Annual Report on Evaluation, Measurement & Verification Findings for KCP&L Program Year 2015

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with

Final Report
October 7, 2016

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Definition of Key Acronyms

As a first step to detailing the evaluation methodologies, the evaluators provided a glossary of terms which supplement the defined terms in 4 CSR 240-3.163, -3.164, -20.093, 20.094 and 4 CSR 240-22.020:

- C&I – Commercial and Industrial
- CAC – Central air conditioner
- CFL – Compact fluorescent lamp
- CDD – Cooling degree days
- Deemed Savings – A savings estimate for homogenous measures, in which an assumed average savings across a large number of rebated units is applied
- DLC – Residential direct load control
- ECM – Energy conservation measure
- EFLH – Equivalent full load hour
- EISA – Energy Independence and Security Act of 2007
- EM&V – Evaluation, measurement and verification
- *Ex Ante* – A program parameter or value used by implementers/sponsoring utilities in estimating savings before implementation
- Expected Savings - The saving calculated by the implementation contractor. These numbers are developed prior to the evaluator's analysis.
- *Ex Ante* Net Savings = *Ex Ante* Gross Savings x *Ex Ante* Free Ridership Rate
- *Ex Post* – A program parameter or value as verified by the Evaluators following completion of the evaluation effort
- *Ex Post* Net Savings = *Ex Post* Gross Savings x *Ex Post* Free Ridership Rate
- FAQ – Frequently asked questions
- Free Ridership – Percentage of savings resulting from program participants who would have implemented the same energy efficiency measures in a similar timeframe absent the program.
- Gross Savings – Energy and demand savings as determined through engineering analysis, statistical analysis, and/or onsite verification
- Gross Realization Rate = Ratio of *Ex Post* Gross Savings / *Ex Ante* Gross Savings
- HDD – Heating degree days
- HP – Heat pump
- HVAC – Heating, ventilation, and air conditioning
- ICF – ICF International
- ISR – In–service rate
- kW – Kilowatt
- kWh – Kilowatt-hour
- M&V – Measurement and verification
- MW – Megawatt
- MWh – Megawatt hour
- Net Realization Rate = Ratio of *Ex Post* Net Savings / *Ex Ante* Net Savings
- Net Savings –Gross savings factoring off free-ridership and adding in spillover.
- NTG – Net-to-gross
- NTGR – Net-to-gross-ratio = (1 – Free Ridership % + Spillover %), also defined as Net Savings / Gross Savings
- POP – Point-of-purchase
- QA – Quality assurance
- QC – Quality control
- ROI – Return on investment

- RR – Realization rate
- Realized Savings or Achieved Savings- The savings that have been verified by the EM&V contractor. This includes adjustments for equipment that may not have been installed, calculation errors, and differences in assumptions.
- Spillover Rate – Percentage of savings generated by a program that are not incentivized.
- T&D – Transmission and distribution
- TRM – Technical Reference Manual
- VFD – Variable Frequency Drive

Executive Summary

As a result of the Missouri Public Service Commission's (PSC) approval of a Stipulation and Agreement[1] in File No. EO-2014-0095, KCP&L launched demand-side management (DSM) programs on or after July 6, 2014. KCP&L is required to complete process and impact evaluations[2] to assess the progress of its DSM programs towards meeting the annual energy and demand savings targets[3] established by the PSC for these programs.

To meet these requirements, KCP&L contracted with Navigant Consulting, Inc. (Navigant) to conduct comprehensive evaluation, measurement and verification (EM&V) of its 12 DSM programs during the 18-month program cycle beginning July 6, 2014 through December 31, 2015 (Navigant PY2015 EM&V Report, p. 6).

As presented in the EM&V Plan[4], Navigant developed an evaluation strategy to provide KCP&L and stakeholders with the best information possible over the course of the MEEIA programs within the available evaluation financial resources.[5] Navigant's plan will perform full EM&V following completion of the 18-month plan and will be performed in parallel with Navigant's EM&V for KCP&L Greater Missouri Operations Company's three year programs approved by the Commission in File No. EO-2012-0009.

The goal of these evaluations is to comply with the requirements of Section 4 CSR- 240-22.070(8):[6]

> *"The purpose of these evaluations shall be to develop the information necessary to evaluate the cost-effectiveness and improve the design of existing and future demand-side programs and demand-side rates, to improve the forecasts of customer energy consumption and responsiveness to demand-side programs and demand-side rates and to gather data on the implementation costs and load impacts of demand-side programs and demand-side rates for use in future cost-effectiveness screening and integrated resource analysis" (p. 18).*

In 2012, the PSC contracted with Johnson Consulting Group, LLC, to serve as its EM&V Auditor[7] (Auditor) to review and comment on compliance with 4 CSR 240-22.070(8) and on the overall quality,

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[1] File No. EO-2014-0095,Non-Unanimous Stipulation and Agreement Resolving Kansas City Power & Light Company's MEEIA Filing was filed on May 27, 2014 and was approved June 5, 2014, as a result of the Commission's Order Approving Stipulation and Agreement,.

[2] 4 CSR 240-20.093(7) and 4 CSR 240-3.163(7)

[3] 4 CSR 240-20.094(3)(A).

[4] Evaluation, Measurement, and Verification Plan described in paragraph 18 of the Non-Unanimous Stipulation and Agreement Resolving Kansas City Power & Light Company's MEEIA Filing filed on May 27, 2014 in File No. EO-2014-0095.

[5] Approximately five percent of the 18-month MEEIA programs' budget of $19,175,842 will be spent on EM&V.

[6] A more complete citation of the requirements of 4 CSR 240-22.070(8) is in the Introduction section of this Report.

[7] 4 CSR 240-20.093(7) Evaluation, Measurement, and Verification (EM&V) of the Process and Impact of Demand-Side Programs. Each electric utility shall hire an independent contractor to perform and report EM&V of each commission-approved demand-side program in accordance with 4 CSR 240-20.094 Demand-Side Programs. The

scope and accuracy of the Navigant report. The EM&V Auditor Team members' roles and responsibilities are summarized in Table E-1.

Table E-1: Roles and Responsibilities of the EM&V Auditor's Team

Member	Role	Primary Areas of Responsibility
Dr. Katherine Johnson	Project Manager	Overall Report and Process Evaluations Review and Analysis
Mr. Scott Dimetrosky	Subject Matter Expert: Lighting and Market Effects	Residential Lighting and Home Energy Report Program Review, NTG and Market Effects Model Review, Statistical Review and Analysis
Dr. Jim Bradford	Subject Matter Expert: M&V Issues and TRM	Overall Portfolio Results, Custom Program Review, AC Upgrade and Programmable Thermostat Program Review
Mr. Baskar Subbarao	Principle Investigator	Summarize and Analyze Key Findings for Business Standard, Home Appliance, Income Eligible Weatherization, Building Operator Certification, and Energy Analyzer
Mr. Gregg Eisenberg	Principle Investigator	Assist in review of process evaluations, recommendations and editorial oversight

The EM&V Auditor Team completed its review and assessment of the Navigant report in several ways. The Team reviewed the report's key findings, recommendations, and analytical techniques. Next, the key findings and recommendations were organized by topic areas to identify high-level themes and draw conclusions about the overall progress of the program portfolio.

EM&V Recommendations

Navigant provided a total of 59 recommendations on ways to improve KCP&L's energy efficiency portfolio. As Figure 1 shows, the one-third of recommendations focused on ways to improve database tracking (31%) while one quarter focused on ways to improve program operations (24%) and 22 percent focused on improving TRM calculations.

commission shall hire an independent contractor to audit and report on the work of each utility's independent EM&V contractor.

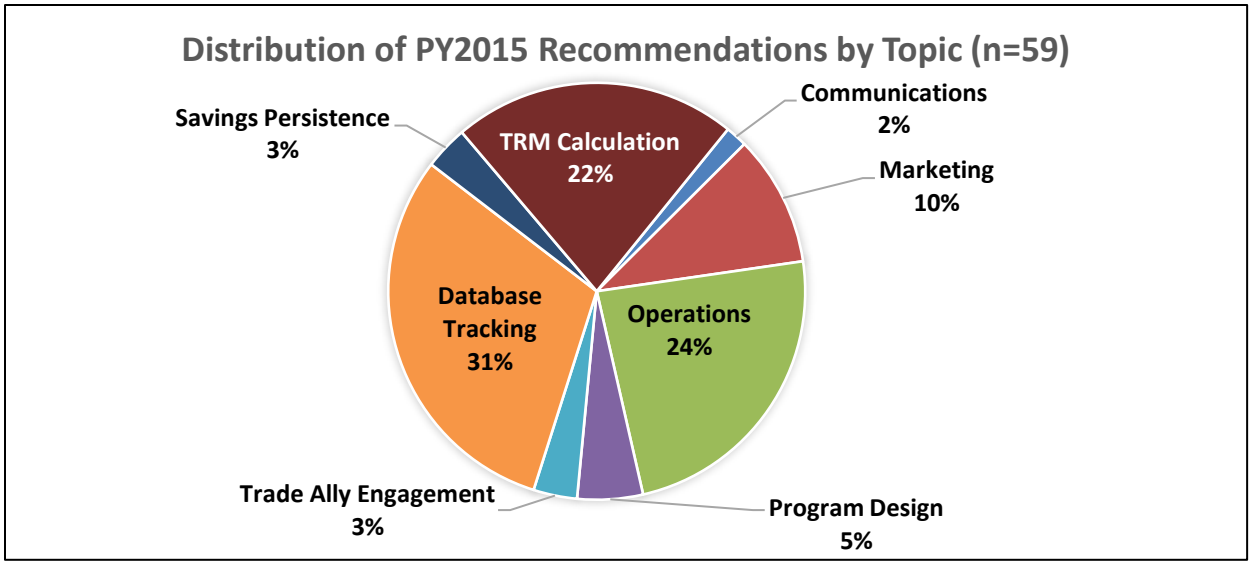


Figure E- 1: Distribution of PY2015 Recommendations by Topic

Based on this review, the EM&V Auditor Team developed both short-term and long-term recommendations on ways to improve the EM&V and evaluation reporting processes. These analyses and the recommendations for improvement are based on the EM&V Auditor Team's collective experience with utility energy efficiency programs, EM&V best practices and professional judgment.

Recommendations to Improve Current Impact Evaluations

Recommendations to Current Program: There are several recommendations embedded in the Evaluators' findings. However, the EM&V Auditor did not find these recommendations included in the summary list. These should have been included more directly in the final report.

While reviewing the Executive summary of the Navigant evaluation report, the EM&V Auditor identified clarifications required in the summary tables in the Executive Summary. These corrections were made in the final report.

Recommendations to Improve Future Impact Evaluations

When referencing and using Ameren Missouri evaluations, make sure to use the most recent publically available evaluations. As a smaller portfolio, it is reasonable that the KCP&L evaluation should leverage, where applicable, data collection findings from Ameren Missouri. The evaluations, however, should make sure to use the most recent publically available Ameren Missouri evaluations, otherwise the KCP&L evaluation will reflect outdated values that are inconsistent with the current Ameren Missouri assumptions. This recommendation is also relevant for other aspects of evaluation, including methods and baseline assumptions (i.e., where applicable use similar methods and baseline assumptions as Ameren Missouri).

Recommendations to Improve Current Process Evaluations

Navigant should provide a clearer explanation as to why it relied on the survey responses from the Implementation Contractor for its HER and Income Eligible HER rather than conducting an independent survey. While it was appropriate for Navigant to leverage this survey and address the critical research questions, the Evaluator should provide additional explanations as to how they were able to ensure that this survey remained neutral, since it was sponsored by the implementation contractor. This topic was only partially addressed in the final report (Navigant PY2015 EM&V Report, p. 255).

Recommendations to Improve Future Process Evaluations

Navigant should continue to employ best practices in conducting future process evaluations. Referring to established process evaluation protocols, such as those used in Arkansas[8], and New York will ensure that the process evaluation activities are both cost-effective and informative.

To the extent possible, Navigant should continue to try and standardize the response scales used to measure customer and trade ally satisfaction across KCP&L's energy portfolio. In addition, Navigant should conduct an independent assessment of the HER and Income Eligible Programs to ensure that these surveys focus on key process evaluation metrics rather than just the research goals of the program implementer.

Recommendations to Future Cost-Effectiveness Analysis

Future cost-effectiveness analysis should incorporate the following elements: ensure the proper costs and benefits are defined in the methods section (Table 1-3, page 5), and be sure to check the results of each perspective is in line with expectations (UCT is not lower than TRC, like it was for the HAR and IE-Wx programs).

Overall Conclusions from the EM&V Auditor Team

Navigant's EM&V Report conformed to industry standards and best practices. The findings were clearly stated and the basis of each recommendation was linked to the EM&V findings. Moreover, the evaluation activities provided updates to previous recommendations, comparison to industry benchmarks, and provided actionable recommendations to improve overall program operations and enhance energy savings calculations.

However, the EM&V Auditor made in previous draft final reports the following recommendations to improve the overall readability and quality of the report.

- **Do not use Roman numeral numbering in the Executive Summary**. Navigant has addressed this recommendation.
- **Navigant should address all of the errors identified in this report**. Navigant has addressed this recommendation.

[8] Protocol C: Process Evaluation Protocols, Arkansas Technical Reference Manual, Volume 1, 2015, pp. 31.

Organization of This Report

This report is organized into the following sections to guide the reader through this summary of the key results:

- Section 1: Summary of Key Findings and Recommendations from the Impact Evaluations
- Section 2: Summary of Key Findings and Recommendations from the Process Evaluations
- Section 3: Review of Cost-Effectiveness
- Section 4: EM&V Auditor's Findings and Recommendations

Introduction

With the passage of the Missouri Energy Efficiency Investment Act in 2009, the State of Missouri and the stipulated agreement reached by KCP&L and its stakeholders signaled a new beginning of energy efficiency program offerings to all KCP&L customer classes. The 12 MEEIA programs were launched in 2013. In accordance with 4 CFR- 240-22.070(8), the electric utilities are required to complete process evaluations to improve program design and delivery processes and impact evaluations to assess progress towards meeting the annual energy and demand savings targets.

To meet these requirements, KCP&L contracted with Navigant Consulting, Inc. (Navigant) to conduct comprehensive evaluation, measurement and verification (EM&V) of its 12 DSM programs during the 18-month program cycle beginning July 6, 2014 through December 31, 2015 (Navigant PY2015 EM&V Report, pp. 6-7).

According to 4 CFR- 240-22.070(8), the electric utilities are required to complete process and impact evaluations.

> *…The purpose of these evaluations shall be to develop the information necessary to evaluate the cost-effectiveness and improve the design of existing and future demand-side programs and demand-side rates, to improve the forecasts of customer energy consumption and responsiveness to demand-side programs and demand-side rates and to gather data on the implementation costs and load impacts of demand-side programs and demand-side rates for use in future cost-effectiveness screening and integrated resource analysis.*
>
> *(A) Process Evaluation. Each demand-side program and demand-side rate that is part of the utility's preferred resource plan shall be subjected to an ongoing evaluation process which addresses at least the following questions about program design.*
>
> *1. What are the primary market imperfections that are common to the target market segment?*
>
> *2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?*
>
> *3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?*
>
> *4. Are the communication channels and delivery mechanisms appropriate for the target market segment?*
>
> *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?*
>
> *(B) Impact Evaluation. The utility shall develop methods of estimating the actual load impacts of each demand-side program and demand-side rate included in the utility's preferred resource plan to a reasonable degree of accuracy.*
>
> *1. Impact evaluation methods. At a minimum, comparisons of one (1) 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; and*
>
> *B. Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same time period.*
>
> *2. The utility shall develop load-impact measurement protocols that are 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; or*
>
> *B. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics.*
>
> *(C) The utility shall develop protocols to collect data regarding demand-side program and demand-side rate market potential, participation rates, utility costs, participant costs, and total costs.*

In 2012, the Missouri Public Service Commission (PSC) contracted with Johnson Consulting Group, LLC, to serve as its EM&V Auditor to comply with 4 CSR 240-20.0943(7)[9] and to review and comment on compliance with 4 CSR 240-22.070(8) and on the overall quality, scope and accuracy of these reports.

This review consisted of the following components and processes. The EM&V Auditor Team members read each the program's draft evaluation report in its entirety, and summarized the key findings and recommendations made by program by topic area. Organizing the findings at this level allows for a comprehensive review of the important trends among the programs and identifies issues that are important at both the program and portfolio level. The EM&V Auditor Team members also made additional recommendations based on the EM&V Auditor Team's collective experience with utility energy efficiency programs' EM&V best practices and professional judgment.

Lastly, the EM&V Auditor Team members assessed the overall quality of the program evaluation completed by Navigant.

This report is organized into the following sections, to help guide the reader through this summary of the key results:

- Section 1: Summary of Key Findings and Recommendations from the Impact Evaluations
- Section 2: Summary of Key Findings and Recommendations from the Process Evaluations
- Section 3: Review of Cost-Effectiveness
- Section 4: EM&V Auditor's Findings and Recommendations

To facilitate the reader, the specific program evaluations are referenced in the text by the year of evaluation and specific page number (i.e., Navigant PY2015 EM&V Report, pp. 93-94) since all of the reports are for KCP&L programs. The full document reference is provided in the reference section of this report. Furthermore, the percentages cited in parenthesis (%) are used to denote particular or significant findings from a particular evaluation finding and follow standard industry reporting conventions.

[9] 4 CSR 240-20.093(7) Evaluation, Measurement, and Verification (EM&V) of the Process and Impact of Demand-Side Programs. Each electric utility shall hire an independent contractor to perform and report EM&V of each commission-approved demand-side program in accordance with 4 CSR 240-20.094 Demand-Side Programs. The commission shall hire an independent contractor to audit and report on the work of each utility's independent EM&V contractor.

Section 1: Summary of Key Findings and Recommendations from the Impact Evaluations

The impact evaluation examines the annual and lifetime energy and demand savings and cost effectiveness resulting from each program and from the portfolio of programs as a whole. ***This section summarizes the findings from the impact evaluations,*** while Section 4 provides the EM&V Auditor's assessment of the appropriateness of these savings estimates.

1.1 Summary of Impact Evaluation Findings

Portfolio Level Findings

This section summarizes the key energy savings estimates for both demand kilowatts (kW) and energy kilowatt-hours (kWh) across program portfolio. Table 1 shows the target savings, total gross savings reported (Ex Ante) and verified (Ex Post) and *Ex Post* Net savings.

