target. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 8.3.1)
- Recommendations from the process evaluation (Section 8.3.2)

8.3.1 Impact

Navigant reviewed the program tracking database to verify if the data needed to monitor the program and determine how program savings are tracked. The evaluation team also reviewed the program's reported savings calculation inputs and methodology. Figure 8-2 presents Navigant's recommendations for the WHE program.

Figure 8-2. WHE Program Impact Recommendations: PY2016



Source: Navigant analysis

8.3.2 Process

Navigant addressed the five required process evaluation questions through the research activities described above. Table 8-9 describes Navigant's recommendations based on each question. Overall, Navigant found that the program could benefit from more targeting marketing to increase participation in the rebate program tiers, particularly among customers who have already participated in the Energy Savings Kit program.

Table 8-9. 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?	Consider geotargeting online advertising or mailings to neighborhoods with a high density of older homes.
2. What are the primary market imperfections that are common to the target market?	Consider whether it would be feasible to provide cost estimates—and ideally payback period estimates—for recommended measures within the Energy Savings Kit home assessment report.
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?	Explore whether additional advertising or trade ally marketing support could increase participation in less popular measures. Explore ways to highlight the synergies of the program's different tiers to achieve a better overall result for customers. One example could be identifying the level of weatherization improvement that would allow the selection of a lower SEER/Heating Seasonal Performance Factor (HSPF) HVAC unit. While the HVAC unit would be less efficient, the improved weatherization could allow a similar experience for the customer at a reduced total cost. Explore whether a rebate for the comprehensive energy audit would increase participation in Insulation and Air Sealing Rebate.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Consider a more comprehensive energy audit rather than the Energy Savings Kit for customers with a higher level of EE knowledge. Consider offering Energy Auditor /Insulation and Air Sealing trade allies additional training and easy-to-understand program information that they can leave behind with customers so that customers understand the program process from start to finish. If the program chooses to reinstate the HVAC tune-up rebate, consider developing an awareness campaign or educational materials that would assist trade allies in persuading their customers of the need for tune-ups.
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?	Consider whether a series of personalized follow-up contacts from the EEP would build on the trust established during the Energy Savings Kit and encourage more participation in other KCP&L programs. Encourage trade allies to promote other KCP&L programs and consider offering trade allies a small bonus for encouraging their customers to participate in other KCP&L programs.

Source: Navigant analysis

9. INCOME-ELIGIBLE MULTIFAMILY

9.1 Program Description

The Income-Eligible Multifamily Program (IEMF) program delivers long-term energy savings and bill reduction to residents in multifamily housing that meets the income requirements and multifamily housing owner's whose buildings have income-eligible residents. The program is separated into two tiers: one consisting of efficiency kits installed directly in residences, and the second installing efficient lights into multifamily common areas. There is also a custom option for measures that fall outside of those two categories. Lastly, the program partnered with Food Banks in the area to provide CFL bulb kits as another way to reach its target market segment. Table 9-1 details the IEMF program.

Table 9-1. IEMF Program Description

Income-Eligible Multifamily	
Sector	Multifamily housing
Implementation Contractor	ICF
Program Description	The IEMF program provides home EE measures including lighting, water, pipe insulation, smart power strips as a DI option to income-eligible tenants. The program also provides a custom option that allows for proposing other measures not part of the pre-defined DI options. These measures combine to provide property owners and tenants reduced energy usage and energy bills. The program also distributes CFLs through food banks.
Application Process	Customers apply to the program by contacting KCP&L directly or by visiting their website. Once a customer completes the application, the 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 GMO 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 also is present for the installation of DI equipment at a sampling of units. For custom rebates, project verification is completed at the site of the installed equipment by the IEMF program manager
Rebate Process	Eligible tenants participate in this program free of charge. Food banks distribute CFLs 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)
Disputes, Rejected Applications	The GMO program manager handles disputes and rejected applications. The most common, which is typically resolved quickly, is from a tenant directly to ICF 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	GMO stores data on completed projects in its project tracking database intermittently, as projects are completed.

Source: Evaluation team analysis

9.2 Evaluation Findings

The impact and process evaluations for the IEMF program are detailed in this section; the section covers the gross impact findings, NTG analysis, and planned activities for PY2017. The evaluation team used method 1a and protocol 2b of the MO regulations to evaluate this program.

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. Navigant then verified the savings using the tracking database to re-calculate measure savings for each installed measure.

The following sections present Navigant's PY2016 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 9.2.1)
- Process evaluation findings (Section 9.2.3)

9.2.1 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, CFs) sourced from the Illinois TRM 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 1,780,322 kWh and 189 kW in energy and demand savings at the customer meter, resulting in realization rates of 77% for energy and 81% for coincident demand.

Table 9-2. IEMF Program PY2016 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)	2,309,219	1,780,322	77%	10,014,278	1,780,322	18%
Coinc Demand at Customer Meter (kW)	234	189	81%	1,357	189	14%

Source: Program tracking database and Navigant analysis

Most of the savings for the IEMF program in PY2016 came from lighting measures, in the form of CFL food bank distribution. This measure drove the savings and the realization rate for both energy and demand. Navigant applied lower ISR, HOU and CF values to the CFL measure, leading to the low

realization rates. Navigant sourced these values from the Illinois TRM, with values of 83% for the ISR, 847 hours and 8.1%, respectively, compared with the deemed values from KCP&L of 938 hours and 10.0%.

Table 9-3. IEMF Savings Summary by Measure

Measure Category	Gross					
	Reported kWh	Verified kWh	Realization Rate	Reported kW	Verified kW	Realization Rate
Lighting	2,175,693	1,700,776	78%	220.31	167.35	76%
Aerators	13,575	22,898	169%	1.72	16.29	947%
Power Strips	5,530	7,725	140%	0.39	0.87	223%
Pipe Insulation	0	0	NA	0.00	0.00	N/A
Low-Flow Shower Head	29,263	48,922	167%	2.14	4.50	210%

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:

- Faucet aerators had a deemed baseline value less than the actual efficiency level. This caused a negative realization rate for this measure
- Power strips used the deemed values from the Cycle 1 research Navigant conducted instead of Illinois TRM values. The local market usage was found to have higher per unit savings than the Illinois TRM, which drove the savings increase.
- The deemed GPM for low-flow showerheads in the Illinois TRM is lower than the deemed value used by KCP&L, but the number of people per household given in the TRM was higher, causing an overall increase in savings.

9.2.1.1 Net-to-Gross

As shown in Table 9-4, for PY2016, Navigant assumed a NTG value of 1.0 for the IEMF program.

Table 9-4. IEMF NTG Components and Ratio: PY2016

Program Year	FR	PSO	NPSO	NTG Ratio
	Deemed 1.0			100%

Source: Navigant analysis

9.2.2 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 as well as 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, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program does not reach 1.0 in

the TRC, UCT, or RIM tests. The PCT benefit-cost ratio is INF indicating that there are program benefits to participant but no costs. Navigant's analysis resulted in a TRC ratio that is similar to that filed by GMO.

Table 9-5. IEMF Benefit-Cost Ratios: PY2016

Program Year	TRC Test[44]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	0.92	0.90	1.01	0.90	INF*	0.36
Program Overall	**0.92**	**0.90**	**1.01**	**0.90**	**INF***	**0.36**

Source: Navigant analysis

9.2.3 Process

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

Table 9-6. 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 PY2016, and what changes are planned for PY2017?	• Program staff interviews • Materials review
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program staff interviews • Materials review
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Materials review
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review

Source: Navigant analysis

The team's findings are provided below. Recommendations for consideration in relation to these findings are provided in Section 9.3.

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

9.2.3.1 General Process Evaluation Questions

QUESTION 1: What changes have been made to the program in PY2016, and what changes are planned for PY2017?

FINDING 1: This is a new program introduced in PY2016.

- KCP&L is planning to focus primarily on the Custom portion of the IEMF program in PY2017. No other changes are planned.

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 target market for this program is low-income, multifamily residents, targeting both owners and tenants. This market has limited capital availability and low awareness of EE options.

- The primary difficulty in this market is the inability of income-eligible tenants to afford EE measures, as well as the limited incentive for the owners to increase EE when the tenants pay the utility bills.
- Another obstacle to this market is lack of knowledge—many customers may not be aware of the extent to which increasing EE could lower their energy use and their energy bills.

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 well-defined and does not need to be consolidated or expanded because the program explicitly defines the population using Federal Poverty Guidelines..

- 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 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.

QUESTION 3: Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?

FINDING 3: Navigant found that the program 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 measures for those measures deemed to be appropriate for that property. The custom program encompasses all end uses and, therefore, addresses all EE 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 were initially not appropriate for the program, but the delivery system for the tenant measures is appropriate.

- Communication channels and delivery are appropriate given the direct interaction with the end user (tenant). The program is DI for the tenants, and they are not required to fill out any paperwork as a part of the program.
- KCP&L identified property owners as the most promising points of contact for recruiting program participants. Compared to property managers, property owners have the authority and capital to make decisions and commit to larger projects with deeper energy savings. Further, this opened up additional opportunities with the same property owner, as owners often have more than one property.
- During the interview, the program manager at KCP&L indicated that there was not sufficient information on the website for property owners and managers to pursue participation in the program in an efficient manner.

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: Multifamily is a difficult segment to target in most jurisdictions.

- Tenants are often not allowed to make significant alterations, and property owners and landlords have little incentive to increase efficiency because they usually do not pay—directly or indirectly—for utilities.
- Recommendations to overcome this challenge are presented in the following section.

9.3 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 IEMF program forward and meet the MEEIA target. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 9.3.1)
- Recommendations from the process evaluation (Section 9.3.2)

Overall, 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.

9.3.1 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. Navigant does not recommend any changes to the tracking data.

The data provided in the KCP&L deemed savings document gave less information than required to fully compare the calculations used to determine savings. For instance, the document did not contain information such as hours per day or showers per day for the aerator and low-flow showerhead measures. Navigant recommends including more detailed information on inputs used and baseline values for DI measures, particularly for low-flow showerheads and aerators as these had differing realization rates; this indicates input assumptions are not fully matching those used in verification.

9.3.2 Process

Drawing on the materials review and staff interviews, the evaluation team developed recommendations to enhance the success of the program in the following section.

9.3.2.1 Recommendations Based on Missouri's Requirements for Process Evaluation

Navigant addressed the five required process evaluation questions set forth in MO regulations[45] for the IEMF program.

Table 9-7. 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; however, there are opportunities to improve outreach and education in this segment, particularly in fully utilizing direct contact with property owners.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	Since this is an income-eligible program, the target market segment is appropriately defined. Potentially, KCP&L could expand this program to the broader multifamily market.
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	The 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 the custom measures grow over the next PY and consider including these as prescriptive measures moving forward to ease implementation; these measures could also be linked directly to the Business EER program.

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

Missouri Question	Navigant Recommendation
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Working with the property owners directly is an appropriate communication mechanism. Navigant recommends including high frequency custom measures in a prescriptive manner in future PYs to ease implementation.
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 manager recently updated the program website to provide sufficient information for property owners. There is an opportunity for increased market research and identifying new measures. This may include leveraging information from the custom program this year to identify possible prescriptive measures.

Source: Navigant analysis

10. HOME LIGHTING REBATE

10.1 Program Description

The Home Lighting Rebate (HLR) program provides upstream incentives to partnering manufacturers and retailers in the KCP&L-MO and GMO service territories. In turn, the manufacturers and retailers discount the shelf price of LED bulbs, passing the incentive on to their customers. The program also provides marketing and educational materials at the point of purchase. The program started in April 2016 and supports standard A-line LEDs and A-line general service medium-screw base LEDs and specialty LEDs (reflectors, floods, candelabras, and globe lamps, among others). In PY2016, the GMO HLR program paid an average markdown discount of about $2.26 per standard LED bulb and $3.43 per specialty LED bulb. In PY2016, 13 manufacturers and 13 retailers sold 305,375 standard LEDs and 77,411 specialty LEDs through the GMO program.

