



NYSERDA

Energy Efficiency Portfolio Standard (EEPS-2) Program

Quarterly Report to the Public Service Commission

Quarter Ending June 30, 2015

Final Report

NYSERDA's Promise to New Yorkers:

NYSERDA provides resources, expertise, and objective information so New Yorkers can make confident, informed energy decisions.

Mission Statement:

Advance innovative energy solutions in ways that improve New York's economy and environment.

Vision Statement:

Serve as a catalyst – advancing energy innovation, technology, and investment; transforming New York's economy; and empowering people to choose clean and efficient energy as part of their everyday lives.

Energy Efficiency Portfolio Standard (EEPS-2) Program

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1 Introduction

This quarterly report reflects progress on Energy Efficiency Portfolio Standard (EEPS-2) Program evaluation activities administered by the New York State Energy Research and Development Authority (NYSERDA). This report contains the anticipated schedule and status of current and upcoming evaluation studies, summaries of recently completed evaluations, and the status of evaluation recommendations through June 30, 2015. Information contained within this report comports with the guidance received from the New York State Department of Public Service (DPS) and discussed with the Evaluation Advisory Group in July 2012 and the E2 Working Group in March 2014.

2 Evaluation Reports Completed

NYSERDA finalized the following reports in the second quarter of 2015. Each report is summarized in Appendix A.

- EmPower Impact Evaluation
- Industrial Process Efficiency
- Multifamily Impact Evaluation

3 Evaluation Status Update

Table 3-1 and Table 3-2 provide the anticipated schedule and status of current and upcoming impact, process, and market evaluation activities by program. As applicable, table notes provide further clarification and information about study timing. Planned evaluation projects and timing may change based on input from internal and external stakeholders, the EEPS evaluation review that is underway, and program progress. Likewise, evaluation project schedules are subject to change based on progress in administering the evaluation studies themselves. Future quarterly reports will highlight any timeline revisions. Timeline revisions made this quarter are designated by cell shading. PY denotes program year and Q denotes quarter.

Table 3-1. Impact Evaluation Schedule and Status

EEPS Program	Impact Evaluation Schedule					
	Detailed Evaluation Plan Submittal	Project Kickoff	Data Collection Complete	Draft Report	Final Report	Notes
Industrial & Process Efficiency (Phase 2)	Completed	Completed	Completed	Completed	Completed	Report finalized
Existing Facilities	Completed	Completed	Completed	Q2 - 2015	Mid 2015	Report being drafted
Agriculture	TBD	TBD	TBD	TBD	TBD	Cancelled.
New Construction	Completed	Completed	TBD	TBD	TBD	Field work in progress.
Agriculture Disaster	Completed	Completed	Completed	Completed	Completed	Final report completed July 2014. Program closed. No further evaluations planned.
FlexTech	Completed	Completed	TBD	TBD	TBD	Cancelled
Commercial Existing Buildings Non-Participant Spillover Study	Completed	Completed	Completed	Completed	Completed	Report finalized.
Multifamily Performance Program	Completed	Completed	Completed	Completed	Completed	Report finalized

Table 3-1 continued

EEPS Program	Impact Evaluation Schedule					
	Detailed Evaluation Plan Submittal	Project Kick-off	Data Collection Complete	Draft Report	Final Report	
Point of Sale (POS) Lighting	Completed	Completed	Completed	Completed	Completed	Reports for 2012-2013 finalized in May 2014
EmPower New York	Completed	Completed	Completed	Completed	Completed	Report finalized including Phase 1 and Phase 2 results.
Home Performance with ENERGY STAR®	Completed	Completed	Phase 2 Completed	Phase 2 Q3 - 2015	Phase 2 Q3- 2015	
New York ENERGY STAR® Certified Homes	TBD	TBD	TBD	TBD	2015	Analysis is underway to determine optimal timing and scope of evaluation results that will be of greatest value. Previous impact evaluation of PY 2007 - 2008 completed in September 2012.