The Income Eligible Weatherization (IEW), program was not evaluated and thus realization rates and net to gross ratios were stipulated at 100 percent. Income Eligible Home Energy Report (IE-HER) and Home Energy Report (HEA) programs savings were calculated by applying a realization rate for the entire 2014-15 program cycle and a NTG precent of 100 percent. This approach to adjustments is per KCP&L-MO's Stipulation and Agreement. Paragraph 18 of the KCP&L-MO Stipulation Agreement states: "*the EM&V impact evaluation will not include market effects for purposes of determining KCP&L-MO's NTG calculation and resulting Performance Incentive Award for the Plan period ending December 31, 2015."*

Table 1: Portfolio Level Savings

Summary of Overall Portfolio	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	33,872,206	68,716,971	102,589,177	24,341	18,752	43,093
Ex Ante Gross	49,925,208	146,936,871	196,862,079	24,120	31,664	55,784
Ex Post Gross	43,784,137	160,318,348	204,102,485	25,158	32,184	57,342
Ex Post Net	40,894,672	148,098,083	188,992,755	24,540	29,717	54,236

(Sources: Navigant PY2015 EM&V Report, pp. 12-13 and KCP&L MEEIA Filing)
Note that the 54,259 kW demand *Ex Post* Net demand savings does not match the value presented in the Navigant Evaluation, Table ES-7 pg 16.

In 2014, C&I programs provided 34 percent of the savings compared to a goal of 57 percent of total energy, but in 2015 C&I program savings accounted for 78 percent of the savings compared to a goal of 54 percent. This large swing in percent savings in the C&I programs is primarily due to the inclusion of "carryover" savings for the Custom program as a result of paragraph 12 of the *Non-Unanimous Stipulation and Agreement Resolving MEEIA Filings* filed in File No. EO-2015-0241 on November 23, 2015. According to the Evaluator, Carryover projects contributed 51,327,856 kWh and 7,328 kW in net energy and demand savings, representing approximately 38 percent and 26 percent of total net energy and demand savings for PY2015, respectively (Navigant PY2015 EM&V Report, p. 9).

In 2014, the Residential energy efficiency programs accounted for 62 percent of energy savings compared to a goal of 41 percent. In 2015, residential made up only 21 percent of energy savings compared to a goal of 44 percent.

In PY2014-15 the Summary of Overall Portfolio *Ex Post* Net savings exceeded targets achieving 130.4 percent of target. The planned and actual energy savings results for PY2014 are summarized in Figure 1.

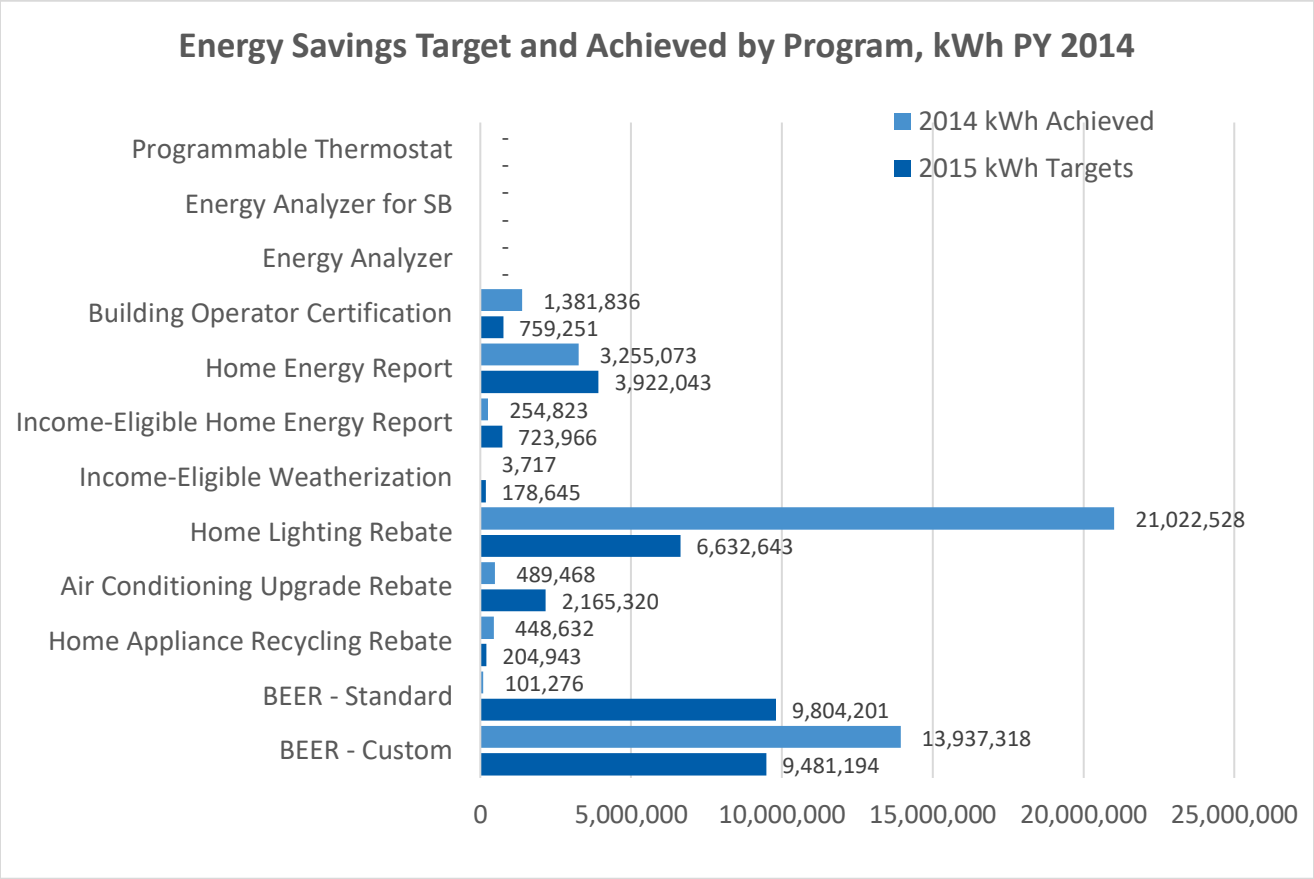


Figure 1: Energy Savings Target and Achieved by Program, kWh PY 2014

Figure 2 summarizes the energy savings summarizes the planned and achieved by program for PY2015.

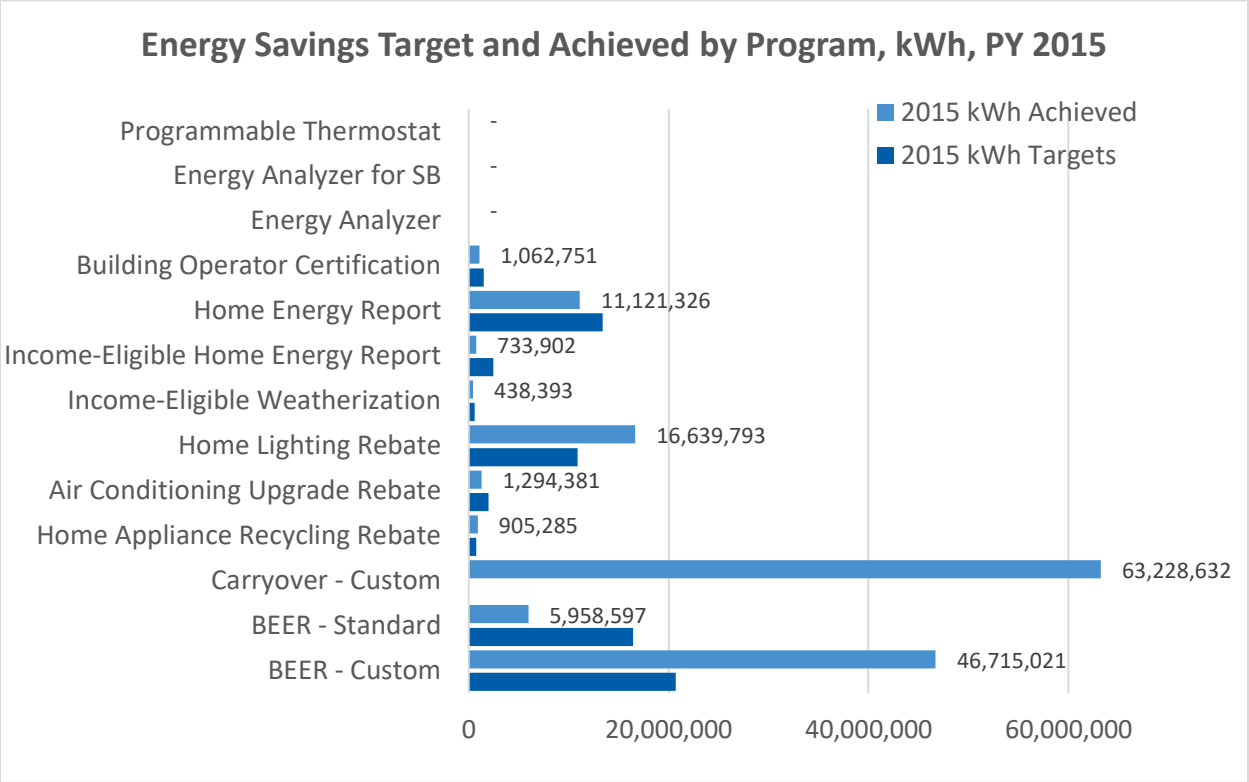


Figure 2: Energy Savings Target and Achieved by Program, kWh PY 2015

Figure 3 summarizes these results during the entire evaluation period of PY2014-PY2015.

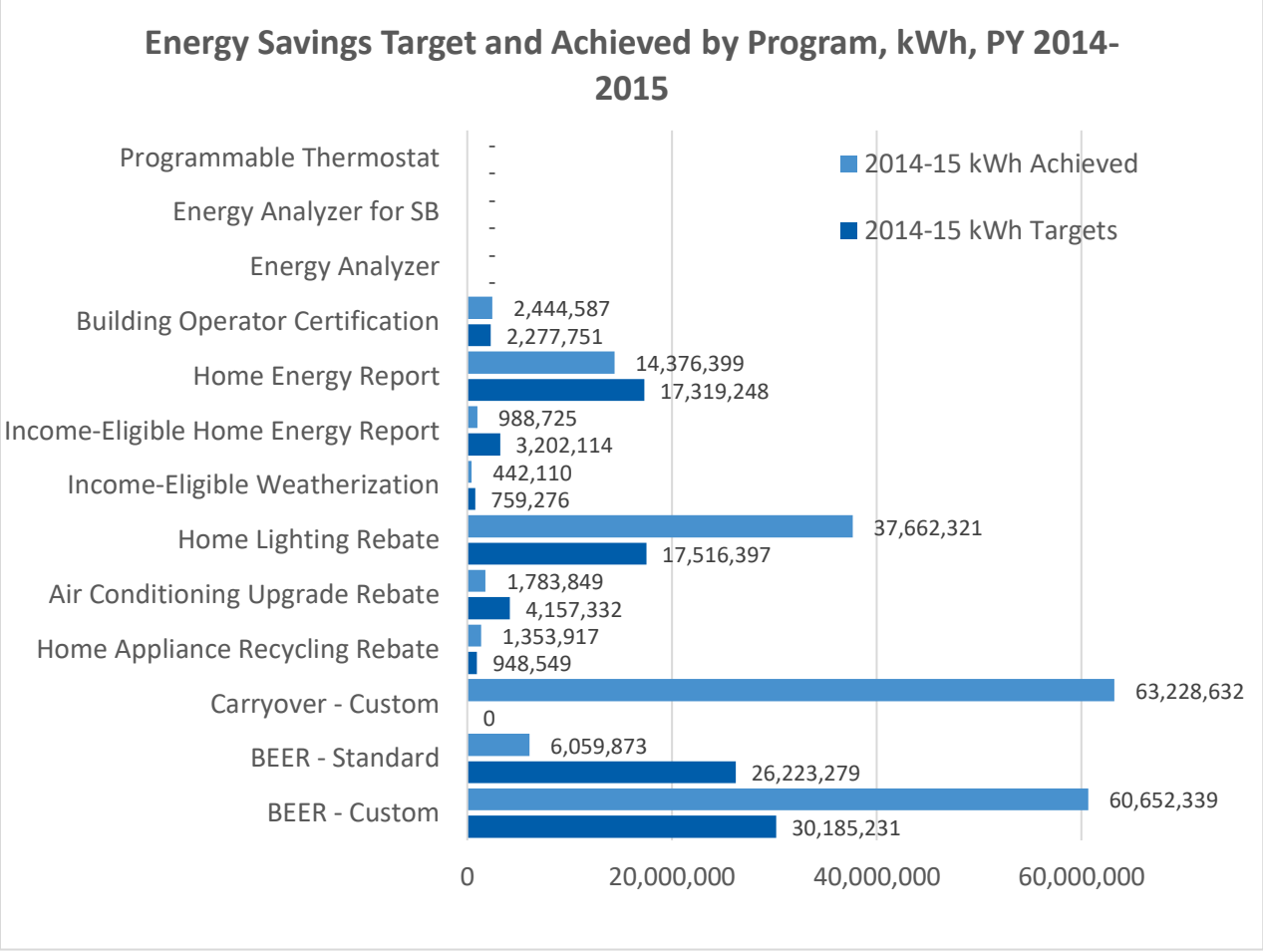


Figure 3: Energy Savings Target and Achieved by Program, kWh PY 2014-2015

Table 2 summarizes the KCP&L energy efficiency targets, gross savings *ex ante* values, gross savings *ex post* values, net savings *ex post* values, and percent of target achieved (net achievement compared to the targets for energy savings). In the EM&V Auditor report, these terms are defined as follows:

- **Energy Savings Targets** – Target values are annualized savings targets for the residential, commercial, and industrial sectors.
- **Gross Savings *Ex Ante*** – *Ex ante* gross savings are annualized savings either reported by KCP&L MEEIA programs, or as calculated by applying tracked program activity to TRM savings values.
- **Gross Savings *Ex Post*** – *Ex post* gross savings are annualized savings as calculated and presented by the evaluator, which is generally known as "Realized kWh Savings" or "Achieved Savings" in the report.
- **Net Savings *Ex Post*** – *Ex post* net savings is the *ex post* savings multiplied by the net-to-gross (NTG) ratio, which accounts for free ridership and spillover effects.

Table 2: Portfolio Energy Savings in PY2014, kWh

Program	Savings Targets 2014	Gross Savings *Ex Ante*	Gross Savings *Ex Post*	Net Savings *Ex Post*: 2014	% of Target Achieved
BEER - Custom	9,481,194	13,622,419	15,149,259	13,937,318	147%
BEER - Standard	9,804,201	118,952	110,083	101,276	1%
Home Appliance Recycling Rebate	204,943	422,667	801,129	448,632	219%
Air Conditioning Upgrade Rebate	2,165,320	876,014	699,240	489,468	23%
Home Lighting Rebate	6,632,643	28,402,347	22,128,977	21,022,528	317%
Income-Eligible Weatherization	178,645	3,717	3,717	3,717	2%
Income-Eligible Home Energy Report	723,966	674,338	254,823	254,823	35%
Home Energy Report	3,922,043	3,830,703	3,255,073	3,255,073	83%
Building Operator Certification	759,251	1,974,051	1,381,836	1,381,836	182%
KCP&L-MO TOTAL	**33,872,206**	**49,925,208**	**43,784,137**	**40,894,672**	**121%**

(Source: Navigant PY2015 Program EM&V Report, Table ES-2, p. 11)

Table 3 and Table 4 show the gross savings *ex ante*, gross savings *ex post* and net savings *ex post* for energy savings for PY2014 and PY2015.

Table 3: Portfolio Energy Savings in PY2015, kWh

Program	Savings Targets 2015	Gross Savings *Ex Ante*	Gross Savings *Ex Post*	Net Savings *Ex Post*: 2015	% of Target Achieved
BEER - Custom	20,704,037	13,622,419	50,777,197	46,715,021	226%
BEER - Standard	16,419,078	118,952	6,476,736	5,958,597	36%
BEER- Carryover- Custom	NA	57,618,258	68,726,774	63,228,632	NA
Home Appliance Recycling Rebate	743,606	851,586	1,616,581	905,285	122%
Air Conditioning Upgrade Rebate	1,992,012	2,345,924	1,849,116	1, 294,381	65%
Home Lighting Rebate	10,883,754	16,475,996	17,515,572	16,639,793	153%
Income-Eligible Weatherization	580,631	438,393	438,393	438,393	76%
Income-Eligible Home Energy Report	2,478,148	1,942,125	733,902	733,902	30%
Home Energy Report	13,397,205	13,088,028	11,121,326	11,121,326	83%
Building Operator Certification	1,518,500	1,974,051	1,062,751	1,062,751	70%
KCP&L-MO TOTAL	**68,716,971**	**146,936,871**	**160,318,348**	**148,098,083**	**216%**

(Source: Navigant PY2015 EM&V Report, ES-4, p. 13)

Table 4: Portfolio Energy Savings in PY2014-15, kWh

Program	Savings Targets	Gross Savings *Ex Ante*	Gross Savings *Ex Post*	Net Savings *Ex Post*	% of Target Achieved
BEER - Custom	30,185,231	59,281,964	65,926,456	60,652,339	201%
BEER - Standard	26,223,279	7,117,467	6,586,819	6,059,873	23%
BEER- Carryover- Custom	N/A	57,618,258	68,726,774	63,228,632	N/A
Home Appliance Recycling Rebate	948,549	1,274,253	2,417,710	1,353,917	143%
Air Conditioning Upgrade Rebate	4,157,332	3,221,938	2,548,356	1,783,849	43%
Home Lighting Rebate	17,516,397	44,878,343	39,644,549	37,662,323	215%
Income-Eligible Weatherization	759,276	442,110	442,110	442,110	58%
Income-Eligible Home Energy Report	3,202,114	2,616,463	988,725	988,725	31%
Home Energy Report	17,319,248	16,918,731	14,376,399	14,376,399	83%
Building Operator Certification	2,277,751	3,492,552	2,444,587	2,444,587	107%
KCP&L-MO TOTAL	**102,589,177**	**196,862,078**	**204,102,485**	**188,992,755**	**184%**

(Source: Navigant PY2015 EM&V Report, Table ES-6, p. 15)

Table 5 and Table 6 show the gross savings *ex ante*, gross savings *ex post* and net savings *ex post* for demand reductions for PY2014 and PY2015, while Table 7 shows the results for the entire 18-month period 2014 to 2015.