Table 10-1. HLR Program Description

HLR Program Key Details	
Sector	Residential
Implementation Contractor	ICF International 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 KCP&L.
Program Description	The HLR program pays incentives to manufacturers and retailers for documented sales of ENERGY STAR-qualified 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 (MOUs) with them. Customers do not apply to participate, but instead buy discounted bulbs without the need for rebate coupons.
Verification of Purchase/Project	Manufacturers and retailers provide invoices and proof of sales to ICF, who verifies the invoices.
Rebate Process	The HLR program offers no customer rebates but instead 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

10.2 Evaluation Findings

The following sections present Navigant's PY2016 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 10.2.1)

- Cost-effectiveness analysis (Section 10.2.2)
- Process evaluation findings (Section 10.2.3)

10.2.1 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 ISR based on primary research conducted during onsite saturation visits to customers' homes.

The HLR program achieved 11,128 MWh of verified gross energy savings at the customer meter in PY2016, for a realization rate of 88%. This represents the combined savings from standard and specialty LEDs, with standard LEDs accounting for 78% of the savings. The net energy savings totaled 9,327 MWh, or 37% of the three year MEEIA target.

The program achieved 1,296 kW of verified gross demand savings at the customer meter in PY2016, for a realization rate of 102%. This represents the combined savings from standard and specialty LEDs, with standard LEDs accounting for 79% of the savings. The net demand savings totaled 1,086 kW, or 42% of the three year MEEIA target.

Five factors largely drove the realization rates; the first four served to reduce savings while the last one increased savings:

- The reported energy savings for GMO did not account for leakage (purchases made by customers who live outside of the KCP&L-MO or GMO service territories), which is assumed to be 12% based on the results of the MEEIA Cycle 1 evaluation.
- Reported savings did not account for ISRs. The savings assumed all bulbs purchased would eventually be installed by the purchasers, while the evaluation found that 94.2% would be installed within 4 years of purchase (taking the net present value into account based on a confidential discount rate provided by KCP&L).
- Navigant also assumed a lower HOU, adjusting the value from 938 hours to 840 hours based on the Illinois TRM Version 5.
- Navigant assumed a lower CF, adjusting the value from 0.095 to 0.08 based on the Illinois TRM Version 5.

Based on the results of the MEEIA Cycle 1 evaluation, Navigant also adjusted energy and demand savings to account for the 4% of LEDs obtained through the HLR program that were installed in C&I settings (i.e., cross-sector sales). The energy savings resulting from installations of HLR LEDs into C&I spaces captured additional savings due to higher HOU (3,306 vs. 840 hours). C&I installations also drove the higher than expected demand savings due to the substantial HOU and a larger CF for C&I (0.6) as compared to residential (0.08).

Table 10-2. HLR Program PY2016 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)	12,708,827	11,128,338	88%	25,288,145	9,327,485	37%
Coinc Demand at Customer Meter (kW)	1,273	1,296	102%	2,558	1,086	42%

Source: Program Tracking Database and Navigant Analysis

10.2.1.1 Net-to-Gross Analysis

Navigant turned to demand elasticity modeling (DEM) to calculate net of free riders, a proxy for NTG in this PY2016 report. 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. Navigant ran this model with actual program incentives and then again assuming KCP&L (inclusive of both the GMO and KCP&L-MO operations) did not offer incentives, Thus, the model predicts sales in the presence and absence of program incentives. The FR rate is defined as follows:

Equation 10-1. Freeridership

$$\text{Free riders} = \frac{\text{Modeled Sales without Incentives}}{\text{Modeled Sales}}$$

The proxy for the NTG ratio in this PY2016 report is as follows:

Equation 10-2. Net of Free Riders

$$\text{Net of free riders} = (1 - \text{Free riders}) = \left(1 - \frac{\text{Modeled Sales without Incentives}}{\text{Modeled Sales}}\right)$$

As shown in Table 10-3, the DEM model yielded a NTG ratio of 85.8% (FR = 14.2%) for standard (A-line) LEDs and 76.2% (FR = 23.8%) for specialty LEDs (most commonly reflectors, globes, and candelabras). The sales-weighted overall program NTG is 84% (FR = 16%). The net energy savings totaled 9,492 MWh, or 38% of the 3-year MEEIA Cycle 2 target. The net demand savings totaled 1,086 kW, or 42%% 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 M and the accompanying databook contain additional details on the methodology and results.

Table 10-3. HLR NTG Components and Ratio: PY2016

Stratum	FR	PSO	NPSO	Net of FR
Standard LEDs	0.14	N/A	N/A	86%
Specialty LEDs	0.24	N/A	N/A	76%
Total	**0.16**	**N/A**	**N/A**	**84%**

Source: Evaluation team analysis

10.2.2 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 as well as the sources for the benefit and cost input assumptions.

Table 10-4 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program exceeds 1.0 in the TRC, SCT, UCT, and PCT tests. Navigant's analysis also resulted in a slightly higher TRC ratio than that filed by KCP&L-MO due to the inclusion of cross-sector sales.

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. Upon analysis, the HLR sales data was divided as total participation in each sector where 95.5% of lighting sales remained in the residential sector and 4.5% of the lighting sales went to the commercial sector. To calculate the benefit-cost analysis uniquely for each sector, the total HLR program administrative costs were divided proportionally based on participation between these two sectors, using the respective participation percentages. This way, Navigant calculated a benefit-cost ratio for each of the HLR program's sectors. Note that the benefit-cost ratio of those sales going to the commercial sector is much higher than the benefit-cost ratio of those sales in the residential sector. This is caused by higher HOU values in the commercial sector than in the residential sector. Commercial sector lights are used far more frequently and can, therefore, accrue higher savings, which results in higher benefits in the commercial sector than in the residential sector. This result collectively boosted the HLR program's benefit-cost ratio.

Table 10-4. HLR Benefit-Cost Ratios: PY2016

Program Year	TRC Test[46]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	1.45	1.73	2.02	2.14	4.39	0.52
2016 Residential		1.42	1.66	1.76	4.03	0.46
2016 Commercial		8.18	9.55	10.12	11.88	1.00
Program Overall	**1.45**	**1.73**	**2.02**	**2.14**	**4.39**	**0.52**

Source: Navigant analysis

10.2.3 Process

The HLR program's process evaluation focused on understanding program design and revisions, marketing and outreach, and interactions among GMO, the IC (ICF), and partnering manufacturers and retailers. The upstream nature of 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, GMO customer lighting surveys and onsite saturation visits—which included both program and non-program respondents—addressed customer awareness and preferences for efficient lighting, exposure to program marketing and outreach, and lighting purchase, use, and storage behavior.

Navigant addressed five process evaluation research questions and the five MO-required questions[47] for process evaluation through program and implementation staff interviews, a program materials review, supplier (i.e., manufacturer and high level buyer) interviews, onsite saturation visits, and consumer surveys. Table 10-5 provides a summary of the research questions and activities.

Table 10-5. 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?	• Supplier interviews
2. What changes have been made to the program in PY2016, and what changes are planned for PY2017?	• Program and implementation staff interviews
3. How satisfied are manufacturers and high level buyers with the program overall?	• Supplier interviews
4. How influential are non-ENERGY STAR LEDs in the market and for the program?	• Program and implementation staff interviews • Supplier interviews • Consumer surveys • Onsite saturation surveys
5. What types of training do manufacturers and retailers provide to retail sales staff?	• Supplier interviews

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

[47] 4 CFR- 240-22.070(8)

Process Evaluation Research Question	Evaluation Activity
Missouri-Required Questions for Process Evaluation	
1. What are the primary market imperfections that are common to the target market segment?	• Program and implementation staff interviews • Materials review • Consumer surveys
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program and implementation staff interviews • Materials review • Consumer surveys • Onsite saturation visits
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 and implementation staff interviews • Materials review • Supplier interviews
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program and implementation staff interviews • Materials review
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program and implementation staff interviews • Materials review • Supplier interviews • Consumer surveys • Onsite saturation surveys

Source: Navigant analysis

The team's findings are provided below. Recommendations for consideration in relation to these findings are provided in Section 10.3.

10.2.3.1 General Process Evaluation Questions

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

FINDING 1: Table 10-6 summarizes the recommendations from the previous evaluation and progress toward implementing those recommendations.

Table 10-6. HLR Progress on Past Recommendations

Past Recommendation	Progress Toward Implementation
1. GMO should continue to selectively add new retailers to its network of HLR program retailers to provide diverse retailers suited to all customer segments.	In PY2016, GMO and ICF added retailers (e.g., dollar and bargain stores) and retail locations with the goal of reaching more customer segments. In PY2017, they will expand to grocery stores, drugstores, and online sales.
2. The IC could improve performance by ensuring that its program manager has access to all relevant information to share with GMO and that information is not bottlenecked at higher levels in the organization	GMO selected a new IC (ICF) in PY2016. GMO and ICF communicate regularly, and ICF delivers weekly sales and other reports to GMO. Both parties feel relevant information is shared in a timely fashion.

QUESTION 2: What changes have been made to the program in PY2016, and what changes are planned for PY2017?

FINDING 2: The program design continues to evolve to reflect changes in the residential lighting market and to expand the venues through which consumers can purchase discounted LEDs.

- In 2016, the program discontinued support for CFLs and only supported LEDs. It also expanded the retailers included in the program and the retail locations at which they sell program LEDs.
- In 2017, the program will expand to include drugstores and grocery stores as well as offer online sales through multiple retailers.

QUESTION 3: How satisfied are manufacturer and high level buyers with the program overall?

FINDING 3: Supplier survey responses indicated a high satisfaction level among manufacturers and buyers.

- The team asked eight partnering suppliers to rate their level of satisfaction with the program on a scale of 0 to 10, where 0 is very dissatisfied and 10 is very satisfied. They rated their satisfaction as 7.8, with the six manufacturers giving a rating of 7.6 and the two retailers giving a rating of 8.5, on average.
- While suppliers infrequently provided low ratings, those that did attributed their dissatisfaction to their perception that HLR incentives are slightly lower than other comparable programs. Navigant cautions that it does not have access to publicly available comparative data to assess this claim, although participation in the Consortium for Residential Energy Efficiency Data (CREED) would provide data on incentive levels in many other program areas. Suppliers generally argue for higher incentives in the interviews the evaluation team has conducted for program administrators across the nation, as higher incentives benefit the suppliers. In short, the team reports this finding, but it does not conclude that this perception of a subset of suppliers justifies reduced incentive levels.
- When asked for suggestions for program improvements, suppliers most often suggested adding budget, increasing incentive levels, and offering more flexibility in terms of the timing of incentives and the products those incentives go toward.

QUESTION 4: How influential are non-ENERGY STAR LEDs in the market and for the program?

FINDING 4: Suppliers, program staff, and implementation staffs believe that non-ENERGY STAR LEDs are a strong influence on the market and voice concern that consumers will turn away from all LEDs if they have a bad experience with an inferior non-ENERGY STAR model.