Table 3-2. Process and Market Evaluation Schedule and Status

EEPS Program	Process and Market Evaluation Schedule					
	Detailed Evaluation Plan Submittal	Project Kick-off	Data Collection Complete	Draft Report	Final Report	Notes
Existing Facilities	Completed	TBD	TBD	TBD	TBD	Last process evaluation completed in February 2012. Last market evaluation completed in September 2012.
Agriculture	TBD	TBD	TBD	TBD	TBD	Cancelled.
New Construction	Completed	Completed	Completed	Completed	Completed	Final report completed October 2014.
Agriculture Disaster	Completed	Completed	Completed	Completed	Completed	Final report completed September 2012. Program closed. No further evaluations planned.
FlexTech	Completed	Completed	Completed	Completed	Completed	Final report completed July 2014.
Multifamily Performance Program	Completed	Completed	Completed	Completed	Completed	Final report completed August 2014.
Point of Sale Lighting	Completed	Completed	Completed	Completed	Completed	Reports for 2012-2013 finalized in May 2014.
EmPower New York	Completed	TBD	TBD	TBD	TBD	Last process evaluation completed in July 2010. Planning for next process evaluation on hold pending Clean Energy Fund development.
Home Performance with ENERGY STAR®	Completed	Completed	Q3 - 2014	Q4 - 2014	Q3 - 2015	Draft report in process
New York ENERGY STAR® Certified Homes	TBD	TBD	TBD	TBD	TBD	NYSERDA to identify research and evaluation needs for this market.
C&I Natural Gas Market Characterization	Completed	Completed	Completed	Completed	Completed	Report finalized.

3.1 Recommendation Tracking

Recommendations generated from NYSERDA evaluation studies are tallied in Table 3-3. These recommendations are categorized as follows:

- Total Number of Recommendations Made to Date: Cumulative number of recommendations contained in final NYSERDA evaluation reports.
- Total Number of Recommendations Implemented to Date: Cumulative number of recommendations contained in final NYSERDA evaluation reports that have been implemented by NYSERDA and incorporated into NYSERDA programs.
- Total Number of Recommendations Rejected to Date: Cumulative number of recommendations contained in final NYSERDA evaluation reports that have been rejected by NYSERDA.
- Total Number of Recommendations Currently in Progress: Cumulative number of recommendations contained in final NYSERDA evaluation reports that NYSERDA is still considering for implementation or rejection.

Table 3-3. Recommendation Tracking

Total Number of Recommendations:	Through June 30, 2015
Made to Date ¹	220
Implemented to Date	159
Rejected to Date	21
Currently in Progress	40

¹ The Total Number of Recommendations Made to Date only includes recommendations made in Final (not Interim) evaluation reports.

4 Other

Per the DPS reporting guidance, this section provides an opportunity to report significant activities or events not already reflected in the report. This section is not for reporting routine activities.

There are no other significant activities requiring explanation for the second quarter of 2015.

Appendix A: Completed Evaluation Summaries

This appendix contains a high-level summary of each recently completed evaluation study. The full report on each evaluation study is available on the NYSERDA website. NYSERDA finalized the following evaluation reports in the second quarter of 2015:

- EmPower Impact Evaluation Report, July 2015
- Industrial Process Efficiency Report, July 2015
- Multifamily Impact Evaluation Report, July 2015

NYSERDA EmPower Program and NFGDC Low Income Usage Reduction Program (LIURP): Impact Evaluation Summary

Evaluation Conducted by: Energy Resource Solutions (ERS) Impact Evaluation Team
ERS, Lead Investigators, May 2015

PROGRAM SUMMARY

EmPower was developed in 2004 to serve the low-income residential market and provides both electric and natural gas energy efficiency installations at no cost to qualifying homeowners and at minimal cost to qualifying renters. Participants receive a heating system check, an energy audit, weatherization measures, an infiltration reduction, natural gas usage reduction measures and consumer education. The National Fuel Gas Distribution Corporation’s Low Income Usage Reduction Program (LIURP) began in September 2007 through Commission Order and was designed to be a weatherization program for low income customers. LIURP’s program design is consistent with, and is jointly administered with NYSERDA, as part of EmPower.