Table 5: Portfolio Demand Reduction in PY2014, kW

Program	Demand Savings Targets 2014	Gross Savings Ex Ante	Gross Savings *Ex Post*	Net Savings *Ex Post*: 2014	% of Target Achieved
BEER - Custom	2,590	1,776	2,017	1,856	72%
BEER - Standard	2,012	22	22	20	1%
Home Appliance Recycling Rebate	33	72	98	55	166%
Air Conditioning Upgrade Rebate	1,260	487	778	545	43%
Home Lighting Rebate	704	3,020	3,568	3,390	481%
Income-Eligible Weatherization	65	3	3	3	4%
Income-Eligible Home Energy Report	0	0	0	0	N/A
Home Energy Report	0	0	0	0	N/A
Building Operator Certification	87	225	158	158	181%
Programmable Thermostat	17,590	18,515	18,515	18,515	105%
KCP&L-MO TOTAL	**24,341**	**24,120**	**25,158**	**24,540**	**101%**

(Source: Navigant PY2015 EM&V Report, Table ES-3, p. 12)

Table 6: Portfolio Demand Reduction in PY2015, kW

Program	Demand Savings Targets 2015	Gross Savings *Ex Ante*	Gross Savings *Ex Post*	Net Savings *Ex Post*: 2015	% of Target Achieved
BEER - Custom	5,411	8,168	9,276	8,534	158%
BEER - Standard	3,304	1,259	1,261	1,160	35%
BEER-Custom Carryover	N/A	11,684	9,655	8,883	N/A
Home Appliance Recycling Rebate	119	145	198	111	93%
Air Conditioning Upgrade Rebate	1,153	1,328	2,085	1,460	127%
Home Lighting Rebate	1,155	1,751	2,790	2,651	229%
Income-Eligible Weatherization	173	325	325	325	188%
Income-Eligible Home Energy Report	769	603	274	274	N/A
Home Energy Report	4,124	4,029	3,979	3,979	96%
Building Operator Certification	173	173	121	121	70%
Programmable Thermostat	2,371	2,199	2,220	2,220	94%
KCP&L-MO TOTAL	**18,752**	**31,664**	**32,184**	**29,717**	**158%**

(Source: Navigant PY2015 EM&V Report, Table ES-5, p. 14)

Table 7: Portfolio Demand Reduction in PY2014-15, kW

Program	Demand Savings Targets	Gross Savings *Ex Ante*	Gross Savings *Ex Post*	Net Savings *Ex Post*	% of Target Achieved
BEER - Custom	8,001	9,944	11,293	10,390	130%
BEER - Standard	5,316	1,281	1,283	1,180	22%
BEER Carryover- Custom	N/A	11,684	9,655	8,883	N/A
Home Appliance Recycling Rebate	152	217	296	166	109%
Air Conditioning Upgrade Rebate	2,413	1,815	2,863	2,004	83%
Home Lighting Rebate	1,859	4,771	6,358	6,040	325%
Income Eligible Weatherization	238	328	328	328	138%
Income Eligible Home Energy Report	769	603	274	274	36%
Home Energy Report	4,124	4,029	3,979	3,979	96%
Building Operator Certification	260	398	279	279	107%
Programmable Thermostat	19,961	20,714	20,735	20,735	104%
KCP&L-MO TOTAL	**43,093**	**55,784**	**57,342**	**54,236**	**126%**

(Source: Navigant PY2015 EM&V Report, Table ES-7, p. 16)

The Net-to-Gross (NTG) estimates presented are final and based on data collected 2015 from participants and, where appropriate, from trade allies.

Table 8 provides a summary of the final free ridership, participant spillover, and non-participant spillover estimates for each program. Note that the values shown as NA were stipulated and were not reviewed or adjusted based on the evaluation.

Table 8: Estimated Free Ridership and Spillover Rates for Each Program

Program Name	Free Ridership	Participant Spillover	Non-Participant Spillover	NTGR
BEER Custom	0.12	0.04	0	0.92
BEER Standard	0.13	0.05	0	0.92
Home Appliance Recycling Rebate	0.44	NA	NA	0.56
Income-Eligible Weatherization	NA	NA	NA	1.00
Air Conditioning Upgrade Rebate	0.34	0	0.04	0.70
Home Lighting Rebate	0.45	0	0.40	0.95
Home Energy Report	NA	NA	NA	1.00
Income-Eligible Home Energy Report	NA	NA	NA	1.00
Programmable Thermostat	NA	NA	NA	1.00

(Source: Navigant PY2015 EM&V Report, Table ES-9, p. 21)

Program Level Findings

This section summarizes the findings from the impact evaluation of commercial energy efficiency programs by program.

Business Energy Efficiency Rebate Custom Program

The KCP&L-MO Business Energy Efficiency Rebate (BEER) Custom Program provides incentives for energy efficient upgrades for business customers. While a set of standard measures are available through the standard program, the custom program is tailored to meet needs C&I customers who want to install complex projects or a combination of measures.

Not including a new "carryover" program category, in PY2015 the BEER Custom Program achieved 225.6 percent (46,715.0 MWh) of its proposed savings target (20,704.0 MWh). The BEER Custom program accounts for approximately 40 percent of the total energy savings target in 2015. The BEER Custom Program PY2014-PY2015 total gross savings reported *ex ante* is 59,281,964 kWh. Overall, the Evaluator determined that the custom program had a total gross savings of 65,926,456 kWh, and a realization rate of 111 percent for energy savings (see Table 9).

Table 9: Summary of BEER – Custom Program Impact Findings

BEER	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	9,481,194	20,704,037	30,185,231	2,590	5,411	8,001
Ex Ante Gross	13,622,419	45,659,545	59,281,964	1,776	8,168	9,944
Ex Post Gross	15,149,259	50,777,197	65,926,456	2,017	9,276	11,293
Ex Post Net	13,937,318	46,715,021	60,652,339	1,856	8,534	10,390

(Source: Navigant PY2015 EM&V Report, Table 2-1 and Table 2-2, pp. 53-54)

Table 10 summarizes the savings from the Carryover Custom projects.

Table 10: Summary of BEER – Carryover Custom Program Impact Findings

BEER Carryover-Custom	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	N/A	N/A	N/A	N/A	N/A	N/A
Ex Ante Gross	N/A	57,618,258	57,618,258	N/A	11,684	11,684
Ex Post Gross	N/A	68,726,774	68,726,774	N/A	9,655	9,655
Ex Post Net	N/A	63,228,632	63,228,632	N/A	8,883	8,883

(Source: Navigant PY2015 EM&V Report, Table 2-1 and Table 2-2, pp. 53-54)

Combining the previously reported savings and the "carryover" savings, gives the overall reported BEER Custom results shown in Table 11. It is assumed that the carryover savings arises

from Custom projects initiated in 2014, and completed in 2015. However this has not been verified with the utility or with the Evaluator.

Table 11 BEER Custom Including Originally Reported and Carryover

BEER Custom incl Carryover	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	9,481,194	20,704,037	30,185,231	2,590	5,411	8,001
Ex Ante Gross	13,622,419	103,277,803	116,900,222	1,776	19,852	21,628
Ex Post Gross	15,149,259	119,503,971	134,653,230	2,017	18,931	20,948
Ex Post Net	13,937,318	109,943,653	123,880,971	1,856	17,417	19,273

Business Energy Efficiency Rebate Standard Program

The KCP&L-MO Business Energy Efficiency Rebate (BEER) Standard Program provides incentives for energy efficient upgrades for business customers. A set of standard measures are available through the standard program.

In PY2015 the BEER Standard Program achieved 36.3 percent (5,958.6 MWh) of its proposed savings target (16,419.1 MWh). The BEER Standard program accounts for approximately 31 percent of total energy savings target in 2015. During the two-year program cycle, (PY2014-PY2015) overall total gross savings reported *ex ante* is 7,117,467 kWh (see Table 10). The Evaluator reported a total gross savings of 6,586,819 kWh, which led to a rate of 93 percent for energy savings and an even higher realization rate 100 percent for demand reduction (see Table 12).

Table 12: Summary of BEER Standard Program Impact Findings

Business Standard Program	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	9,804,201	16,419,078	26,223,279	2,012	3,304	5,316
Ex Ante Gross	118,952	6,998,515	7,117,467	22	1,259	1,281
Ex Post Gross	110,083	6,476,736	6,586,819	22	1,261	1,283
Ex Post Net	101,276	5,958,597	6,059,873	20	1,160	1,180

(Source: Navigant PY2015 EM&V Report, Table 2-1 and Table 2-2, pp. 53-55)

Home Appliance Recycling Rebate Program Impact Evaluation

The Home Appliance Recycling Rebate (HARR) Program provide rebates for recycling working secondary appliances with an emphasis focus on refrigerators and freezers.

In PY2015 the Home Appliance Recycling Rebate Program achieved 121.7 percent (905.3 MWh) of its proposed savings target (743.6 MWh). However, this program only accounts for approximately one percent of total energy savings target in 2015. The Home Appliance Recycling Rebate Program PY2014-PY2015 total gross savings reported *ex ante* is 1,274,253 kWh (see Table 13). The Evaluator reported total gross savings of 2,417,710 kWh which resulted in a significant realization rate of 190 percent.

Table 13: Summary of Home Appliance Program Impact Findings

Home Appliance	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	204,943	743,606	948,549	33	119	152
Ex Ante Gross	422,667	851,586	1,274,253	72	145	217
Ex Post Gross	801,129	1,616,581	2,417,710	98	198	296
Ex Post Net	448,632	905,286	1,353,918	55	111	166

(Source: Navigant PY2015 EM&V Report, Table 3-1 -Table 3-3, p. 122)

Air Conditioning Upgrade Rebate Program

The Air Conditioning Upgrade Rebate (ACUR) Program (formerly Cool Homes program) focuses on improving efficiency through upgrades of residential heating, ventilation, and air conditioning (HVAC) through testing, tune-up, and, if needed, replacement (Navigant PY2015 EM&V Report, p. 92).

In PY2014-15 the ACUR program achieved 42.9 percent (1,783.8 MWh) of its proposed savings target (4,157.3 MWh) (see Table 14).

Table 14: Air Conditioning Upgrade Rebate Program Impact Findings

Air Conditioning Upgrade Rebate	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	2,165,320	1,992,012	4,157,332	1,260	1,153	2,413
Ex Ante Gross	876,014	2,345,924	3,221,939	487	1,328	1,815
Ex Post Gross	699,240	1,849,116	2,548,356	778	2,085	2,862
Ex Post Net	489,468	1,294,381	1,783,849	545	1,459	2,004

(Source: Navigant PY2015 EM&V Report, Table 4-1-4-3, pp. 145-146)

Home Lighting Rebate Program

This Home Lighting Rebate (HLR) aims to improve lighting efficiency through an instant rebate upstream lighting program that reduces the cost for KCP&L-MO customers to purchase efficient light bulbs. Customers can visit a number of participating retail stores to purchase compact fluorescent lamp (CFL) and light-emitting diode (LED) light bulbs at subsidized prices that bring the cost below typical retail costs (Navigant PY2015 EM&V Report, p. 187).

In PY2014-15 the HLR program achieved 215 percent (33,662 MWh) of its proposed savings target (17,516.4 MWh) as the following table shows.

Table 15: Home Lighting Rebate Program Impact Findings

Home Lighting Rebate	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	6,632,643	10,883,754	17,516,397	704	1,155	1,859
Ex Ante Gross	28,402,347	16,475,996	44,878,343	3,020	1,751	4,771
Ex Post Gross	22,128,977	17,515,572	39,644,550	3,568	2,790	6,358
Ex Post Net	21,022,528	16,639,793	37,662,323	3,390	2,651	6,040

(Source: Navigant PY2015 EM&V Report, Tables 5-1-5-3, pp. 188-189)

Income-Eligible Weatherization Program

The Income Eligible Weatherization (IEW) Program for program provides energy efficiency services to KCP&L-MO's residential customers who meet the program's income eligibility requirements. The program assists low-income customers in reducing energy use and bills by weatherizing their homes (Navigant PY2015 EM&V Report, p. 219).

In PY2014-PY2015 total gross savings reported ex ante is 442,110 kWh, however this program was excluded from impact EM&V, per Stipulation and Agreement, paragraph 18. Thus, the values shown as N/A were not evaluated. In these cases, the *Ex Post* Net and Gross savings are equal to the *Ex Ante* Gross value (see Table 16).

Table 16: Summary of Income-Eligible Weatherization Program Impact Findings

Income-Eligible Weatherization Program	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	178,645	580,631	759,276	65	173	238
Ex Ante Gross	3,717	438,393	442,110	3	325	328
Ex Post Gross	N/A	N/A	N/A	N/A	N/A	N/A
Ex Post Net	N/A	N/A	N/A	N/A	N/A	N/A

(Sources: Navigant PY2015 EM&V Report, Tables 6-1-6-3, p. 220)

Income-Eligible Home Energy Report Program

The Income-Eligible Home Energy Report Program (IE-HER) is designed to generate energy savings by providing residential customers with information about their specific energy use and energy conservation suggestions and tips. Participating households receive the reports monthly by email and every other month by U.S. mail. Customers may also log on to a program website to learn more ways to save energy and to report conservation steps they have taken (Navigant PY2015 EM&V Report, p. 234).

The IE-HER Program impact evaluation used a stipulated NTG of 1.0 but the gross savings (realization rate) was evaluated for the combined 2014-2015 years. The Evaluator states that the individual program years were not reported since they would not produce statistically-valid results. The Evaluators also noted that there were two waves of home energy reports, labeling them Wave 1 and Wave 2. It appears that Wave 1 was entirely in 2014 and Wave 2 in 2015. Thus it is possible to distinguish the waves as program years. The Evaluator points out that the IE-HER program, particularly showed a low realization rate of only 38 percent. The findings are highlighted in Table 17.

Table 17: Summary of Income-Eligible Home Energy Report Impact Findings

Income Eligible Home Energy Report	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	723,966	2,478,148	3,202,114	-	769	769
Ex Ante Gross	674,338	1,942,125	2,616,463	-	603	603
Ex Post Gross	N/A	N/A	988,725	N/A	N/A	274
Ex Post Net	N/A	N/A	988,725	N/A	N/A	274

(Sources: Navigant PY2015 EM&V Report, Tables 7-1-7-3, pp. 234-235)

Home Energy Report Program

The Home Energy Report Program (HER) Program is designed to generate energy savings by providing residential customers with information about their specific energy use and energy conservation suggestions and tips. Participating households receive the reports monthly by email and every other month by U.S. mail. Customers may also log on to a program website to learn more ways to save energy and to report conservation steps they have taken.

Table 18 shows the reported and evaluated non-income eligible portion of the HER program. The Evaluator conducted a billing analysis of participants and a random control group to calculate the program savings; because of this approach, NTG values are set to 1.0.

Table 18: Summary of Home Energy Report Impact Findings

Home Energy Report	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	3,922,043	13,397,205	17,319,248	-	4,124	4,124
Ex Ante Gross	3,830,703	13,088,028	16,918,731	-	4,029	4,029
Ex Post Gross	N/A	N/A	14,376,399	N/A	N/A	3,979
Ex Post Net	N/A	N/A	14,376,399	N/A	N/A	3,979

(Sources: Navigant PY2015 EM&V Report, Tables 7-1-7-3, pp. 234-235)

Building Operator Certification Program

The Building Operator Certification (BOC) Program provides a rebate to building operators who attend and complete the Building Operator Certification training program (Navigant PY2015 EM&V Report, p. 278).

In PY2015 the BOC program achieved 70 percent (1,062.8 MWh) of its proposed savings target (1,518.5 MWh). The BOC program accounts for approximately three percent of total energy savings target in 2015. The BOC program PY2014-PY2015 total gross savings reported *ex ante* is 3,492,552 kWh. Overall the BOC Program had a total gross savings of 2,444,587 kWh, which yielded a gross realization rate of 70 percent (see Table 19).

Table 19: Summary of Building Operator Certification Program Impact Findings

Build. Operator Certification	Energy (kWh)			Demand (kW)		
	2014	2015	2014-15	2014	2015	2014-15
Target	759,251	1,518,500	2,277,751	87	173	260
Ex Ante Gross	1,974,051	1,518,501	3,492,552	225	173	398
Ex Post Gross	1,381,836	1,062,751	2,444,587	158	121	279
Ex Post Net	1,381,836	1,062,751	2,444,587	158	121	279

(Sources: Navigant PY2015 EM&V Report, Tables 8-1-83, pp. 279-280)

Energy Analyzer Program

The Energy Analyzer (EA) Program offers online tools designed to help customers learn about a variety of energy efficiency solutions for their home and business such as lighting, HVAC and insulation

solutions. The program has been running since July 26, 2014 in KCP&L-MO territory (Navigant PY2015 EM&V Report, p. 298).

The EA Program was excluded from impact EM&V, per Stipulation and Agreement, paragraph 18.

Similarly, the Energy Analyzer for Small Business Program (EASB) offers online tools designed to help customers learn about a variety of energy efficiency solutions for their home and business such as lighting, HVAC and insulation solutions. The program has been running since July 26, 2014 in KCP&L-MO territory.

This program was also excluded from impact EM&V, per Stipulation and Agreement, paragraph 18.

Programmable Thermostat Program

The Programmable Thermostat (PT) Program is a direct load control (DLC) program that allows KCP&L-MO to call demand response (DR) events during peak demand periods by sending a signal to participating thermostats that causes them to run HVAC systems in reduced load mode for up to four hours. The combined PY2014-2015 findings are summarized in Table 20 (Navigant PY2015 EM&V Report, p. 310).

Table 20 Summary of Programmable Thermostat Program Impact Findings

Programmable Thermostat	Demand (kW)		
	2014	2015	2014-15
Target	17,590	2,371	19,961
Ex Ante Gross	18,515	2,200	20,714
Ex Post Gross	18,515	2,220	20,735
Ex Post Net	18,515	2,220	20,735

(Sources: Navigant PY2015 EM&V Report, Tables 10-1-10-3, pp. 310-311)

1.2 Summary of Impact Evaluation Recommendations

The evaluators provided a total of 33 impact recommendations to improve KCP&L's energy efficiency portfolio. Figure 4 summarizes the number of distributions by topic area while Figure 5 summarizes the total number of recommendations by program.

