Annual Report on Evaluation, Measurement & Verification Findings for KCP&L – Greater Missouri Operations Company (GMO) Program Year 2015

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with

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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:

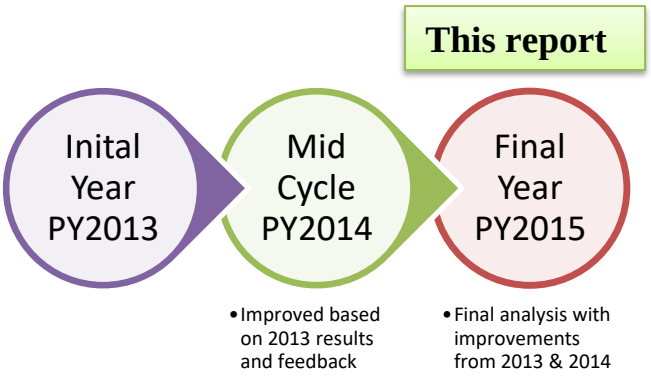
- ASHP – Air-source heat pump
- C&I – Commercial and Industrial
- CAC – Central air conditioner
- CFL – Compact fluorescent lamp
- CDD – Cooling degree days
- Deemed Savings – A savings estimate for homogenous measures, in which an assumed average savings across a large number of rebated units is applied
- 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 Rate– 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 is 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 in Case No. EO-2012-0009 and its *Report and Order* in Case No. ER-2012-075, KCP&L Greater Missouri Operations Company (GMO) launched 16 demand-side management (DSM) programs on or after January 26, 2013. GMO is required to complete process and impact evaluations[1] to assess the progress of its DSM programs towards meeting the annual energy and demand savings targets[2] established by the PSC for these programs. The evaluation parameters were prescribed as part of the PSC's Missouri Energy Efficiency Investment Act (MEEIA) Rules, Chapter 22 Electric Utility Resource Planning Rules and the Stipulation and Agreement approved by the PSC in its November 15, 2012, Order Approving Non-unanimous Stipulation and Agreement Resolving KCP&L Greater Missouri Operations Company's MEEIA Filing.

GMO hired Navigant Consulting (Navigant) to complete the three-year evaluation of the GMO energy efficiency program portfolio. To address these specific research objectives, Navigant developed a three-year evaluation plan[3] which described a multi-year evaluation strategy to provide GMO and stakeholders with the best information possible during the course of the MEEIA programs within the available evaluation financial resources.[4] Navigant's plan concentrated on those programs with the greatest contribution to overall portfolio savings. The PY2015 program evaluation summarize the findings from the information tracked by GMO for its portfolio of 16 programs for program year 2015, and summarize findings across the entire MEEIA 2013-2015 period (Navigant PY2015 EM&V Report, p. 8). The following figure illustrates the evaluation process during these three years.



(Source: Navigant PY2015 EM&V Report, p. 9)

Figure E- 1: Three Year Evaluation Plan Summary

[1] 4 CSR 240-20.093(7) and 4 CSR 240-3.163(7).
[2] 4 CSR 240-20.094(3)(A).
[3] Evaluation, Measurement, and Verification Plan: GMO Energy Efficiency and Demand Response Program 2013-2015 prepared by Navigant. October 2013.
[4] Approximately 5% of the 3-year MEEIA programs' budget of $13,944,367 will be spent on EM&V.

The goal of these evaluations is to comply with the requirements of Section 4 CSR- 240-22.070(8):[5]

> *"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[6] (Auditor) to review and comment on compliance with 4 CSR 240-22.070(8) and on the overall quality, 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,
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 GMO program portfolio.

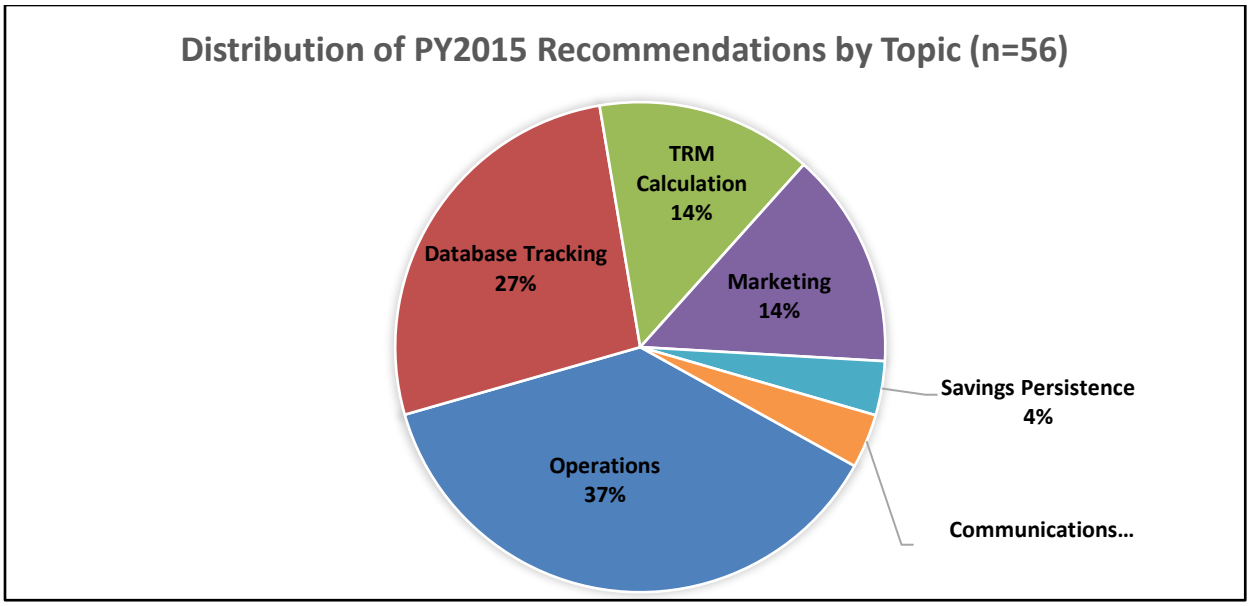
Based on this review, the EM&V Auditor Team developed both short-term and long-term recommendations on ways to improve the EM&V and evaluation reporting processes. These analyses and the recommendations for improvement are based on the EM&V Auditor Team's collective experience with utility energy efficiency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

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

[6] 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.

EM&V Recommendations

Based on their program evaluations, Navigant developed 56 recommendations on ways in which GMO could improve its energy efficiency portfolio. The distribution of these recommendations by topic area is summarized in the following figure.



(Source: Navigant EM&V Report)

Figure E- 2: Distribution of PY2015 Recommendations by Topic

As this figure shows, most of the recommendations focused on ways to improve operations (37%) and database tracking (27%)

Recommendations to Improve Current and Future Impact Evaluations

The EM&V Auditor has developed several recommendations that should be incorporated into all future EM&V reports prepared for GMO. 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 Missouri evaluations, make sure to use the most recent publicly available evaluations**. The evaluations, should make sure to use the most recent publicly available Ameren Missouri evaluations, otherwise the GMO evaluation will reflect outdated values that are inconsistent with the current Ameren Missouri assumptions.

Recommendations to Improve Current and 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[7], and New York will ensure that the process evaluation activities are both cost-effective and informative. This will ensure there is a proper allocation of evaluation resources throughout the three-year program cycle; and
- **To the extent possible, Navigant should continue standardize, wherever practical, the response scales used to measure customer and trade ally satisfaction across GMO'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.

Overall Conclusions

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 which have been corrected in the final report.

- **Do not use Roman numeral numbering in the Executive Summary**. Navigant has addressed the recommendation; and
- **Navigant should address all of the errors identified in this report** and provide the additional clarifications as requested by the EM&V Auditor. Navigant has addressed this issue.

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

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

Introduction

With the passage of the Missouri Energy Efficiency Investment Act in 2009, the State of Missouri and the stipulated agreement reached by GMO and its stakeholders signaled a new beginning of energy efficiency program offerings to all GMO 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.

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)[8] 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 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 evaluations 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

The percentages cited in parenthesis (%) are used to denote particular or significant findings from a particular evaluation finding and follow standard industry reporting conventions.

[8] 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

This section summarizes the findings from the impact evaluations while Section 4 provides the EM&V Auditor's assessment of the appropriateness of the savings estimates. Navigant conducted impact evaluations to determine the savings estimates attributable to each program or measure. Navigant proposed and the utility approved a multiple year EM&V plan from PY2013 through PY2015 and the multi-year plan was implemented. As part of the EM&V Auditor's review, team members summarized the data from both the individual program and program portfolio evaluations.

1.1 Summary of Impact Evaluation Findings

Portfolio Level Findings

This section summarizes the key energy savings estimates for demand kilowatts (kW) and energy kilowatt-hours (kWh) across GMO's MEEIA program portfolio. For the entire program period PY2013-15, the Portfolio achieved 133 percent (214,411 MWh) of its proposed savings target (161,281 MWh).

Table 1: Portfolio Energy Savings[9]

Portfolio	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	39,285,976	61,602,845	60,392,067	161,280,888	14,257	34,441	19,324	66,525
Ex Ante Gross	31,332,169	61,998,822	109,160,182	202,491,424	20,657	21,959	38,573	67,761
Ex Post Gross	29,046,771	57,898,184	123,393,633	210,375,191	20,551	23,564	39,332	70,034
Ex Post Net	28,521,025	54,041,565	127,847,574	214,411, 282	20,466	22,246	38,833	68,333

(Sources: Navigant PY2015 EM&V Report, pp. 13-15, prior year's evaluation review notes and GMO MEEIA Filing)

The targets and goals, categorized by residential and C&I sectors, are shown in Figure 1 and Figure 2 which shows the target and actual savings by program.

[9] According to the Evaluator, summing these values would result in discrepancies because savings for PY2013 and PY2014 numbers were updated when reporting the PTD (2013-2015) totals in the PY2015 report. These include: 1) NET savings differ because finalized NTG ratios were applied retroactively and are not reflected in the PY2013 or PY2014 reports; 2) Demand values in PY2013 and PY2014 reports for the DRI program represent the installed capacity for that year and cannot be summed across the reports. Rather, the Evaluator only counted the installed capacity in PY2015 towards to three-year total for that program – this is consistent with how MEEIA targets were determined; 3) Navigant made an accounting correction for HVAC measures installed in PY2013 and PY2014 in the C&I standard program, for reporting the PY2013-PY2015 totals in the PY2015 report. This leads to the small differences in the gross energy numbers listed in the table. The main takeaway is that the three year totals in the PY2015 report are the correct numbers and reflect the changes listed above. However, these changes were not applied to the PY2013 or PY2014 reports. Therefore, the totals of summing the individual report totals will not equal the three year totals listed in the PY2015 report.