EVALUATION OBJECTIVE AND HIGH LEVEL FINDINGS

The objective of the Phase I impact evaluation work was to complete a billing analysis that provided realization rates for the Program. The objective of the Phase II impact evaluation work was to determine the main drivers of Phase I natural gas realization rates (RR) that were lower than expected (0.49 and 0.37 for NYSERDA and NFGDC respectively), and make recommendations that could improve them going forward.

The Impact Evaluation Team concluded that current installation contractor practices are satisfactory and are not a direct contributor to low natural gas realization rates. However, it was determined that NYSERDA’s EmPCalc tool can be improved by the adjustment of several assumptions and through the application of an empirically derived thermal calibration factor of 0.70 to all insulation and air sealing measures. Additionally, the Program can benefit by automating the transfer of measure data to the reported savings database and by developing quality assurance/quality control checks in EmPCalc.

DETAILED IMPACT EVALUATION FINDINGS

Final reported and evaluated electricity and natural gas savings are presented Table 1-1.

Table 1-1. Reported and Evaluated Electricity and Natural Gas Savings for Projects Installed in 2010 and 2011

	Annual Electric Savings (MWh/Yr)	Annual Natural Gas Savings (MMBtu/Yr)	
		NFGDC	NYSERDA
Funding Source	All participants	NFGDC	NYSERDA
Program-reported savings	17,136	62,343	65,422
Realization Rate	0.97	0.37	0.49
90% confidence interval	0.92 – 1.02	0.33 – 0.41	0.41 – 0.56
Evaluated gross savings	16,623	22,955	32,104

Each of the recommended changes is expected to incrementally improve the Program RR from the initial 0.43 determined in the Phase I billing analysis to a final expected RR of 0.85. The evaluation concluded that the remaining 0.15 is at least partly explained by snapback, but likely incorporates other unknown factors.

Table 1-2 summarizes the magnitude of the recommended Program changes in MMBtus and the expected Program RR after implementation. The Program impacts reflect the methods and population from 2010–2011 and may not fully represent another year, which will have different year-to-year variations in weather and population. That being said, the basic approach of the EmPCalc tool has remained consistent even with ongoing incremental improvements, and the participant population is fairly homogenous. Given this high level consistency, the impacts calculated for 2010–2011 are expected to be representative of impacts in future years.

Table 1-2. Impact of Recommendations on EmPower Program Savings and RR¹

	Implementation Status	Program Savings (MMBtu)	Change in RR	RR
Program reported savings	N/A	127,765	–	0.43
Recommendation: Fix administrative errors	Implemented	-10,100	0.04	0.47
Recommendation: Correct EmPCalc factors, including HDD and window-to-wall ratio	Implemented	-24,200	0.12	0.59
Recommendation: Apply a thermal CF of 0.70 to insulation and air sealing measure savings estimates	Recommended	-28,400	0.26	0.85
Total expected reported savings	N/A	65,000	–	0.85
Unknown and behavioral factors	N/A	-10,000	0.15	1.0
Evaluated savings (from Phase I of the impact evaluation)	N/A	55,059	N/A	–
¹ This table presents the expected impact of each recommendation on the Program savings and RR. The overall Program reported natural gas savings are presented at the top, followed by the recommendations and total expected natural gas savings and Program RR after the recommendations have been implemented. The Impact Evaluation Team identified approximately 10,000 MMBtu of overstated savings which are attributed to unknown and behavioral factors that were not evaluated in this study.				