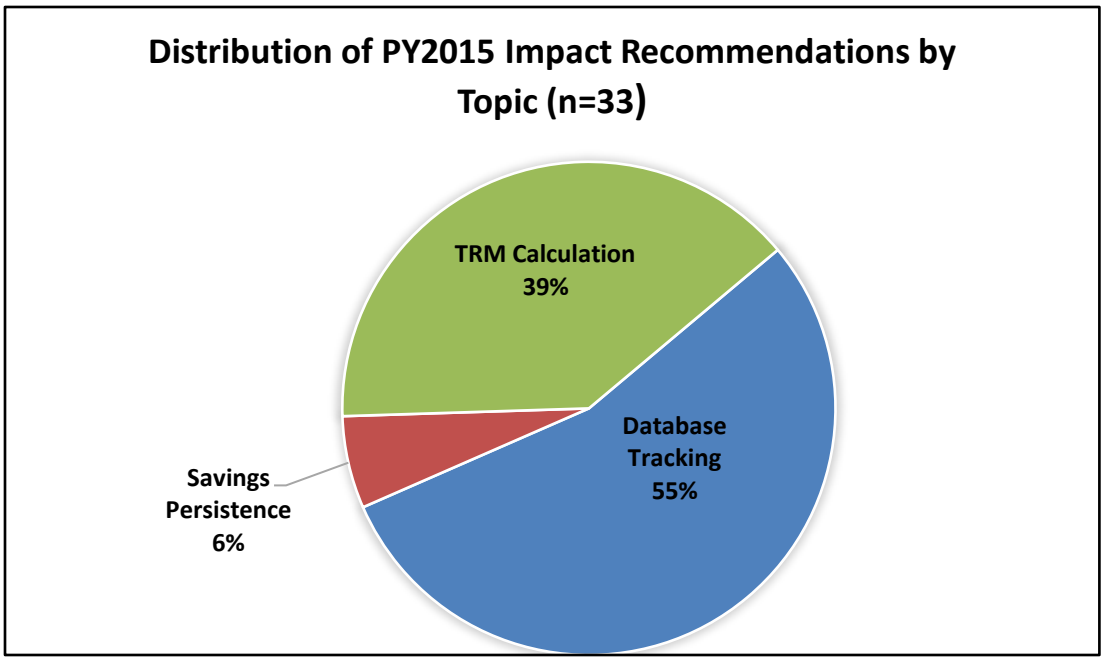


Figure 4: Distribution of PY2015 Impact Recommendations by Topic

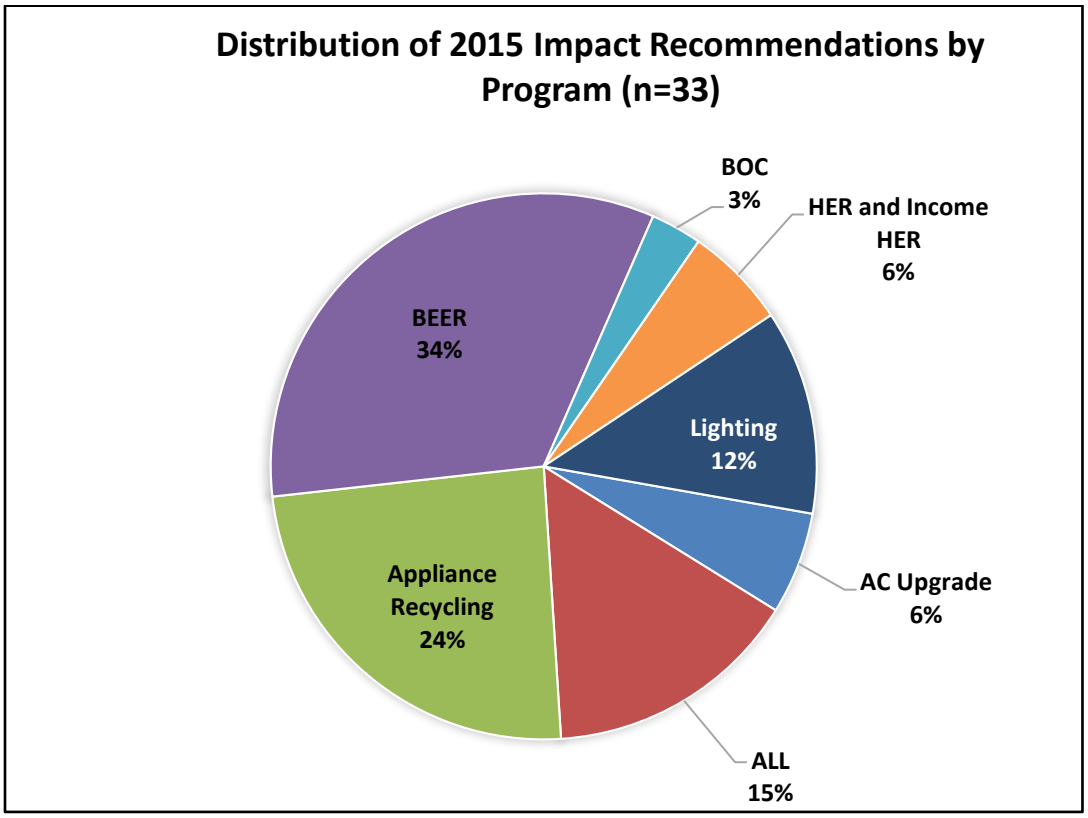


Figure 5: Distribution of 2015 Impact Recommendations by Program

These 33 impact recommendations are summarized by topic area next.

Database Tracking

Navigant provided the following recommendations on ways to improve the database tracking systems across all of KCP&L's programs:

- Align savings values within the electronic program tracking database with the supporting project files (Navigant PY2015 EM&V Report, pp. 21, 56-57);
- Store and track all project-related documentation, including revised savings calculations and energy models, to facilitate evaluation and tracking of savings. While most files provided sufficient support, the evaluation team often made multiple requests to secure the accurate documentation. (Navigant PY2015 EM&V Report, pp. 21,56);
- Include both gross and net savings in the electronic tracking data and provide any assumptions regarding net-to-gross ratios (Navigant PY2015 EM&V Report, p. 21); and
- To the extent possible, track hours of operation / occupancy of buildings and residences before and after participant to support additional impact measurement through billing analysis (Navigant PY2015 EM&V Report, p. 21).

The evaluators also provided several recommendations on ways to improve the database tracking for the following programs:

BEER Program

- Include the total quantity installed value in the program tracking database for the Custom Program. Many entries contained a value of 1. (Navigant PY2015 EM&V Report, p. 22);
- Align savings values within the electronic program tracking database with the project files. (Navigant PY2015 EM&V Report p. 56);
- Specify the measure types by end use for all measures (Navigant PY2015 EM&V Report, p. 105);
- Include facility/building type in the database (Navigant PY2015 EM&V Report p. 105);
- Standardize the project files (Navigant PY2015 EM&V Report, p. 105); and
- Store and track all project-related documentation (Navigant PY2015 EM&V Report, p. 22).

Building Operator Certification (BOC) Program

- Incorporate level of certification achieved, participation dates, in particular when the class was attended, and building square footage of the building (Navigant PY2015 EM&V Report, p. 22).

Home Appliance Recycling Rebate Program

- Include data for key parameters such as age of appliance, location, and capacity for all participants.
- Report gross savings in addition to net savings in the tracking data. (Navigant PY2015 EM&V Report, pp. 22, 123).

Home Lighting Rebate Program

- Incorporate bulb wattage and style directly into the tracking database to reduce the likelihood of mismatches as products are cycled in and out of the program (Navigant PY2015 EM&V Report,

pp. 22, 190).

Savings Persistence

- KCP&L-MO should consider measuring savings persistence experimentally in MEEIA Cycle 2 (Navigant PY2015 EM&V Report, p. 252); and
- KCP&L-MO should measure the persistence of energy savings in the HER Program empirically rather than assume that savings persistence is 100 percent (Navigant PY2015 EM&V Report, p. 252).

TRM Calculation

All Programs

- Update tracked savings values and the supporting Technical Reference Manual on an annual basis to reflect the most current evaluation findings to include supporting algorithms and performance variable assumptions around operation hours, equipment sizes and efficiencies (Navigant PY2015 EM&V Report, p. 21).

BEER Program

- Improve calculations by including Waste Heat Factors for the lighting projects which have conditioned spaces and site-specific Coincident Demand Factor for the lighting projects (Navigant PY2015 EM&V Report, pp. 22, 57);
- Capture baseline conditions in the project files, if possible (Navigant PY2015 EM&V Report, p. 57);
- Use a well-defined deemed measure savings list that includes a baseline case and corresponding efficient case (Navigant PY2015 EM&V Report, p. 57);
- Include a spreadsheet or scanned document showing how the reported savings were calculated (Navigant PY2015 EM&V Report, p. 57); and
- Including Waste Heat Factors for the lighting projects which have conditioned spaces and site specific Coincident Demand Factor for the lighting projects (Navigant PY2015 EM&V Report, p. 56).

Air Conditioning Upgrade Rebate Program

- For lighting measures, include the baseline wattage and efficient replacement wattage to accurately calculate savings. Provide detailed assumptions, such as waste heat factors and operation hours, to assist in replicating the tracked savings (Navigant PY2015 EM&V Report, p. 22).

Home Lighting Rebate Program

- Update per-unit savings values based on current bulb mix and verified savings estimates (Navigant PY2015 EM&V Report, pp. 22, 190); and
- Include gross energy and demand savings and the associated NTG values in addition to the net

energy and demand savings currently in the tracking data. (Navigant PY2015 EM&V Report, p. 190).

HER and Income-HER

Navigant recommends that MEEIA change its method of producing its incremental energy and demand savings targets for the HER and IE-HER Programs to reflect a more realistic assumption about savings persistence (Navigant PY2015 EM&V Report. p. 22).

Home Appliance Recycling Rebate Program

- Include methodology used to calculate the reported savings. The assumptions made in absence of deemed values may have resulted in lower verified savings (Navigant PY2015 EM&V Report, pp. 22, 123); and
- Include coincident factors for each appliance to accurately calculate peak demand savings (Navigant PY2015 EM&V Report, p. 123).

Section 2: Summary of Key Findings and Recommendations from the Process Evaluations

2.1 Summary of Process Evaluation Findings

This section summarizes the key findings from the process evaluations of KCP&L's energy efficiency program portfolio targeting both residential and business customers. It is based on a thorough review of the EM&V report prepared for each program. References are provided throughout to aid the reader. The findings are organized by key topic area to facilitate the analysis across the entire portfolio.

Program Performance

The Home Lighting Rebate Program has successfully achieved its participation and savings targets. The program continues to exceed its targets. In its first 18 months of operation, the program sold over 1,100,000 bulbs in KCP&L-MO territory, and achieved 193 percent of its reported net savings target of 17.5 GWh. The evaluators determined that the program planning documents, flow diagrams, and quality assurance/quality control (QA/QC) procedures suggest a well-designed program all contributed to its success (Navigant PY2015 EM&V Report, pp. 207-208).

However, GMO's program has increased participation by adding several new retailers in PY2015, particularly local hardware retailers, mass merchant retailers, and other smaller retailers, while KCP&L-MO has not (Navigant PY2015 EM&V Report, p. 211).

KCP&L-MO's HLR program is functioning well and reaching sufficient number of customers to more than reach its participation and savings goals. However, there is always room for improvement, and it is possible that while overall program participation is even higher than projected, certain customer segments are underrepresented and would more readily participate in the program with the addition of more diverse retailers (Navigant PY2015 EM&V Report, p. 211).

In addition, the Programmable Thermostat Program has come close to its kW enrollment, but it has exceeded its budget targets in PY2014-15. (Navigant PY2015 EM&V Report, p. 313).

But some programs are struggling to meet participation and savings goals. For example, the HER program is producing energy savings in line with their goals but the IE-HER program is not. Opt-outs remain low for both programs (Navigant PY2015 EM&V Report**,** p. 274).

In PY2015, the IEW Program struggled to meet it participation goals, but faces several challenges. The CAP agencies have long project waitlists and the staff has difficulties in communicating with the participating CAP agencies. In addition, the staff confirmed that the funding limits imposed by the CAPs leads to staffing shortages, which create project backlogs. These problems are further exacerbated by long processing times for payments, which further constrains the CAP agencies' resources. Moreover, the program is not meeting current savings targets (Navigant PY2015 EM&V Report, pp. 225, 226).

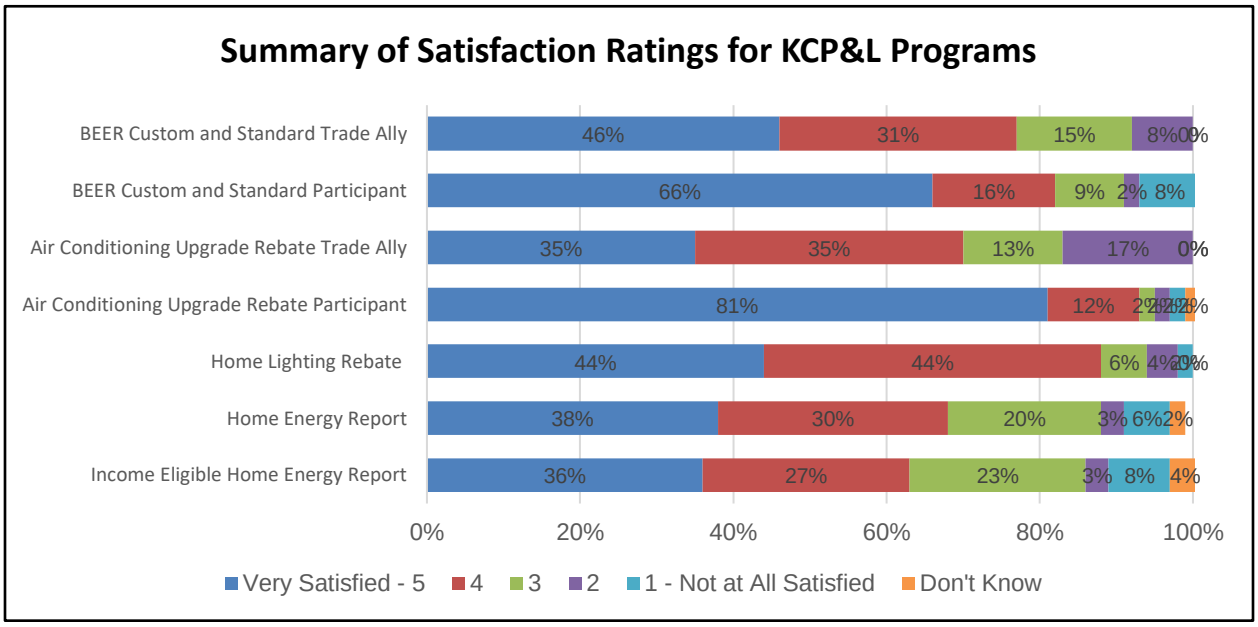
The number of participants in the BOC program has decreased from 2014 to 2015. According to the program manager, part of the decrease in participation is due to market saturation. The program spent 77 percent of its budget (Navigant PY2015 EM&V Report, p. 294).

Several KCP&L Programs were discontinued in PY2015. The HARR program implementation company (JACO) entered receivership in November 2015. KCP&L-MO staff worked quickly to wrap up operations smoothly and the program ended in PY2015. (Navigant PY2015 EM&V Report, pp. 32, 124)

Starting in PY2016, the IEW Program will no longer be a part of MEEIA but will still be delivered by KCP&L-MO **(**Navigant PY2015 EM&V Report, p. 221). Due to declining participation, the BOC Program ended in PY2015, but customers will still be able to receive a rebate for the certification through the BEER Custom Program (Navigant PY2015 EM&V Report p. 281).

Customer Satisfaction

Participants and trade allies report a high level of satisfaction across these programs. Many of these groups rated program satisfaction near 80 percent ("4" or higher on a five-point scale, where "5" means "very satisfied"). HER results differ from the other programs where a large share of participants rated program satisfaction "5" out of "10" (where "10" means "extremely satisfied"[10]); this result is typical of opt-out programs like HER. (Navigant PY2015 EM&V Report, p. 40)



(Source: Navigant Participant Fast Feedback, End-of-Year, In-Store Intercept, and Trade Ally Surveys; Opower Customer Engagement Tracker Survey (p. Navigant PY2015 EM&V Report, p. 40)

Figure 6: Summary of Satisfaction Ratings for KCP&L Programs

[10] For the purposes of this graphic, Navigant converted the responses of the program IC's survey scale of 1-10 to Navigant's scale of 1-5.

Participant satisfaction is also high. Eighty-two percent of participants rated their satisfaction with KCP&L energy efficiency programs overall as a "4" or "5" on a five-point scale (where "5" is very satisfied) and 66 percent gave the highest rating (Navigant PY2015 EM&V Report, pp. 40-41, 111, 183, 184).

The HER program produces high satisfaction and increases positive perception of KCP&L-MO. Furthermore, the program has satisfied most participants and increased their positive perceptions of KCP&L-MO's energy efficiency efforts and trustworthiness (Navigant PY2015 EM&V Report pp. 40, , 237).

Trade Ally Satisfaction

Trade ally satisfaction is also very high across the portfolio. For the BEER Program, 77 percent trade ally were satisfied and 46 percent gave the highest satisfaction. This is consistent with the previous satisfaction ratings reported in the GMO evaluation in 2013 and 2014 (Navigant PY2015 EM&V Report p. 111).

The BEER trade allies are satisfied with the application process as 100 percent of trade allies rated their satisfaction with the application process as a "3" or higher (Navigant PY2015 EM&V Report pp. xxxix, 16, 62). In addition, these trade allies are generally satisfied with amount and type of communications with KCP&L-MO (Navigant PY2015 EM&V Report, p. 112).

Most of the ACUR trade allies rated their satisfaction very high, but four (out of 23) rated the program at a two (using the one-to-five scale). When asked the reason why they gave it a low rating, one trade ally expressed dissatisfaction with the program requirements that all units receive a pre-check and pre-qualification. The other trade ally stated that they gave the program a low rating because they "can't offer [the program] to their Kansas customers." (Navigant PY2015 EM&V Report, p. 182).

Marketing

KCP&L-MO implemented a thorough and extensive advertising campaign in May through September of 2015, including the use of billboard, radio, and television advertisements leading to increased participation for some programs. As a result, KCP&L-MO's fall marketing push increased usage of the residential tool and the number of online audits completed Energy Analyzer and SB Energy Analyzer (Navigant PY2015 EM&V Report, pp. 38, 124, 137, 148, 172, 299).

The marketing promotions were so effective, that the planned marketing for the HLR was curtailed since the program was exceeding its savings goals without the marketing. In addition, incented sales of CFLs also had to be curtailed midway through the year due to high participation (Navigant PY2015 EM&V Report, p. 208).

The HARR program uses communication channels and delivery mechanisms that are appropriate for the target market. The program communicates through a variety of media including print, radio, bill inserts, and direct marketing (pp. 32, 124).

The ACUR program used various communications channels effectively. KCP&L-MO thorough and extensive advertising campaign, conducted in May through September of 2015 and referenced above, included the use of billboard, radio, and television advertisements. While the ACUR program began in July of 2014 with fairly low participation rates, the 2015 marketing effort increased participation. The

program was able to achieve high level of participation from June to September of 2015, despite experiencing a relatively cool summer (Navigant PY2015 EM&V Report, p. 148, 179).

Marketing Benchmarking Results

Most of KCP&L-MO's marketing and outreach activities met or exceeded California Best Practices for marketing and outreach for most of its programs (pp. 109, 180, 211, 228, 255, 275, 304, 323-324). The KCP&L-MO marketing campaign included direct mailings, emails, in-store advertisements, social media advertisements, and bill inserts. The advertisements produced by the campaign were sophisticated, aesthetically pleasing, and contemporary looking. The marketing campaign also included a series of televisions advertisements that spoofed the PBS's "Antiques Roadshow", where instead of learning the value of an antique item, the contestants learned the value of appliance recycling. These best practices include using targeted marketing strategies and promoting the benefits of the program (Navigant PY2015 EM&V Report, p. 138).

Program Awareness

The results regarding program awareness were mixed, despite KCP&L's marketing and outreach strategies. For example, HLR evaluation revealed that program discounts are not as influential as in-store information in respondents' decision to purchase energy efficient bulbs (Navigant PY2015 EM&V Report p. 191).