- None of the suppliers, program staff, or implementation staff survey respondents feel the HLR program should support non-ENERGY STAR LEDs. Instead, they feel the HLR program should continue to provide incentives on ENERGY STAR models so that these bulbs are offered at prices competitive to non-ENERGY STAR models.
- Suppliers, program staff, and implementation staff also believe that non-ENERGY STAR LEDs are less bright, are inconsistent in their color (i.e., measured in kelvins as cool or warm light), and do not last as long as manufacturers claim.
- At present, consumers' experiences with LEDs are positive: most onsite survey respondents who had used LEDs (86%) confirmed that they would purchase them again, and consumer survey

respondents who had used them most often preferred LEDs over halogens (56%) and CFLs (58%). In fact, consumer survey respondents who purchased bulbs in the past 6 months purchased more LEDs (10.6) than CFLs (6.0) or halogens (4.6), on average. However, consumers cannot distinguish between ENERGY STAR and non-ENERGY STAR models.

- Suppliers, program staff, and implementation staff are concerned that consumers will purchase a poorly performing non-ENERGY STAR LED for its low price, but then generalize that all LED products—including the superior and quality tested ENERGY STAR LEDs supported by the program—are of poor quality. They worried that consumers could backslide to halogen or incandescent bulbs that remain on store shelves or stockpiled in consumer homes; in fact, one-half of the bulbs (51%) stored in onsite homes are incandescent bulbs.

QUESTION 5: What types of training do manufacturers and retailers provide?

FINDING 5: Manufacturer and retail contacts generally indicated that they rely on ICF for training their staff.

- One manufacturer noted that they tend to hire experienced staff that do not require training on different lighting technologies or program design.

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: 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 HLR program reduced the shelf price of standard LEDs by an average of $2.26 to $1.67 and of specialty LEDs by an average of $3.43 to $3.95.
- Currently, LEDs are installed in 16% of sockets and 76% of homes that participated in the onsite study, showing opportunities to increase LED saturation and penetration in the market.
- The HLR program supported LEDs in home improvement, hardware, mass merchandise, specialty lighting shops, and bargain stores in PY2016 and will expand to drugstores and grocery stores as well as online sales in PY2017.
- The HLR program marketed in mass media and through large-scale promotional events (e.g., at a Kansas City Royals game) as well as at the point of sale through educational signage that explained the benefits of LEDs and small in-store promotional events.
- Suppliers, program staff, and implementation staff are concerned that consumers will purchase poorly performing non-ENERGY STAR LEDs for their low prices, and then generalize that all LED products are of poor quality and backslide to halogen or incandescent bulbs that remain on store shelves.

- Of the 660 (out of 933)[48] LEDs found installed during onsite visits for which the evaluation team could determine ENERGY STAR status, 51% were ENERGY STAR-qualified by either Specification 1.2 or Specification 2.0, while 49% did not qualify.[49] This confirms the concerns raised by suppliers, program staff, and implementation staff that consumers may buy non-qualified models if prices of qualified models are not competitive. Still, the proportion of ENERGY STAR models is higher than that found recently for New York (which no longer supports LEDs)—63% of LEDs installed in homes were non-ENERGY STAR models. This suggests that the GMO HLR program has successfully moved consumers toward ENERGY STAR models compared to consumers in areas lacking programs.[50]
- Consumers' experiences with LEDs are positive, and they are buying them in larger quantities than they are other bulb types.
- While 88% of all consumer survey respondents were very or somewhat familiar with CFLs, slightly less than three-quarters (74%) were very or somewhat familiar with LEDs. While most consumers know what an LED bulb is, roughly one-quarter of consumers have limited to no awareness of LEDs.
- On the topic of awareness, consumer survey respondents also indicated that, after considering price, they most commonly sought information about wattage or wattage equivalence (78%) when deciding what type of lighting to purchase.

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, although the evaluation results suggest 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). The evaluation found that HTR shoppers are less familiar with LEDs and less likely to report buying LEDs in the past 6 months.

- Based on consumer survey responses, it appears that HTR customers have less familiarity and experience with energy efficient lighting, especially LEDs. For example:
    - Income-eligible and renter respondents were less likely than their counterparts (non-income-eligible and homeowner) respondents to be somewhat or very familiar with LEDs.
    - Less than one-third of frequent bargain store shoppers reported purchasing LEDs in the past 6 months, while nearly one-half of non/infrequent bargain stores shoppers (48%) reported doing so.

[48] The lack of model numbers precluded determining ENERGY STAR status for the other installed LEDs. Model numbers are not always listed on bulbs, and technicians are sometimes unable to remove bulbs to check model numbers.

[49] Navigant verified ENERGY STAR status by examining qualification lists from November 2015, September 2016, March 2017, and May 2017. Navigant team member NMR periodically downloads and saves ENERGY STAR-qualified lighting lists because ENERGY STAR tracks only currently qualified models—not previously qualified models. Thus, while Navigant believes it found most qualified models, the possibility remains that the team missed a few models not covered by its lists.

[50] NMR Group, Inc. *Lighting Market Assessment Consumer Survey and On-site Saturation Report*. Available at http://ma-eeac.org/wordpress/wp-content/uploads/Lighting-Market-Assessment-Consumer-Survey-and-On-Site-Saturation-Study.pdf.

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 appropriately supports LED bulbs only, having dropped CFLs in PY2016 in keeping with market trends and conditions. The evaluation results suggest that adding LED downlights, retrofit kits, and integrated fixtures could diversify the end uses for this technology.

- While interviewees believed that the program should continue supporting LED bulbs, suppliers suggested adding LED downlight and retrofit kits and integrated LED fixtures.

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

FINDING 4: KCP&L and the IC market the program widely through mass media (including the Internet) and within retail stores, but there is room for improvement.

- KCP&L marketing aligned with the portfolio-level "We're great at energy efficiency" campaign, but the marketing material reviewers observed that materials did not consistently reference ENERGY STAR lighting.
- There are opportunities to improve marketing targeted at HTR populations. With the exception of one retailer, point of purchase materials had Spanish translations only in fine print as opposed to being in full-sized font. Additionally, during the consumer survey, only two of the 14 frequent bargain store respondents reported seeing any marketing or displays; on the other hand, one-half of other shoppers reported seeing marketing or displays.

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 program has made a great deal of progress on addressing the primary imperfections of price, availability, and customer knowledge of efficient lighting. However, consumers continue to purchase light bulbs based on price and wattage, and in-home use suggests they buy ENERGY STAR and non-ENERGY STAR bulbs in nearly equal proportions. One-quarter of respondents remain unfamiliar with LEDs.

- See prior bullets in Findings 1-4 for evidence.

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 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 10.3.1)
- Recommendations from the process evaluation (Section 10.3.2)

Overall, the HLR program functions smoothly, its marketing materials are adequate, and the evaluation team encourages the program to continue supporting ENERGY STAR LEDs. Navigant provides suggestions for consideration to encourage participation and increase market penetration and saturation.

10.3.1 Impact

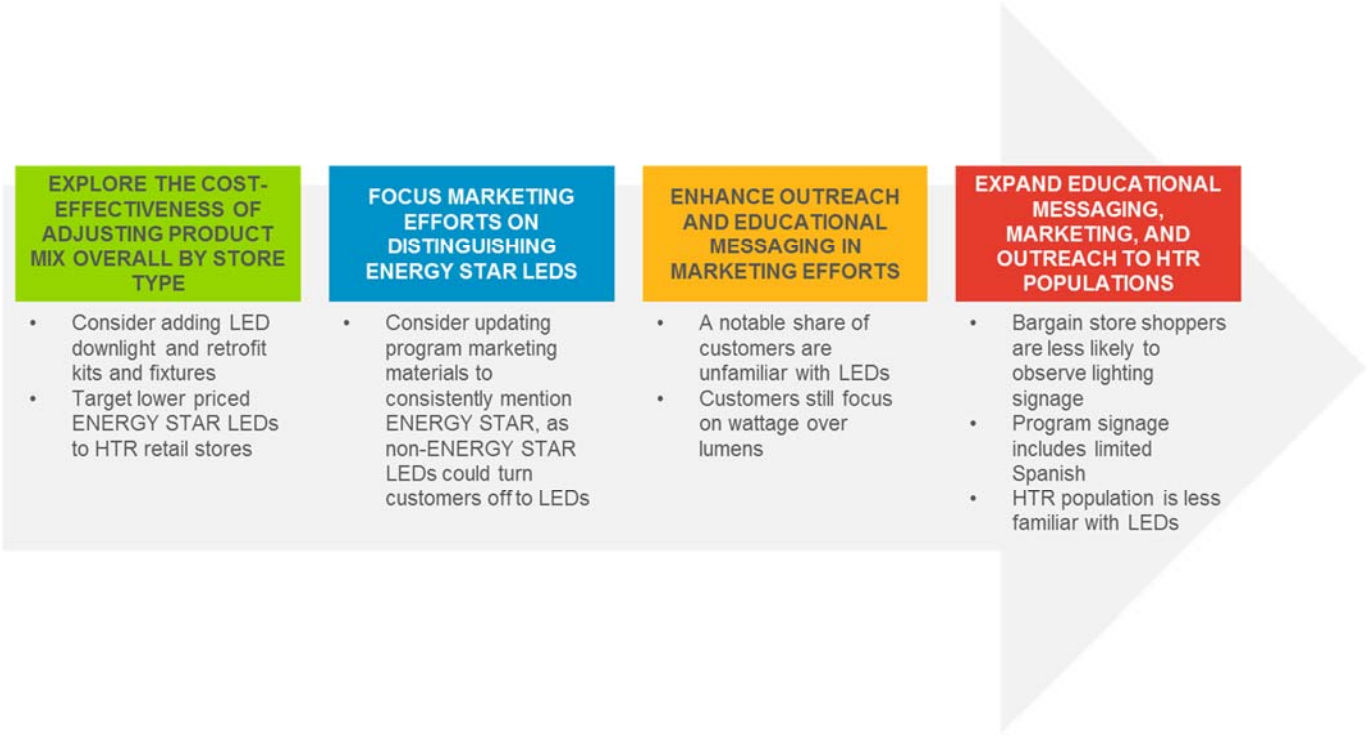
Navigant suggests revising energy and demand savings calculations to reflect the following:

- Account for leakage, assumed to be 12% of HLR LED bulb sales (GMO currently makes no adjustment for leakage)
- Assume a lifetime ISR of 94.2% for all HLR LED bulb sales (GMO currently makes no adjustment for ISR)
- Reduce annual HOU from 938 hours to 840 hours for HLR LED bulb sales installed in residential settings
- Reduce peak CF from 0.095 to 0.08 for HLR LEDs bulb sales installed in residential settings
- Account for 4% C&I cross-sector sales contribution of HLR LED bulb sales by applying HOU and CF values of 3,306 and 0.6, respectively
- Estimate net savings separately for standard and specialty LEDs rather than using a program-wide NTG ratio, as the mix of standard and specialty LEDs could vary from year to year
- Assume a NTG ratio of 85.8% for standard LEDs and 76.2% for specialty LEDs

10.3.2 Process

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, Navigant developed recommendations to enhance the success of the program.

Figure 10-1. HLR Program Process Recommendations: PY2016



Source: Navigant analysis

10.3.2.1 Recommendations Based on the Research Questions

The process evaluation found that the HLR program enjoys a high level of supplier (i.e., partnering manufacturer and retailer) satisfaction. The 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 10-7 summarizes recommendations based on the five additional process questions Navigant explored in this evaluation.