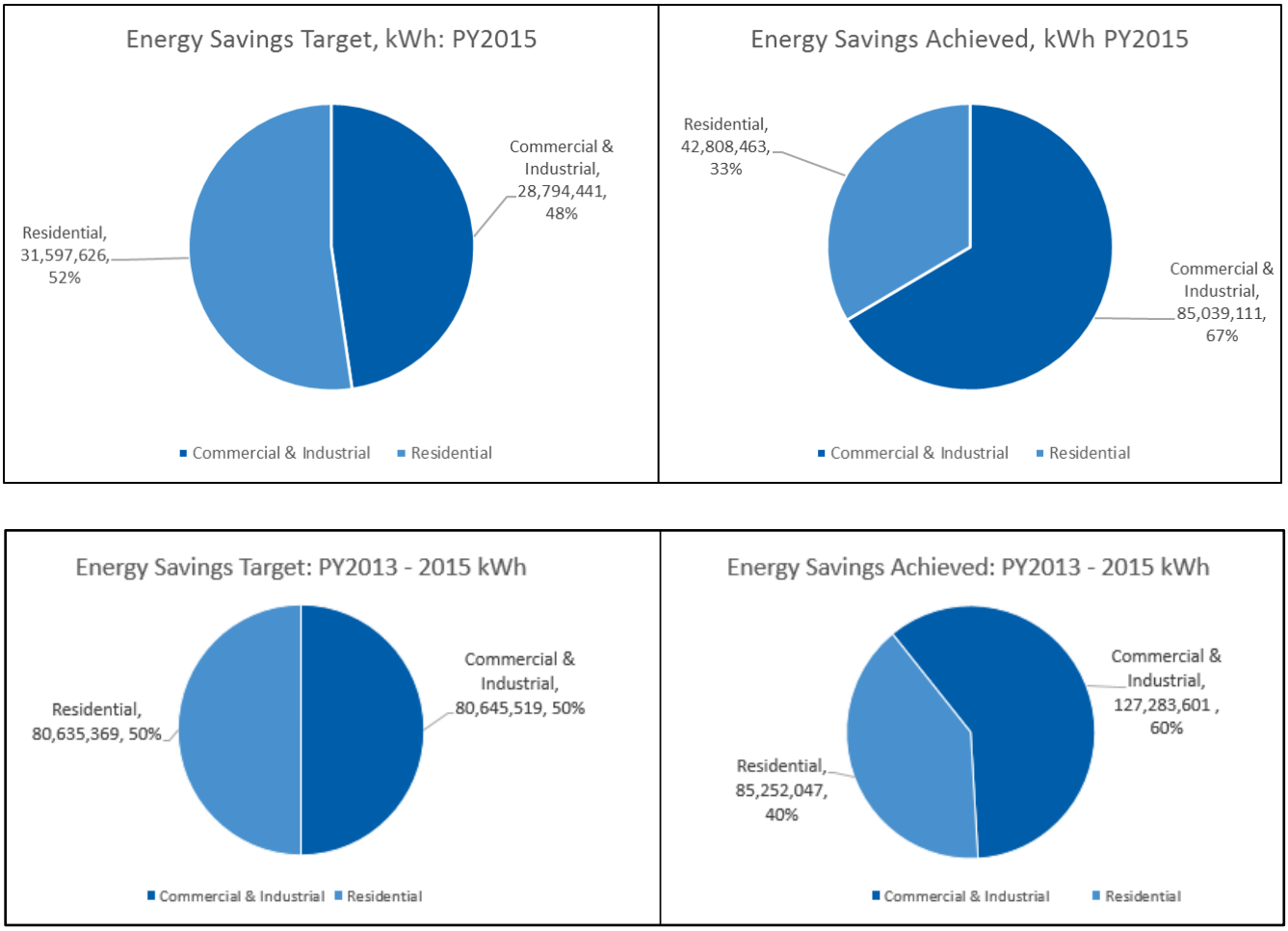


Figure 1: Energy Savings Target and Achieved by Sector: kWh

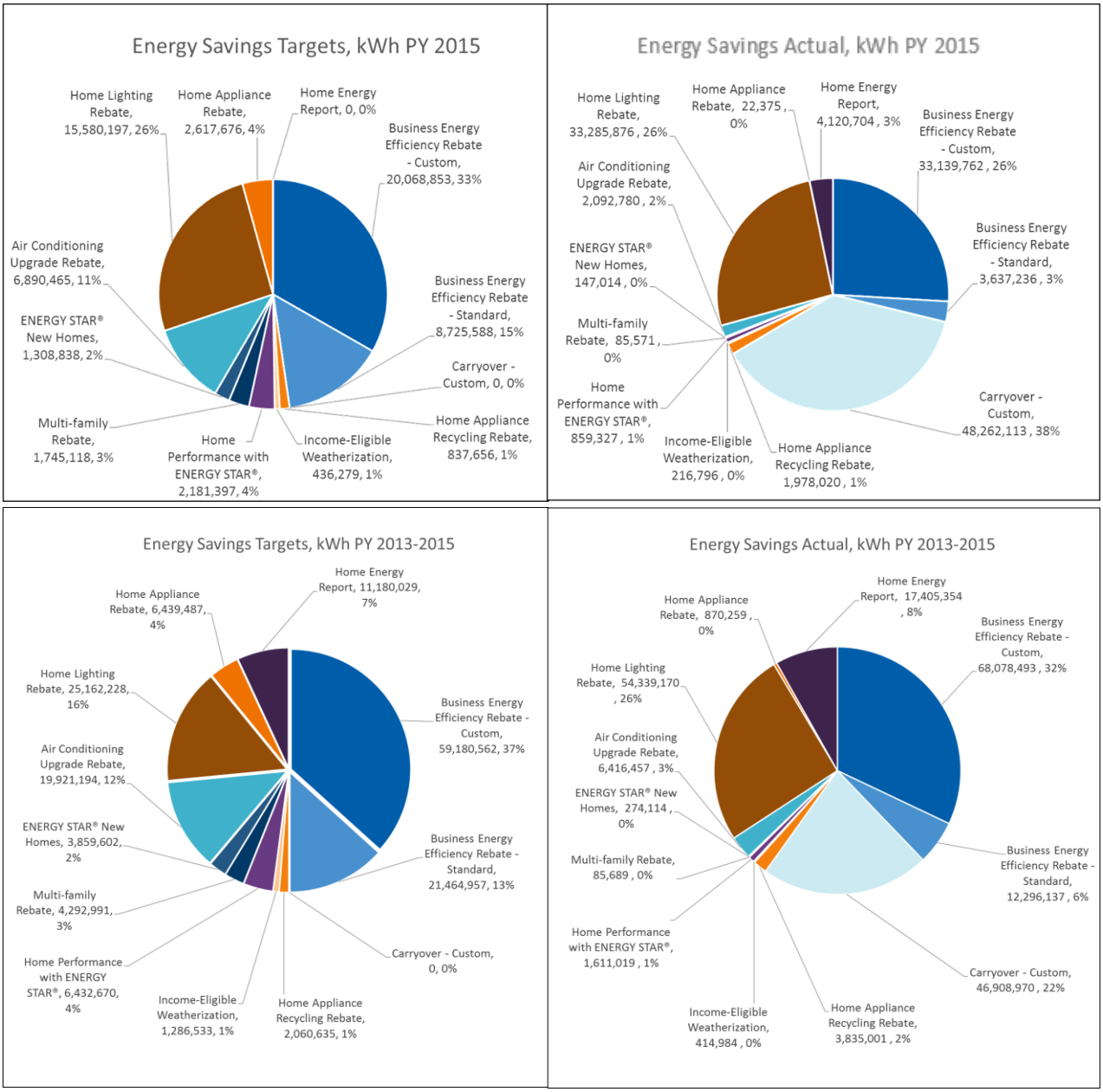


Figure 2: Energy Saving Targets and Actuals

Table 2 summarizes the GMO 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 Table 2 and Table 3, comparing reported *ex ante* gross values to verified *ex post* gross values shows a realization rate of 114 percent in 2015 and 102 percent for the three-year cycle. Per the evaluation plan, net to gross values were finalized by the evaluator for the entire three-year program. Comparing *ex post* net to *ex post gross* energy use shows an overall NTG ratio of 104 percent for 2015, however, the NTG for the entire three-year cycle was calculated to be 102 percent.

Table 2: GMO 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
Business Energy Efficiency Rebate Custom	20,068,853	27,962,734	30,971,741	33,139,762	165%
Business Energy Efficiency Rebate Standard	8,725,588	4,027,322	3,497,342	3,637,236	42%
Carryover- Custom	N/A	42,373,108	45,104,779	48, 262,113	N/A
Home Appliance Recycling Rebate	837,656	3,997,865	3,532,179	1,978,020	236%
Income-Eligible Weatherization	436,279	187,084	216,796	216,796	50%
Home Performance with ENERGY STAR®	2,181,397	987,776	987,733	859,327	39%
Multi-family Rebate	1,745,118	85,571	85,571	85,571	5%
ENERGY STAR® New Homes	1,308,838	147,014	147,014	147,014	11%
Air Conditioning Upgrade Rebate	6,890,465	3,431,994	2,989,686	2,092,780,	30%
Home Lighting Rebate	15,580,197	28,779,530	31,700,834	33,285,876	214%
Home Appliance Rebate	2,617,676	70,167	39,254	22,375	1%
Home Energy Report	0	-2,889,983	4,120,704	4,120,704	N/A
TOTAL	**60,392,067**	**109,160,182**	**123,393,633**	**127,847, 574**	**212%**

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

Table 3: GMO Portfolio Energy Savings in PY2013-15, kWh

Program	Savings Targets	Gross Savings *Ex Ante*	Gross Savings *Ex Post*	Net Savings *Ex Post*	% of Target Achieved
Business Energy Efficiency Rebate Custom	59,180,562	58,584,325	63,624,760	68,003,992	115%
Business Energy Efficiency Rebate Standard	21,464,957	12,793,288	11,823,209	12,056,320	57%
Carryover Custom	N/A	42,373,108	45,104,779	48,262,113	N/A
Home Appliance Recycling Rebate	2,060,635	8,175,922	6,848,216	3,835,000	186%
Income-Eligible Weatherization	1,286,533	370,411	414,984	414,984	32%
Home Performance with ENERGY STAR®	6,432,670	1,853,460	1,851,746	1,611,019	25%
Multi-family Rebate	4,292,991	86,702	85,689	85,689	2%
ENERGY STAR® New Homes	3,859,602	274,109	274,114	274,114	7%
Air Conditioning Upgrade Rebate	19,921,194	8,514,834	9,166,367	6,416,457	32%
Home Lighting Rebate	25,162,228	52,716,202	52,249,202	54,861,662	218%
Home Appliance Rebate	6,439,487	7,012,274	1,526,771	870,259	14%
Home Energy Report	11,180,029	9,736,789	17,405,354	17,405,354	156%
TOTAL	**161,280,888**	**202,491,424**	**205,622,717**	**214,411,282**	**133%**

(Source: Navigant PY2015 EM&V Report, p. 15)

Table 4 and Table 5 show the gross savings *ex ante*, gross savings *ex post* and net savings *ex post* for demand reductions for PY2015 and 2013-2015 respectively.

Table 4: GMO Demand Reductions in PY2015 kW

Program	Demand Savings Targets 2015	Gross Savings *Ex Ante*	Gross Savings *Ex Post*	Net Savings *Ex Post*: 2015	% of Target Achieved
Business Energy Efficiency Rebate Custom	2,726	6,379	4,988	5,337	196%
Business Energy Efficiency Rebate Standard	1,796	1,574	1,183	1,233	69%
Carryover Custom	N/A	9,517	5,365	5,141	N/A
Home Appliance Recycling Rebate	61	556	431	241	395%
Income-Eligible Weatherization	31	138	161	161	519%
Home Performance with ENERGY STAR®	1,005	459	459	399	40%
Multi-family Rebate	117	79	79	79	68%
ENERGY STAR® New Homes	399	184	171	171	43%
Air Conditioning Upgrade Rebate	4,036	1,914	4,233	2,963	73%
Home Lighting Rebate	1,655	3,059	5,090	5,345	323%
Home Appliance Rebate	1,331	10	14	8	1%
Home Energy Report	0	-726	1,026	1,026	N/A
Programmable Thermostat	2,662	3,442	3,437	3,437	129%
Demand Response Incentive	3,505	11,988	12,695	12,695	362%
TOTAL	**19,324**	**38,573**	**38,332**	**38,833**	**201%**

(Source: Navigant PY2015 EM&V Report, p. 14)

Table 5: GMO Demand Reductions in PY2013-15 kW

Program	Demand Savings Targets	Gross Savings *Ex Ante*	Gross Savings *Ex Post*	Net Savings Ex Post	% of Target Achieved
Business Energy Efficiency Rebate Custom	8,038	11,293	10,485	11,218	140%
Business Energy Efficiency Rebate Standard	4,419	3,601	2,935	3,052	69%
Carryover - Custom	0	9,517	5,365	5,741	NA
Home Appliance Recycling Rebate	121	1,109	885	496	410%
Income-Eligible Weatherization	91	270	297	297	326%
Home Performance with ENERGY STAR®	2,964	862	861	749	25%
Multi-family Rebate	288	79	79	79	27%
ENERGY STAR® New Homes	1,177	279	259	259	22%
Air Conditioning Upgrade Rebate	11,661	4,735	8,997	6,298	54%
Home Lighting Rebate	2,673	5,604	7,429	7,801	292%
Home Appliance Rebate	3275	1,121	196	112	3%
Home Energy Report	1720	2,654	4,703	4,703	273%
Programmable Thermostat	8,461	8,807	9,021	9,021	107%
Demand Response Incentive	21,637	17,830	18,455	18,455	85%
TOTAL	**66,525**	**67,761**	**70,034**	**68,333**	**103%**

(Source: Navigant PY2015 EM&V Report, p. 16)

Findings from the NTG research, including free ridership and spillover rates from both the participant and trade ally surveys are summarized in Table 6.

Table 6: Estimated Free Ridership, Spillover, and Market Effect Rates for Each Program

Program Name	Free Ridership	Participant Spillover	Non-Participant Spillover	NTGR
BEER Custom	0.11	0.04	0.14	1.07
BEER Standard	0.13	0.03	0.14	1.04
Multi-Family Rebate	NA	NA	NA	1.00
Home Energy Report	NA	NA	NA	1.00
Air Conditioning Upgrade Rebate	0.35	>0	0.05	0.70
Home Appliance Rebate	0.49	0.06	--	0.57
Home Performance with ENERGY STAR®	0.18	0.05	--	0.87
ENERGY STAR® New Homes	NA	NA	NA	1.00
Home Appliance Recycling Rebate	0.44	NA	NA	0.56
Income-Eligible Weatherization	NA	NA	NA	1.00
Home Lighting Rebate	0.5	0	0.54	1.05
Demand Response Incentive	NA	NA	NA	1.00
Programmable Thermostat	NA	NA	NA	1.00

(Source: Navigant PY2015 EM&V Report, p. 22)

Program Level Findings

The following section summarizes the overall program performance by program.

Business Energy Efficiency Rebate - Custom Program

The Business Energy Efficiency Rebate program (BEER) was renamed from the "C&I Custom Rebate Program" for the 2015 program year. The program is a custom program that provides energy efficiency upgrade incentives for businesses. Owners or trade allies can submit projects; however, projects must pass a societal benefit-cost test (Navigant PY2015 EM&V Report. p. 59).

In PY2013-15 the Business Energy Efficiency Rebate - Custom achieved 115 percent (68,078 MWh) of its proposed savings target (59,180.6 MWh). For PY2013-15, the Business Energy Efficiency Rebate - Custom program accounts for 32 percent of total Portfolio verified energy compared to a target of 37 percent.

Table 7: Summary of Business Energy Efficiency Rebate - Custom Program Impact Findings

Business Energy Efficiency Rebate Custom	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	19,394,851	19,716,858	20,068,853	59,180,562	2,634	2,678	2,726	8,038
Ex Ante Gross	16,115,000	14,506,591	27,962,734	58,584,325	2,547	2,367	6,379	11,293
Ex Post Gross	16,068,199	16,584,820	30,971,741	63,624,760	2,939	2,569	4,988	10,496
Ex Post Net	17,192,973	17,745,757	33,139,762	68,078,493	3,145	2,749	5,337	11,231

(Sources: Navigant PY2015 EM&V Report, pp. 55-56, 63-64, 90 and EM&V Auditor records of 2013 and 2014 programs)

The Evaluator reports that the lighting remained the dominant C&I measure installed, resulting in 94 percent of the savings (Navigant PY2015 EM&V Report, p. 65). Unspecified, industrial process and compressed air projects made up the balance of the savings.

The Evaluator reported that difference between reported and verified gross savings (realization rate) was due to the reported savings not including waste heat factors or site-specific coincident demand factors. (Navigant PY2015 EM&V Report, p. 62).

Carryover Custom

The evaluation presents carry over projects, which were started in 2015 but not completed until 2016. This category is a subset of the Custom BEER program and is the 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.

This carryover custom category has a significant effect on the commercial programs and the portfolio making up 38 percent of the 2015 program year energy savings and 22 percent of the entire 2013-2015 program period energy savings. Counted along with the BEER Custom program, custom-style programs

make up over 50 percent of the entire portfolio overt the three-year period, of which the large majority are lighting projects.

Savings for the Carryover Custom program are as follows:

Table 8: Summary of Custom Carryover Program Impact Findings

Carryover - Custom	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	N/A	N/A	0	0	N/A	N/A	0	0
Ex Ante Gross	N/A	N/A	42,373,108	42,373,108	N/A	N/A	9,517	9,517
Ex Post Gross	N/A	N/A	45,104,779	45,104,779	N/A	N/A	5,365	5,365
Ex Post Net	N/A	N/A	48,262,113	48,262,113	N/A	N/A	5,741	5,741

(Sources: Navigant PY2015 EM&V Report, pp. 55-56, 63-64, 90 and EM&V Auditor records of 2013 and 2014 programs)

Business Energy Efficiency Rebate - Standard Program

The BEER Provides incentives for prescribed energy efficiency upgrades including lighting, HVAC, motors, variable frequency drives (VFDs), appliances, and food service refrigeration.

In PY2013-15 the BEER - Standard program fell well short of its goals, achieving only 56 percent (12,056.2 MWh) of its proposed savings target (21,465.0 MWh). In PY2013-15, the Business Energy Efficiency Rebate - Standard program accounts for approximately seven percent of the total portfolio as Table 9 shows (Navigant PY2015 EM&V Report, pp. 12-14).

Table 9: Summary of Business Energy Efficiency Rebate - Standard Program Impact Findings

Business Energy Efficiency Rebate Standard	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	4,166,822	8,572,547	8,725,588	21,464,957	858	1,765	1,796	4,419
Ex Ante Gross	5,095,000	3,670,965	4,027,322	12,793,288	1,166	861	1,574	3,260
Ex Post Gross	5,109,045	3,216,822	3,497,342	11,823,209	913	879	1,183	2,653
Ex Post Net	5,313,407	3,313,327	3,637,236	12,296,137	913	905	1,230	2,759

(Sources: Navigant PY2015 EM&V Report, pp. 55-56, 63-64, 91-92 and the EM&V Auditor records of 2013 and 2014 programs)

Residential Programs Impact Evaluation

This section summarizes the findings from the impact evaluation of GMO's residential energy efficiency programs.