The HER Program evaluation found that, surprisingly, the participants are no more aware of other specific KCP&L-MO programs, when compared to a control group**.** Both participant groups are no more aware of other specific KCP&L-MO programs, when compared to a control group (Navigant PY2015 EM&V Report, p. 269).

For the BOC program, both communication channels and delivery mechanisms are appropriate for the target market segment, but is mostly focused on outreach by Key Account Managers (Navigant PY2015 EM&V Report, p. 37).

However, a few BEER trade allies reported low awareness of available marketing materials from KCP&L-MO (Navigant PY2015 EM&V Report, pp. 31, 58).

Program Operations

Program operations were mixed. The HER Program recipients reported reduced energy usage while the IE-HER participants did not lower energy usage (Navigant PY2015 EM&V Report, p. 36). But both participant groups report taking specific steps to lower energy usage similar to as the control group (Navigant PY2015 EM&V Report, pp. 36, 237).

For the HARR program, KCP&L-MO staff responded to the closing of their program implementer quickly and thoroughly, ensuring that participants were minimally affected. When KCP&L-MO learned that JACO had not sent rebate checks to participants since September of that year, they worked with JACO to develop a list of unpaid participants and began sending rebates the next week. KCP&L-MO also began a campaign to notify customers who had received checks from JACO to notify them not to deposit the bad checks. (Navigant PY2015 EM&V Report, p. 32).

The implementation contractor redesigned the EA tool in PY2015. The new tools provided full functionality to residential customers and limited functionality to 10,000 small business customers in 2015. Only residential customers have access to the online audit or neighborhood comparison. However, small business customers can explore their usage, view a commercial tip library, and create a savings plan for their business. Navigant found that KCP&L-MO's efforts to broaden access to online audit tools for residential and commercial customers achieved their goal of helping educate their customers and increased participation in their DSM programs (Navigant PY2015 EM&V Report, pp. 38, 299).

Performance Tracking

Overall performance tracking was sufficient for most program operations. For the most part, the program databases did include the KPIs, even for programs that inherited an older database from the previous implementer (Navigant PY2015 EM&V Report, p. 33).

But this was not consistent across all programs. For example, the evaluators found that the ACUR Program is not consistently tracking KPIs in the main database (Navigant PY2015 EM&V Report, p. 148).

Trade Ally Engagement

Trade allies are generally satisfied with amount and type of communications with KCP&L-MO. Trade allies report high satisfaction with the amount and type of communication from KCP&L, 67 percent rate their satisfaction or a 4 or 5 on a five-point scale. Trade allies report they would like to receive information monthly or as needed but all of them want to receive information through email. Trade allies also report satisfaction with the marketing materials provided to them, with 58 percent rating satisfaction as a 3 or above. (Navigant PY2015 EM&V Report, p. 183).

For the ACUR Program, the staff focused on increasing trade ally engagement in PY2014-15 by requiring that trade allies complete a certain number of projects to remain on the list of active trade allies; redesigning the trade ally incentive process; and ensuring that the field technicians received the incentive for completing projects (Navigant PY2015 EM&V Report, pp. 33, 148).

Communications

The HARR program uses communication channels and delivery mechanisms that are appropriate for the target market. The program communicates through a variety of media including print, radio, bill inserts, and direct marketing (Navigant PY2015 EM&V Report, p**.** 141).

The ACUR program used various communications channels effectively. KCP&L-MO implemented a thorough and extensive advertising campaign in May through September of 2015, including the use of billboard, radio, and television advertisements. While the program began in July of 2014 with fairly low participation rates, the 2015 marketing effort increased participation. The program was able to achieve high level of participation from June to September of 2015, despite experiencing a relatively cool summer (Navigant PY2015 EM&V Report, p. 185).

There are also good communications in place with the retailers participating in the HLR Program and the implementation contractor which kept the program participation on pace with program budget (Navigant PY2015 EM&V Report, p. 209. However, both the program and contractor staff reported that key information is not shared in a timely manner between the IC's upper management and the IC's day-to-day

program manager, resulting in decreased effectiveness of communication between KCP&L-MO and the IC (Navigant PY2015 EM&V Report, p. 211).

But communication for the IEW between KCP&L-MO and the agencies is generally limited to customer approval and billing (Navigant PY2015 EM&V Report, pp. 35, 221).

While the BOC program targeted the specific market segment for program recruitment. The program's marketing messages were seen to clearly communicate the benefits of the training in tangible terms that are valued by the prospective trainee. Marketing messages are personalized, where feasible. (Navigant PY2015 EM&V Report, p. 292).

Cross Program Participation

The evaluators found that the Energy Analzyer and Small Business Energy Analyzer Programs have been effective in promoting cross-program participation because it channels participants to other EE programs by providing users program-specific tips that have language centered on other KCP&L-MO EE programs. These tools also provide the KCP&L-MO rebates and incentives available for a certain program (Navigant PY2015 EM&V Report, p. 232).

In addition, the HER Program also led to increased participation among in both the Air Conditioning Upgrade Rebate and the Home Appliance Recycling Rebate (Navigant PY2015 EM&V Report, p. 273)

Barriers to Participation

Some program participants in the IE-HER Program may not be able to make the recommended improvements because they are either renters or cannot afford the installations (Navigant PY2015 EM&V Report, pp. 36, 237).

In addition, the long project waitlists have led to program drop outs for the IEW Program. Furthermore, the IEW Program is also facing a decreasing eligible population due to saturation of the targeted market, large building owners (Navigant PY2015 EM&V Report, pp. 35, 221).

The HLR Program manager reported that although the program is available to customers in through a broad mix of channels, the lack of access to more detailed sales-level transaction records prevents more specific customer targeting for those segments (Navigant PY2015 EM&V Report, p. 210).

The main barriers to entry into the Energy Analyzer program identified by Navigant are technology-related. This free tool for KCP&L-MO customers is provided through the corporate website. This requires a computer, tablet, or smart phone, Internet access, and computer literacy. A potential barrier for some residential customers is the time commitment required to complete all levels of the initial home energy assessment. However, customers can save their work and return later to complete the assessment if needed (Navigant PY2015 EM&V Report, p. 308).

Program Design

The current program design of the Custom and Standard BEER Program's incentive levels are insufficient (Navigant PY2015 EM&V Report, p. 31). The trade allies are also concerned about the lower incentive levels for PY2016, as they made reduce the number of projects they complete (Navigant PY2015 EM&V Report, p. 115)

Program Changes

KCP&L also made some adjustments to enhance program operations. For example, the contractor redesigned the online audit tool for its Energy Analyzer and Small Business Energy Analyzer Programs (Navigant PY2015 EM&V Report, p. 38). To address these issues, KCP&L streamlined the application processing times and established application processing targets for its Standard and Custom Programs (Navigant PY2015 EM&V Report, pp. 112-113).

KCP&L-GMO is also planning to make several changes to some of its programs in PY2016. These changes include discontinuing CFLs for the Lighting Program and only incentivizing LEDs (Navigant PY2015 EM&V Report, p. 208).

KCP&L-GMO will also be testing new Nest learning Wi-Fi enabled thermostats and will develop a unique algorithm based on customer living patterns, comfort thresholds, and how they set and adjust their thermostats starting in PY2016 (Navigant PY2015 EM&V Report, p. 313)

Areas for Program Improvement

The evaluators identified a number of areas for improving the KCP&L-GMO programs, which are summarized in their recommendations. Overall, these suggestions include:

- Address throughput bottlenecks for the IEW Program (Navigant PY2015 EM&V Report, p. 35);
- Standardize reporting (Navigant PY2015 EM&V Report, p. 35); and
- Address participant concerns regarding comparisons to neighbors by providing additional clarifying language (Navigant PY2015 EM&V Report, p. 274).

2.2 Status of Previous Process Recommendations

The evaluators provided a progress report regarding the status of the 13 previous process evaluation recommendations, including five the 2009 program evaluation. These findings are summarized in Table 21.

Table 21: Number of Process Recommendations from Previous Evaluations

Year	Number
2009	5
Marketing	1
Operations	3
Program Design	1
2014	8
Communications	3
Database Tracking	1
Operations	2
Program Design	2
Grand Total	**13**

As Figure 7 shows, most of the previous recommendations (46%) have been implemented and 15 percent are no longer applicable. Only one-third (31%) were not implemented.

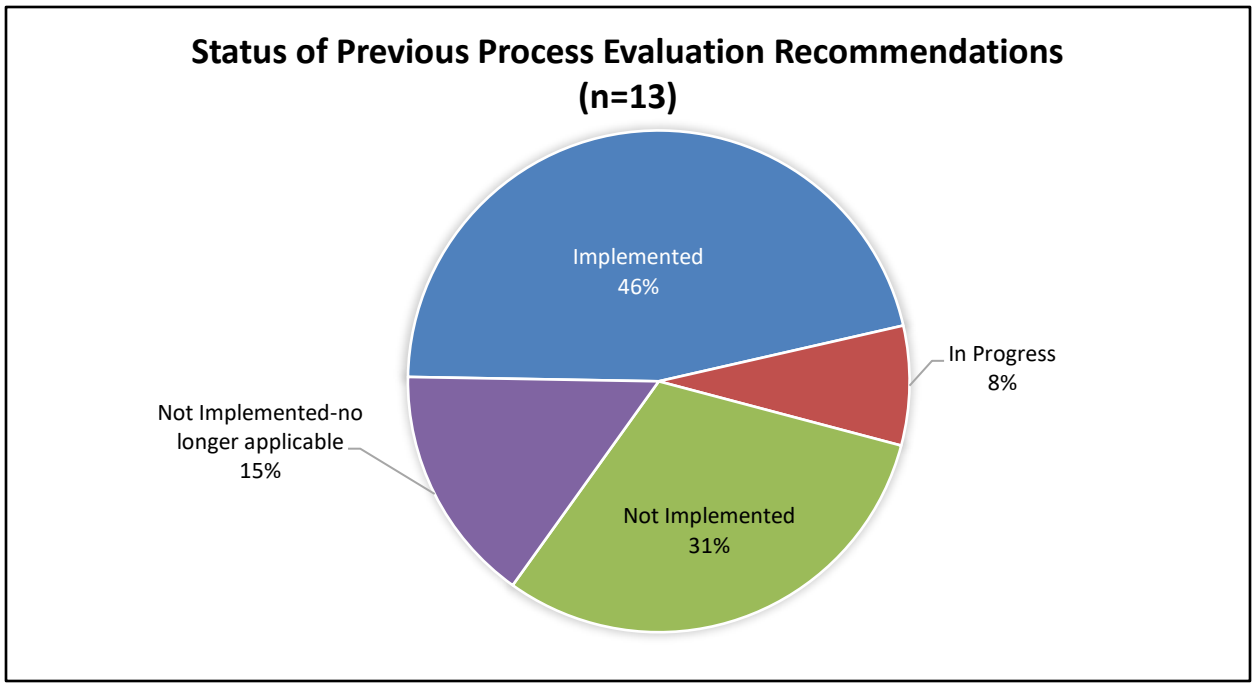


Figure 7: Status of Previous Process Evaluation Recommendations

2.3 Summary of PY2015 Process Evaluation Recommendations

The process evaluations included 26 recommendations on specific ways in which KCP&L could improve its current program offerings. The key recommendations are grouped by topic area while details for each specific recommendation are provided in the Navigant PY2015 evaluation report. As Figure 8 shows, 54 percent of these new evaluations focused on improving program operations.

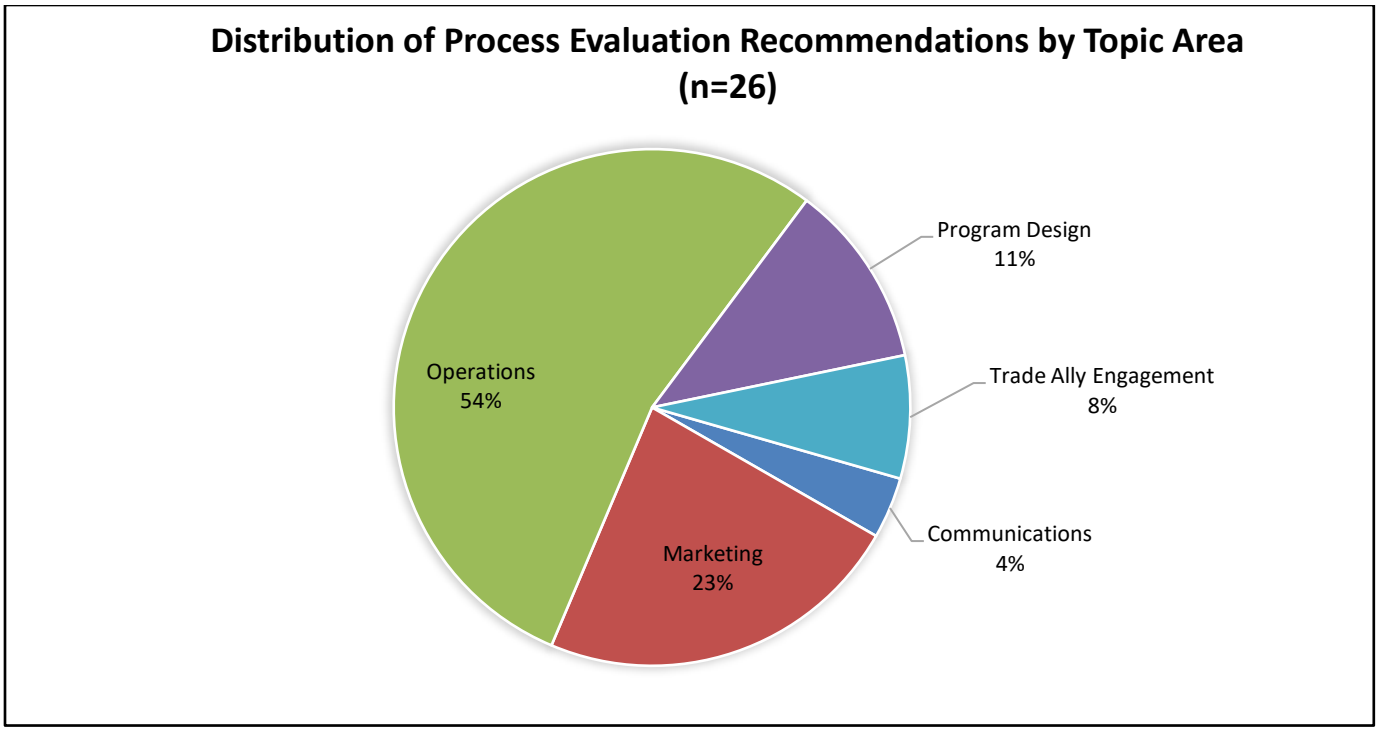


Figure 8: Distribution of Process Evaluation Recommendations by Topic Area

Communications

- As a way to improve the IEW Program, Navigant recommended that KCP&L-MO should take advantage of the agencies' quarterly meetings to strategize solutions to the bottlenecks (Navigant PY2015 EM&V Report, p. 35).

Marketing

The evaluators provided six recommendations on ways to improve the marketing and outreach strategies for KCP&L's program including increasing promotions in new venues, continuing to reach out to trade allies and providing customer education.

- KCP&L-MO should continue to perform outreach to trade allies on the marketing materials that are available to them (Navigant PY2015 EM&V Report p. 58);
- KCP&L-MO should continue to emphasize energy savings benefits of behavioral measures but offer more segment-specific messaging to IE-HER participants as well as developing an educational component highlighting energy saving behaviors to complement the new capabilities of the learning thermostats. (Navigant PY2015 EM&V Report p. 274); and
- Consider additional promotion of KCP&L-MO programs in the HER, especially through the program's Marketing Modules and should also should consider more prominent messaging on the report around the information available on the Energy Analyzer web portal (Navigant PY2015 EM&V Report p. 237).

Operations

Navigant provided 17 recommendations on ways to improve overall operations across all of KCP&L's programs. These recommendations included developing better coordination with the program implementers and CAP agencies to enhance and improve program activities, identify ways to improve overall energy savings and program performance, complete development on the planned program updates and continue to track program performance against budget and participation goals. These recommendations are summarized next.

- KCP&L-MO should meet with its various program implementers to identify ways in which these programs can improve and meet their energy savings and participation goals especially for the IE-HER and IEW programs through enhanced coordination and communication (Navigant PY2015 EM&V Report pp. 35). The utility should also work with Nest Labs to extend the program's capability to achieve energy savings while maintaining and expanding its DR capacity (Navigant PY2015 EM&V Report p. 23);
- Navigant also recommended that KCP&L continue to monitor critical program benchmarks such as application processing times, participation levels in other KCP&L programs, and spending to ensure that the programs are operating as efficiently as possible (Navigant PY2015 EM&V Report pp. 31, 33, 58).; and
- KCP&L should also continue its plans to improve program operations. For example, the HLR should enhancing its dealer network for the HLR retailers and complete the planned audit tool for small, medium and large business customers (Navigant PY2015 EM&V Report, p. 179).

Program Design

Navigant provided two recommendations regarding program design changes that KCP&L should consider for the BEER and HER and IE-HER programs. They support the changes to the incentive levels, but recommend conducting additional research into the income eligible segment prior to making program changes (Navigant PY2015 EM&V Report, p. 262).

Trade Ally Engagement

Navigant also continued to encourage KCP&L to increase its trade outreach activities, especially providing additional training for retailers in the HLR Program (Navigant PY2015 EM&V Report, p. 34). KCP&L should also continue to provide trade ally training on its new incentive structure and application processes for its BEER Program (Navigant PY2015 EM&V Report, p. 31).

Section 3: Review of Cost-Effectiveness

Benefit-Cost Methodology

Navigant performed cost-benefit analyses using the five standard benefit-cost ratios: Total Resource Cost (TRC) Test, Societal Cost Test (SCT), Program Administrator Cost Test (PACT), Participant Cost Test, (PCT) and Ratepayer Impact Measure (RIM) Test, following the 2001 California Standard Practice Manual (SPM) but does not account for the subsequent 2007 SPM Clarification Memo (Navigant PY2015 EM&V Report, pp. 23-24).