Table 10-7. 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?	The program has implemented both key process recommendations from MEEIA Cycle 1, expanding the retail channels in which the HLR supports LEDs and improving communications with the newly selected IC. In PY2017, GMO could consider monitoring the effects of expanding program offerings in grocery stores, drugstores, and online and continue regular and open communications with the IC; it may also want to assess the effects of promotional events on sales and consumer education.
2. What changes have been made to the program in PY2016 and what changes are planned for PY2017?	Monitor the cost-effectiveness of the newly added component incorporating drugstore, grocery store, and online retailers.
3. How satisfied are manufacturer and high-level buyers with the program overall?	While satisfaction is high, the program might benchmark its incentive levels to comparable programs in other jurisdictions and/or explore the cost-effectiveness of increasing incentive levels.
4. How influential are non-ENERGY STAR LEDs in the market and for the program?	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.
5. Why types of training do manufacturers and retailers provide?	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.

Source: Navigant analysis

10.3.2.2 Recommendations Based on Missouri's Requirements for Process Evaluation

Navigant's investigation into MO's five required process evaluation questions[51] for the HLR program suggests that GMO successfully reduces the upfront cost of general service and mid-range wattage LEDs (i.e., 60W and 75W) to prices that compare with less efficient or non-ENERGY STAR LEDs. Marketing materials also explain the benefits of using LEDs over less efficient products. However, Navigant suggests some improvements regarding product mix and focus and the targeting of marketing and outreach materials.

[51] 4 CFR- 240-22.070(8)

Table 10-8. HLR Program Missouri Requirement-Based Recommendations

Missouri Question	Navigant Recommendation
1. What are the primary market imperfections that are common to the target market?	The program may wish to focus efforts on the particularly higher cost specialty and high lumen lamps to reduce upfront cost and, therefore, increase market penetration and saturation. Future marketing and educational materials could highlight the benefits and quality of ENERGY STAR models versus non-ENERGY STAR models. The program may also find it beneficial to enhance its educational efforts on how to select bulbs based on lumens versus wattage.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	As described in Recommendation 5 below, Navigant suggests that the program consider sharpening its educational and marketing efforts geared toward HTR customers. Continue to partner with bargain stores, and, if possible, offer less expensive ENERGY STAR LEDs that exceed the life and light quality of CFLs at bargain stores.
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	If possible, work with the IC to determine if adding LED downlight and retrofit kits and integrated fixtures to the program would further program goals to achieve savings and increase adoption.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	The team emphasizes that promotional efforts carry a consistent portfolio theme. The program could possibly shift to a system of consistently referencing and highlighting ENERGY STAR and using the ENERGY STAR logo whenever possible to differentiate from non-ENERGY STAR models.
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?	Consider posting Spanish language marketing in communities with larger concentrations of Spanish-speaking residents. Possibly take steps to ensure improved visibility of marketing in bargain stores to increase participation among HTR populations.

Source: Navigant analysis

11. HOME ENERGY REPORTS

11.1 Program Description

Through the Home Energy Reports (HER) program, 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:[52]

- 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.

Customers received reports in April, June, September, and December 2016 as well as in January 2017. Customers with email addresses on file (about 8% of customers) also received monthly email reports. These reports contained less information than the mailed report, focusing on the similar homes comparison and three energy-saving tips. These emails were sent monthly on an opt-out basis.

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. This evaluation included three waves: 1) KCP&L GMO 2013, 2) KCP&L GMO 2015, and 3) KCP&L GMO 2016 Expansion.

Table 11-1. 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.

[52] The HER format changed during PY2016. The description provided is for the updated format.

HER Key Details	
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 HER program, though participants may choose to participate in other EE programs as a result of the reports.[53]
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

11.2 Evaluation Findings

To verify program impacts, the evaluation team conducted a billing analysis for PY2016 for each program wave of customers. The billing analysis compares the pre-program period to program period change in monthly energy use for the treatment group to the pre-period to program period change in energy use for the control group. Because the home energy reports encourage participation in other EE programs, the team also compared participation in KCP&L's other EE programs between the treatment and control group to adjust impact estimates for possible double-counted savings between the HER program and other KCP&L EE programs.

The billing analysis cannot directly measure coincident demand impacts because it is based on monthly data. Monthly data does not have the granularity needed to derive demand impacts. Demand impacts can only be estimated for hourly or more granular usage data. To obtain estimates of coincident demand impacts, Navigant multiplied the verified energy savings the team obtained from its regression analyses by the ratio of KCP&L GMO's reported PY2016 coincident demand savings to reported PY2016 energy savings.

A key feature of the RCT design is that the analysis inherently yields energy savings estimates that are net of FR and participant SO 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 guarantees that the treatment and control customers will have identical propensities to undertake energy-conserving behaviors and purchases in the absence of the program. Thus, the evaluation team applied a NTG ratio of 1.0.

The following sections present Navigant's PY2016 findings for the HER program. Additional detail on Navigant's approach and findings are available in the accompanying appendices and databook files. Navigant divided the evaluation findings into the following:

1. Impact evaluation (Section 11.2.1)
2. Cost-effectiveness assessment (Section 11.2.2)
3. Process evaluation (Section 11.2.3)

[53] To avoid double counting, Navigant deducts energy savings attributable to uplift in participation in these other programs from HER program savings.

11.2.1 Impact

The HER program achieved 16,307,486 kWh of verified gross and net incremental energy savings at the customer meter in PY 2016 for a realization rate of 99%. This represents the combined savings from the three waves of customers. The program achieved 77% of the three-year Cycle 2 MEEIA target .

The program achieved 2,232 kW of verified gross and net coincident demand savings at the customer meter in PY 2016 for a realization rate of 99%. This represents the combined coincident saving from all three waves of customers. The program achieved 53% of the three-year Cycle 2 MEEIA target.

The lower-than-targeted savings of the HER program was likely driven by low savings in the KCP&L GMO 2016 Expansion wave. On average, households in that wave saved 0.33% compared to 1.29% for KCP&L GMO 2015 wave and 1.65% for the KCP&L GMO 2013 wave. Typically, new waves do start with lower savings and then ramp up in subsequent years, though the first-year savings for the 2016 Expansion wave were lower than the verified savings (0.80%) for the 2015 wave in its first year. In addition, households in the 2016 Expansion wave 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.

Table 11-2. HER Program PY2016 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)	16,454,000	16,307,486	99%	21,070,772	16,307,486	77%
Coinc Demand at Customer Meter (kW)	2,252	2,232	99%	4,215	2,232	53%

Source: Navigant analysis

11.2.1.1 Net-to-Gross

As shown in Table 11-3, for PY2016, Navigant assumed a NTG value of 1.0 for the HER program.

Table 11-3. HER NTG Components and Ratio: PY2016

Program Year	FR	PSO	NPSO	NTG Ratio
	Billing analysis is inherently net.			100%

Source: Navigant analysis

11.2.2 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 as well as the sources for the benefit and cost input assumptions.

Table 11-4 presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, the program does not reach 1.0 in the TRC, SCT, UCT, or RIM tests. The PCT benefit-cost ratio is INF, indicating that 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 due to a realization rate of 99%.

Table 11-4. HER Benefit-Cost Ratios: PY2016

Program Year	TRC Test[54]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	0.79	0.71	0.71	0.71	INF*	0.32
Program Overall	**0.79**	**0.71**	**0.71**	**0.71**	**INF***	**0.32**

Source: Navigant analysis

11.2.3 Process

Navigant addressed four process evaluation research questions and the five MO-required questions for process evaluation through staff interviews, a program materials review, and analysis of the program IC's Customer Engagement Tracker (CET) survey.

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

Table 11-5. HER Process Evaluation Questions and Activities

Process Evaluation Research Question	Evaluation Activity
General Process Evaluation Questions	
1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?	• Program staff interviews • Materials review
2. What changes have been made to the program in PY2016, and what changes are planned for PY2017?	• Program staff interviews • Materials review
3. How are customers engaging with the program through the reports and energy-saving actions?	• CET survey
4. How satisfied are customers with the reports? Do reports impact their satisfaction with 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 • Materials review
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Materials review
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review • CET survey

Source: Evaluation team analysis

The team's findings are provided below. Recommendations for consideration in relation to these findings are in Section 11.3.

11.2.3.1 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: Table 11-6 summarizes the recommendations from the previous evaluation and progress toward implementing those recommendations.

Table 11-6. HER Progress on Past Recommendations

Past Recommendation	Progress Toward Implementation
1. GMO should continue to expand the program to more customer segments.	The program added an additional wave of almost 80,000 customers.
2. GMO should use the home energy reports for additional cross promotion of GMO programs.	In 2016, the HER program promoted other KCP&L EE programs through the HER marketing modules and campaigns.
3. GMO should continue to emphasize the energy savings benefits of behavioral measures.	Energy-saving tips on the PY2016 reports included a mix of behavioral-based and equipment-based measures.
4. GMO should consider more prominent messaging on the report around the information available on the Energy Audit web portal.	The program implemented a special campaign through the reports ("Know-it, Show-it") to encourage HER recipients to complete the "What Uses Most" section of the Energy Audit web portal.

Source: Navigant analysis

QUESTION 2: What changes have been made to the program in PY2016, and what changes are planned for PY2017?

FINDING 2: The program upgraded its format and will launch a new wave of customers.

- In 2016, the program upgraded to Oracle's HER 2.0 report format, which features updated presentment of data and tips.
- In 2017, the program will launch a new wave of about 26,000 treatment customers and 12,000 control customers; this will max out available customers in the KCP&LGMO territory.

QUESTION 3: How are customers engaging with the program through the reports and energy-saving actions?

FINDING 3: Most customers read the report and nearly one-quarter report taking an energy-saving action.

- 94% of KCP&L GMO customers responding to the CET who recall receiving the home energy report state that they read some or all of the report or glance at the pictures and 61% report talking to others within or outside their household about the report.
- 23% of KCP&L GMO customers responding to the CET who recall receiving the home energy report state that they took an action after reading the report. The most common actions were adjusting lighting habits and adjusting or replacing thermostats.

QUESTION 4: How satisfied are customers with the reports? Do reports impact their satisfaction with KCP&L?

FINDING 4: Among KCP&L GMO customers responding to the CET survey who have looked at the reports, 79% agree or strongly agree that they like the reports.

- Treatment customers are equally likely as control customers to agree or strongly agree to statements that KCP&L helps customers to manage their energy use and save money, with more than half of both groups expressing agreement.

11.2.3.2 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 PY2016 program targeted over 132,000 customers to receive five home energy reports. An additional 40,000 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. While more customers cite the similar homes comparison as a feature they like about the home energy reports, a small number of customers question the accuracy of the similar homes comparison.

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.

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: Home energy reports 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- and no-cost actions as well as suggestions to buy efficient equipment and appliances.
- The tips cover the main residential electricity end uses: lighting, HVAC, electronics, water heating, appliances, and pools.

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 five paper reports in PY2016.
- Customers with email addresses on file 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.

- 29% of CET respondents either did not recall receiving the report or did not read the report.
- However, 94% of CET respondents who recall receiving a home energy report state that they read or looked at the report.
- Of respondents who recall the reports, 79% like the reports and 61% talk to other people about the reports.

11.3 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 11.3.1)
- Recommendations from the process evaluation (Section 11.3.2)

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.

11.3.1 Impact

The tracking data and savings calculations provided by Oracle are appropriate for billing analysis of an RCT. Navigant recommends continuing to use Oracle reported savings for tracking purposes.

11.3.2 Process

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

Figure 11-1. HER Program Process Recommendations: PY2016

Source: Navigant analysis

11.3.2.1 Recommendations Based on the Research Questions

In addition to the five Missouri questions, the team also examined a few research questions. Based on its research-question based findings, the team suggests two recommendations to further understand customer satisfaction and engagement.