Home Appliance Recycling Rebate

The Home Appliance Recycling Rebate (HARR) Program is an appliance recycling program for working secondary refrigerators, freezers, window air conditioners, and dehumidifier (Navigant PY2015 EM&V Report, p. 112).

In PY2013-15 the Home Appliance Recycling Rebate program achieved 186 percent (3,835MWh) of its proposed savings target (2,060 MWh). However, in PY2013-15, the HARR program accounted for just two percent of total portfolio (Navigant PY2015 EM&V Report, p. 114) (see Table 10).

Table 10: Summary of Home Appliance Recycling Rebate Program Impact Findings

Home Appliance Recycling Rebate	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	769,260	822,964	837,656	2,060,635	167	60	61	121
Ex Ante Gross	1,322,621	2,855,436	3,997,865	8,175,922	175	378	556	1,109
Ex Post Gross	1,095,304	2,220,733	3,532,179	6,848,216	178	276	431	885
Ex Post Net	569,558	1,243,610	1,978,020	3,835,000	93	155	241	496

(Sources: Navigant PY2015 EM&V Report, pp. 113-114, 117, 124-125, and EM&V Auditor records of 2013 and 2014 programs)

Income-Eligible Weatherization

The Income-Eligible Weatherization (IEW) Program assists low-income customers in reducing energy use and bills by weatherizing their homes. GMO partners with non-profit low-income advocacy groups called Community Action Programs (CAPs) to implement the program. Weatherization crews hired by CAPs perform site visits at the request of low-income customers to complete home energy audits, identifying drafts and other sources of inefficiency, and evaluating needed heating and cooling system repairs. In response to audit findings, pending approval by the program manager, the program may finance air sealing, ceiling insulation, wall insulation, window replacement and heating or cooling system repairs in order to effectively weatherize the home (Navigant PY2015 EM&V Report, p. 136)

In PY2013-15 the IEW Program achieved 32.3 percent (415.0 MWh) of its proposed savings target (1,286.5 MWh) (see Table 11).

Table 11: Summary of Income-Eligible Weatherization Impact Findings

Income-Eligible Weatherization	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	421,627	428,627	436,279	1,286,533	2,613	30	31	91
Ex Ante Gross	48,893	134,434	187,084	370,411	32	100	138	270
Ex Post Gross	47,353	150,835	216,796	414,984	33	103	161	297
Ex Post Net	47,353	150,835	216,796	414,984	33	103	161	297

(Sources: Navigant PY2015 EM&V Report, pp. 136, 141, 144 and EM&V Auditor records of 2013 and 2014 programs)

Navigant's verified savings are reflective of actual energy and demand savings at the customer meter and do not take into account Stipulation and Agreement adjustments noted in GMO's MEEIA Stipulation and Agreement, p. 13.

Home Performance with ENERGY STAR®

The Home Performance with ENERGY STAR® (HPwES) program seeks to provide energy savings to residential customers using a "whole-house" approach to energy efficiency retrofits of existing homes. The program begins with a whole-house energy assessment performed by a Building Performance Institute (BPI) trained and certified contractor or consultant. GMO offers rebates to customers who follow through and complete at least one recommended energy improvement to their homes that meets program guidelines. Measures rebated through the program include attic, wall, and floor insulation, air sealing, duct sealing, and ENERGY STAR®-qualified windows and doors. (Navigant PY2015 EM&V Report, p. 155).

In PY2013-15 the Home Performance with ENERGY STAR® program achieved 1,611 MWh of its proposed savings target of 6,432.7 MWh or 25 percent as Table 12 shows (Navigant PY2015 EM&V Report, p. 155, 157-159).

Table 12: Summary of Home Performance with ENERGY STAR® Impact Findings

Home Performance with ENERGY STAR®	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	2,108,136	2,143,137	2,181,397	6,432,670	(273)	988	1,005	2,964
Ex Ante Gross	397,149	468,535	987,776	1,853,460	185	218	459	862
Ex Post Gross	395,499	468,514	987,733	1,851,746	184	218	459	861
Ex Post Net	395,499	393,552	859,327	1,611,019	184	183	399	749

(Sources: Navigant PY2015 EM&V Report, pp. 155-159, 162 and EM&V Auditor records of 2013 and 2014 programs)

Multifamily Rebate

The Multifamily Rebate Program offers prescribed rebates for energy efficient products to encourage multi-family property owners or managers in the GMO territory to install energy efficient products in common areas and dwelling units of multi-family complexes, mobile homes, and condominiums (Navigant PY2015 EM&V Report, p. 169).

In PY2013-15 the Multifamily Rebate program achieved two percent (85.7 MWh) of its proposed savings target (4,293.0 MWh). The program accounts for approximately 0% of total Portfolio verified energy savings, although the target was three percent of the portfolio as illustrated in Table 12 (Navigant PY2015 EM&V Report, p. 170).

Table 13: Summary of Multifamily Rebate Impact Findings

Multifamily Rebate	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	833,364	1,714,509	1,745,118	4,292,991	11,429	115	117	11,661
Ex Ante Gross	1,131	-	85,571	86,702	-	-	79	79
Ex Post Gross	118	-	85,571	85,689	-	-	79	79
Ex Post Net	118	-	85,571	85,689	-	-	79	79

(Sources: Navigant PY2015 EM&V Report, pp. 170, 173 and EM&V Auditor records of 2013 and 2014 programs)

ENERGY STAR® New Homes

The ENERGY STAR® New Homes (ESNH) program is designed to improve the energy efficiency of homes built in the residential construction market by applying efficient construction techniques and high-performance products according to the EPA guidelines through the ENERGY STAR® program. To earn the ENERGY STAR® label, a home must be rated or certified to ENERGY STAR® version 3.0 requirements and pass inspections and achieve a Home Energy Rating System (HERS) rating of 85 or less, meaning they are built at least 15 percent more energy efficient than homes built to the 2004 International Residential Code (IRC) (Navigant PY2015 EM&V Report, p. 181).

In PY2013-15 the ENERGY STAR® New Homes program achieved a very low 7.1 percent (274.1 MWh) of its proposed savings target (3,859.6 MWh). In PY2013-15, the ENERGY STAR® New Homes program accounts for less than 0.2% of total Portfolio verified energy savings. Table 14 summarizes the impact evaluation findings for this program (Navigant PY2015 EM&V Report, pp. 182, 189).

Table 14: Summary of ENERGY STAR® New Homes Impact Findings

ENERGY STAR® New Homes	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	1,264,882	1,285,882	1,308,838	3,859,602	2,484	392	399	1,177
Ex Ante Gross	704	126,391	147,014	274,109	2	93	184	279
Ex Post Gross	704	126,396	147,014	274,114	2	86	171	259
Ex Post Net	704	126,396	147,014	274,114	2	86	171	259

(Source: Navigant PY2015 EM&V Report pp. 182, 184,186, 187-188 and EM&V Auditor records of 2013 and 2014 programs)

The ENERGY STAR® New Homes Program did not achieve its PY2015 or three-year cycle MEEIA targets.

Air Conditioning Upgrade Rebate

The ACUR Program focuses on improving efficiency through upgrades of residential HVAC through testing, tune-up, and, if needed, replacement (Navigant PY2015 EM&V Report, p. 194).

In PY2013-15 the Air Conditioning Upgrade Rebate program achieved 32 percent (6,416 MWh) of its proposed savings target (19,921.2 MWh). In PY2013-15, the Air Conditioning Upgrade Rebate program accounts for approximately four percent of the total portfolio verified energy savings (see Table 15).

Table 15: Summary of Air Conditioning Upgrade Rebate Impact Findings

Air Conditioning Upgrade Rebate	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	6,398,183	6,632,546	6,890,465	19,921,194	4,036	11,661	4,036	11,661
Ex Ante Gross	2,417,759	2,665,081	3,431,994	8,514,834	1,914	4,735	1,914	4,735
Ex Post Gross	3,017,339	3,159,342	3,011,577	9,188,258	4,177	8,997	4,233	9,053
Ex Post Net	3,017,339	2,243,133	2,108,104	6,431,781	2,924	6,298	2,963	6,337

(Sources: Navigant PY2015 EM&V Report, pp. 195-196, 201-203, 214, and EM&V Auditor records of 2013 and 2014 programs)

Home Lighting Rebate

The Home Lighting Rebate (HLR) Program is an instant rebate upstream lighting program that reduces the cost for GMO customers to purchase efficient light bulbs. Can purchase CFLs and LEDs below retail prices at participating retail stores, including mass merchants, economy retailers, home improvement retailers. There is also an online retail store, and free bulbs are distributed via food banks (Navigant PY2015 EM&V Report, p. 228).

In PY2013-15 the Home Lighting Rebate program achieved 218 percent (54,861 MWh) of its proposed savings target (25,162.2 MWh). In PY2013-15, the HLR Program is a large contributor to the overall GMO portfolio, accounting for approximately 31 percent of total portfolio verified energy savings achieved as summarized in Table 16.

Table 16: Summary of Home Lighting Rebate Impact Finding

Home Lighting Rebate	Energy (kWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	N/A	9,582,031	15,580,197	25,162,228	N/A	1,018	1,655	2,673
Ex Ante Gross	N/A	23,936,672	28,779,530	52,716,202	N/A	2,545	3,059	5,604
Ex Post Gross	N/A	20,548,368	31,700,834	52,249,202	N/A	2,339	5,090	7,429
Ex Post Net	N/A	21,575,786	33,285,876	54,861,662	N/A	2,456	5,345	7,801

(Sources: Navigant PY2015 EM&V Report, pp. 229-230)

Home Energy Report

The 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. Program

participants receive monthly home energy reports that give customers various types of information, about their usage along with advice on how to save energy (Navigant PY2015 EM&V Report, p. 286).

In PY2013-15 the Home Energy Report program achieved 156 percent (17,405.4 MWh) of its proposed savings target (11,180.0 MWh). In PY2013-15, the Home Energy Report program is a significant contributor to the portfolio, accounting for approximately 11 percent of total portfolio verified energy savings as Table 17 shows.

Table 17: Summary of Home Energy Report Impact Findings

Home Energy Report	Energy (MWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	3,048,049	8,131,980	-	11,180,029	469	1,251	0	1,720
Ex Ante Gross	2,695,254	9,931,518	(2,889,983)	9,736,789	631	2,749	-726	2,654
Ex Post Gross	2,695,254	10,589,396	4,120,704	17,405,354	631	3,046	1,026	4,703
Ex Post Net	2,695,254	10,589,396	4,120,704	17,405,354	631	3,046	1,026	4,703

(Source: Navigant PY2015 EM&V Report, pp. 283-289)

1.2 Demand Response Programs Impact Evaluation

Demand Response Incentive

The MPower DR program was renamed Demand Response Incentive (DRI) Program in January 2015(Navigant PY2015 EM&V Report, p. 358). MPower is a seasonal, event-based DR program that provides customers monetary incentives to reduce demand during peak load periods. The demand reductions during the program cycle are summarized in Table 18.

Table 18: Summary of Demand Response Incentive Program Impact Findings

Demand Response Incentive	Energy (MWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	-	-	-	-	14,308	3,824	3,505	21,637
Ex Ante Gross	-	-	-	-	13,428	-7,586	11,988	17,830
Ex Post Gross	-	-	-	-	13,373	-7,613	12,695	18,455
Ex Post Net	-	-	-	-	13,373	-7,613	12,695	18,455

(Source: Navigant PY2015 EM&V Report, p. 359)

GMO conducted a test event in August 15, and the Evaluator reports that although most participants were below their firm power level, the majority of those that were above their FPL successfully responded (Navigant PY2015 EM&V Report, p. 359).

Programmable Thermostat

GMO's Programmable Thermostat program is a residential and small commercial direct load control (DLC) program that allows the utility to call curtailment events during peak demand periods.

Programmable, communicating thermostats are installed to control HVAC systems in participants' homes or businesses, free of charge. When the utility calls a curtailment event, the implementer controls the thermostats remotely to run HVAC systems in one of several energy optimizing patterns for up to four hours (Navigant PY2015 EM&V Report, p. 336).

GMO can extend the curtailment when necessary by strategically and sequentially initiating curtailment in different regions of its service territory. Participants are allowed to override the system once per month to prevent curtailment. Table 19 summarizes the demand savings achieved during the three-year cycle.

Table 19: Summary of Programmable Thermostat Program Impact Findings

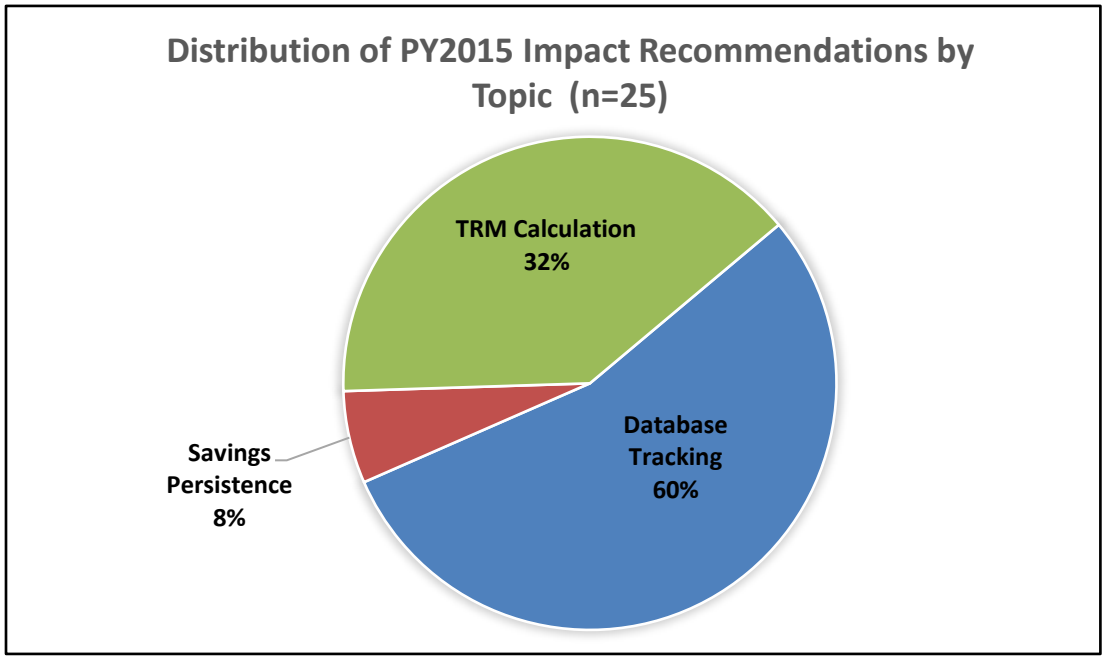
Programmable Thermostat	Energy (MWh)				Demand (kW)			
	2013	2014	2015	2013-15	2013	2014	2015	2013-15
Target	-	-	-	-	2,977	2,822	2,662	8,461
Ex Ante Gross	-	-	-	-	619	4,746	3,442	8,807
Ex Post Gross	-	-	-	-	728	4,856	3,437	9,021
Ex Post Net	-	-	-	-	728	4,856	3,437	9,021

(Source: Navigant PY2015 EM&V Report, p. 343)

In PY2013-15 the Programmable Thermostat Program achieved 107 percent (9,021 kW) of its proposed demand savings target (8,461 kW) (Navigant PY2015 EM&V Report, p. 342). In PY2013-15, the PT Program is a significant contributor to the portfolio, accounting for approximately 15 percent of total portfolio verified demand savings.