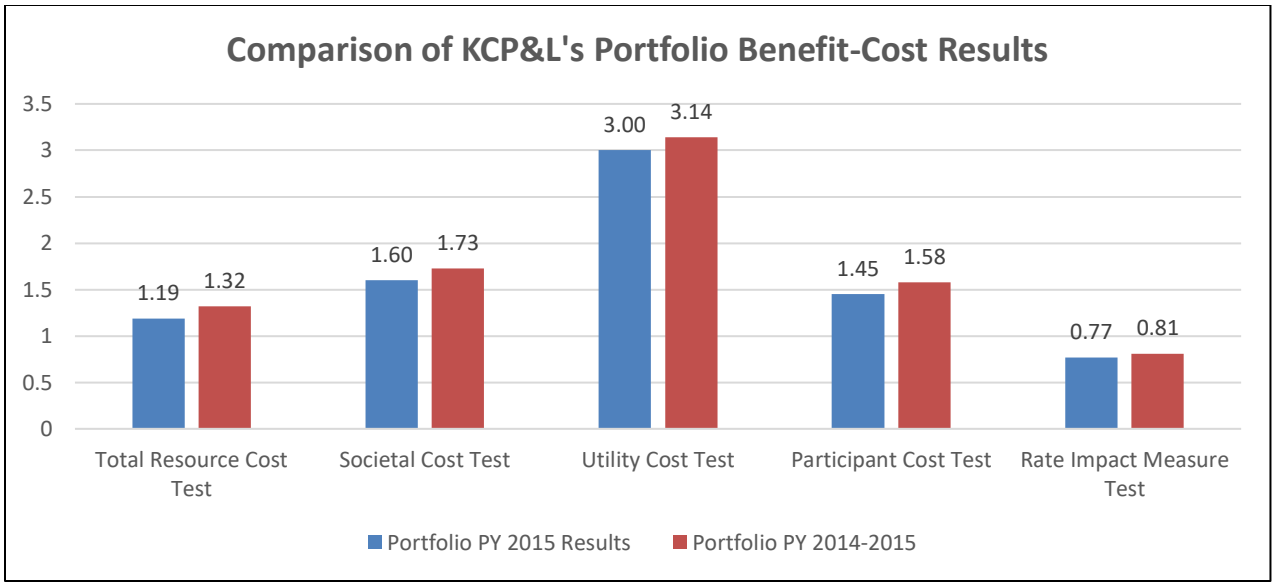
The cost-effectiveness section of the report provides a comprehensive list of assumptions and included costs; and discussions on the application of different of discount rates and for the treatment of free riders (Navigant PY2015 EM&V Report, pp. 23-29). An extensive discussion of the allocation of costs for the early retirement of air conditioners in the ACUR Program is provided (Navigant PY2015 EM&V Report, p. 5-6). Navigant used the evaluated NTG for all applicable programs (Navigant PY2015 EM&V Report, p. xxiii). Assumptions developed by Navigant, and not provided by KCP&L, include energy and peak demand savings, EUL and RUL values and participant equipment costs (Navigant PY2015 EM&V Report, Table 1-4, p. 47).

The audit team confirmed the discounting of the benefits and costs for the cost-effectiveness tests with Navigant. A summary of how Navigant discounted is included below:

- 2014 B/C ratios: cash flows discounted to 2014;
- 2015 B/C ratios: cash flows discounted to 2015;
- Aggregate 2014-2015 B/C ratios: cash flows discounted to 2014;
- 2014 monetary costs and benefits: discounted to 2014;
- 2015 monetary costs and benefits components: discounted to 2015;
- 2014 savings: represent first-year savings only, so no discounting;
- 2015 savings: represent first-year savings only, so no discounting;
- Aggregate 2014-2015 savings: simple sum of 2014 and 2015 first-year savings, so no discounting; and
- 2014 should only reflect the participants acquired during the last ~6 months of the year, so savings are lower, but they still represent the full first-year (after implementation) of savings.

Cost-Effectiveness Results

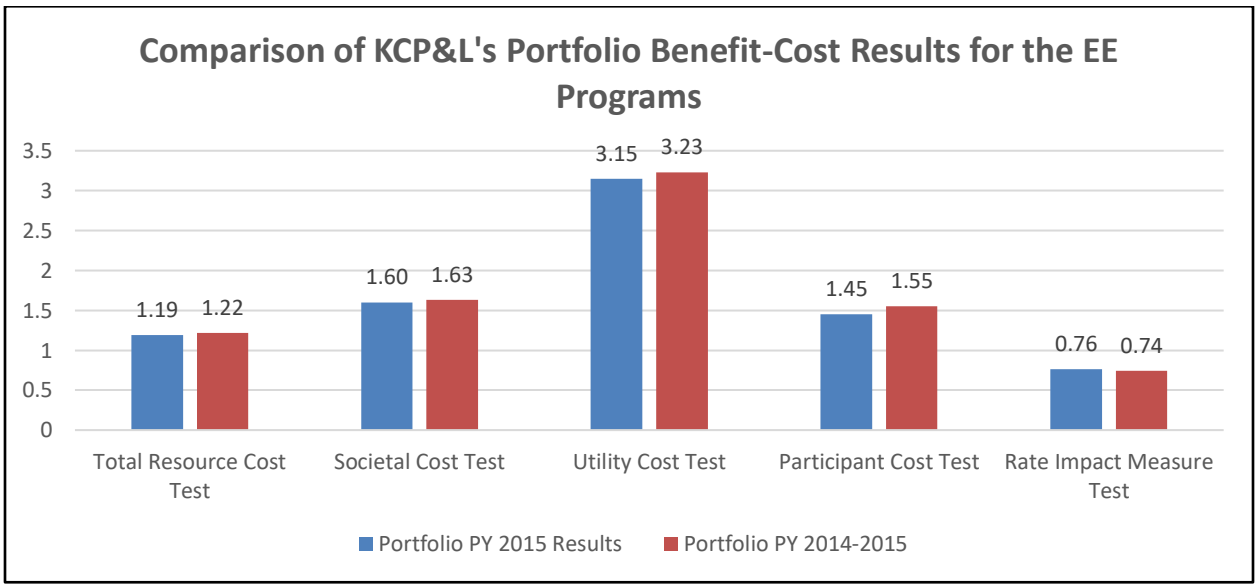
KCP&L's overall program portfolio is cost-effective for PY2015. As Figure 9 shows, KCP&L's overall energy efficiency and DR portfolio continues to be cost-effective, though the benefit-cost ratios have declined slightly over the program period.



(Source: Navigant PY2015 EM&V Report, pp. 25- 27)

Figure 9: Comparison of KCP&L's Portfolio Benefit-Cost Results

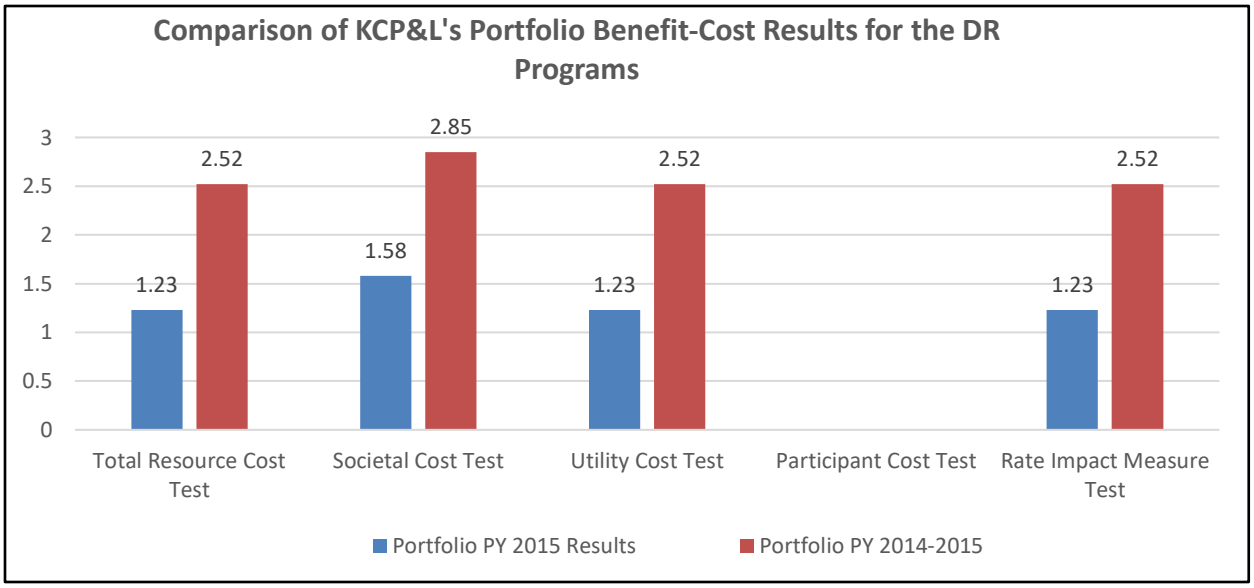
As Figure 10 illustrates, the energy efficiency programs are cost-effective across all tests, except for the RIM test. Again, the results show a slight decline as the program period continues.



(Source: Navigant PY2015 EM&V Report, pp. 28-29)

Figure 10: Comparison of KCP&L's Portfolio Benefit-Cost Results for the Energy Efficiency Programs

Both of KCP&L's DR programs continue to be very cost-effective both on an annual and cumulative basis. These programs also pass all of the benefit-cost tests, including the RIM as Figure 11 shows.



(Source: Navigant PY2015 EM&V Report, pp. 28-29)

Figure 11: Comparison of KCP&L's Portfolio Benefit-Cost Results for the Demand Response Programs

However, cost-effectiveness varies considerably across the programs on a cumulative (PY14-15) basis. The C&I Programs showed higher cost-effectiveness relative to the residential programs, with the exception of the Home Lighting Rebate program (Navigant PY2015 EM&V Report, Table ES-12, ES-15, pp. 27-29). These differences are highlighted in Table 22.

Table 22: Benefit-Cost Ratios by Program and Cost Test - Program to Date - PY2014-PY2015

Program		Total Resource Cost Test	Societal Cost Test	Utility Cost Test	Participant Cost Test	Rate Impact Measure Test
C&I EE Programs	BEER – Custom	1.19	1.62	3.68	1.33	0.81
	BEER – Standard	1.31	1.76	3.22	1.52	0.83
Residential EE Programs	Home Appliance Recycling	0.89	1.05	0.67	INF*	0.28
	Air Conditioning Upgrade	1.04	1.38	1.08	1.65	0.64
	Home Lighting Rebate	1.81	2.02	2.684	5.73	0.39
	Income-Eligible Weatherization	1.19	1.61	1.19	INF*	0.65
	Home Energy Report	1.61	1.61	1.61	INF*	0.42
	Home Energy Report – IE	0.16	0.16	0.16	INF*	0.13
Educational Programs	Building Operator Certification	8.27	9.04	10.21	24.93	0.79
DR Programs	Programmable Thermostat	2.52	2.85	2.52	INF*	2.52

* Ratios are infinite because there are positive benefits and not participant costs.

(Source: Navigant PY2015 EM&V Report, p. 27)

Both the Custom and Standard C&I program offerings and the Building Operator Certification program are cost effective as Table 22 shows (Navigant PY2015 EM&V Report, p. 27). In addition, most of the residential programs have positive TRC and UCT results, with the HLR Program showing a cost-effectiveness ratio of 1.81 for the TRC and 2.68 for the UCT. There were several residential programs failing to pass the TRC test based on program results to date (Navigant PY2015 EM&V Report, p. 27). KCP&L's demand response program had the highest TRC and UCT ratios of any program in KCP&L's portfolio (Navigant PY2015 EM&V Report, p. 27).

Section 4: EM&V Auditor Findings and Recommendations

As presented in the two-year evaluation, measurement, and verification (EM&V) Plan, Navigant developed a multi-year evaluation strategy to provide KCP&L and stakeholders with the best information possible over the course of the program cycle within the available evaluation financial resources. Navigant's plan concentrates on those programs with the greatest contribution to overall portfolio savings (Navigant PY2015 EM&V Report, pp. xvii)

4.1 Evaluation Methodologies

In year one, for the impact evaluation, Navigant completed a detailed review of all data contained in the tracking system as well as the algorithms and/or deemed savings values used for ex ante savings estimates. The methodologies used to complete this review are summarized in Table 23.

Table 23: Summary of Impact Evaluation Methodologies Used in the EM&V Reports

Program		Tracking System and Database Review	Engineering Review and Analysis	Participant Telephone Surveys	Billing Analysis	Onsite Verification and Metering
Business Energy Efficiency Rebate	Custom	✓	✓	✓	✓	✓
	Standard	✓	✓	✓	✓	✓
Residential Energy Efficiency	Home Appliance Recycling Rebate	✓	✓			
	Air Conditioning Upgrade Rebate	✓	✓	✓		
	Home Lighting Rebate Program	✓	✓	✓		
	Income-Eligible Weatherization	Excluded from impact EM&V, per Stipulation and Agreement, paragraph 18.				
	Building Operator Certification	✓	✓	✓		
	Energy Analyzer	Excluded from impact EM&V, per Stipulation and Agreement, paragraph 18.				
	Energy Analyzer for Small Business					
	Income-Eligible Home Energy Report	✓		✓		
	Home Energy Report	✓		✓	✓	
Demand Response	Programmable Thermostat	✓				

(Source: Navigant PY2015 EM&V Report, Table ES-8, p. 20)

To complete the PY2015 process evaluations, Navigant completed the following activities which are also summarized in Table 24.

- Review the status of the program's progress toward implementing the key process recommendations provided in the program's most recent EM&V report;
- Identify program process improvements to increase program participation and savings; and
- Address the five required questions per the MO Regulations.

Table 24: Summary of Primary Research for Process Evaluation

Program	Participant	Trade Ally
BEER Custom	Fast Feedback Telephone Survey	End-of-Year Telephone Survey
BEER Standard	Fast Feedback Telephone Survey	End-of-Year Telephone Survey
ACUR	End-of-Year Telephone Survey	End-of-Year Telephone Survey
HLR	Mid-Year In-store Intercept	
HER	Mid-Year Telephone Survey	
HER-IE	Mid-Year Telephone Survey	

(Source: Navigant PY2015 EM&V Program, p. 48)

4.2 Summary of 4 CSR 240-22.070(8) Requirements

As part of the 4 CSR 240-22.070(8) requirements, the program evaluations were required to meet specific requirements specified in 4 CSR 240-22.070(8).

Process Evaluation Findings

As part of the MEEIA requirements, Navigant also provided responses to each question posed in the 4 CSR 240-22.070(8). These responses, which were quite thorough are summarized in Tables 25-Table 29.

1. What are the primary market imperfections that are common to the target market segment?
2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?
3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?
4. Are the communication channels and delivery mechanisms appropriate for the target market segment?
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?

Table 25: 4 CSR 240-22.070(8) Issue #1

Program	Response
Business Energy Efficiency Rebate- Custom & Standard	*The C&I Standard and Custom Programs address several market imperfections of the target market of all commercial and industrial customers.: 1) first cost barrier; 2) limited customer awareness; and 3) prioritization of energy efficiency.*
Home Appliance Recycling Rebate	*The HARR program addresses two major market imperfections of the target market of all residential customers in the KCP&L-MO service area: 1) lack of momentum in customer decision-making and action, and 2) lack of awareness of recycling procedures for large appliances...The HARR program also serves to overcome the barrier of residential customers not being aware of the procedures for recycling large appliances. By arranging to remove the appliance and transport it to a recycling center, the program effectively addresses this issue.*
Air Conditioning Upgrade Rebate	*The ACUR program addresses several market imperfections of the target market of all residential customers.: 1) additional incremental cost associated with high-efficiency units and 2) the length of the payback period. The targeted market segment for the ACUR program is all residential customers with existing, working central AC units or heat pumps. Customers who have their units tested by a program-certified HVAC technician... Many residential customers are concerned that the payback period is too long or that the energy savings will not be enough to justify the additional upfront costs…Residential customers are often concerned that they will not stay in their current residence long enough to see the benefit from the more expensive unit. Another key market imperfection that ACUR addresses is the variance in the level of quality of work done by HVAC contractors in specifying equipment to install and in performing the installation. Customers generally are unaware of these variances... The program also provides training and technical support to contractors to facilitate quality work.*
Home Lighting Rebate	*There are three primary market imperfections common to the efficient home lighting market: 1. Relatively high upfront costs of efficient CFL and LED bulbs relative to incandescent and halogen bulbs 2. Longer payback period for LEDs and a lack of understanding of the payback period by consumers for both CFLs and LEDs; 3. Lack of consumer awareness of the benefits, characteristics and functioning of modern CFL and LED bulb technologies and their potential to reduce energy use and save customers money over time.*
Income-Eligible Weatherization Program	*The program target markets low-income residences, both owned and rented. The primary difficulty in this market is that low-income residents generally cannot afford professional home weatherization services such as the installation of insulation, efficient windows, and heating and cooling system repairs…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.*
Home Energy Report and Income-Eligible Home Energy Report	*The HER and IE-HER Programs address two market imperfections fundamental to residential customers:* *1) the information asymmetry between the energy end user and the energy provider regarding how end-use behaviors contribute to the monthly bill.* *2) awareness of cost-effective strategies to reduce energy use in the home.*
Building Operator Certification Program	*The program addresses the need and cost required to appropriately train building operators in managing their facilities energy usage. The program addresses three primary market imperfections: Provide high quality training in the service area (where none may have existed before); Connect customers that have building operators with the training; Cover half the tuition of the training*

Program	Response
Energy Analyzer and Energy Analyzer for Small Business	*The program addresses the primary market imperfection of informing KCP&L-MO customers of how their behavior and energy consuming appliances affect overall energy usage. The program provides tools to better understand and guidance on how to better manage their energy consumption.*
Programmable Thermostat Program	*The primary market imperfection the PT program addresses is that customers have little incentive to reduce usage during peak periods given the price structures in place at many utilities. As a result, utilities use DLC programs to obtain needed demand flexibility using opt-in designs…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 lower cost.*

(Sources: Navigant PY2015 EM&V Report, pp. 118-120, 141, 184-186, 217-218, 231, 276-277, 295-297, 307-308, 326-327)

Table 26: 4 CSR 240-22.070(8) Issue #2:

Program	Response
Business Energy Efficiency Rebate- Custom & Standard	*The target market for these two programs is all C&I customers within KCP&L-MO territory, regardless of size or rate class. In general, this is similar to what is done in similar programs at other utilities and is considered to be an appropriate target market. The presence of the Custom Program in addition to the Standard Program ensures that larger customers with more complex systems and energy efficiency needs are able to participate in the KCP&L-MO program offerings.*
Home Appliance Recycling Rebate	*The target market for this program is all residential customers within KCP&L-MO territory. While this is in line with similar programs at other utilities, these programs sometimes also work with businesses. Expanding the target market to include businesses would capture additional savings.*
Air Conditioning Upgrade Rebate	*The target market segment for the ACUR programs includes residential customers with working inefficient HVAC systems. The program should consider opening up the program to very small businesses and multi-family complexes. These customers likely have the same type of units as residential customers and would greatly benefit from the tune-up and associated rebate.*
Home Lighting Rebate	*The program market segment is appropriately defined as all KCP&L-MO residential customers buying light bulbs.... The program's portfolio of stores is diverse in that it includes mass merchants, home improvement stores, economy retailers, and food banks... Additionally, the online store delivers the program to customers who are far from participating stores and to those who need or prefer the convenience of shopping from home. Small businesses and landlords of multi-family units may also be purchasing bulbs from retailers through the program, however, and KCP&L-MO is aware that their program may serve a broader market than the implied residential-only target market.*
Income-Eligible Weatherization Program	*The program defines the target market of low-income customers to be both home-owning and renting utility customers who have household incomes below 200 percent 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, and if renters, be fully responsible for electricity bills. This market for low-income home weatherization is well-defined and does not need to be consolidated or expanded because in reflecting Federal Poverty Guidelines it properly reflects market realities.*