EVALUATION METHODS AND SAMPLING

The analysis in the Phase I work relied on a statistical model that combined pre- and post-installation billing records with weather data and program tracking information to determine the extent to which reported savings could be identified in the changes in consumption. Six utilities provided data for both the electric and natural gas analyses.

The objective of the Phase II work was to identify the reasons why the Program was overestimating natural gas savings and to recommend steps for the Program to improve those estimates. In the first stage, analysis of project files, billing results, tracking data, and secondary data were used to posit a variety of hypotheses that might explain the natural gas RRs. In the second stage, select hypotheses were tested through intensive on-site data collection and analysis of a sample of 98 participant sites, with additional tasks to analyze project files, review Program QA/QC processes, and conduct further billing analysis. Additional billing analysis was conducted using a Princeton Scorekeeping Method (PRISM) type analysis to see if there might be evidence of changes in the home’s balance point. Such a change would indicate possible adjustments by household members to internal temperature settings and provide evidence of snapback.

EVALUATION RECOMMENDATIONS AND PROGRAM ADMINISTRATOR RESPONSE

Recommendation 1. Automate the transfer of EmPCalc savings estimates to the reported savings database.

The electronic transfer of savings estimates into the reported savings database would eliminate the potential for manual data entry errors and would make it easier to maintain the latest version of estimates.

Response to Recommendation 1. This recommendation was implemented on January 2, 2015; EmPCalc savings estimates are now automatically uploaded into CRIS, NYSERDA's reported savings database.

Recommendation 2. Implement range checks and techniques to minimize data entry error.

The Impact Evaluation Team recommends adding range checks to EmPCalc for select fields to reduce data entry errors. The use of checkboxes to indicate approved measures was particularly error-prone and could be replaced with a pick-list, which would make a mis-key less likely to occur and could also be used to track the reasons measures were not selected for installation.

Response to Recommendation 2. A revision to EmCalc is underway. Developers will initiate a system for flagging inputs that appear to be out of range. Staff is also exploring whether a pick-list strategy, as described, would work with the upcoming modifications to the software.

Recommendation 3. Correct the EmPCalc window-to-wall ratio.

Detailed building dimensions were collected on site and used in conjunction with standard practice framing techniques to calculate each site's window-to-wall ratio. This ratio accounts for the percentage of the treated area that is either framing, windows, or doors and cannot be insulated. Based on this effort, the Impact Evaluation Team determined that treated homes have an average window-to-wall ratio of 25% and therefore the EmPCalc window-to-wall ratio assumption should be adjusted from 15% to 25%. Implementation of this recommendation was completed in December 2014 following an initial results presentation and is expected to improve the natural gas RR by approximately 2%.

Response to Recommendation 3. This recommendation was implemented by staff.

Recommendation 4. Correct the EmPCalc heating degree day (HDD) assumptions.

Local weather conditions have been factored into EmPCalc heat load calculation using a 30-year average weather data set. However, this data set does not reflect current warmer conditions. The typical meteorological year version 3 data (TMY3) data with a 60°F base more accurately represents current weather conditions and heating system operation that is characteristic of the participants.

Response to Recommendation 4. Implementation of this recommendation was completed in December 2014 following an initial results presentation and is expected to improve the natural gas RR by approximately 10%.

Recommendation 5. Apply a thermal CF of 0.70 to the savings estimates for all insulation and air sealing measures.

The application of a 0.70 CF to the calculated savings of all insulation and air sealing measures will improve the accuracy of savings estimates Program-wide. This CF was derived from models of post-installed usage that account for the implementation of the previous recommendations and therefore, will not 'double-count' the effect of these changes. Implementation of the thermal CF is estimated to improve the Program RR by 26%. The tracking of savings estimates with and without the recommended thermal CF could allow for future analysis, but this practice would need to be decided upon by NYSERDA and NFGDC.

Response to Recommendation 5. NYSERDA is currently exploring the options for applying the CF.