1.3 Summary of Impact Evaluation Recommendations

The evaluators provided a total of 25 impact recommendations to improve GMO's energy efficiency portfolio. Figure 3 summarizes the number of distributions by topic



(Source: Navigant GMO EM&V Report)

Figure 3: Distribution of PY2015 Impact Recommendations by Topic

Database Tracking

There were numerous data tracking issues encountered by Navigant during their review of the VisionDSM database used by GMO.

BEER Custom Program (Navigant PY2015 EM&V Report, pp. 23,88)

- Align savings values within the electronic program tracking database with the project files;
- Include the total quantity installed value in the program tracking database; and
- Store and track all project-related documentation.

BEER Standard Program (Navigant PY2015 EM&V Report, p. 23)

- Specify the measure types by end use for all the measures;
- Include facility/building type in the database;
- Standardize the project files for all projects within the Standard program; and
- Capture baseline conditions in the project files, if possible.

Recycling Program (Navigant PY2015 EM&V Report, pp. 23, 114)

- Include data for key parameters like age of appliance, location and capacity for all the participants; and
- Report gross savings in addition to net savings in the tracking data.

IEW Program (Navigant PY2015 EM&V Report, p. 145)

- Explicitly include all calculations used to evaluate the final kWh and kW savings values within the database.

HPwES Program (Navigant PY2015 EM&V Report, p. 32)

- Consider tracking all major milestone dates for all applications, if not in the main database then in some system, to allow routine monitoring of project progress to identify and address any bottlenecks or lags.

Multifamily Program (Navigant PY2015 EM&V Report, p. 171)

- Collect baseline data through the applications to use in engineering analysis for accurate savings verification.

HLR Program (Navigant PY2015 EM&V Report, p. 231)

- 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; and.
- Include key parameters, such a gross savings and the deemed NTG ratio for each record.

Recommendations Regarding Savings Persistence

Navigant provided two recommendations on ways in which the HER Program could increase overall savings persistence:

- GMO should consider measuring savings persistence experimentally in MEEIA 2 (Navigant PY2015 EM&V Report, p. 303); and
- MEEIA should change its method of producing its incremental energy and demand savings targets for the HER Program to reflect a more realistic assumption about savings persistence (Navigant PY2015 EM&V Report, p. 303).

TRM Calculation

Navigant also provided eight specific recommendations on ways to improve the TRM calculations for specific programs. These recommendations are summarized next by program.

Custom Program (Navigant PY2015 EM&V Report, pp. 57,88)

- 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.

Home Appliance Recycling Program (Navigant PY2015 EM&V Report, p. 126)

- Update refrigerator recycling and freezer recycling deemed savings values to reflect the per-unit verified savings;
- Update room air conditioner and dehumidifier recycling savings values to reflect the per-unit verified savings based on the Michigan Deemed Savings;
- Update the measure life of recycled refrigerators be updated from 15 years to eight years, based on the Illinois TRM recommended measure life value; and
- Include the algorithms used for calculating the deemed savings and including the coincidence factors used for calculating peak demand deemed values.

Multifamily Program (Navigant PY2015 EM&V Report, p. 171)

- Include methodology, including algorithms and assumptions, used to calculate the reported savings; and
- Include coincident factors for demand savings.

Home Lighting Program (Navigant PY2015 EM&V Report, pp. 24, 246)

- Update per-unit savings values based on current bulb mix and verified savings estimates; 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.

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

The types of process evaluation activities conducted across GMO's energy efficiency program portfolio and the key findings are summarized here.

2.1 Summary of Process Evaluation Findings

This section summarizes the key findings from the process evaluations of GMO'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.

Program Results

Program results have been mixed for the GMO portfolio. GMO's Custom Program exceeded savings targets while the Standard Program did not meet their goal (BEER Program, p. 30). The HLR program was the most successful residential program, exceeding annual savings targets by 83 percent (Navigant PY2015 EM&V Report, p. 35).

The Programmable Thermostat Program attained 129 percent of the MEEIA target for demand savings in PY2015 and 102 percent of the three-year target (pp. 39, 334). It exceeded its kW enrollment as well as its budget targets in PY2014 and in PY2015 (p. 39) for residential customers, and increased enrollment in its DR program in PY2015 (Navigant PY2015 EM&V Report, p. 39).

The HER Program exceeded the three-year MEEIA target by 156 percent and 273 percent for energy and demand, respectively (p. 281). The DRI Program achieved 362 percent of the PY2015 MEEIA coincident demand savings target, and 85 percent of the PY2013-PY2015 coincident demand savings target (Navigant PY2015 EM&V Report, p. 363).

Some of the residential program offerings struggled to meet goals in 2015. For example, there was low participation for the ENERGY STAR® New Homes program, found to be due to insufficient rebate amounts and lack of interest in the program from builders and HERS raters (Navigant PY2015 EM&V Report, p. 177). The IEW program faced challenges with completing projects in a timely manner due to low staffing levels at the CAP agencies (Navigant PY2015 EM&V Report, p. 136).

The HARR program experienced a particularly tumultuous year as the implementation contractor (JACO) entered receivership in November 2015. GMO program staff had to located a new program implementer, CLEAResult, as well as resolve outstanding issues to ensure customers received their promised rebates However, higher than anticipated program participation, resulting from increased marketing and partnerships with big box retailers, contributed to the HARR Program exceeding targets (Navigant PY2015 EM&V Report, pp. 31, 114, 128).

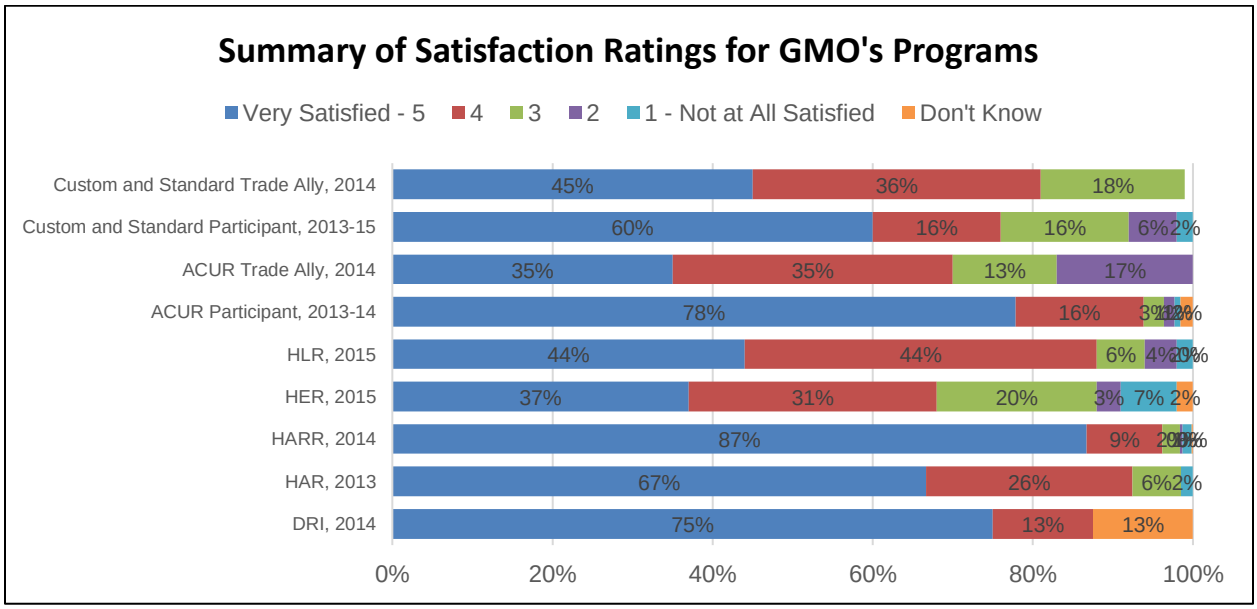
Several programs were discontinued in 2015, including the ENERGY STAR® New Homes Program, the IEW, HARR and BOC programs ((Navigant PY2015 EM&V Report pp. 31-33, 36). The ACUR and HPwES programs will be modified in the next MEEIA cycle and the IEW program will be offered through an alternative approach (Navigant PY2015 EM&V Report pp. 32, 34). The HPwES Program ended with 2015 (Navigant PY2015 EM&V Report, p. 32).

Customer Satisfaction

Overall, participant satisfaction remains high across GMO's energy efficiency program portfolio. The majority (76%) of program participants for the C&I programs awarded a high satisfaction rating (4 or 5 on a 5-point scale, with 60 percent giving the highest rating**)** for the BEER Program (pp. 30, 32, 41). Ten percent of BEER prescriptive participants and 18 percent of custom participants reported slow rebate processing as a reason for low satisfaction (Navigant PY2015 EM&V Report, p. 30).

In addition, the HER program also received high participant satisfaction ratings and increased their positive perceptions of GMO's energy efficiency efforts and trustworthiness, even though there was a negative news story reported about the HER Program in 2015. There was no increase in the number of customers opting out of the program (Navigant PY2015 EM&V Report, pp. 38, 283-284).

These satisfaction ratings are summarized across all of GMO's programs for which participant and trade ally surveys collected these data. The programs represent 99 percent of portfolio net savings for PY2013-15.



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. 41)

Figure 4: Summary of Satisfaction Ratings for GMO's Programs

Program Operations

GMO successfully called a curtailment event for its DR program in August 2015. The utility notified customers in advance, and most customers reduced load when the curtailment was called. However, opportunity for improvement remains in reporting measured curtailment to participants, program manager, implementation contractors, and the evaluator. Although the test event was in August, the curtailment reports for participants or the program manager were not completed by November when Navigant performed its interviews. In addition, there were some delays and issues with the event data that Oracle provided the evaluation team (Navigant PY2015 EM&V Report, pp. 40, 346).

The HER appeared a small effect on decreasing energy usage among program participants. The evaluators found that 23 percent of the recipients reported decreased energy usage compared to 14 percent of the control group. However, these findings also showed that the HER had little effect on changing behavior as 56 percent of the recipients and 57 percent of the control group reported undertaking the same energy savings measures, suggesting that the program had little effect. In addition, a minority of participants feel the neighbor comparison is inaccurate (Navigant PY2015 EM&V Report, pp. 38, 282, 284).

Several programs struggled with program database and tracking issues which affected overall program operations. Of particular note, a few BEER participants reported delays with application processing in PY2015 **(**Navigant PY2015 EM&V Report, pp. 30, 58). Furthermore, key variables are still not for the HPwES program (p. 32) and the new program implementer has increased data collection requirements leading to errors for the IEW program (Navigant PY2015 EM&V Report, p. 32).

Several program designs appear to be ineffective in attracting program participants. The BOC program struggles to reach building owners throughout GMO's service territory. In addition, there is no participation targets nor participation or savings for this program, according to the evaluators (Navigant PY2015 EM&V Report, p. 36).

The Energy Analyzer Small Business Program also does track participation levels or program savings. In addition, even though the savings tool was redesigned in PY2015, it still has limited features (Navigant PY2015 EM&V Report, p. 37).

The Programmable Thermostat Program has more than 11,500 customers that using out dated technology that is currently inoperable with the current program. Moreover, these units are nearing the end of their useful lifetimes (Navigant PY2015 EM&V Report, p. 39).

Marketing and Outreach

GMO implemented an extensive marketing campaigns for the HARR, ACUR, Energy Analyzer and DR programs from May through September 2015 (Navigant PY2015 EM&V Report, pp. 31, 34, 36, 37, 330). In addition, program implementers also increased outreach which led to increased program enrollment in its DR program and increased participation to 111 percent for its HARR Program (Navigant PY2015 EM&V Report, pp. 31, 113-114).

The DRI program hired CLEAResult to actively recruit small-to-medium sized commercial customers who do not require diesel backup generation. As a result, the program enrolled 10 new participants responsible for 12MW of capacity for PY2015. The program should continue this targeted recruitment approach to counter any large customers who might be unable to participate in the program due to the EPA regulations on diesel generation (Navigant PY2015 EM&V Report, pp. 355-356).

For the BOC Program, GMO relied on one-on-one conversations between customers and key account managers. Focusing on Tier 1 customers, key account managers highlighted the benefits of combining training with the installation of rebated energy efficient measures (Navigant PY2015 EM&V Report p. 317).

Program Awareness

The HER activities did not lead to increased program awareness of other GMO programs. As the evaluators found, program participants were not any more aware of GMO programs compared to the control group. Despite receiving HER, the participants were not more aware of other GMO programs, compared to the control group addition, GMO did not promote other programs or educate participants about LEDs through the energy reports. (Navigant PY2015 EM&V Report, p. 284).

Marketing Benchmarking Results

Most of GMO's marketing and outreach activities met or exceeded California Best Practices for marketing and outreach for most of its programs (pp. 128-129, 216, 243, 276, 321). The GMO 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. 132).

Communications

Communications between the implementation contractors and program staff varied across programs. For example, there were open channels of communication, clearly defined responsibilities, and built-in feedback loops which contributed to overall success of the DR program. But the evaluators also found communication of event reporting needs improvement. Although the test event was in August, by November the curtailment reports for participants and program manager were still not completed. (Navigant PY2015 EM&V Report, pp. 40, 353, 355-356).

But there was a distinct lack of communication between GMO and the CAP agencies which contributed to overall operational challenges for the IEW program (Navigant PY2015 EM&V Report, p. 136). In particular, the evaluation found that the program staff and CAP agencies were no longer holding "regular meetings" in PY2015 (Navigant PY2015 EM&V Report, pp. 146-147).

Both program staff and the implementer reported strong communication and collaboration on strategies to optimize the bulb mix throughout the year for the HLR program, which created a high degree of flexibility in managing the mix of bulbs sold. But, the evaluators also found that this 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 CLEAResult and GMO for the HLR program. (Navigant PY2015 EM&V Report, pp. 35, 227).

Cross Program Participation

GMO's cross-promotional efforts were uneven in PY2015. GMO successfully cross-promoted the ACUR and HARR programs by adding three big box retailers. Now, when customers purchase a new appliance in these they are informed about the HARR Program and are presented with the opportunity to

have their old unit removed when their new unit is delivered GMO (Navigant PY2015 EM&V Report, pp. 148, 217).

GMO also began a cross-promotional effort to inform low-income customers about the IEW Program through the Food Bank component of the HLR Program. The HLR Program gives away KCP&L promotional tote bags with CFLs to low-income customers through local food banks (Navigant PY2015 EM&V Report, p. 148).