Program	Response
Home Energy Report and Income Eligible Home Energy Report	*The target market segment for the HER Program is appropriately defined as residential customers with the highest energy consumption. The focus on residential customers is appropriate because residential customers often lack awareness of their actual energy usage and the available alternatives for saving energy. The focus on high-end users is appropriate because, since their consumption is higher than average, they have greater opportunities to save and should save more energy, on average, than others. In future program years, the program can be expanded to include additional residential customers. The target market segment for the IE-HER program is appropriately defined as low-income residential customers.*
Building Operator Certification Program	*The BOC program has a narrow target market in the large commercial/industrial sector, and it is appropriately defined. For the class to be relevant and beneficial to the student and KCP&L-MO, the students need to be directly associated with operating a facility, managing people directly, or consulting/advising those who are directly operating and managing a facility. … The program has been focusing on large building owners.... However, the program's decreasing participation suggests that the current target market may be saturated. The utility could conduct an assessment to estimate the pool of potential participants in the current targeted market (large building owners) and in other potential market segments (small and medium building owners) which might benefit from training.*
Energy Analyzer and Energy Analyzer for Small Business	*The program's target market segments consist of 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 EA/EASB tools are customers who perceive their bills as high and customers who are motivated by the "green movement." Combining the small business non-demand rate customers with residential customers is appropriate... The utility identified medium and large on-demand rate customers as an additional sub-segment and is developing a similar tool for that population. Thus, KCP&L-MO appropriately defined and targeted the market segments.*
Programmable Thermostat Program	*The target market is all residential and small commercial KCP&L-MO customers with peak demand less than 200 kW and having HVAC systems accessible through installation of a communicating, programmable thermostat. This represents a very large segment of KCP&L-MO's total residential and small commercial customer markets. There is no need to expand this market, as large commercial customers are better served by the Demand Response Incentive (DRI) program. There is also no reason to further subdivide this target market, as both residential and small commercial customers are well-served in a similar manner by the program. Some large C&I and institutional customers are also eligible for inclusion in the Innovari DR pilot.*

(Sources: Navigant PY2015 EM&V Report, pp. 118-120, 141, 184-186, 217-218, 231, 276-277, 295-297, 307-308, 326-327)

Table 27: 4 CSR 240-22.070(8) Issue #3

Program	Response
Business Energy Efficiency Rebate- Custom & Standard	*The end-use mix provided by the Standard Program is sufficient. The Standard Program offers a wide mix of end-use measures... This is typical among programs in markets that have a lot of low-hanging fruit. Despite the variety of end uses included in the Standard Program, participants chose Custom over Standard, even for lighting. In sum, Navigant finds the end-use mix of the Standard Program sufficient and recognizes the greater diversity of end uses that the Custom Program offers. However, … the Custom Program achieved significant lighting savings suggests that there may be barriers specific to the Standard Program that divert participation to the Custom Program. KCP&L-MO is aware of the differing incentive levels in the Custom program and is moving to a $/kWh rate and is shifting measures from Custom to Standard in MEEIA 2.*
Home Appliance Recycling Rebate	*The mix of end-use measures included is appropriate. The HARR program offers recycling services for four qualifying appliances: refrigerators, freezers, dehumidifiers, and window air conditioners. Thus, this mix serves homeowners and renters in single-family units as well as in multi-family units.*
Air Conditioning Upgrade Rebate	*The measure mix is appropriate as the program focuses primarily on residential HVAC energy consumption by providing rebates for the purchase of high-efficiency equipment as well as tuning existing units to their most efficient operating condition. In addition, the program incentivizes efficient lighting through CFL bulb giveaways.*
Home Lighting Rebate	*The mix of CFL and LED bulbs generally available for rebates under the program appropriately reflects the diversity of bulb options within the efficient home lighting market. The program offers discounts on standard CFL and LED bulbs, as well as specialty products such as flame and globe shaped bulbs and 3-Way bulbs. Many brands and models of CFL and LED bulbs are included in the rebate program, and the mix of bulbs is continually monitored and updated by the IC to reflect market realities. However, in reaction to higher than anticipated sales volume in KCP&L-MO during PY2015, the program curtailed all incented sales of CFLs for the last five months of the year, limiting the variety of bulbs available to KCP&L-MO customers.*
Income-Eligible Weatherization Program	*End-use measures included in the program include all home weatherization measures typically completed for non-low-income home weatherization projects, and thus reflect the 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, as well as heating and air conditioning system repairs.*
Home Energy Report and Income Eligible Home Energy Report	*The program recommends steps to reduce energy use that span the typical end uses of residential customers. This program is considered a behavioral program because customers install no equipment or measures directly rebated by the program. The energy reports communicate household energy consumption and compare customers to similar households in order to increase awareness and motivate the recipients to take action to reduce consumption. Every report includes three recommendations for ways to reduce energy use that are selected based on the customer's demographics and any conservation steps taken (as self-reported through the program website).*
Building Operator Certification Program	*The BOC program offers a wide mix of end-use measures, and it is appropriate for the target customers. Municipalities, commercial high rise building owners, hospitals, manufactures, warehouses, and others all receive training on how to operate their building efficiently... These courses provide knowledge specific to end-use technologies toward the specific target markets. Also, in order to maintain certification, participants must take a refresher course every two years; graduates must complete a minimum of credit hours to maintain certification.*

Program	Response
Energy Analyzer and Energy Analyzer for Small Business	*The tools appropriately reflect the diversity of end-use energy service needs of the target market. The residential tool has five components: 1. Explore own usage,* *2. Neighbor comparison,* *3. Online audit,* *4. Tip library, and* *5. Savings plan for customer's home.*
Programmable Thermostat Program	*KCP&L-MO offers both commercial and residential DR programs, which cover the diversity of energy service needs and technologies available. The IC, remotely controls thermostats in participating homes and businesses to put HVAC systems on energy optimizing behavior patterns during curtailment event periods.*

(Sources: Navigant PY2015 EM&V Report, pp. 118-120, 141, 184-186, 217-218, 231, 276-277, 295-297, 307-308, 326-327)

Table 28: 4 CSR 240-22.070(8) Issue #4

Program	Response
Business Energy Efficiency Rebate- Custom & Standard	*The C&I Standard and Custom Programs use communication channels and delivery mechanisms that are appropriate for the target market. The C&I Standard and Custom Programs have a good presence on the KCP&L-MO website. The C&I Standard and Custom Programs have hired a trade ally manager focused on trade ally outreach and program awareness in 2014. Trade allies report high satisfaction with the amount and type of communications from KCP&L... KCP&L program staff reported an uptick in the municipalities, universities, schools, and hospitals (MUSH) market participation when compared to 2014. This is a market where KCP&L completed additional outreach activities.*
Home Appliance Recycling Rebate	*The HARR program uses communication channels and delivery mechanisms that are appropriate for the target market. The program communicates through a variety of media including print, radio, bill inserts, and direct marketing. The "It's Worth What?" marketing campaign implemented in PY2014-15 effectively used these various means of communication to reach participants through multiple channels, thus increasing awareness and participation in KCP&L-MO territory.*
Air Conditioning Upgrade Rebate	*The ACUR program uses a variety of techniques to promote the program to their customers, and the breadth of the material offered is effective and appropriate. While the program is designed for KCP&L-MO customers to make the initial contract with a program-certified HVAC contractor, Navigant's research for GMO in PY2014 suggests that most participants learn about the program from their HVAC contractor, which suggests the importance of supporting trade allies in promoting the program to customers. Additionally, in PY2015 KCP&L-MO has increased trade ally outreach, ensuring that trade allies are better informed about the program and more engaged with the program.*
Home Lighting Rebate Income Eligible Weatherization Program Home Lighting Rebate	*In-depth interviews with program staff and the implementers suggest that both communication channels and delivery mechanisms are appropriate for the target market segment: potential purchasers of standard socket light bulb. In PY2015 the utility recognized that television and internet mass marketing of the program is not necessary. Participation was higher than expected even in advance of the planned mass-marketing campaign, thus KCP&L-MO cancelled the campaign for the HLR program and reallocated advertising funds to programs with lower participation rates. The IC markets to potential customers through in-store events, placement of in-store marketing materials and signage, training of retaile staff, in-person advice and guidance to retail shoppers on efficient lighting from field representatives in the store, as well as community outreach events. The program incentive is in anstant rebate which streamlines participation. Low-income customers receive free CFL bulbs through the food bank component of the program.*

Program	Response
Home Energy Report and Income-Eligible Home Energy Report	*The HER Program uses two primary communication channels: monthly emails and paper mailers every other month. 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 impact of any efficiency and consumption changes they make. A sample mailer is provided in Appendix D. The program also provides a web portal so users can receive more tips and commit to implementing them, KCP&L-MO staff noted that participation in the web portal increased in 2015.*
Building Operator Certification Program Income Eligible Weatherization Program	*Both communication channels and delivery mechanisms are appropriate for the target market segment, but low participation suggests there is an opportunity for improvement. Because the community of potential participants is relatively small, the outreach by Key Account Managers is appropriate for commercial and industrial building owners and employees in charge of facility maintenance for large buildings. Also, recommendations by previous participants provides credibility for the program. In addition, the MO DOE engages level I participants to continue for level II certification. However, relatively low participation might mean that communication channels and delivery mechanisms could be improved. In particular, it seems that there are quite a few participants far from the training center, and thus cannot take advantage of the Certification Communication channels and delivery mechanisms are appropriate for the target market, low-income customers. Low-income customers can access program benefits through their local CAPs....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. Because the target population is low-income and likely has access to other benefits and information through CAPs, having CAPs serve as liaisons managing the application process for low-income customers is an appropriate delivery mechanism. 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 low-income households, as it does not require travel or a large time commitment on the part of the prospective program participant…professional home weatherization is a highly valuable benefit to low-income customers, allowing them to reduce their energy use and consequently their energy bills, freeing up income for other necessities.*
Energy Analyzer and Energy Analyzer for Small Business Home Energy Report and Income Eligible Home Energy Report	*Both communication channels and delivery mechanisms are appropriate for the target market segment. OPower handles all communication issues and delivery mechanisms for the EA/EASB Program. After the change in implementation contractor and a complete redesign of the tool, there was a full comprehensive marketing campaign in the fall for the EA/EASB. This marketing outreach was aimed specifically at residential customers, because only a subset of small business customers had access to the Analyzer in 2015, and not all capabilities are enabled yet. The Small Business Analyzer is still in development and KCP&L-MO plans to provide to a broader set of customers in 2016. The campaign resulted in a marked increase in the number of audits completed. The HER Program uses two primary communication channels: monthly emails and paper mailers every other month. 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 impact of any efficiency and consumption changes they make. A sample mailer is provided in Appendix D. The program also provides a web portal so users can receive more tips and commit to implementing them, KCP&L-MO staff noted that participation in the web portal increased in 2015.*

Program	Response
Programmable Thermostat Program Building Operator Certification Program	*Both communication channels and delivery mechanisms are appropriate for the target market segment. Honeywell handles all communication issues and delivery mechanisms for the PT program…Honeywell actively markets the program to KCP&L-MO customers using a direct mail and telemarketing approach. Honeywell communicates with the participating customer's device during a curtailment event. Honeywell handles all aspects of program delivery…Program delivery consists of a Honeywell field representative visiting the customer's site to install the communicating and programmable thermostat and connect it to the HVAC system. The only requirement for the customer is to be present to allow the Honeywell representative on site to install the device. Delivery during a curtailment event consists of Honeywell's systems interacting directly with participating customers' communicating thermostats, without the need for any action on the part of the customer. Both communication channels and delivery mechanisms are appropriate for the target market segment, but low participation suggests there is an opportunity for improvement. Because the community of potential participants is relatively small, the outreach by Key Account Managers is appropriate for commercial and industrial building owners and employees in charge of facility maintenance for large buildings. Also, recommendations by previous participants provides credibility for the program. In addition, the MO DOE engages level I participants to continue for level II certification. However, relatively low participation might mean that communication channels and delivery mechanisms could be improved. In particular, it seems that there are quite a few participants far from the training center, and thus cannot take advantage of the Certification*
Energy Analyzer and Energy Analyzer for Small Business	*Both communication channels and delivery mechanisms are appropriate for the target market segment. OPower handles all communication issues and delivery mechanisms for the EA/EASB Program. After the change in implementation contractor and a complete redesign of the tool, there was a full comprehensive marketing campaign in the fall for the EA/EASB. This marketing outreach was aimed specifically at residential customers, because only a subset of small business customers had access to the Analyzer in 2015, and not all capabilities are enabled yet. The Small Business Analyzer is still in development and KCP&L-MO plans to provide to a broader set of customers in 2016. The campaign resulted in a marked increase in the number of audits completed.*
Programmable Thermostat Program	*Both communication channels and delivery mechanisms are appropriate for the target market segment. Honeywell handles all communication issues and delivery mechanisms for the PT program…Honeywell actively markets the program to KCP&L-MO customers using a direct mail and telemarketing approach. Honeywell communicates with the participating customer's device during a curtailment event. Honeywell handles all aspects of program delivery…Program delivery consists of a Honeywell field representative visiting the customer's site to install the communicating and programmable thermostat and connect it to the HVAC system. The only requirement for the customer is to be present to allow the Honeywell representative on site to install the device. Delivery during a curtailment event consists of Honeywell's systems interacting directly with participating customers' communicating thermostats, without the need for any action on the part of the customer.*

(Sources: Navigant PY2015 EM&V Report, pp. 118-120, 141, 184-186, 217-218, 231, 276-277, 295-297, 307-308, 326-327)

Table 29: 4 CSR 240-22.070(8) Issue #5

Program	Response
Business Energy Efficiency Rebate- Custom & Standard	*Navigant's research indicates that the following would be useful in helping to overcome identified market imperfections: Creating a set of increased incentives targeted at small commercial customers can help the segment overcome the first cost barrier of energy efficient technologies. Increasing outreach efforts to contractors (through industry events, newsletters, or emails) can increase trade ally participation. Providing marketing materials for participating trade allies to give to their customers can address barriers of limited customer awareness. KCP&L-MO is planning to address these market barriers in MEEIA 2 by increasing outreach to trade allies and establishing performance levels for specific marketing efforts. The program should also consider creating a type of financing program for all C&I customers. This would allow participants the opportunity to undertake more expensive and extensive energy efficiency projects that they would not be able to otherwise, thus increasing the program savings.*
Home Appliance Recycling Rebate	*The HARR program can increase customers' awareness of the benefits of recycling large, inefficient appliances through program marketing activities. Also, the program overcomes the lack of momentum to deal with customers' inefficient appliances by making the decision to recycle an old appliance an easy and convenient choice for homeowners. The program may also consider working directly with appliance retailers to recycle units they pick up when they deliver new units, as the program does in the GMO territory.*
Air Conditioning Upgrade Rebate	*The ACUR program can more effectively overcome the market imperfections associated with the adoption of high-efficiency HVAC units by continuing to grow and support the participating trade ally network. Navigant recognizes that combining the elements of ACUR program with the Home Energy Audit Program in the Home Energy Savings program starting in PY2016 will allow the program to more effectively overcome market imperfections than the current ACUR program did, by increasing the number of high-efficiency actions undertaken by program participants.*
Home Lighting Rebate	*Navigant has identified two potential approaches KCP&L-MO can take to overcome identified market imperfections and increase participation*
Income-Eligible Weatherization Program	*The utility has identified using excess program budget to identify and contact households having difficulty keeping their electricity on due to budget constraints, either through direct mail or telemarketing, in order to increase program participation. The utility could use program budget to provide energy efficient window air conditioning units and fans to replace inefficient existing units during warm months. Finally, the utility could expand current efforts to partner with community relations organizations in order to further outreach and drive program awareness in low-income communities. KCP&L-MO program staff indicated that in PY2015 the utility leveraged cross-program promotional opportunities to disseminate information on the IEW program in CFL give-away tote bags given out through the HLR program.*
Home Energy Report and Income Eligible Home Energy Report	*For both HER and IE-HER, customer doubt over the validity of the energy use comparison between their household and similar households is a barrier to customer acceptance. This is detailed in a finding of this process evaluation. Providing evidence of the comparison's validity by specifying the characteristics used—square footage, location, and type of space heat—may improve customer acceptance and motivate increased implementation of energy saving recommendations. Targeting this evidence at specific demographics would achieve the California best practice of marketing to specific subgroups of interest as discussed above. For IE-HER, the program needs to investigate how to target messaging to the segment to stimulate behavioral changes to effect energy savings.*

Program	Response
Building Operator Certification Program	*The BOC program has a narrow target market. It is conceivable that the program could reach a point where everyone who is in the market to take the training would have completed it. Reaching out to all customers who might employ a designated facilities manager/building operator might enable the program in KCP&L-MO territory to attract more participants. Focus could also be shifted to small and medium size building owners. Other types of marketing opportunities, such as bill inserts, trade associations and email blasts could be utilized.*
Energy Analyzer and Energy Analyzer for Small Business	*The main barriers to entry are technology-related. This free tool for KCP&L-MO customers is provided through the corporate website. This requires a computer, tablet, or smart phone, Internet access, and computer literacy. A potential barrier for some residential customers is the time commitment required to complete all levels of the initial home energy assessment. However, customers can save their work and return later to complete the assessment if needed.*
Programmable Thermostat Program	*The program is successful in enrolling peak demand savings capacity, with over 2,700 participants enrolled in 2015, representing over 2,200 kW. KCP&L-MO should consider calling test events annually. A limited test event was called in August to test whether the Wi-Fi enabled thermostats would switch to event mode. This enabled the utility to measure the effectiveness of the communication with the Wi-Fi enabled units. No problems or errors were discovered. The program is sponsoring a study of program participants with EPRI. To enhance program offerings, they are investigating customer attitudes with the thermostats and with cycling events. The findings of this study will be important for the continued improvement of the program.*

(Sources: Navigant PY2015 EM&V Report, pp. 118-120, 141, 184-186, 217-218, 231, 276-277, 295-297, 307-308, 326-327)

Impact Evaluation Findings

In accordance with MO Regulations, KCP&L-MO 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 (1) 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; and
   B. Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same time period.

2. *The Evaluator shall develop **load-impact measurement protocols** that are 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; or
   B. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics.

For calculating verified savings for the evaluation, Navigant used impact evaluation method 1A for all energy efficiency and DR programs except for the Home Energy Report programs, which utilized method 1B. Navigant used load impact measurement protocol 2B for all programs except for the Home Energy Reports programs, which utilized protocol 2A. These methods and protocols for the impact evaluation are summarized in the following two tables.