Table 11-7. HER Research Question-Based Recommendations

Research Question	Navigant Recommendation
1. GMO should continue to expand the program to more customer segments.	The program added an additional wave of almost 80,000 customers. No further recommendation needed.
2. GMO should use the home energy reports for additional cross promotion of GMO programs.	In 2016, the HER program promoted other KCP&L EE programs through the HER marketing modules and campaigns. No further recommendation needed.
3. How are customers engaging with the program through the reports and energy-saving actions?	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 Opower to understand what changes customers are making in response to the reports and why some customers do not read the reports.
4. How satisfied are customers with the reports? Do reports impact their satisfaction with KCP&L?	KCP&L could consider including questions on the CET or conducting a separate survey to understand customer satisfaction with the different parts of the home energy report.

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 MO regulations[55] 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.

[55] 4 CFR- 240-22.070(8)

Table 11-8. HER Missouri Requirement-Based Recommendations

Missouri Question	Navigant Recommendation
1. What are the primary market imperfections that are common to the target market?	Continue messaging on the reports to help customers understand the similar homes comparison and how to use the report.
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. For example, new thermostat, lighting, or connected home technologies may be relevant future tips.
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 Opower which may or may not be feasible given the program resources.
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 increase engagement among customers not reading the reports, the program could consider special messaging or promotions to encourage customers to read every report. Content could be suggested via leveraging the upcoming CET or other surveys to ask report recipients about meaningful content to gain insights into what components of the report are meaningful and engaging for customers. Future CET surveys or other surveys should include the 2016 expansion wave to better understand lower savings in that wave.

Source: Navigant analysis

12. HOME ONLINE ENERGY AUDIT AND BUSINESS ONLINE ENERGY AUDIT

12.1 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 KCP&L territories can access the full functionality of the tools through KCP&L's My Account web page. 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 12-1. Online Energy Audit Program Description

Online Energy Audit Key Details	
Sector	Residential and commercial
Implementation Contractor	Oracle implements the program.
Program Description	The HOEA and 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 KCP&L call center handles disputes.
Project Reporting	Oracle provides more frequent program tracking reports.

Source: Evaluation team analysis

12.2 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 investigated the impact of HOEA on

participation in other EE programs. Specifically, how the tools encourage or channel customers to participate in other EE programs.

To answer the question, the evaluation team first defined participation in HOEA as customers who completed the WUM online audit questionnaire. The team chose this activity to signify participation because: 1) the program used banner ads on the KCP&L website and HER marketing modules to encourage customers to complete WUM during PY2016; and 2) completing WUM shows a deeper level of engagement than just logging on to view energy use. HOEA is not designed as a RCT, so the team developed a comparison group of customers to compare participation in EE programs post-WUM completion to a group of similar customers who have not completed WUM. The team defined similar customers as customers who had logged into My Account but had not completed WUM. By selecting customers who had logged into My Account the team selected customers who are like customers who have completed WUM in that both groups use online tools and engage with KCP&L online. The evaluation team uses these observable characteristics as proxies for any characteristics associated with having Internet access and engaging online that may also correlate with likelihood to participate in EE programs. Finally, the team limited both groups to customers who enrolled in My Account or completed WUM between July 2015 and June 2016.

The evaluation team looked at rates of participation in EE programs (WHE equipment, WHE insulation and windows, thermostats, and kits) over the 12-month period after WUM completion or My Account enrollment. Because this is not an RCT, the evaluation team does not know for certain these customer groups are identical in their propensity to participate in EE programs; thus, the results are informational and suggestive of future areas for research.

12.2.1 Post-Enrollment Program Participation

Customers who completed WUM had higher rates of participation in other EE programs during the 12 months after completion than customers who only used My Account. After 12 months, the cumulative rate of customers participating in EE programs for customers who completed WUM was 5.9% compared to 1.8% of My Account customers. This represents a participation uplift of 4.1%, or 303 customers. Most (65%) of the uplift came from customers who installed thermostats, while 22% came from customers who received kits.

12.2.2 Pre-Enrollment Program Participation

Customers who completed WUM are more likely to have participated in an EE program in the prior 6 months than customers enrolling in My Account. In the post-enrollment program participation analysis, the evaluation team limited the analysis to customers with no prior EE program participation. Among customers enrolling in My Account between July 2015 and June 2016, 0.35% of customers participated in an EE program in the 6 months prior to enrollment, while 2.76% of customers completing WUM participated in an EE program in the 6 months prior to enrollment. This suggests that HOEA may be a natural next step for customers who have participated in an EE program and are looking for additional actions to take or guidance around their energy use.

Most WUM completers participated in an AC rebate program (60%) or thermostat program (22%) prior to completing WUM. Nearly all (89%) participated in only one EE program.

12.2.3 Other Energy-Saving Actions

Between July 2015 and October 2016, over 11,000 residential customers reviewed tip actions and marked at least one tip as “done,” “will do,” or “no thanks.” The 10 most popular tips (tips marked “done” or “will do”) are shown in **Table** 12-2. The most popular tips related to computer use and plug loads (tips 61, 59, 60, 62), staying cool in the summer (tips 92, 20, 18), appliances (tips 1, 77), and lighting (tip 52).

Table 12-2. Most Popular Residential Tips: July 2015-October 2016*

Most Popular Tips (Tip Number)	Marked Tip "Done"	Marked Tip "Will Do"
Computer power saving modes (61)	38%	11%
Turn off lights (52)	34%	7%
Set thermostat wisely summer (92)	24%	17%
Use power strips (59)	16%	19%
Unplug devices (60)	12%	15%
Keep out solar heat (20)	20%	4%
Buy ENERGY STAR (1)	19%	4%
Use a clothes dryer efficiently (77)	15%	7%
Improve window shading (18)	16%	6%
Turn off computer at night (62)	13%	5%

n = 11,301 customers who marked at least one tip.

*Text of tip is the internal shorthand tip description. Actual tips in context provide more description for the customer.

Source: Navigant analysis of KCP&L OEA and program tracking data

Fewer residential customers marked tips as “no thanks.” Table 12-3 shows the five tips most often marked “no thanks.” Notably three of the five top “no thanks” tips (tips 11, 59, 60, 92) are among the top 10 “done” or “will do” tips.

Table 12-3. Least Popular Residential Tips: July 2015-October 2016

Least Popular Tips (Tip Number)	Marked Tip "No Thanks"
Hang dry laundry (10)	13%
Recycle second refrigerator (11)	11%
Use power strips (59)	10%
Unplug devices (60)	7%
Set thermostat wisely summer (92)	6%

n =11,301 customers who marked at least one tip.

Source: Navigant analysis of KCP&L OEA and program tracking data

During the same period, 43 small business customers marked at least one tip as “done,” “will do,” or “no thanks.” The most popular tips (marked “done” or “will do” by 20 or more businesses) were install compact fluorescents (tip number 500), install efficient outdoor lamps (tip number 506), buy efficient office equipment (tip number 517), and turn off cooking equipment (tip number 547).

12.2.4 Cost-Effectiveness

The evaluation does not include cost-effectiveness testing because HOEA and BOEA do not claim savings for program activities.

12.2.5 Process

Navigant addressed four process evaluation research questions and the five MO-required questions for process evaluation through staff interviews, a program materials review, and analysis of the program IC's CET survey, which included questions about the HOEA tool.

Table 12-4. HOEA and BOEA Process Evaluation Questions and Activities

Process Evaluation Research Question	Evaluation Activity
General Process Evaluation Questions	
1. What is the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report?	• Program staff interviews • Materials review
2. What changes have been made to the program in PY2016, and what changes are planned for PY2017?	• Program staff interviews • Materials review
3. How are residential customers engaging with Energy Audit and energy-saving actions?	• CET survey
4. 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 • Materials review
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Materials review
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review • CET survey

Source: Navigant analysis

The team's findings are provided below. Recommendations for consideration in relation to these findings are in provided Section 12.3.

12.2.5.1 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: Table 12-5 summarizes the recommendations from the previous evaluation and progress toward implementing those recommendations.

Table 12-5. HOEA and BOEA Progress on Past Recommendations

Past Recommendation	Progress Toward Implementation
1. Complete development of a tool for small businesses and for medium and large businesses.	The BOEA was available to businesses without a demand charge throughout the PY. In December 2016, KCP&L launched a tool that can aggregate energy usage data for a building that has multiple meters/tenants to help large businesses meet local requirements for benchmarking.
2. Establish targets for audit completions and track against actual completions.	In 2016, the program manager set internal targets (10% of My Account users) for WUM completions and tracked completions against targets.
3. Track participation in other EE programs.	This current evaluation includes a deeper exploration of cross-program participation.
4. Estimate behavioral savings through a survey.	This effort is under consideration for research and pilot plans.
5. Conduct marketing campaigns to maintain customer engagement. Use similar campaigns for small businesses when the tool is ready.	The program used banner ads and messaging on home energy reports to engage customers. Messaging encouraged customers to complete the WUM survey. In 2017, the program will promote "Ways to Save" to encourage ongoing customer engagement. In addition, the program reaches out to small and medium businesses by cross-promoting through the SBL program and through business forums, educational events, and lunch and learns.

Source: Navigant analysis

QUESTION 2: What changes have been made to the program in PY2016, and what changes are planned for PY2017?

FINDING 2: In 2017, the program emphasis will shift from WUM to Ways to Save to help guide customers through the tools.

- In 2016, HOEA promoted WUM to encourage customers to start using the online tools.
- In 2017, the program will promote the Ways to Save portion of the portal.
- Oracle decommissioned the My Goal page in 2016 due to low page views.
- The colors and style sheets for the portal will be updated in April 2018.

QUESTION 3: How are residential and small business customers engaging with the Energy Audit tool and energy-saving actions?

FINDING 3: More than 27,000 customers in the combined KCP&L-MO and KCP&L-GMO territories completed the online What Uses Most audit. Across all KCP&L territory, 11% of My Account users completed WUM in calendar year 2016, exceeding the program manger's goal of 10%.

- Among respondents (all residential) to the Oracle CET, 64 out of 83 customers who have used the Energy Audit tool report that they have used it once or twice while 19 report using it at least monthly.
- 25 customers reported taking a specific action as a result of using Energy Audit. Respondents most often reported adjusting thermostats (10 out of 25) or turning off/unplugging appliances (8 out of 25).

QUESTION 4: How satisfied are residential customers with the Energy Audit? Does this tool impact their satisfaction with KCP&L?

FINDING 4: Most HER customers who have also used the Energy Audit tool report high levels of satisfaction with Energy Audit.

- More than 77% of customers included in the CET who have used the tool agree that the tool helps them understand and make better decisions about their energy use at home.
- Customers who have used Energy Audit are more likely than web users who have not used Energy Audit to agree or strongly agree that KCP&L helps them manage their energy use.
- Because the tool is optional and available to everyone, these results may be due to selection bias.

12.2.5.2 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 provides 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 2016, 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 are 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 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.

- In 2016, the program used banner ads on the KCP&L website and messaging on home energy reports to direct residential customers to the tools, particularly the WUM section. Completions of WWUM increased substantially in 2016 to over 27,000 completions from MO customers (combined territories).
- For small business customers, the program used the website homepage, cross-promotion with the SBL program, and business forums, lunch and learns, and educational settings.

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.
- A potential barrier for some customers could be 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. Notably, between August 2015 and September 2016, 990 small businesses logged onto BOEA, but only 43 small businesses flagged any tips as “done,” “will do,” or “no thanks.”

12.3 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 EE 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.