However, the HER Program did not integrate any additional cross promotion in PY2015; instead the program staff focused on increasing overall marketing for the residential energy efficiency programs (p. 304). The uplift analysis demonstrates increased participation in the Home Appliance Recycling Rebate (HARR) program and in the Home Performance with ENERGY STAR® Program (Navigant PY2015 EM&V Report, p. 306).

Program Changes

GMO is making changes to some of its program offerings to streamline program operations, and address the issues with aging DR and Programmable Thermostats technologies. In 2016, GMO plans to standardize the incentive levels for the Custom and Standard Program which will expedite application processing and provide standardized rebate amounts for equivalent energy savings, mitigating contractor issues (Navigant PY2015 EM&V Report, p. 102). Other planned changes for this program include improving the application form, "right sizing" the measure mix, providing additional marketing materials and adding measures to the Standard Program (Navigant PY2015 EM&V Report, pp. 102-103).

The ACUR and BEER Program implementation staff established new requirements such as instituting key performance indicators and better benchmarks as a way to improve overall program operations (Navigant PY2015 EM&V Report, pp. 34, 104).

The HARR and HLP programs also expanded their program reach in PY2015 by adding more retailers as a way to reach out to a wider group of GMO customers (Navigant PY2015 EM&V Report, pp. 35, 111, 113, 227).

The HLR program updated its bulb mix which increased LED sales and kept program participation in pace with program budget. GMO also plans to phase out CFLs in place of LEDs by PY2016 (Navigant PY2015 EM&V Report, p. 227).

The Energy Analyzer web portal was also updated and the reports were integrated with the online bill pay capability in PY2015 (Navigant PY2015 EM&V Report, p. 309).

In Cycle 2, the new Nest learning Wi-Fi enabled thermostats will develop a unique algorithm based on customer living patterns, comfort thresholds, and how they set and adjust their thermostats. These new thermostats provide an opportunity for behavioral changes and energy savings (Navigant PY2015 EM&V Report, p. 39).

Furthermore, GMO plans to switch to Advanced Metering Infrastructure (AMI) meters through the DR program to ensure easier verification of program participation and report creation as long as it is technically feasible (Navigant PY2015 EM&V Report, p. 40).

But the evaluators also found that several negative changes in the IEW contributed to its poor participation rate. These changes included new stricter state guidelines requiring that applications be cancelled if the customer does not provide seven to eight required documents within 90 days of opening the application, which led to an increase in program drop outs (Navigant PY2015 EM&V Report, p. 148).

Trade Ally Engagement

There were no formal trade ally surveys completed in PY2015 for most programs. Therefore, the findings regarding trade ally engagement are limited to those programs in which this information was reported through the interviews with program staff.

Several program staff tried to increase activities to improve trade ally engagement in PY2015. GMO's efforts to increase trade ally outreach were successful for the ACUR program, but less successful for the HPwES program (Navigant PY2015 EM&V Report, pp. 34, 41, 153). To increase trade ally engagement in the ACUR program, GMO required trade allies to complete a certain number of projects to remain active, redesigned the trade ally incentive process and conducted a trade ally contest (Navigant PY2015 EM&V Report, pp. 34, 41, 194).

In addition, the evaluators found that the trade allies continue to request marketing materials for their customers. Most of the program participants learned about the incentive program through their contractor (42 percent) or their distributor/supplier (33 percent), suggesting that trade allies are critical for the distribution of program updates and information (Navigant PY2015 EM&V Report, p. 109).

But the several efforts in PY2015 to recruit trade allies in populous towns that have few participating trade allies were not successful for the HPwES program (Navigant PY2015 EM&V Report, p. xxi, 117).

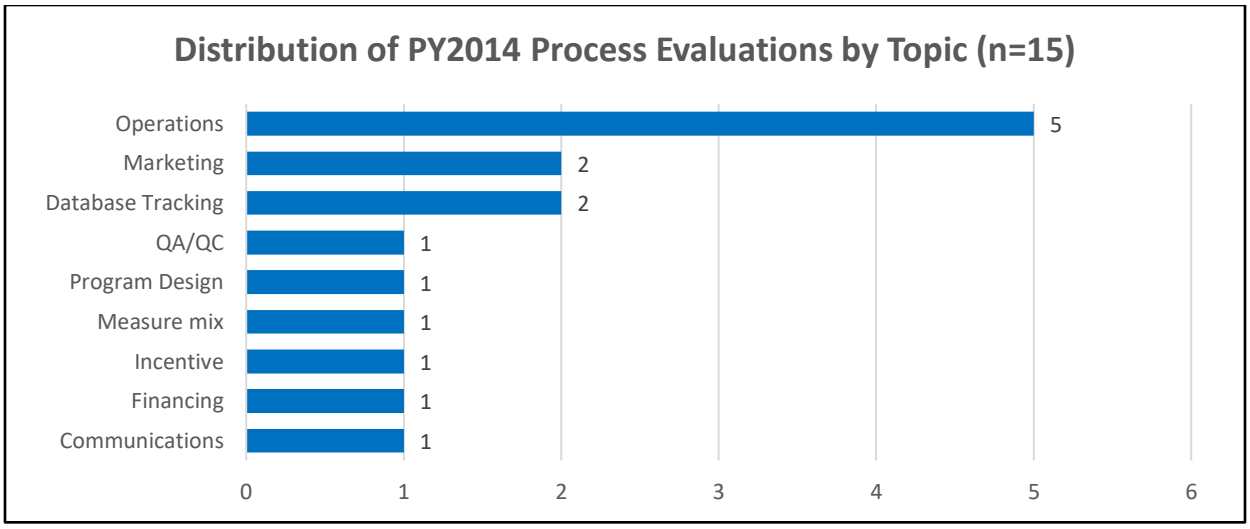
Areas for Program Improvement

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

- Address throughput bottlenecks for the IEW Program;
- Standardize reporting;
- Share best practices; (Navigant PY2015 EM&V Report, pp. 32, 136);
- Report energy savings and set energy savings targets for the Energy Analyzer and SB Energy Analyzer, (Navigant PY2015 EM&V Report, pp. 37, 40); and.
- Address participant concerns regarding comparisons to neighbors by providing additional clarifying language (Navigant PY2015 EM&V Report, pp. 38, 284).

2.2 Status of Previous Process Evaluation Recommendations

In accordance with process evaluation best practices, the evaluators provided a status report regarding the progress made towards implementing the 15 process evaluation recommendations made in the PY2014 EM&V Report. The evaluators provided a total of 15 process evaluation recommendations based on the PY2014 EM&V Report across the following topic areas (see Figure 5). As this figure shows, the evaluators provided the most number of recommendations on ways to improve overall program operations (n=15).



(Source: Navigant PY2015 EM&V Reports)

Figure 5: Distribution of PY2014 Process Evaluations by Topic

As the following figure shows, the results are evenly divided; five have been implemented; five are in progress; and five were not addressed.

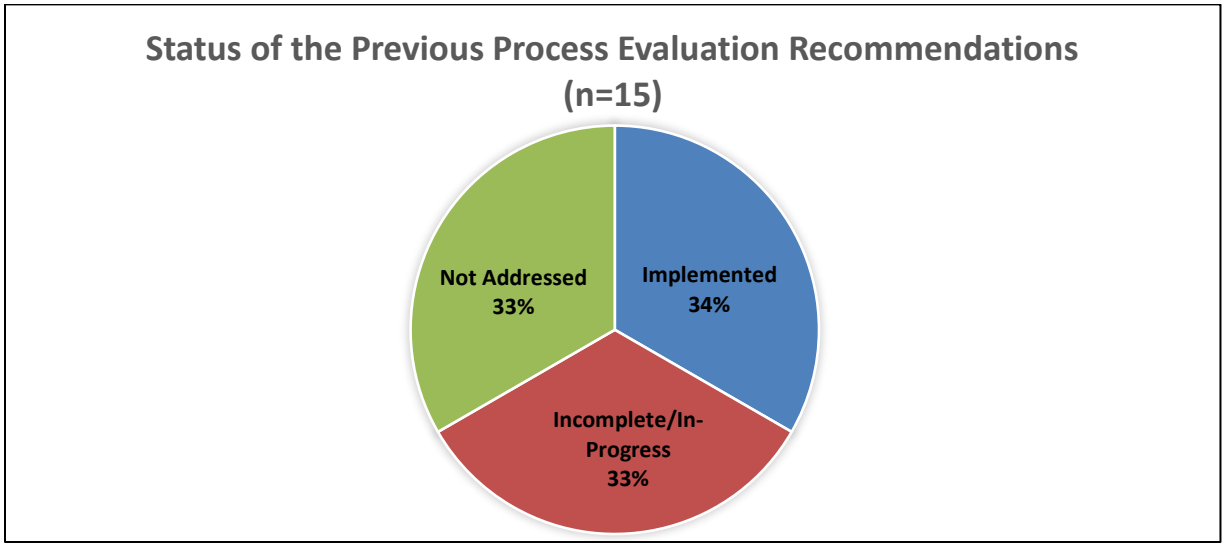


Figure 6: Status of Previous Process Evaluation Recommendations

According to the PY2015 Evaluation Report, GMO has implemented two recommendations to improve program operations by moving to online application processing for its C&I program and developing guidelines for the HPwES auditors (Navigant PY2015 EM&V Report, pp. 54, 116). GMO also made the recommended improvements to its marketing pieces for trade allies (Navigant PY2015 EM&V Report, p. 34,165), and implemented an improved QA/QC strategy to ensure fewer data tracking errors (Navigant PY2015 EM&V Report, p. 95). Lastly, GMO started to promote rebates through cross-program participation activities (Navigant PY2015 EM&V Report, pp. 38, 284, 304).

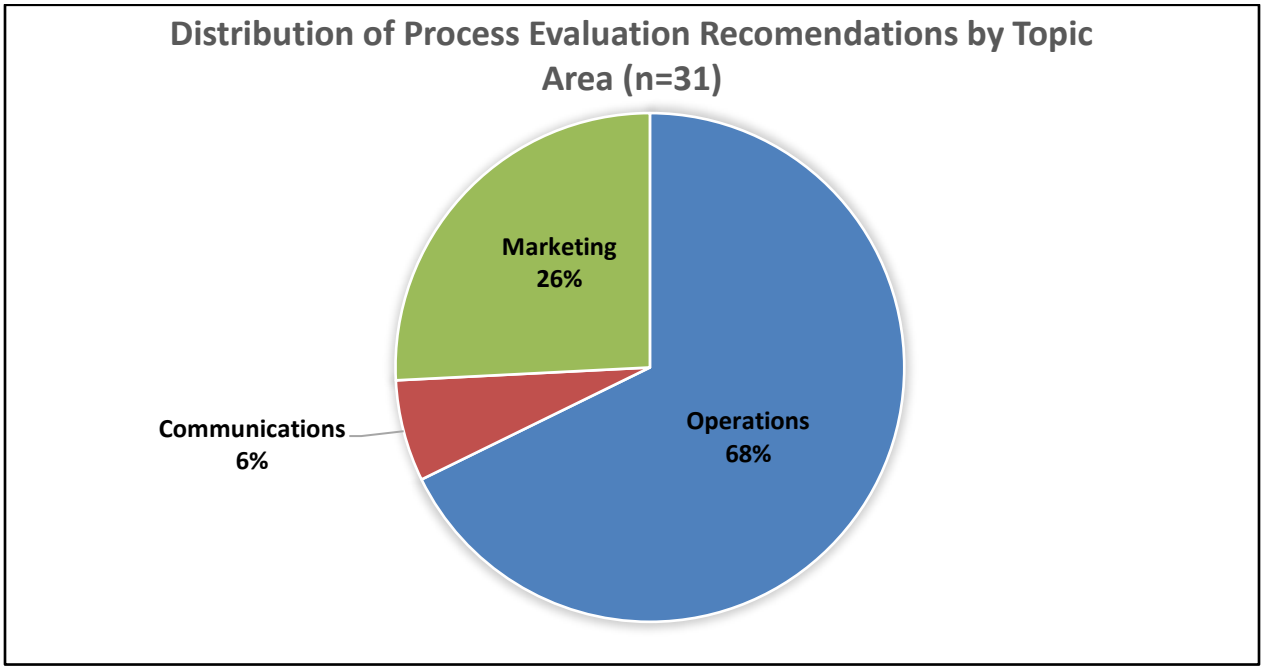
Five recommendations are still in-progress or have not yet been completed. These recommendations included redesigning the BEER incentive structure, but this has to be implemented as part of a larger transition in implementation contractors (Navigant PY2015 EM&V Report, p. 30). However, Navigant's previous recommendations to engage more directly with the CAP agencies and provide them materials and support has not yet been fully implemented (Navigant PY2015 EM&V Report, p. 98).

GMO has also not yet made all the recommended improvements to its database tracking systems regarding both application processing and monitoring participation goals (Navigant PY2015 EM&V Report, pp. 98, 116).

In PY2015, GMO also did not implement five recommendations regarding changes in the incentive structure, offering a financing program, changing the measure mix or improving the tracking system requirements for some of its programs (Navigant PY2015 EM&V Report, pp. 54, 55, 95, 99).

2.3 Summary of PY2015 Process Evaluation Recommendations

In the PY2015 EM&V Report, Navigant provided a total of 31 process evaluations on ways to improve GMO's current energy efficiency program portfolio. Of these 31 recommendations, two-thirds (68%) identified areas for ways to improve program operations as illustrated in Figure 7. GMO also provided eight recommendations on ways to improve program marketing activities and two recommendations on ways to enhance communications. These recommendations are summarized next.



(Source: Navigant PY2015 EM&V Report)

Figure 7: Distribution of Process Evaluation Recommendations by Topic Area

Operations

Given the challenges with the IEW Program, Navigant offered four recommendations on ways to help GMO improve its overall relationships with the CAP agencies, enhance communications, and streamline reporting and data collection bottlenecks (Navigant PY2015 EM&V Report, pp. 32, 136).

Navigant also made suggestions to provide additional customer training and education regarding its program offerings for both its residential and C&I customers (Navigant PY2015 EM&V Report, pp. 30, 36, 58).

Other recommendations to improve program operations included completing the development of the planned audit tool for small, medium and large commercial customers (Navigant PY2015 EM&V Report, p. 37); and continue plans to add AMI meters for the DR Program (Navigant PY2015 EM&V Report, p. 40).

Navigant also recommended that the GMO should conduct a best practices review to inform future program designs for its ENERGY STAR® New Homes and Multifamily Programs for the next MEEIA cycle (pp. 33, 168, 175, 187). GMO should also incorporate the pilot study results in PY2015 to refine the Programmable Thermostat Program (Navigant PY2015 EM&V Report, p. 39).

The evaluator also recommended that the program database and tracking methods should be refined and improved to include critical metrics such as program administration, spending, and participation levels for its Programmable Thermostat and Small Business Programs (Navigant PY2015 EM&V Report, pp. 329, 338).

Lastly, Navigant recommended that the DR Program continue with its customer targeting and operations cycle (p. 372) and encouraged GMO to expand the retailer network for both its HRL and Recycling Programs going forward (Navigant PY2015 EM&V Report, pp. 31, 227).