Table 30: Summary of 4 CSR 240-22.070(8) Regulations Impact Evaluation Methods for PY2014-PY2015

Sector	Program	Impact Evaluation Method
Commercial EE Programs	Business Energy Efficiency Rebate - Custom	1A
	Business Energy Efficiency Rebate - Standard	1A
Residential EE Programs	Home Appliance Recycling Rebate	1A
	Air Conditioning Upgrade Rebate	1A
	Home Lighting Rebate Program	1A
	Income-Eligible Weatherization	This program is excluded from impact EM&V, per Stipulation and Agreement, paragraph 18.
	Income-Eeligible Home Energy Report	1B
	Home Energy Report	1B
Educational Programs	Building Operator Certification	1A
	Energy Analyzer	These programs are excluded from impact EM&V, per Stipulation and Agreement, paragraph 18.
	Energy Analyzer for Small Business	
	Programmable Thermostat	1A

Table 31: Summary of 4 CSR 240-22.070(8) Regulations Load Impact Measurement Protocols for 2015

Sector	Program	2015 Load-Impact Measurement Protocol
Commercial EE Programs	Business Energy Efficiency Rebate - Custom	2A and 2B
	Business Energy Efficiency Rebate - Standard	2A and 2B
Residential EE Programs	Home Appliance Recycling Rebate	2B
	Air Conditioning Upgrade Rebate	2B
	Home Lighting Rebate Program	2B
	Income-Eligible Weatherization	This program is excluded from impact EM&V, per Stipulation and Agreement, paragraph 18.
Educational Programs	Building Operator Certification	2B
	Energy Analyzer	These programs are excluded from impact EM&V, per Stipulation and Agreement, paragraph 18.
	Energy Analyzer for Small Business	
DR Programs	Income-Eligible Home Energy Report	2A
	Home Energy Report	2A
	Programmable Thermostat	2B

Source: Navigant analysis

The portfolio values shown under "Gross and Net Savings Summary" (Navigant Evaluation, 9/9/16 pp. 8 – 10 do not fully match those presented in Table ES-6 (Navigant Evaluation, 9/9/16, pp. 11 – 16.

Net-to-Gross (NTG)

The NTG methods mirrored those used for GMO, and the overall logic were extremely well designed, analytically sound, and clearly presented. The research employs best practices through the use of "real time" (fast feedback) participant data collection, year-end surveys to capture spillover, incorporation of both customer and trade ally perspectives, both quantitative and qualitative indicators of program influence, consistency checks, and sensitivity analysis (including alternate and original intentions scoring) to test different algorithm structures. There were two aspects of the NTG estimates, however, that are worth exploring in more detail:

Trade Ally vs. Customer Free ridership. As discussed in our PY2014 report for GMO, it is surprising that Trade Ally (TA) free ridership would be higher than the customer reported FR (i.e., the TA is supposed to serve as a cap on free ridership, with the assumption that the program is influencing the stocking/recommendations/sales more than customers realize). But that does not seem to be the case here – the FR estimates are very close. But in the case of the BEER Custom and ACUR programs the TA free ridership was relatively close, but higher than the participants. On one hand this consistency provides additional validity for the free ridership estimate, but does also seem to suggest that the program is not having the anticipated influence on TA stocking and recommendations. The differences between the TA and customer free ridership estimates seem worth noting and discussing in more detail in the report.

Spillover methods and assumptions. There were a number of aspects regarding the estimation of spillover worth noting.

- ***ACUR non-participant spillover (NPSO).*** The evaluation appeared to use a conservative estimate of TA NPSO (4%), limiting the NPSO to only those trade allies that participated in the survey, rather than extrapolating to the entire trade ally population, which would have provided a NPSO estimate of 18 percent (p. 169). The EM&V Auditor Team suggests that in the future the Evaluator should collect, analyze, and discuss more qualitative input into the reasoning for NPSO (i.e., probe during surveys about the reason for not submitting this additional equipment to the program); there might be a solid reason for the NPSO (e.g., dislike of the paperwork and the verification calls) and a strong case for using the higher value. The EM&V Auditor Team is also available to meet in the future to discuss these assumptions prior to finalizing the draft report. Note also that the Ameren MO analysis for NPSO used very aggressive assumptions for NPSO; we're not suggesting that this correct, but seems highly inconsistent that Ameren MO should use aggressive estimates and KCP&L and should be limited to conservative estimates. Both need to be based on equally defensible estimates of NPSO that provide sufficient detail and pass the "burden of proof" test to prove program attribution for these additional savings.

- ***NPSO for the HLR Program***. For HLR, it appears that the spillover for the event days (the days in which the spillover was estimated) were assumed to be the same for the entire year; the only adjustment was to not apply spillover to selected retailers with few non-discounted bulbs (Navigant PY2015 EM&V Report, Appendix B, p. 25-26). Given the extensive promotion on event days it's not completely surprising that there would be substantial spillover, but it's not clear that applying this high level of NPSO (39%) for the entire year is appropriate, and in fact may likely overstate the spillover.
- ***NPSO for C&I vs. Residential***: As described in the NTG appendix, the C&I programs appear to use self-reported estimates for NPSO savings, but the residential programs appear to rely on a deemed approach. The reasons for this difference are not clear and not discussed, so it would be helpful for Navigant to explain the rationale for this. The Auditor also suggests that Navigant review the list of commercial NPSO measures and consider if a more prescriptive approach can be used going forward for both residential and C&I, as we believe this is a much more reliable way to estimate NPSO savings compared to relying on customer estimates.

Navigant's sampling methods for the M&V efforts for the Custom and Standard programs meet industry standards and were well executed. While, overall the report is complete and provides excellent information, a more strategic look at results, and a discussion of how the results should be used to modify future programs should be increased.

4.3 Recommendations to Improve Current Impact Evaluation Reports

Recommendations have been organized by topic and program.

All Programs

Evaluator should explain the "Custom Carryover" Projects and savings in more detail.

The following 7 comments have all been addressed by the evaluator in their final evaluation document:

- In Table ES-2, Energy Savings at the Customer Meter – PY2014, Footnote 2 states KCP&L-MO does not include savings values for IEW, IE-HER, nor HER Programs. The Evaluator should add footnote by KCP&L-MO Total to identify the total does not include all of the items included in the table.
- In Table ES-3, Coincident Demand Savings at the Customer Meter – PY2014, Footnote 3 states KCP&L-MO does not include savings values for the IEW, IE HER or HER Programs. The Evaluator should add footnote by KCP&L-MO Total to identify the total does not include all of the items included in the table.
- In Table ES-4. Energy Savings at the Customer Meter – PY2015, Footnote 4 states KCP&L-MO does not include savings values for the IEW, IE HER or HER Programs. The Evaluator should add footnote by KCP&L-MO Total to identify the total does not include all of the items included in the table.

- In Table ES-5, Coincident Demand Savings at the Customer Meter – PY2015, Footnote 5 states KCP&L-MO does not include savings values for IEW, IE HER or HER Programs. The Evaluator should add footnote by KCP&L-MO Total to identify the total does not include all of the items included in the table.
- In Table ES-6, Energy Savings at the Customer Meter – Program to Date – PY2014-PY2015, Footnote 6 states KCP&L-MO does not include savings for the IEW, IE HER or HER Programs. The Evaluator should add footnote by KCP&L-MO Total to identify the total does not include all of the items included in the table. The Evaluator should also provide additional supporting information is required to clarify the discrepancy.
- In Table ES-6. Energy Savings at the Customer Meter – Program to Date – PY2014-PY2015, the 2014-15 Gross Verified savings and Net Verified savings for IEW, IE HER or HER Programs do not equal the sum of the individual years. It is not clear how the number for Gross Verified Savings and Net Verified Savings were derived. Additional supporting information is required to clarify the discrepancy.
- In Table ES-7, Coincident Demand Savings at the Customer Meter – Program to Date – PY2014-PY2015, Footnote 7 states KCP&L-MO does not include savings values IEW Program. The Evaluator should add footnote by KCP&L-MO Total to identify the total does not include all of the items included in the table.
- In Table ES-7, Coincident Demand Savings at the Customer Meter – Program to Date – PY2014-PY2015, the 2014-15 Gross Verified savings and Net Verified savings for IE-HER and HER Program do not equal the sum of the individual years. It is not clear how the number for Gross Verified Savings and Net Verified Savings were derived. Additional supporting information is required to clarify the discrepancy (Navigant PY2015 EM&V Report, pp. vi, xi, xiii, xiv, xv, xvi).

Home Appliance Program

- The KCP&L-MO EM&V Plan dated January 21, 2015 shows billing analysis evaluation. Table ES-8 does not include Billing Analysis as a method of evaluation. The Evaluator should clarify if billing analysis was used in the evaluation analysis.**This comment has been addressed in the final evaluation document.**

Home Energy Reports and Income Eligible Home Energy Reports

- The original evaluation report noted that the energy consumption patterns of the treatment and control groups were statistically indistinguishable during the pre-enrollment year (original Navigant PY2015 EM&V Report, p. 194), and the EM&V Auditor recommended that the report should clarify if monthly usage between the treatment and the control group were examined and found to be equivalent. The final report now includes this clarification (final Navigant PY2015 EM&V Report, p. 242).
- The Evaluator should provide clarifications or explanations as to the reason that the HER program is so far below anticipated savings, plus present any potential solutions, if possible, to increase savings to that of most HER programs.

- The original evaluation report showed that the MEEIA plan 2014-15 Table 2.4/2.5 Data Collection suggests billing analysis will be primarily used for the Home Energy Report Program. Table ES-8 did not show billing analysis to be used for the HER impact activities. This issue has now been fixed in the final evaluation report (Navigant PY2015 EM&V Report, table ES-8, p.20) .
- In the original Navigant evaluation report, Tables 6-7 and 6-8 were incorrectly labelled as ACUR program summaries. The table contents are actually for the IEW program (Navigant PY2015 EM&V Report, p. 173). This issue has been resolved in the final report (Navigant PY2015 EM&V Report, p. 222).

Home Lighting Rebate Program

- As the EM&V Auditor Team noted in our GMO PY2014 report, Ameren Missouri had recently completed a lighting metering study, and we recommended that study be used going forward for both GMO and KCP&L. The originally reported evaluation value for the HOU, however, was not updated based on the most recent Ameren study, which has now been publically available for about a year. The Ameren study estimated the HOU at 2.2/day, or 803/year, compared to the 1,067 hours/year presented in the report (original Navigant PY2015 EM&V Report, p. 148). The final report was updated to reflect the lower HOU with the new Ameren study (final Navigant PY2015 EM&V Report, p. 199).
- Since Navigant conducted intercept surveys with a sufficiently large sample, it was not clear why the cross-sector sales and leakage were not applied in the original report. At 14 percent cross-sector sales and seven percent leakage (original Navigant PY2015 EM&V Report, p. 159), this would have led to a substantial increase in savings. The original report cited the UMP recommendation that in absence of primary research both cross-sector sales and leakage should be excluded, but as noted here there does seem to be primary data in this case. The final Navigant report has since addressed this issue and the lighting savings are inclusive of cross-sector sales and leakage (final Navigant PY2015 EM&V Report, p. 200).

Air Conditioning Upgrade Rebate Program

- The original evaluation report showed that savings for the program CFLs were inconsistent with assumptions from the HLR Program. For example, the evaluation assumes a 0.071 coincidence factor (Navigant PY2015 EM&V Report, p. 112), but Table 5-1 in the HLR section shows 0.081 coincidence factor from the IL TRM, and it was not clear why different assumptions were being used. The final evaluation report included additional references that demonstrated why these differences were present (final Navigant EM&V Report, p.163-164).

Building Operator Certification Program Impact Evaluation

- The KCP&L-MO EM&V Plan dated January 21, 2015 shows database review, engineering review, engineering analysis/analytics database and savings verification. Table ES-8 Summary of Impact Evaluation Activities for PY2015 states Tracking system and data base review and

participant telephone survey. The Evaluator should provide additional information to clarify analysis.

Programmable Thermostat Program

- The KCP&L-MO EM&V Plan dated January 21, 2015 shows database review, engineering review, engineering analysis/analytics database and savings verification. Table ES-8 Summary of Impact Evaluation Activities for PY2015 shows Tracking system and data base review was considered. The Evaluator should provide additional information to clarify analysis.

- Energy savings from scheduling using programmable thermostat is not accounted-for in energy savings in MEEIA plan and evaluator report. Per KCP&L - Missouri Energy Efficiency and Demand Response Programs 2014 – 2015 (p. 35), EPRI plans to study energy savings impacts of this subset of customers via billing analysis, as well as demand reduction via analysis of interval data. Provide additional information if available.

- The evaluator reviews the per-unit savings and describes the program key details. However, the evaluation but does not discuss whether or not the curtailment systems were actually used or tested, or the results of such operations.

4.4 Recommendations to Improve Future Impact Evaluation Reports

The EM&V Auditor has developed several recommendations that should be incorporated into all future EM&V reports prepared for KCP&L. These recommendations are intended to ensure that the presentation of the impact evaluation findings conforms to industry standards and best practices.

When referencing and using Ameren MO evaluations, make sure to use the most recent publicaly available evaluations. As a smaller portfolio, it is reasonable that the KCP&L evaluation should leverage, where applicable, data collection findings from Ameren MO. The evaluations, however, should make sure to use the most recent publically available Ameren evaluations, otherwise the KCP&L evaluation will reflect outdated values that are inconsistent with the current Ameren assumptions. This recommendation is also relevant for other aspects of evaluation, including methods and baseline assumptions (i.e., where applicable use similar methods and baseline assumptions as Ameren). As an example, the original PY2015 evaluation used a prior Ameren HOU estimate for the HLR program (p. 169), thus overstating the HOU compared to the most recent Ameren MO metering study findings. Though this issue has since been resolved for the final Navigant report (which now references the most current Ameren HOU study estimates), the EM&V Auditor prefers to keep this recommendation for future evaluation efforts.

For the HER Program it would be helpful to make specific recommendations for exactly how to incorporate persistence. The report recommends that persistence be measured experimentally (p. 251, and assumed by the Auditor to mean by using the RCT approach and selectively terminating reports to a randomly selected group of customers). The Auditor does believe, however, that there are many studies now available that demonstrate existence of and quantify likely persistence. So while we agree that measuring persistence is preferable to using data from other jurisdictions, we do believe that KCP&L can begin accounting for persistence now. It would be helpful if the report can present options for doing so,

including either claiming a longer EUL (and only claiming incremental savings each year above the persistence, or the avoided decay), or using a "crop rotation" approach to have some cohorts stop receiving reports, then claim persistence for those customers. The most recent Illinois TRM provides some helpful examples.[11]

Evaluators should verify HVAC early replacement (ER) for the ACUR Program and adjust savings to a replace-on-burnout (ROB) scenario if necessary. Navigant notes in the evaluation that over a quarter (26%) of respondents reported that their replaced unit was not operational upon replacement (Navigant PY2015 EM&V Report, p. 158). Regardless of the respondent interpretation of the question, this is clearly strong evidence that the customers felt the unit was not meeting their needs and might have been upgraded soon, and thus should probably not have qualified for ER. There are various ways to assess this (IL, MA, and CA all have ER algorithms), and Navigant should use an ER algorithm approach for the next evaluation and adjust savings accordingly.

EM&V Auditor's Assessment of Process Evaluations

Overall, Navigant's process evaluation conformed to industry best practices. The evaluator provided an update of previous recommendations, even though these process evaluations were conducted several years ago. In addition, the process evaluations included clearly written findings and appropriate recommendations. Lastly, the responses to the CSR 4 requirements drew upon the process evaluation findings for each program and included additional insights to help improve program operations and overcome market barriers.

4.5 Recommendations to Improve the Current Impact Evaluation Reports

The evaluation report uses the term "reported" to describe ex ante gross savings, while "verified" describes ex ante net savings. These are helpful definitions that use plain language, although the evaluator could clarify how or if reported savings reflects preliminary NTG ratios.

Considering the low participation, RR and NTG ratio, the evaluator should be sure to provide specifically address changes needed to bring the RR and NTG ratios to one (unity) and to improve participation, or align targets with realistic goals. (pg. 95).

The evaluator suggests an equation set that should be used for the program analysis (pg. 107). The evaluator should provide citations for the equations and suggest updating any TRM to provide transparent analysis methods.

In the Navigant evaluation, Tables 6-7 and 6-8 appears to be incorrectly labelled as ACUR program summaries. The table contents are actually for the IEW program (Navigant PY2015 EM&V Report, pp. 166). This comment has been addressed.

4.6 Recommendations to Improve the Current Process Evaluation Reports

Navigant should provide a clearer explanation as to why it relied on the survey responses from the Implementation Contractor for its HER and Income Eligible HER rather than conducting an independent

[11] The most recent IL TRM is available online at http://www.ilsag.info/il_trm_version_5.html.

survey. While it was appropriate for Navigant to leverage this survey and address the critical research questions, the evaluator should provide additional explanations as to how they were able to ensure that this survey remained neutral, since it was sponsored by the Implementation Contractor.

4.7 Recommendations to Improve Future Process Evaluations

Navigant should continue to employ best practices in conducting future process evaluations. Referring to established process evaluation protocols, such as those used in Arkansas[12], and New York will ensure that the process evaluation activities are both cost-effective and informative.

To the extent possible, Navigant should continue to try and standardize the response scales used to measure customer and trade ally satisfaction across KCP&L's energy portfolio. In addition, Navigant should conduct an independent assessment of the HER and Income Eligible Programs to ensure that these surveys focus on key process evaluation metrics rather than just the research goals of the program implementer.

4.8 Recommendations to Future Cost Effectiveness Analysis

Future cost-effectiveness analysis should incorporate the following elements: ensure the proper costs and benefits are defined in the methods section (Table 1-3, page 5), and be sure to check the results of each perspective is in line with expectations (UCT is not lower than TRC, like it was for the HAR and IE-Wx programs).

4.9 Overall Conclusions from the EM&V Auditor Team

Navigant's EM&V Report conformed to industry standards and best practices. The findings were clearly stated and the basis of each recommendation was linked to the EM&V findings. Moreover, the evaluation activities provided updates to previous recommendations, comparison to industry benchmarks, and provided actionable recommendations to improve overall program operations and enhance energy savings calculations.

However, the EM&V evaluator makes the following recommendations to improve the overall readability and quality of the report.

- **Do not use Roman numeral numbering in the Executive Summary**. This has been addressed.
- **Navigant should address all of the errors identified in this report, and specifically in the impact sections of the report**. These corrections addressed in the final report.

[12] Protocol C: Process Evaluation Protocols, Arkansas Technical Reference Manual, Volume 1, 2015, p 30.

References

Navigant Consulting, 2015, "KCP&L Evaluation, Measurement, & Verification Report – FINAL, Program Year 2015, Prepared for KCP&L – Greater Missouri Operations, September 9.