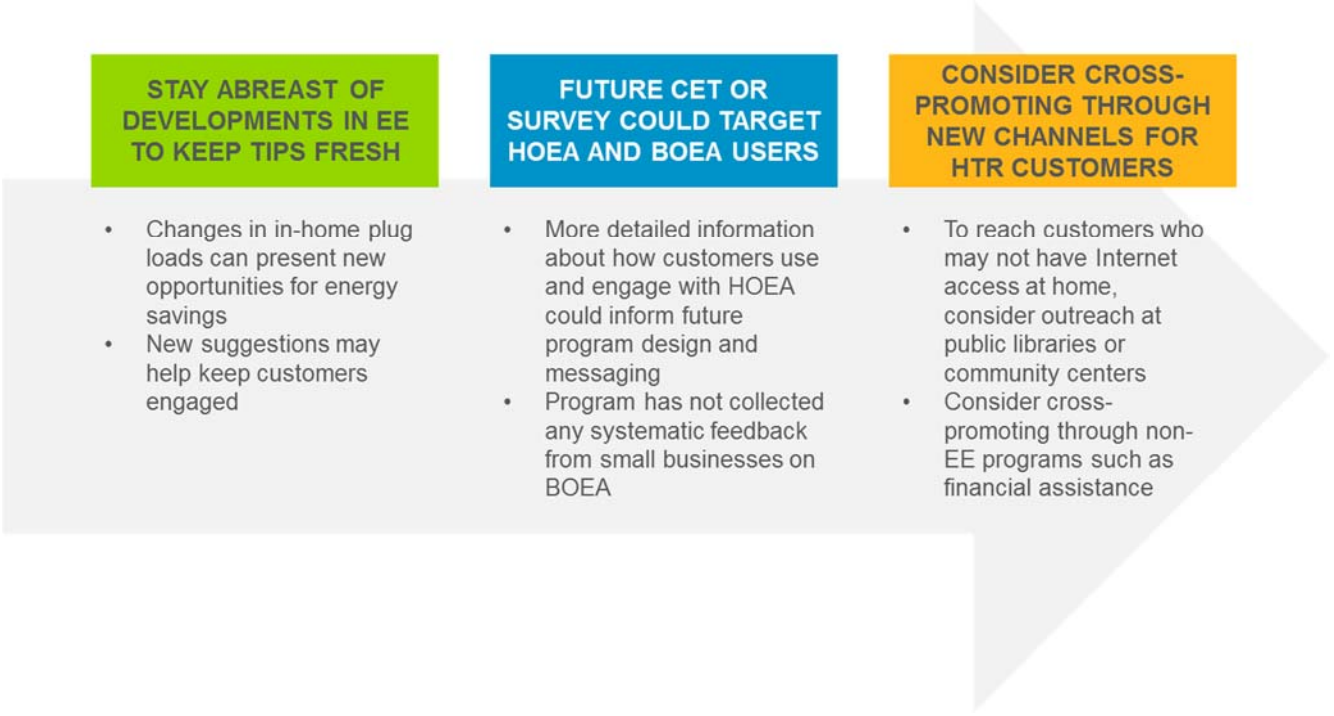
12.3.1 Impact

There are no savings associated with the Energy Audit program. The program tracks 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.

12.3.2 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 12-1. HOEA and BOEA Process Recommendations: PY2016



Source: Navigant analysis

12.3.2.1 Recommendations Based on the Research Questions

Based on its research-question based 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 primary data collection, the evaluation did team did not have any feedback from small and medium businesses on the BOEA.

Table 12-6. 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 could consider strategies or promotions to encourage customers to return to the tools more frequently.
2. How satisfied are residential customers with the HOEA? Does this tool impact their satisfaction with KCP&L?	KCP&L can consider surveys or interviews with residential and small and medium business customers to better understand how they are using the tools and what would make them more useful.

Source: Navigant analysis

12.3.2.2 Recommendations Based on Missouri's Requirements for Process Evaluation

Navigant addressed the five required process evaluation questions set forth in MO regulations[56] 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.

[56] 4 CFR- 240-22.070(8)

Table 12-7. 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?	Continue to monitor effectiveness of outreach to ensure residential and small business customers learn about the tools. KCP&L 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, the tips for small and medium businesses may want to emphasize LEDs over CFLs to be consistent with other program messaging.
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 EE programs such as the 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-EE 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. KCP&L could consider surveys or other data collection to learn from small businesses what works and what could be improved in the tools. KCP&L could consider strategies or promotions to encourage customers to return to the tools more frequently.

Source: Navigant analysis

13. RESIDENTIAL AND BUSINESS THERMOSTAT PROGRAMS

13.1 Program Description

The Residential and Business Programmable Thermostat (PT) programs incentivize customers to sign up to receive a Nest thermostat at no cost or a rebate on their previously owned Nest thermostat. By participating, customers allow KCP&L to remotely operate their HVAC system during peak demand periods by sending a signal to participating thermostats. Additionally, the thermostats help participants save energy throughout the year through optimizing algorithms.

There are three PT program customer types:

1. **Do It Yourself (DIY):** These participants are those 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 annual incentive each year that they remain in the program. DIY participants are the most common type of 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 annual incentive each year that they remain in the program.
3. **Bring Your Own Nest (BYON):** 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 annual incentive each year that they remain in the program.

As Nest thermostat owners, customers can elect to be part of either (or both) the Seasonal Savings program or the Rush Hour Rewards program.

Table 13-1. Programmable Thermostat Program Description

Programmable Thermostat Details	
Sector	Residential and C&I
Implementation Contractor	Nest is the thermostat vendor and hosts the online DIY portal. CLEAResult issues incentives and facilitates the DI and BYON 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 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.
Application Process	DIY: Customers enroll in the program through an online portal hosted by Nest. DI: Customers can call the contact center to enroll in the program. BYON: Customers can call the contact center to enroll in the program.

Programmable Thermostat Details	
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 Rust Hour Rewards program. Each thermostat that is installed as part of KCP&L's Rush Hour Rewards is also eligible to receive the Seasonal Savings program. Navigant used a data extract from Nest that identified activated thermostats as confirmation and verification of installation.
Rebate Process	CLEAResult issues thermostat incentives to customers. DIY customers receive a $50 incentive post installation, and BYON 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	When KCP&L calls DR events, thermostat-level information on energy use by participant is recorded by Nest and provided to KCP&L.

Source: Navigant interview of KCP&L product manager

13.2 Evaluation Findings

Navigant conducted a deemed savings approach for PY2016 by verifying and reviewing KCP&L's proposed deemed savings and applied the verified per unit savings to program tracking data, which provided participant's unit installation information. This data—provided by CLEAResult and Nest—identified Rush Hour Rewards and Seasonal Savings participation by unit.

Navigant found the proposed deemed savings numbers reasonable and aligned with industry-expected values. The deemed savings values originated from the following sources:

- **Demand savings deemed value:** Navigant's PY2014 evaluation where the evaluation team conducted a literature review on thermostat savings.[57]
- **Energy savings deemed value:** A methodology discussed with the product manager at KCP&L[58] and detailed in the Appendices programmable thermostat's methodology section.
- **Additional incremental deemed energy savings value:** A study provided by Nest[59] focused on the KCP&L territory's results from participants being Seasonal Savings participants.

Navigant used device activation date to verify that devices were activated for the Rush Hour Rewards program[60]. All thermostat customers (DI, DIY, BYON) are enrolled to be a part of the Rush Hour Rewards program starting in late 2016 but can also choose to participate in the Seasonal Savings program.

[57] GMO Evaluation, Measurement, and Verification Report, Program Year 2014, Section 13.2.3

[58] The evaluation team calculates the deemed energy savings using a weighted average of baseline gas/AC and heat pump usage determined by the 2012 Navigant Potential Study for KCP&L as well as savings assumptions of 10% for gas/AC and 13% for heat pumps derived from a Cadmus evaluation: Cadmus Group, *Evaluation of the 2013-2014 Programmable and Smart Thermostat Program*, prepared for Vectren Corporation, January 29, 2015, p.3.

[59] Memo provided by Nest: "Seasonal Savings Impacts: KCP&L Summer 2016," February 27, 2017.

[60] Activations as of the end of PY2016. Devices ordered but not activated during PY2016 are expected to be activated during PY2017 where upon savings can be recognized as PY2017 savings.

The method that Navigant used to calculate verified savings differs from the method KCP&L used to calculate reported savings. Navigant verified that a device had been installed by using activation date as a proxy for confirmation of installation. Thus, in most circumstances, Navigant multiplied the *number of activated devices* by the per unit deemed values for DR impacts and energy savings. KCP&L used the *number of ordered devices* multiplied by the per unit deemed values to achieve reported DR impacts and energy savings. This is the main source of discrepancy between reported and verified savings in this analysis.

Navigant conducted its analysis using data provided by both CLEAResult and Nest. CLEAResult served as the primary data source for device serial number and activation date. The evaluation team used the Nest data to fill in gaps found in activation date for DIY customers pre-December 2016.[61] Navigant also used Nest's data to identify Seasonal Savings customers.

The following sections present Navigant's PY2016 findings for the PT programs. 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 Residential PT program achieved nearly 1,896,858 kWh of energy savings at the customer meter in PY2016 for a realization rate of 87%. The program achieved 31% of the 3-year MEEIA target. The program achieved 4,478 kW of demand impact in PY2016 for a realization rate of 75%, meeting 27% of the 3-year MEEIA target.

The Business PT program achieved nearly 24,087 kWh of energy savings at the customer meter in PY2016 for a realization rate of 90%. The program achieved 30% of the 3-year MEEIA target. The program achieved 63 kW of demand impact in PY2016 for a realization rate of 86%, meeting 29% of the 3-year MEEIA target.

The realization rates for both programs were largely driven by the fact that KCP&L calculated reported savings using the number of devices that had been ordered as opposed to the number of devices that were activated for Rush Hour Rewards, which the Navigant team used as confirmation of installation.

[61] Starting in December 2016, when the online web portal was set up, DIY thermostats were sent to customers with pre-arranged activation in the Rush Hour Rewards program. Before this, customers had to activate Rush Hour Rewards on their own. Thus, customers may have installed some thermostats, but they may have failed to activate the device for Rush Hour Rewards. These thermostats were accounted for in the energy savings analysis using Nest data to confirm installation. The evaluation team did not include these thermostats in the demand impact analysis because their activation for Rush Hour Rewards could not be verified.

Table 13-2. Residential PT 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)	2,180,178	1,896,858	87%	6,144,138	1,896,858	31%
Coinc Demand at Customer Meter (kW)	5,961	4,478	75%	16,757	4,478	27%

Source: Navigant analysis

Table 13-3. Business PT 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)	26,796	24,087	90%	79,002	24,087	30%
Coinc Demand at Customer Meter (kW)	73	63	86%	215	63	29%

Source: Navigant analysis

13.2.1.1 Net-to-Gross

As shown in Table 13-4, results for the Residential and Business PT analysis are inherently net; thus, the evaluation team used a deemed 1.0 NTG ratio.

Table 13-4. PT NTG Components and Ratio: PY2016

Program Year	FR	PSO	NPSO	NTG Ratio
	PT analysis is inherently net.			100%

Source: Navigant analysis

13.2.2 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 as well as 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 the PY2016 Residential and Business PT programs, respectively, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, all cost tests exceed 1.0 for both programs except for the PCT test for the Business PT program which was just shy at 0.93. Navigant's Residential and Business PT analysis resulted in TRC ratios that are lower than that filed by KCP&L-MO due to realization rates below 100%. The Residential PT program has an energy realization rate of 87% and a coincident demand realization rate of 75%. The Business PT program has an energy realization rate of 90% and a coincident demand realization rate of 86%.