Marketing

The evaluators identified a total of eight recommendations on ways to improve marketing and outreach strategies for GMO's programs. These recommendations included:

- Continue and expand customer outreach to new segments (Navigant PY2015 EM&V Report, pp. 35, 38, 372);
- Improve tracking of marketing activities and track critical marketing benchmarks (Navigant PY2015 EM&V Report, pp.109, 164);
- Increase trade ally outreach (Navigant PY2015 EM&V Report, pp. 30, 105);
- Continue to encourage cross-promotion of GMO's residential programs (Navigant PY2015 EM&V Report, p. 38); and
- Continue to emphasize the energy savings benefits of behavioral activities (Navigant PY2015 EM&V Report, p. 38)

Communications

Navigant made two recommendations on ways to improve communications for the DR Program:

- Provide more frequent communication between the utility and the main Implementation Contractor (Navigant PY2015 EM&V Report, p. 40); and
- Strategize on ways to minimize curtailment reporting bottlenecks (Navigant PY2015 EM&V Report, p. 40).

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) and the subsequent 2007 SPM Clarification Memo (Navigant PY2015 EM&V Report, p. 24) but does not account for the subsequent 2007 SPM Clarification Memo.

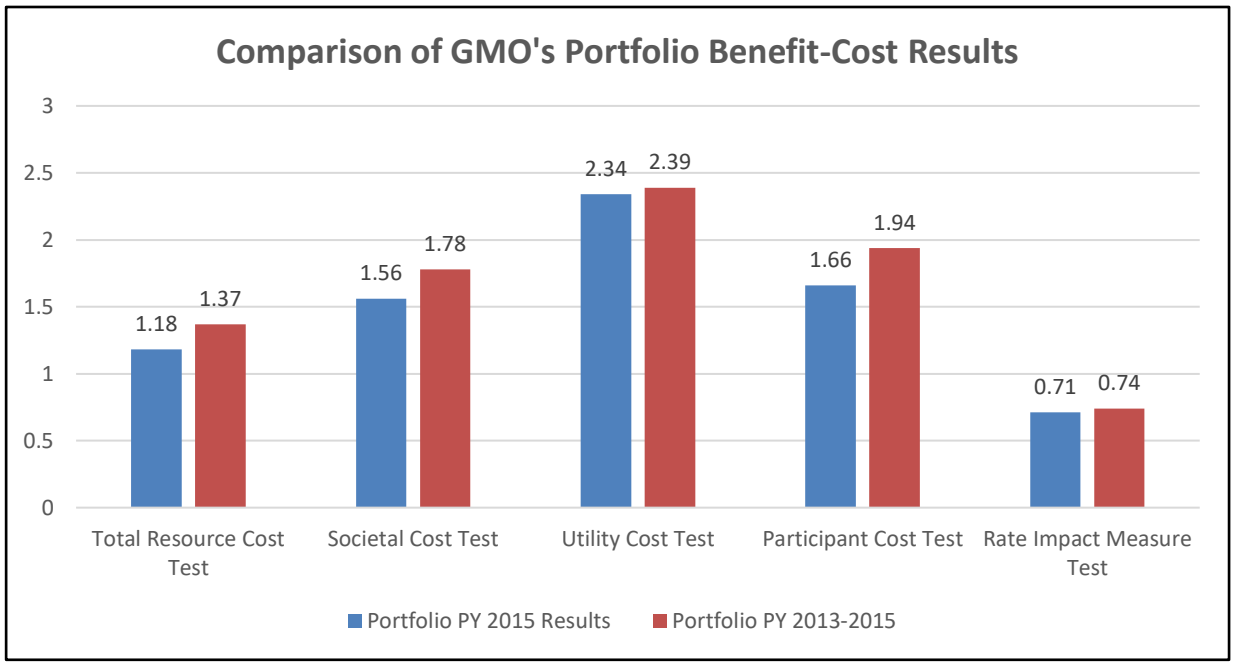
The cost benefit section of the report provides a list of included costs; and discussions on the application of different of discount rates and for the treatment of free riders (Navigant PY2015 EM&V Report, pp. 45-48). An extensive discussion of the allocation of costs for the early retirement of air conditioners in the ACUR Program is provided (Navigant PY2015 EM&V Report, pp. 46-47). Navigate used the current evaluated NTG for all programs (Navigant PY2015 EM&V Report, p. 46-47). Additional assumptions either developed by Navigant or not provided by GMO, include energy and peak demand savings, load shapes, EUL and RUL values and participant equipment costs (Navigant PY2015 EM&V Report, Table 1-4, p. 48).

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:

- 2015 B/C ratios: cash flows discounted to 2015
- Aggregate 2013-2015 B/C ratios: cash flows discounted to 2013
- 2015 monetary costs and benefits components: discounted to 2015
- 2015 savings: represent first-year savings only, so no discounting
- Aggregate 2013-2015 savings: simple sum of 2013-2015 first-year savings, so no discounting

Cost-Effectiveness Results

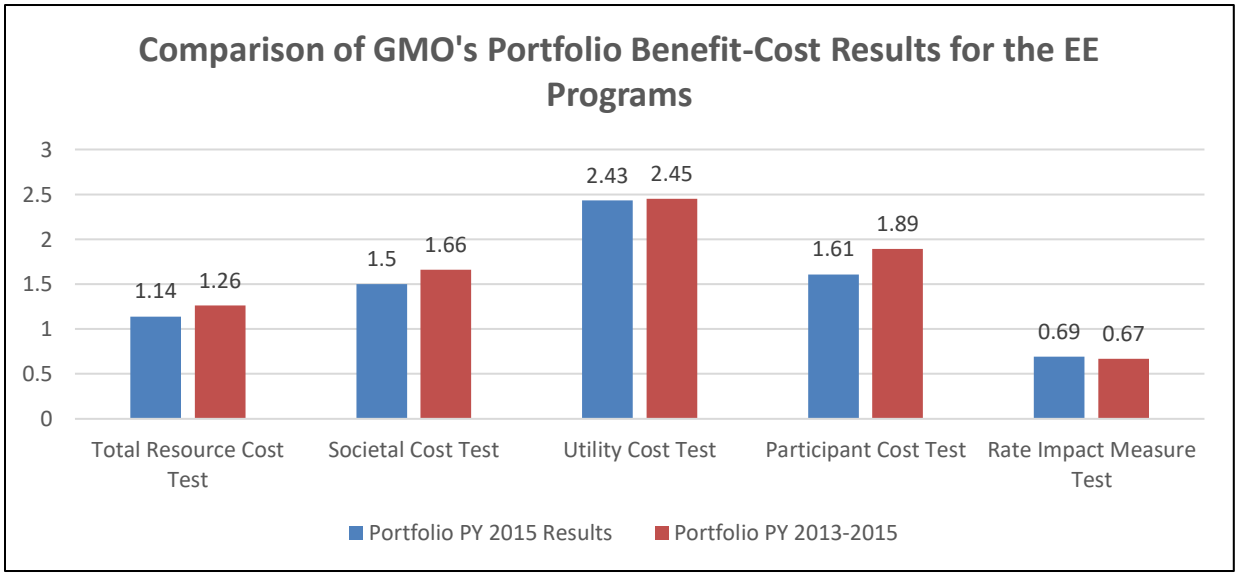
GMO's overall program portfolio remains cost-effective for PY2015. As Figure 8 shows, GMO's overall energy efficiency and DR portfolio continues to be cost-effective, though each perspective has shown a slight decrease in cost-effectiveness in 2015. Navigant did not provide rationale regarding the decline.



(Source: Navigant PY2015 EM&V Report, p. 28)

Figure 8: Comparison of GMO's Portfolio Benefit-Cost Results

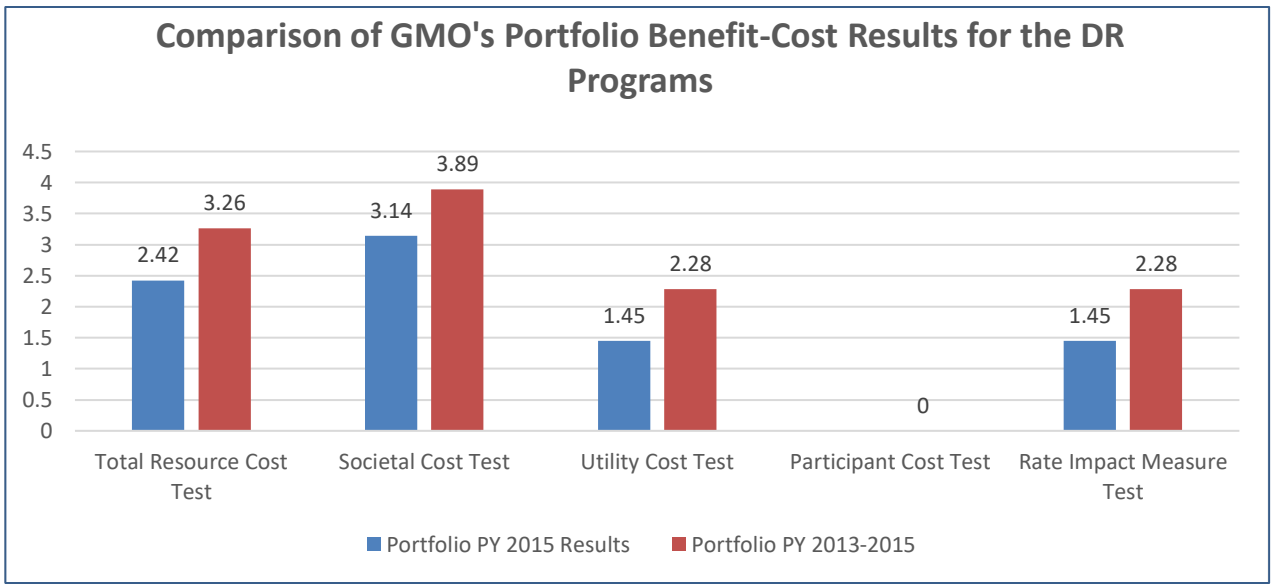
As Figure 9 illustrates, the energy efficiency programs are cost-effective across all tests, except for the RIM test, though the RIM test results were the only perspective that did not show a decline as the program period continues.



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

Figure 9: Comparison of GMO's Portfolio Benefit-Cost Results for the Energy Efficiency Programs

Both of GMO's DR programs continue to be very cost-effective both on an annual and cumulative basis, though the DR programs did show a greater relative decline in overall cost-effectiveness relative to the portfolio. These programs also pass all of the benefit-cost tests, including the RIM as Figure 10 shows.



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

Figure 10: Comparison of GMO's Portfolio Benefit-Cost Results for the Demand Response Programs

Though the portfolio was cost effective over the three-year cycle, individual program cost-effectiveness varied considerably. The C&I Programs as cost-effective across all the tests, with the exception of the RIM test (Navigant PY2015 EM&V Report, pp. 26-28). These differences are highlighted in Table 20 Almost all programs have positive TRC and UCT results, with the exception of the HAR, IEW, and HPwES Program which show a cost-effectiveness ratio of less than one for these tests. Both of GMO's demand response programs showed the highest TRC and UCT tests (Navigant PY2015 EM&V Report, p. 28).

Table 20: Benefit-Cost Ratios by Program and Cost Test - Program to Date - PY2013-PY2015

	Program	Total Resource Cost Test	Societal Cost Test	Utility Cost Test	Participant Cost Test	Rate Impact Measure Test
C&I EE Programs	C&I Custom Rebate	1.21	1.64	2.63	1.61	0.71
	C&I Prescriptive Rebate	2.06	2.69	3.36	2.67	0.85
Residential EE Programs	Multi-Family Rebate	1.95	2.8	8.58	1.12	1.54
	Home Energy Report	1.47	1.47	1.45	INF*	0.51
	Air Conditioning Upgrade Rebate	1.03	1.40	1.53	1.16	0.78
	Home Appliance Rebate	0.48	0.59	0.37	6.20	0.22
	Home Performance with ENERGY STAR®	0.52	0.71	3.52	0.44	0.97
	ENERGY STAR® New Homes	1.05	1.43	1.11	1.56	0.69
	Home Appliance Recycling Rebate	1.31	1.53	0.91	INF*	0.34
	Income-Eligible Weatherization	0.90	1.22	0.90	INF*	0.57
	Home Lighting Rebate	2.80	3.09	4.11	7.81	0.45
DR Programs	Demand Response	4.16	4.16	0.68	INF*	0.68
	Programmable Thermostat	3.20	3.87	2.95	INF*	2.95
*Ratios are infinite because there are positive benefits and not participant costs.						

(Source: Navigant PY2015 EM&V Report, Table ES-9, p. 27)

Section 4: EM&V Auditor Findings and Recommendations

4.1 Evaluation Methodologies

Navigant developed a multi-year evaluation strategy to provide GMO and stakeholders with the best information possible over the course of the MEEIA programs within the available evaluation financial resources.[10] Navigant's plan concentrated on those programs with the greatest contribution to overall portfolio savings. The analyses contained in this report are designed to evaluate, measure, and verify the information tracked by GMO for its program portfolio for PY2015 and summarize findings from the entire MEEIA 2013-2015 period (Navigant EM&V Report, pp. 8, 42).

For impact evaluation, Navigant leveraged the comprehensive data and engineering review that occurred in PY2013. For PY2014, Navigant expanded on this effort with focused on-site data collection for the two Commercial and Industrial (C&I) programs, and residential telephone survey efforts for the HARR, HAR, and ACUR programs. For PY2015, Navigant leveraged participant and trade ally survey data collected in PY2014 for the residential programs, and continued on-site data collection and telephone phone surveys for the C&I programs (Navigant PY2015 EM&V Report, pp. 9-10).

Assessment of the *net savings and the net-to-gross ratio* is integrated with the process evaluation and are determined for programs and the portfolio over the three-year evaluation cycle. The net-to-gross approaches focused on the programs accounting for the majority of portfolio savings and those where free ridership and/or spillover is likely to exist. Net-to-gross findings are applied to the overall three-year gross verified savings to determine net verified savings (Navigant PY2015 EM&V Report, pp. 10-11).

The goal of the *process evaluation* is to document program design and operations and to provide GMO with actionable recommendations for the improvement of its program processes. This may include recommendations about program design, program targeting, improvement of customer and trade ally satisfaction, reduction of barriers to participation, and alternative promotion strategies (Navigant PY2015 EM&V Report, p. 29).

In accordance with MO Regulations, GMO is required to complete an impact evaluation for each program using one or both of the methods and one or both of the protocols detailed below.

1. ***Impact evaluation methods**. At a minimum, comparisons of one (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:*

[10] Approximately 5% of the 3-year MEEIA programs' budget of $13,944,367 will be spent on EM&V.

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 PY2015 evaluation, Navigant used impact evaluation method 1A for all energy efficiency and DR programs, except for the HER and HPwES, which was evaluated using method 1B only. These approaches and the intended approaches for the three-year impact evaluation are summarized in Table 21.

Table 21: Summary of Impact Evaluation Methodologies Used in the EM&V Reports

Program		2013 Impact Evaluation Method	2014 Impact Evaluation Method	2015 Impact Evaluation Method
C&I EE Programs	Business Energy Efficiency Rebate - Custom	1A	1A	1A
	Business Energy Efficiency Rebate - Standard	1A	1A	1A
Residential EE Programs	Home Appliance Recycling Rebate	1A	1A	1A
	Income-Eligible Weatherization	1A	1A	1A
	Home Performance with ENERGY STAR®	1A	1A	1B
	Multi-family Rebate	1A	1A	1A
	ENERGY STAR® New Homes	1A	1A	1A
	Air Conditioning Upgrade Rebate	1A	1A and 1B	1A
	Home Lighting Rebate	-	1A	1A
	Home Appliance Rebate	1A	1A	1A
	Home Energy Report	1A	1B	1B
Demand Response Programs	Residential Programmable Thermostat	1A	1A	1A
	Demand Response Incentive	1A	1A	1A

** Navigant did not perform impact evaluations for the Building Operator Certification, Energy Analyzer, or Energy Analyzer for small business programs because GMO does not claim savings for these programs and therefore Navigant did not verify savings.*
Source: Navigant analysis (pp. 17-20)

Navigant used load impact measurement protocol 2B to evaluate all energy efficiency and DR programs, except for the C&I and HER programs. The HER Program was evaluated using protocol 2A only. The C&I programs were evaluated using both measurement protocols 2A and 2B. These approaches are summarized in the following table.

Table 22: Impact CSR (4) Impact Requirements MO Regulations Impact Evaluation Protocols for 2015*

Program		2015 Load-Impact Measurement Protocol
C&I 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
	Income-Eligible Weatherization	2B
	Home Performance with ENERGY STAR®	2B
	Multi-family Rebate	2B
	ENERGY STAR® New Homes	2B
	Air Conditioning Upgrade Rebate	2B
	Home Lighting Rebate	2B
	Home Appliance Rebate	2B
	Home Energy Reports	2A
Demand Response Programs	Residential Programmable Thermostat	2B
	Demand Response Incentive	2A

** Navigant did not perform impact evaluations for the Building Operator Certification, Energy Analyzer, or Energy Analyzer for small business programs because GMO does not claim savings for these programs and therefore Navigant did not verify savings. (Source: Navigant analysis, Navigant PY2015 EM&V Report, pp. 17-20)*

Table 23: Summary of Impact Evaluation Methodologies Used in the EM&V Reports for PY2015

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 EE Programs	Home Appliance Recycling Rebate	✓	✓			
	Income-Eligible Weatherization	✓				
	Home Performance with ENERGY STAR®	✓			✓	
	Multi-family Rebate	✓				
	ENERGY STAR® New Homes	✓				
	Air Conditioning Upgrade Rebate	✓	✓			
	Home Lighting Rebate	✓	✓	✓ **		
	Home Appliance Rebate	✓	✓			
	Home Energy Report			✓ *		
Educational Programs	Building Operator Certification					
	Energy Analyzer					
	Energy Analyzer for Small Business					
Demand Response Programs	Programmable Thermostat	✓				
	Demand Response Incentive	✓				

*(Source: Navigant analysis. * - Conducted by IC. ** - In-store intercept surveys.*

(Source: Navigant PY2015 EM&V Report, p. 20)

Navigant's multi-year process evaluation strategy concentrated on programs with the greatest contribution to overall portfolio savings. Consistent with Navigant's three-year plan, the process evaluation of PY2013 and PY2014 focused primarily on the two principal C&I programs and four residential programs: BEER Custom and Standard, ACUR, HAR, HARR, and HPwES programs.

In PY2014, Navigant continued to collect primary data from participants and trade allies for C&I programs and residential programs with substantial savings: BEER Custom and Standard, ACUR, HAR, HARR, and HER[11]. Navigant also conducted process evaluations of the other seven programs (Multi-Family, HLR, ESNH, HPwES, IEW, MPower, and Optimizer). This approach meant that the majority of process evaluation resources were expended in year two.

[11] Navigant analyzed data collected from HER participants in a survey conducted by the program implementer.

In year three (PY2015), Navigant leveraged the process evaluation work completed for PY2013 and PY2014 and followed up on process recommendations by conducting program manager and implementer interviews. Additionally, Navigant collected and reported on primary data from participants of BEER Custom, BEER Standard, and HLR programs.

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 24 to Table 28.

4 CSR 240-22.070(8) Issue #1: *What are the primary market imperfections common to the target market segment?*

Table 24: 4 CSR 240-22.070(8) Issue #1

Program	Original Response	2015 Response
Business Energy Efficiency Rebate-Custom & Standard	*The BEER C&I Standard and Custom Programs address several market imperfections of the target market of all commercial and industrial customers. Two are discussed below: 1) first cost barrier and 2) limited customer awareness.*	*Another primary market imperfection the program seeks to address is low prioritization of energy efficiency projects. The program seeks to make energy efficiency a priority for those customers who may already be aware of GMO programs.*
Home Appliance Recycling Rebate	*The HARR Program addresses two major market imperfections of the target market of all residential customers in the GMO service area: 1) lack of momentum in customer decision-making and action, and 2) lack of awareness of recycling procedures for large appliances.*	*None*
Income Eligible Weatherization Program	*The target market for this program is weatherization of low-income residences, both owned and rented. The primary difficulty in this market is the inability of low-income residents to afford professional home weatherization services such as the installation of insulation, efficient windows, and heating and cooling system repairs.*	*None*
Home Performance with Energy Star	*The HPwES Program addresses several market imperfections of the target market of residential customers who are homeowners of a single-family home.: 1) lack of customer awareness of the improvements that can be made to increase the energy efficiency of their home, 2) the cost associated with energy efficiency projects and products, and 3) the inability of customers to locate a certified HPwES auditor. The targeted market segments for the HPwES Program are residential customers in GMO territory*	*None*

Program	Original Response	2015 Response
	who are homeowners of a single-family home.	

Program	Original Response	2015 Response
Multifamily Rebate Program	*The primary market imperfections that are common to the multi-family market include 1) the split incentives resulting from dwelling units being independently metered so building owners or managers have less incentive to invest in efficiency measures and 2) low customer awareness of the benefits of energy efficiency measures and the potential to reduce energy use and save money over time.*	*None*
ENERGY STAR® New Homes Program	*The primary market imperfections that are common to the target market of the ESNH Program are a) increasing building specifications from ENERGY STAR® version 2.5 to the more efficient requirements of ENERGY STAR® version 3.0 and b) low customer awareness of the value of buying an ENERGY STAR® certified home.*	*None*
Air Conditioning Upgrade Rebate	*The ACUR Program addresses several market imperfections of the target market of all residential customers. Two are discussed below: 1) additional incremental cost associated with high efficiency units and 2) the length of the payback period.*	*None*
Home Lighting Rebate	*There are three primary market imperfections common to the efficient home lighting market: Relatively high upfront costs of efficient CFL and LED bulbs relative to incandescent and halogen bulbs: 1. Lengthy payback period for LEDs and a lack of understanding of the payback period by consumers for both CFLs and LEDs* *2. 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.*	*None*
Home Appliance Rebate Program	*The HAR Program attempts to address one major market imperfection of the target market of residential customers in the GMO service area: incremental cost associated with higher efficiency appliances and lighting.*	*The program ended with PY2015, but GMO will continue to incentivize efficient lighting through the Home Lighting Rebate Program, which will offer point-of-purchase incentives for qualified LED lamps at participating retailers. GMO will offer programmable thermostats and rebates for smart strips in new programs in MEEIA 2.*

(Sources: Navigant PY2015 EM&V Report, pp. 106, 130, 149, 164,175, 188, 219-220, 247, 277-278, 309-310, 312, 323, 334, 348-349, 369-370)

4 **CSR 240-22.070(8) Issue #2:** Is *the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?*

Table 25: 4 CSR 240-22.070(8) Issue #2

Program	Original Response	2015 Response
Business Energy Efficiency Rebate-Custom & Standard	*The target market for these two programs encompasses all C&I customers within GMO territory, regardless of size or rate class… However, this target market might achieve better coverage with the addition of a program that addresses smaller commercial customers.*	*The target market is appropriately defined.*
Home Appliance Recycling Rebate	*The target market for this program is all residential customers within GMO 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.*	*If GMO resumes the program, Navigant recommends GMO consider expanding the target market to include businesses.*
Income Eligible Weatherization Program	*The target market of low-income customers is defined by GMO as both home-owning and renting utility customers who have household incomes below 200 percent of Federal Poverty Income Guidelines... 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.*	*None*
Home Performance with ENERGY STAR®	*The target market segment for the HPwES Program includes residential customers in the GMO territory who are homeowners of a single-family unit. The target market for this program is appropriately…The program should make the single-family home requirement clear on marketing material and applications and on all materials for trade allies.*	*None*
Multifamily Rebate Program	*The target market segment is appropriately defined for the Multi-Family Rebate Program. It includes residential customers in existing multi-family buildings with two or more dwellings.*	*None*

Program	Original Response	2015 Response
ENERGY STAR® New Homes Program	*The target market segment for the ESNH Program is appropriately defined: builders of new single-family and multi-family homes that are three stories or less in GMO's residential territory. Multi-family buildings that are greater than three stories can be included in the segment if deemed residential by local building codes and each unit has its own heating, cooling, and hot water system.*	*None*
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.*	*GMO plans to offer its new Home Energy Savings program in PY2016 to homeowners as well as to renters. To reach the small business segment, GMO could consider adding efficient HVAC equipment to its new Small Business Direct Install program in PY2016.*
Home Lighting Rebate	*The program market segment is appropriately defined as all GMO residential customers buying light bulbs. The current target market includes homeowners, apartment residents, students, and any other residential GMO customer needing to purchase light bulbs. The program's portfolio of stores…This diversity makes the program accessible to customers in a wide range of income demographics. 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.*	*Results from Navigant's PY2015 in-store intercept surveys of customer purchasing bulbs in program stores suggest the vast majority of program bulb purchasers are residential customers of GMO—79 percent of all program CFLs and 83 percent of all program LEDs are sold to GMO residential customers; 14 percent of all program CFLs and 4 percent of all program LEDs are sold to GMO commercial customers*
Home Appliance Rebate Program	*The target market for this program is all residential customers within GMO territory who are in the market for new home appliances.*	*None. The market segments continue to be appropriately defined.*

Program	Original Response	2015 Response
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.*	*The target market segment is appropriately defined. In PY2015 HER targeted additional customer segments in PY2015. 13,650 of the 57,000 total participants were the next highest energy users, the "second wave".*
Building Operator Certification Program	*The BOC Program has a narrow target market in the large commercial/industrial sector, and it is appropriately defined. The target market is the person or persons responsible for maintaining a large building's operating facilities on a daily basis.*	*None*
Energy Analyzer and Energy Analyzer for Small Business	*N/A*	*The program's main target is residential and small business customers who are looking for ways to make their homes/businesses more energy efficient and/or reduce 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." …. The utility is working on a separate tool for medium and large on-demand rate customers. Thus the subdivision of market segments is appropriately defined.*
Programmable Thermostat Program	*The target market is all residential and small commercial GMO 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 GMO's total residential and small commercial customer markets.*	*MPower DR program was renamed Demand Response Incentive (DRI) Program in January 2015. Some large C&I and institutional customers are also eligible for inclusion in the Innovari DR pilot.*

Program	Original Response	2015 Response
Demand Response Incentive Program	*The target market segment is all commercial customers that are capable of reducing their demand to 25 kW below estimated peak usage when a curtailment event is called between June 1 and September 30 of a year… At this point, the program consists of only six large Tier I commercial customers. While the target market segment itself does not need to be redefined, the program needs to rebalance the mix of small-to-medium sized and large commercial users, increasing overall participation.*	*…due to the new and stringent EPA regulations governing diesel generators, the program lost participants who require diesel backup to participate. This could leave GMO short on capacity during system peaks, so the program actively recruited new participants in GMO's service territory in 2015. The program hired a third-party contractor, CLEAResult, to focus on marketing. They created marketing materials and proactively evaluated if a customer is a fit for the program and how much load the customer could shed. CLEAResult has been successful in actively recruiting customers; it tripled the program's load reduction capacity from 5.7 MW to 17.8 MW.*

(Sources: Navigant PY2015 EM&V Report, pp. 57 Sources: Navigant PY2015 EM&V Report, pp. 106, 130, 149, 164,175, 188, 219-220, 247, 277-278, 309-310, 312, 323, 334, 348-349, 369-370)

4 CSR 240-22.070(8) Issue #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?*

Table 26: 4 CSR 240-22.070(8) Issue #3

Program	Original Response	2015 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, which reflects end-use potential energy savings profiles estimated in Navigant's DSM Potential Study for GMO.*	*The end-use mix continues to be sufficient. Lighting savings continue to comprise the majority of energy savings in 2015. Navigant also notes the Custom Program has been available for approximately 10 years, whereas the Standard Program has been available since approximately 2013. This could also contribute to the larger savings in the Custom Program.*
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 multi-family units.*	*None*
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 are thus reflective of the full diversity of services and technologies in the home weatherization market.*	*None*

Program	Original Response	2015 Response
Home Performance with ENERGY STAR®	*The HPwES Program contains an appropriate mix of the standard building shell energy efficiency improvements, including attic insulation, wall and floor insulation, air and duct sealing, and new windows and doors. The program rebates are determined based on the type and quantity of improvements implemented. The program should continue to monitor advancements in energy efficiency and include new measures in the program where appropriate.*	*None*
Multifamily Rebate Program	*The mix of measures currently available for rebate under the program appropriately reflect the needs of the target market covering measures for common areas and dwelling units… These measures are also rebated through other GMO residential and commercial energy efficiency programs.*	*None*
ENERGY STAR®New Homes Program	*The ESNH Program contains an appropriate mix of measures that reflect the needs of the target market.*	*None*
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…the program incentivizes efficient lighting through CFL bulb giveaways. GMO could consider expanding the program to incentivize other HVAC-related measures; however, it could be offered as a stand-alone measure.*	*GMO could consider adding quality installation and duct sealing to its new Whole House Efficiency program in PY2016.*
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…. 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.*	*None*
Home Appliance Rebate Program	*The end-use mix of appliances is sufficient. The HAR Program offers rebates for a wide mix of* ENERGY STAR®*-rated appliances. However, the program's offering of efficient lighting is limited to a free two-pack of CFLs. The program should expand to provide the consumer with a broader range of efficient lighting technologies (including CFLs and LEDs) and options (i.e., specialty lamps).*	*The program ended with 2015, but in PY2016 GMO will incentivize communicating, programmable thermostats through the Residential Programmable Thermostat Program, which will offer free thermostats with installation and $25 incentives for participating in the peak DR program. GMO will continue to incentivize LED lamps through its upstream Home Lighting Rebate Program.*

Program	Original Response	2015 Response
Home Energy Report	*The program recommends steps to reduce energy use that span the typical end uses of residential customers. 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 These behavioral recommendations reflect the diversity of home energy end uses for the target market segment.*	*None*