Table 13-5. Residential PT Benefit-Cost Ratios: PY2016

Program Year	TRC Test[62]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	1.95	1.54	1.79	1.83	1.29	1.29
Program Overall	**1.95**	**1.54**	**1.79**	**1.83**	**1.29**	**1.29**

Source: Navigant analysis

Table 13-6. Business PT Benefit-Cost Ratios: PY2016

Program Year	TRC Test[63]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	2.42	2.06	2.39	2.82	0.93	1.98
Program Overall	**2.42**	**2.06**	**2.39**	**2.82**	**0.93**	**1.98**

Source: Navigant analysis

13.2.3 Process

Overall, Navigant's process research found that the Residential and Business PT programs ramped up quickly in the first PY, surpassing their enrollment targets and reaching strong customer satisfaction in thermostat installations. Navigant addressed two process evaluation research questions and the five MO-required questions for process evaluation through staff interviews and a program materials review. A summary is provided in Table 13-7.

Table 13-7. 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 PY2015, and how have these changes affected program satisfaction, participation, savings, and costs?	• Program staff interviews

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

[63] 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
2. Are there additional changes to the program that would be useful in future years or are planned for PY2017?	• 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 • Materials review
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	• Program staff interviews • Materials review
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?	• Program staff interviews • Materials review
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	• Program staff interviews • Materials review
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review

Source: 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 PY2015, and how have these changes affected program satisfaction, participation, savings, and costs?

FINDING 1: KCP&L redesigned the program from PY2015 to PY2016. This included bringing in a new thermostat provider and IC to grow both energy and demand savings.

- Nest took over being the thermostat provider from Honeywell. KCP&L and Nest offered a range of installation and corresponding incentive options to customers (DIY, DI, and BYON). These options allowed customers to participate in whichever way they preferred.
- Monthly surveys from the call center indicate high satisfaction with experiences relating to the DI process and customer call center, which indicates that the processes for the revamped program are meeting customer expectations.

QUESTION 2: Are there additional changes to the program that would be useful in future years or are planned for PY2017?

FINDING 2: Navigant understands KCP&L is going to focus on improving installation rates for DIY scenarios through various reminders to customers to install their thermostat. It took up to 3 months for a small portion of the DIY installations to be completed, so there is room for improvement.

13.2.3.2 Missouri-Required Questions for Process Evaluation

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

FINDING 1: The primary market imperfection the PT programs address is that residential and small commercial customers have little incentive to reduce electricity usage during peak periods given the rate structures in place at most utilities. As a result, utilities use thermostat programs to obtain needed demand reductions using opt-in designs.

- KCP&L can call 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, enabling 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 is residential and small commercial customers. It is appropriately defined because large C&I customers have the Demand Response Incentive program.

- This program, which addresses both residential and C&I customers, and is well accepted by the market.
- Currently, the target market does not need to be further subdivided as it is meeting and exceeding program targets.

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 as it is the highest contributor to peak demand in the residential and small C&I sector.

- If the program does not meet participation goals, KCP&L could consider researching if including more thermostat options would reduce a possible barrier to participation.
- 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.

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

FINDING 4: Marketing has been successful, as KCP&L exceeded its initial PY target of 3,000 thermostats for the GMO territory for PY2016.

- CLEAResult handles marketing via email to customers that were previously in the thermostat program.
- In addition, the CLEAResult technicians cross-promote the Residential PT program with the WHE's Energy Savings Kit program and in the HER program mailers.
- Other additional methods of communication have been through social media and participant promotion through peer-to-peer word-of-mouth communication between customers.
- Monthly surveys from the call center indicate high satisfaction with the DI and customer call in experience, pointing to a successful communication and delivery plan for the program at present.

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 surpassed enrollment goals for PY2016 and has developed a plan to improve installation rates for DIY customers. Cost-effectiveness should continue to be monitored as the program develops to ensure it remains on target.

- In PY2017, the utility plans to increase reminders to DIY customers who delay installing their thermostat.

13.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The team provides these recommendations based on corresponding findings to move the GMO PT programs forward and meet their MEEIA targets. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 13.3.1)
- Recommendations from the process evaluation (Section 13.3.2)

KCP&L surpassed enrollment goals this year. The evaluation team's recommendations are focused on maintaining cost-effectiveness and enrollment targets.

13.3.1 Impact

Navigant recommends reconciling data collected by Nest and CLEAResult so the Nexant system records the following data: Account Number, Premise Number, Thermostat Serial Number, Installation Date, Rush Hour Rewards Activation Date, and Seasonal Savings Enrollment Date. This information will be necessary to support future program billing analysis and to generally enable a more efficient evaluation of the program.

In addition, Navigant suggests maintaining a list of active device serial numbers during each event. This would allow Navigant to verify program participation and DR impact by event more accurately.

The recommendations mentioned above will help Navigant complete the full billing analysis scheduled for the PY2017 evaluation.

13.3.2 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 13-1. PT Process Recommendations: PY2016

Source: Navigant analysis

13.3.2.1 Recommendations Based on Missouri's Requirements for Process Evaluation

Navigant addressed the five required process evaluation questions set forth in the MO regulations[64] for the Residential and Business PT programs. The following section details recommendations surrounding the five MO questions.

[64] 4 CFR- 240-22.070(8)

Table 13-8. 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?	The program addresses market imperfections by providing customers with an ability to reduce electricity usage during hours of peak demand. The ability to automate energy savings is key for overcoming this market's primary imperfection of requiring manual intervention. 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?	In the coming PY consider targeting Honeywell replacements for customers with large HVAC loads per thermostat.
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. However, there are other vendors of similar solutions that could be benchmarked toward the ability to handle multiple thermostat vendors and additional program functionality.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Due to high program participation, consider focusing on marketing channels that best allow targeting Honeywell replacements for customers with large HVAC loads per thermostat.
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?	Monitor program savings targets in addition to enrollment goals to ensure that program cost-effectiveness remains high.

Source: Navigant analysis

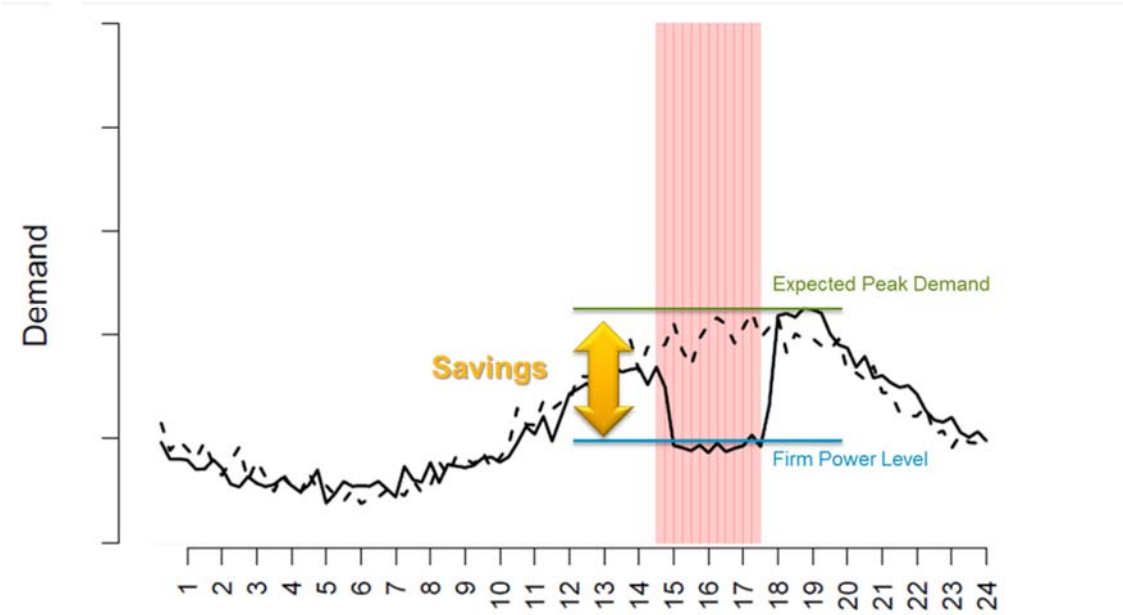
14. DEMAND RESPONSE INCENTIVE PROGRAM

14.1 Program Description

The Demand Response Incentive (DRI) program provides rebates to C&I customers for curtailing their energy usage during system peak demand periods.

Participating customers provide GMO with demand reduction capacity by committing to reduce electric load upon request during the DR curtailment season (June to September). During enrollment, participants sign a contract obligating them to reduce electric load to a pre-defined firm power level (FPL) during curtailment events. As illustrated in Figure 14-1, GMO counts the DR savings capacity represented by the summed differences between participants' estimated peak demands (EPDs) and FPLs as an offset to generation. When KCP&L calls an event, the participants reduce their load (seen in the solid black line in the figure) toward their FPL to create the demand savings.

Figure 14-1. Illustration of EPD vs. FPL



Source: Navigant analysis

The utility 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 start.

CLEAResult, the IC, recruits C&I customers for participation. GMO contracts with Oracle (their interval meter data contractor previously known as DataRaker) to maintain interval meter records and with A2A to perform event notifications and to analyze participant meter data to verify performance.

Participants receive two different incentives for participating in the program:

1. A monthly participation payment for being on call to curtail load of $32.50 per participating kW. These payments are provided as either bill credits (settled on the following bill monthly during 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. 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.

Descriptions of the program, application process, verification of purchase, rebate process, dispute process, and project reporting are provided in Table 14-1.

Table 14-1. DRI Program Description

DRI Program Key Details	
Sector	C&I
Implementation Contractor	CLEAResult provides full marketing and active recruitment support for the program. A2A (formerly Ziphany) maintains all participant records (contracts, names and numbers of customer contacts, FPLs), notifies participants in advance of curtailment events, verifies compliance, and calculates participant event compensation. Oracle (formerly DataRaker) maintains interval meter records.
Program Description	C&I participants respond to curtailment events throughout the summer.
Application Process	Large C&I customers (minimum of 25kW load) are recruited by CLEAResult, have their FPL verified, and are then either accepted or rejected for participation by the GMO program manager.
Verification of Purchase/Project	A2A verifies participant curtailment of energy using post-event interval meter data.
Rebate Process	There are two options for rebates: bill credits and checks. Bill credits are once a month payments that include curtailment payments minus penalty payments. The check option is a onetime payment and both checks and credits are provided after the season ends.
Disputes, Rejected Applications	Any disputes or questions identified by participants are first routed to their GMO Energy Consultant or CLEAResult contact and then routed to the KCP&L product manager for direct intervention and timely resolution.
Project Reporting	When KCP&L calls can event, meter-level information on energy use by participant is recorded by Oracle and shared with GMO.

Source: Navigant interview of KCP&L product manager

14.2 Evaluation Findings

Navigant used three main steps to verify that the program was meeting its objectives. First, the evaluation team reviewed the program tracking data, interval data, and program contract data, which includes contracted curtailable loads provided by KCP&L. Second, the team executed the econometric analysis and customer baseline (CBL)[65] analysis to verify program demand impact. Third, the team interviewed the

[65] The Customer Baseline (CBL) analysis calculates an hourly baseline usage 10 days before event occurs. The impact is calculated by taking the difference between event day usage and the baseline usage.

KCP&L product manager to review program process flow. While the data provided was sufficient, there is an opportunity to improve calculation of EPD, which will affect the curtailable load (CL) requirements. The EPD is a primary factor in potential impacts. Navigant recognizes that KCP&L is working on a new calculation and will look at the new EPDs in PY2017.

The following sections present Navigant's PY2016 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 14.2.1)
2. Cost-effectiveness assessment (Section 14.2.2)
3. Process evaluation (Section 14.2.3)

14.2.1 Impact

The objective of the impact evaluation was to:

1. Verify load reduction during events
2. Confirm FPL achievements
3. Assess the reasonability of the EPD

Navigant verified impacts for 10 customers using a customer-specific regression analysis using participant interval data from May 2016 through September 2016. Navigant employed a CBL approach for three 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, achieved through the approaches mentioned above, were averaged across each event. The evaluation team then averaged the three 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 EPDs by observing customer peak usage 2 days[66] before each event occurred (excluding weekends or event days).