(Sources: Navigant PY2015 EM&V Report, pp. 106, 130, 149, 164,175, 188, 219-220, 247, 277-278, 309-310, 312, 323, 334, 348-349, 369-370)

4 CSR 240-22.070(8) Issue #4: *Are the communication channels and delivery mechanisms appropriate for the target market segment?*

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

Program	Original Response	2015 Response
Business Energy Efficiency Rebate-Custom & Standard	*The BEER C&I Standard and Custom Programs use communication channels and delivery mechanisms that are appropriate for the target market. Navigant suggests these can be improved to increase program participation in the following three ways: 1) expand outreach efforts to trade allies, 2) provide marketing materials for trade allies to give their customers, and 3) provide program information to trade allies in monthly emails.*	*Navigant found the C&I Standard and Custom Programs continue to use communication channels and delivery mechanisms that are appropriate for the target market. GMO continues to increase trade ally recruiting and support through the addition of several KPIs. These KPIs include targets for the number of trade ally meetings, manufacturer representative meetings, networking events, and distributor sponsored trainings. GMO program staff reported an uptick in the municipalities, universities, schools, and hospitals (MUSH) market participation when compared to 2014. This is a market where GMO completed additional outreach activities.*
Home Appliance Recycling Rebate	*he 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.*	*GMO significantly expanded its communication channels in PY2015 through a comprehensive multi-channel marketing effort which included direct mail, email, Valpak coupons, Facebook ads, news releases, bill inserts, and*

Program	Original Response	2015 Response
Home Appliance Recycling Rebate		*contractor material. And in the summer, GMO launched a special campaign, "It's worth what?" of television, radio, print, billboard, and digital ads based on a spoof of PBS' Antiques Roadshow television program. The combined effort resulted in a substantial increase in participation over the same period in PY2014.*
Income Eligible Weatherization Program	*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, which are non-profit agencies dedicated to connecting low-income families and individuals to a variety of services... 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.*	None
Home Performance with Energy Star	*The HPwES Program is primarily promoted through portfolio-wide general marketing materials, such as the Black Friday promotion newsletter. Navigant feels that the program would benefit from a more comprehensive and expansive marketing campaign specifically designed for the program…A comprehensive marketing campaign for the program that includes material that is both informative and simple could improve customer awareness and understanding of the program*	None

(Sources: Navigant PY2015 EM&V Report, pp. 106, 130, 149, 164,175, 188, 219-220, 247, 277-278, 309-310, 312, 323, 334, 348-349, 369-370)

4 CSR 240-22.070(8) #5: *What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end- use measure included in the program?*

Table 28: 4 CSR 240-22.070(8) Issue #5

Program	Original Response	2015 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. In addition, the program should also consider creating a type of financing program for all C&I customers.*	*None. The program continues to increase trade ally outreach.*
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.*	*During PY2015, GMO added 3 additional stores from a major big box retail chain. When customers purchase a new appliance in these stores, they are informed about the HARR Program and are presented with the opportunity to have their old unit removed at the same time as when their new unit is delivered. GMO also implemented an extensive marketing campaign in PY2015, with HARR being one of the three programs being that were heavily promoted.*
Income Eligible Weatherization Program	*The utility had 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. Another suggestion the utility has made is that it could use program budget to provide energy efficient window air conditioning units and fans to replace inefficient existing units during warm months… 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.*	*Given the long waitlist of applicants at some agencies, the utility could focus its efforts on streamlining program processes and helping agencies increase throughput.*

Program	Original Response	2015 Response
Home Performance with ENERGY STAR®	*The HPwES Program can more effectively overcome the market imperfections associated with home energy efficiency improvements by increasing the program marketing. In order to overcome all the barriers, the program marketing materials should promote and explain the program, the benefit of energy efficiency improvements, and the benefit of working with a certified HPwES auditor. The program should also consider extending the timeline for participation in the program or allowing customers to complete the recommended improvements in stages.*	*In 2015 GMO provided contractors with marketing collateral they could personalize to co-brand with the program through several media; these included a two-sided information sheet, door hanger, post card, black and white print ad, and web banner ad. GMO also promoted the program through Facebook ads and bill inserts.*
Multifamily Rebate Program	*The GMO territory does not have as dense a population normally served by multi-family properties. Navigant agrees with GMO's decision to stop offering this program and to reallocate resources from this program to other programs.*	None
ENERGY STAR® New Homes Program	*If GMO wanted to continue this program, they could overcome the identified market imperfections with a three-pronged approach: 1) offering larger incentives to builders and HERS raters so more of the incremental cost of certifying a home to ENERGY STAR® version 3.0 is covered, 2) recruiting more HERS raters in the GMO service territory so HERS raters would not be required to travel long distances to work on homes, and 3) providing more education and outreach to customers so they become aware of the long term economic and home comfort benefits of installing high efficiency equipment.*	*None*
Air Conditioning Upgrade Rebate	*The ACUR Program can more effectively overcome the market imperfections associated with the adoption of high efficiency HVAC units by growing and supporting the participating trade ally network. Navigant's mapping analysis indicates that the trade ally coverage in some populous parts of GMO territory is not sufficient, especially for a program that requires participant trade allies to promote and deliver the program.*	*GMO has taken several steps in PY2015 to increase trade ally participation and engagement, including redesigning the trade ally incentive process to ensure that the field technicians receive the incentive for completed projects and conducting a contest for trade allies to win box tickets to local professional sports events.*

Program	Original Response	2015 Response
Home Lighting Rebate	*Navigant has identified three potential approaches GMO can take to overcome identified market imperfections and increase participation. 1. Consider additional marketing and outreach for LEDs relative to CFLs, possibly in tandem with higher rebates for LEDs relative to CFLs, as LEDs account for only 2 percent of program sales in PY2014. 2. Consider providing procurement training and assistance to retailers that target low-income customers to encourage reliable stocking and availability of bulbs...*	*The program has successfully increased the sale of LEDs from 2 percent of all program bulb sales in PY2014 to 9 percent in PY2015. The program achieved this principally by optimizing the mix of program bulbs and incentive levels to promote LEDs. The program did not provide procurement training or assistance to retailers that target low-income customers to improve stocking and availability of bulbs in PY2015…GMO should consider conducting postal mail or email surveys of customers to gather more granular data on customer participation in the program. More granular data on customer participation would enable GMO to gauge whether there are underserved customer segments and to use targeted marketing and adjust the program to better serve the needs of underserved customer segments.*
Home Appliance Rebate Program	*To more effectively address the market imperfections, the HAR Program can consider the following program changes: Move to an instant rebate process that minimizes paperwork and facilitates participation Offer incentives for a variety of efficient residential lighting measures to all residential customers…*	*The program ended with 2015, but in PY2016 GMO will continue to incentivize efficient lighting through the Home Lighting Rebate Program and will install free communication, programmable thermostats through the Residential Programmable Thermostat Program.*
Home Energy Report	*Customers express doubt over the validity of the energy use comparison between their household and similar households is a barrier to customer acceptance. 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.*	*Customers continue to express doubt over the validity of the energy use comparison. The Energy Analyzer web portal now provides additional detail on the validity of the comparison.*
Building Operator Certification Program	*In order to provide an opportunity for those far from the training center, a hybrid online/in-person version of the program could be explored with the training center. Also, the BOC Program has a narrow target market…Reaching out to all customers who might employ a designated facilities manager/building operator might enable the program in GMO 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.*	*None*

Program	Original Response	2015 Response
Energy Analyzer and Energy Analyzer for Small Business	*N/A*	*The main barriers to entry are technology-related. This free tool for GMO customers is provided through the corporate website… which is a potential barrier for some customers.*
Programmable Thermostat Program	*The program is successful in enrolling peak demand savings capacity, with nearly 4,000 participants enrolled in 2014, representing over 4,500 kW (Moreover, participation appears well -distributed throughout GMO territory,*	*The program called a limited test event in August of 2015 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.*
Demand Response Incentive Program	*One of the key changes the utility should make to overcome market imperfections and increase participation is to improve channels of communication with existing participants to reduce attrition and increase satisfaction. second area for improvement is the program's ability to deliver meaningful demand reductions.*	*The program made progress on all recommendations from Navigant's PY2014 evaluation report [1]. GMO hired a firm, CLEAResult to provide marketing and outreach efforts. The utility PM enhanced the channels of communications by the thorough review of the A2A database to ensure all contacts were correct.*

(Sources: Navigant PY2015 EM&V Report, pp. 106, 130, 149, 164,175, 188, 219-220, 247, 277-278, 309-310, 312, 323, 334, 348-349, 369-370)

EM&V Auditor's Assessment of Impact Evaluations

Net-to-Gross

The NTG methods mirrored those used for KCP&L 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 free ridership (FR) (i.e., the TA is supposed to serve as a cap on FR, 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 Standard and ACUR programs the TA free ridership was relatively close, but higher than the participants. For the BEER Custom, the TA FR was considerably higher than the participant FR. On one hand this consistency provides additional validity for the free ridership estimate, but it 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 (5%), limiting the NPSO to only those TAs that participated in the survey, rather than extrapolating to the entire TA population, which would have provided a NPSO estimate of 16 percent (since the assumption came from previous report, we will reference the PY2014 report, (Navigant PY2014 EM&V Report, p. 211). The EM&V Auditor Team suggests that in the future Navigant collects, analyzes, and discusses 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 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 are not suggesting that this correct, but it seems highly inconsistent that Ameren MO should use aggressive estimates and GMO/KCP&L 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. 28). 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 (54%) 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 EM&V 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.

4.3 Recommendations to Improve Current Impact Evaluation Reports

All Programs

- The evaluation report uses the term "reported" to describe ex ante gross savings, while "verified" describes ex ante net savings. However, the Evaluator could clarify how or if reported savings reflects preliminary NTG ratios.
- The Evaluator presents data for the 2013 and 2014 years at a program level, but does not include summary results by year. Since this evaluation represents the culmination of a three-year

evaluation effort, the Evaluator should expand on prior year's evaluations and results in the summary section in addition to at the program level.

BEER - Custom

- The Evaluator sourced both coincidence factors and waste heat factors from the Illinois TRM, but in addition to the TRM citation, the Evaluator should look at the research or studies used by Illinois, assess the appropriateness of the values and then make a recommendation citing more robust and reliable sources.

BEER - Standard

- The evaluator should discuss the origin, form and reliability of the savings values that were used in the standard program.

Home Energy Reports

- The evaluation notes that the HER control group was slightly more likely to report taking specific steps to reduce home energy usage, with 56 percent of recipients and 57 percent of the control group reporting taking steps to reduce energy (Navigant PY2015 EM&V Report, p. 306). This finding raises the question as to how the program achieved any savings at all, and seems like something that Navigant should discuss more fully.

Home Lighting Rebate Program

- As the EM&V Auditor 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 original evaluation report value for the HOU, however, was not updated based on the most recent Ameren study, which has now been publicly 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 original report. Navigant has since updated the HOU to reflect this current study and has therefore addressed this issue for the final report (Navigant PY2015 EM&V Report, p. 237).
- Since Navigant conducted intercept surveys with a sufficiently large sample, it was not clear why the original evaluation report did not include cross-sector sales and leakage and these variables were not applied. At 14 percent cross-sector sales and seven percent leakage for CFLs this would have led to a substantial increase in savings. Navigant has since included these two parameter estimates in their final report and this issue has been addressed (Navigant PY2015 EM&V Report, p.238),

Air Conditioning Upgrade Rebate Program

- The EM&V Auditor had some concerns about inconsistent savings assumptions being used for the program CFLs relative to the HLR program. For example, the ACUR evaluation assumes a 0.071 coincidence factor (Navigant PY2015 EM&V Report, p. 209), but Table 9-10 in the HLR

section (Navigant PY2015 EM&V Report, p. 236) shows 0.081 coincidence factor from the Illinois TRM. This was originally thought to be due to an inconsistent use of different versions of the Illinois TRM, but Navigant has added clarification in the final report that discusses the Illinois TRM sources and exactly why the values might differ. It is also not clear if the baseline assumptions match, as Table 8-11 appears to have different values from the text above it. Finally, the HOU presented for the ACUR CFLs and the HLR programs were very different in the original report submittal, but the final report has addressed the EM&V Auditors concerns and now uses the most current Missouri specific lighting study for the HOU assumptions.

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 GMO. 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 publicly available evaluations. The evaluations, should make sure to use the most recent publicly available Ameren Missouri evaluations, otherwise the GMO 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). As an example, the PY2015 evaluation used a prior Ameren HOU estimate for the HLR program (Navigant PY2015 EM&V Report, p. 169), thus overstating the HOU compared to the most recent Ameren Missouri metering study findings.

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 (Navigant PY2015 EM&V Report, p. 190), which the EM&V Auditor assumed that by using the RCT approach and selectively terminating reports to a randomly selected group of customers). The EM&V 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 GMO 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.[12]

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

Navigant should rely on the most current information to complete its future evaluations of the HLR Program. The HLR seems to largely rely on the GMO PY2013 LightSavers Impact Evaluation (Navigant PY2015 EM&V Report, p.282), but the KCP&L PY2015 evaluation updated a number of key parameters, including the baseline wattage, the hours of use, and the coincidence factor. While this evaluation was probably not available when Navigant was working on the GMO PY2015 report, these updated parameter values should be incorporated, where possible, for the PY2015 report. In addition, the PY2015 evaluation should attempt to incorporate both free ridership and spillover (the proposed intercept approach will largely be limited to a net of freer ridership number), plus should consider whether or not leakage should be deducted based on the program activity in the surrounding service territories.

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. 107). 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. However, Navigant was only able to provide responses to the CSR 4 requirements for those programs that received a process evaluation in that year, which limits the overall usefulness of this research activity. At the very least, Navigant should have provided an update to the CSR 4 requirements as part of limited process evaluation activities across all of GMO's programs.

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.

4.5 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[13], and New York will ensure that the process evaluation activities are both cost-effective and informative. This will ensure there is a proper allocation of evaluation resources throughout the three-year program cycle.

[13] Protocol C: Process Evaluation Protocols, Arkansas Technical Reference Manual, Volume 1, 2015

To the extent possible, Navigant should continue to try and standardize the response scales used to measure customer and trade ally satisfaction across GMO'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.

4.6 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 46), 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).

4.7 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 and provided actionable recommendations to improve overall program operations and enhance energy savings calculations.

However, the EM&V Auditor made the following recommendations to improve the overall readability and quality of the report which have been corrected in the final report.

- **Do not use Roman numeral numbering in the Executive Summary**. Navigant has addressed the recommendation.
- **Navigant should address all of the errors identified in this report** and provide the additional clarifications as requested by the EM&V Auditor. Navigant has addressed this issue.

References

Navigant Consulting, 2015, "KCP&L Evaluation, Measurement, & Verification Report – DRAFT, Program Year 2014, Prepared for KCP&L – Greater Missouri Operations, September 9.

_____, 2014, "KCP&L Evaluation, Measurement, & Verification Report – FINAL, Program Year 2013, Prepared for KCP&L – Greater Missouri Operations, July 30.