The DRI program achieved 9,883 kW of gross and net demand impacts in PY2016 for a realization rate of 48%. The program achieved 18% of the 3-year 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 shifted to times outside of the event period.

While most customers are contractually meeting program expectations by exhibiting load under their FPL during events, the intent of the program and how it is evaluated—to curtail peak demand—is not being

[66] 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 while this is an easy check for evaluation, that knowing the conditions when setting EPD is more challenging and must be revisited each year to ensure alignment.

met for select customers. The lower-than-targeted effect of the program was driven by customers whose EPD was overestimated, which caused their FPL to be easily attainable, negating their need for curtailment. Navigant found that the following:

- On average across events, 12 out of 13[67] customers were under their EPD during event hours on non-event days with a similar temperature to the event day.
- For two out of three events, seven out of 13 customers met their contracts for the DRI program by performing under their FPL during the event.
- Only two out of 13 customers met their curtailable load as defined by their contract with GMO.
- Net power was not provided in the tracking data, which limits the ability to accurately verify participants that use onsite generation to achieve net demand reductions.

Table 14-2. DRI PY2016 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)	N/A	N/A	N/A	N/A	N/A	N/A
Coinc Demand at Customer Meter (kW)	20,664	9,883	48%	55,000	9,883	18%

Source: Navigant analysis

14.2.1.1 Net-to-Gross

As shown in Table 14-3, the DRI billing analysis generates net results rather than gross results. Further, FR is zero for curtailment programs, as customers have no incentive to reduce peak demand in the absence of the program. The implied NTG ratio is 1.0.

Table 14-3. DRI NTG Components and Ratio: PY2016

FR	PSO	NPSO	NTG Ratio
DRI's analysis is inherently net			100%

Source: Navigant analysis

14.2.2 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 as well as the sources for the benefit and cost input assumptions.

[67] The evaluation team left one GMO customer out of the analysis due to insufficient interval data.

Table presents the benefit-cost ratios for the five standard benefit-cost tests for PY2016, as well as the TRC test filed by GMO. Based on Navigant's benefit-cost analysis, all cost tests exceed 1.0. Navigant's analysis resulted in a TRC ratio that is lower than that filed by GMO due to its coincident demand realization rate of 48%.

Table 14-4. DRI Benefit-Cost Ratios: PY2016

Program Year	TRC Test[68]	TRC Test	SCT	UCT	PCT	RIM Test
	GMO	Navigant				
2016	6.24	3.09	3.09	1.73	433.33	1.73
Program Overall	**6.24**	**3.09**	**3.09**	**1.73**	**433.33**	**1.73**

Source: Navigant analysis

14.2.3 Process

Navigant addressed two process evaluation research questions and the five MO-required questions for process evaluation through staff interviews and a program materials review. A summary is provided in Table 14-5.

Table 14-5. 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 PY2015, 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 PY2017?	• 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 • 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 • Materials review
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	• Program staff interviews • Materials review

Source: Navigant analysis

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

The team's findings are provided below. Recommendations for consideration in relation to these findings are provided in Section 14.3.

14.2.3.1 General Process Evaluation Questions

QUESTION 1: What changes have been made to the program since PY2015, and how have these changes affected program satisfaction, participation, savings, and costs?

FINDING 1: Customer participation incentives changed from PY2015 to PY2016. Navigant will do a customer survey in PY2017 to assess customer satisfaction.

- In PY2015, participants received incentive rebate checks or bill credits equal to (1) $2.50 per kW of curtailable load for monthly program enrollment during the curtailment season independent of any events being called, and (2) $0.35 per actual kW of curtailed load during each event.
- In PY2016, participants received (1) a one-time payment of $32.50 per participating kW[69], (2) an additional payment per curtailment event of $0.075 per kW per hour curtailed up to the first 30 hours of dispatch, and (3) $0.25 per kW for the remaining 50 hours of dispatch.
- In PY2016, the program did not reach the third tier of payment. Savings in PY2016 were smaller than those in PY2015. Navigant will investigate customer perception of incentives in the PY2017 surveys to see whether incentives correlate with observing contracted curtailable load.

QUESTION 2: Are there additional changes to the program that would be useful in future years or are planned for PY2017?

FINDING 2: Most customers were under their contracted expected peak demand during event periods on days with a similar temperature to the event days.

- These customers are easily able to meet contractual FPL yet miss program expectations.
- KCP&L is working on a new calculation for estimating customer peak demand and establishing FPLs during events, which should address this issue.

14.2.3.2 Missouri-Required Questions for Process Evaluation

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

FINDING 1: A barrier to participating in the DRI program is that businesses do not have automatic load curtailment.

- Manual load shedding limits the ability of these businesses to participate in DR programs like DRI 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.

[69] For customers who chose the payment by check option. Bill credits received this payment split into 4 payments for the months of June-Sept.

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.

- To date, the program has focused on customers with the highest savings potential to maintain a cost-effective program. There is still an opportunity to recruit, as the program is cost-effective.

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.

- 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 set points.

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

FINDING 4: Navigant found that the communication channels and delivery mechanisms are intermittent. While communication with program participants takes place at the start of the season, the program could benefit from more continuous communication throughout the DR season.

- CLEAResult leverages KCP&L's energy consultant's one-on-one relationships with customers who have high savings opportunities (referred to as Tier 1 customers) for recruiting purposes.
- KCP&L cross promotes DRI with the Business EER 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: KCP&L has identified recruitment of customers with smaller demand savings potential as an area for improvement. In addition, KCP&L is reworking the EPD calculation.

- Navigant understands KCP&L is working on a solution to utilize smaller loads.
- As noted above, there is an opportunity to update the EPD calculation so that the updated value will better represent customer peak demands.

14.3 Recommendations

Navigant developed the following recommendations based on the impact and process evaluations. The recommendations are divided into two parts:

- Recommendations from the impact evaluation (Section 14.3.1)
- Recommendations from the process evaluation (Section 14.3.2)

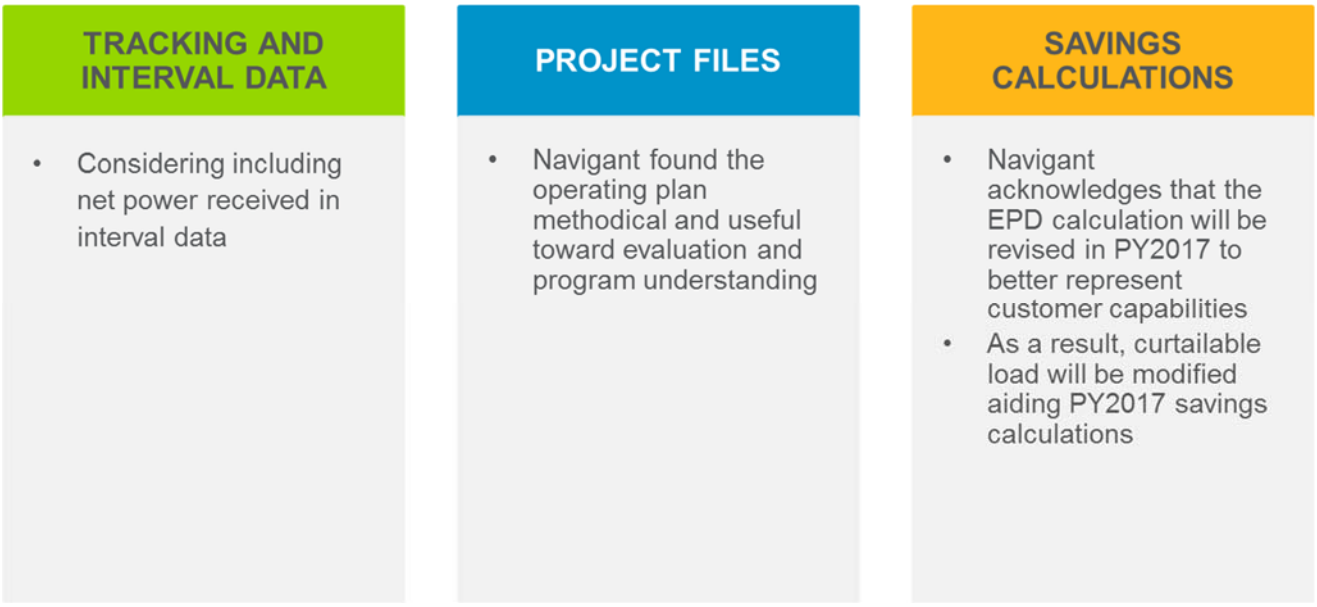
Although the program did not meet its PY2016 target, the program can still meet the 3-year target through enhanced recruitment and improving the EPD calculations. This section provides recommendations for KCP&L to help meet these goals.

14.3.1 Impact

The following impact recommendations are based on the analysis of program interval and tracking data as well as the econometric impact analysis.

Overall, the program data was comprehensive and useful toward reviewing program impacts. Recommendations for the DRI program are detailed in Figure 14-2 and Figure 14-3.

Figure 14-2. DRI Program Impact Recommendations: PY2016



Source: Navigant analysis

14.3.2 Process

Navigant conducted the PY2016 process evaluation through an interview with the KCP&L product manager and a program materials review. The team provides the process recommendations below based on findings from these activities.

Figure 14-3. DRI Process Recommendations: PY2016

Source: Navigant analysis

14.3.2.1 Recommendations Based on Missouri's Requirements for Process Evaluation

Navigant addressed the five required process evaluation questions set forth in the MO regulations[70] for the DRI program.

Table 14-6. DRI Missouri Requirement-Based Recommendations

Missouri Question	Navigant Recommendation
1. What are the primary market imperfections that are common to the target market segment?	KCP&L could use improved modeling capabilities to identify smaller load customers (in Tier 2) to strategically target awareness building and program recruiting efforts. Additionally, considering options to automate the process of calling events and ways to automate customer participation could reduce participation barriers.
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	In PY2016, the program had 14[71] Tier 1 participants. In PY2017 and PY2018 the target market will need to expand to include customers with smaller loads as the list of Tier 1 customers will have been exhausted after PY2016. KCP&L is working with CLEAResult on methods to accomplish this task. While the program expands, Navigant suggests focusing on reaching high impact customers first to best maintain cost-effectiveness.

[70] 4 CFR- 240-22.070(8)

[71] One of the customers did not have sufficient data for the analysis. Thus, Navigant included 13 customers in the analysis for GMO.

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?	For DRI customers that produce their own onsite electricity, it would be useful for GMO to develop a method to include their net power received in the interval data.
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?	Currently, KCP&L's energy consultants and CLEAResult staff are in touch with customers directly about program participation. While methods of communication are sufficient at current program size, Navigant recommends more continuous communication with customers throughout the DR season. Assuming the program continues to grow, more methods of communication may be needed for individualized program assistance. In addition, Navigant encourages continued partnership with internal programs such as the current partnership with the Business EER program to cross-promote programs.
5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	Consider encouraging customers to meet their contracted curtailable load through participant education. Navigant notes that GMO is updating the EPD calculation to be more representative of customer capabilities; the new calculation will be implemented in PY2017. In addition, GMO is working on better processes to flag customers with new advanced metering infrastructure (AMI) across all internal systems to avoid confusion across systems—particularly so that DRI customers do not have their AMI replaced after installation. Navigant encourages continued research into this process improvement as its relevance will continue to grow as more customers get AMI installed.

Source: Navigant analysis