NYSERDA Industrial and Process Efficiency Program Impact Evaluation

Summary

*Evaluation Conducted by: Energy Resource Solutions (ERS) Impact Evaluation Team
ERS, Lead Investigators, April 2015*

PROGRAM SUMMARY

Since 2009, The Industrial and Process Efficiency program has offered funding to improve industrial process energy efficiency in terms of natural gas, electricity and peak demand, through Energy Efficiency Portfolio Standard funding. The program targets industries such as chemicals, pharmaceuticals, metals, minerals, paper and automotive, as well as data centers.

305 projects had one or more energy efficiency measures installed through the IPE program between July 1, 2010 and June 30, 2012.

EVALUATION OBJECTIVE AND HIGH LEVEL FINDINGS

The primary objective of this impact evaluation was to determine the energy savings that resulted from the Program.

The three realization rates (RR) of the program, calculated as the evaluated savings divided by reported savings, are 0.91, 1.10 and 0.96, for electricity, peak demand and natural gas respectively.

DETAILED IMPACT EVALUATION FINDINGS

Evaluated and reported savings are reported in Table 1-1.

Table 1-1. IPE Program Impact Evaluation Results

Parameter	Program-Reported	Realization Rate	Evaluated Savings	Relative Precision
Electric energy (MWh/yr)	207,577	0.91	188,020	6.5%
Peak demand reduction (MW)	19.5	1.10	21.5	8.5%
Natural gas (MMBtu/yr)	338,385	0.96	324,071	3.8%

EVALUATION METHODS AND SAMPLING

The Impact Evaluation Team selected a representative sample to develop a realization rate to apply to the entire population of efficiency projects. The impact evaluation sample was developed with the goal of performing a rigorous and statistically significant evaluation of data center process efficiency, industrial process efficiency, and non-process efficiency projects. To do this, the evaluation electric energy sample was grouped into three categories: data center process efficiency, industrial process efficiency, and non-process efficiency projects. Figure 1-2 illustrates the sampling plan.

In parallel with the retrospective evaluation, the Program and evaluation staff are engaged in a concurrent review process whereby the Impact Evaluation Team reviews projects early in the application process and provides feedback to Program staff on baseline characterization, metering strategies, and analysis methods.

Figure 1-2. IPE Impact Evaluation Sampling Plan

Sampling Component	Sample Approach	Comments
Sample frame	Program-reported data; all projects with at least one measure completed between July 1, 2010, and June 30, 2012	Program-reported data was provided by NYSERDA.
Method	Stratified ratio estimation	Correlation between program-reported and evaluation savings was expected to be strong; the kWh error ratio from the previous (2009–2010) evaluation was 0.33.
Variable to estimate	Realization rate (RR) for annual electric (kWh, kW) or natural gas (MMBtu) savings	M&V to establish evaluated savings and RR is calculated as the ratio of the evaluated savings to the program-reported savings.
Primary sampling unit	Project	A “project” refers to any project with at least one measure completed during the 7/1/10 through 6/30/12 time period. Many projects have multiple measures.
Upper-level stratification variables	Measure type (non-process, process, data center, completed projects that earlier had received concurrent reviews by evaluation team) and fuel type	Separate sampling for each fuel type and facility/measure type; fuel types are separated due to few projects with natural gas savings.
Lower-level stratification variables	Size	Size was determined by the annual kWh savings (for projects with electric savings) and MMBtu savings (for projects with natural gas savings).

EVALUATION RECOMMENDATIONS AND PROGRAM ADMINISTRATOR RESPONSE

Recommendation 1. Expand the existing concurrent evaluation review process to include at least a sample of data center cooling and IT projects.

Data center cooling systems were some of the more difficult facilities to establish baselines for, and the increased scrutiny of the concurrent evaluation process will be critical in establishing better baselines.

- **Response to Recommendation 1.** Concurrent evaluation review process has proven to be effective to assist in the establishment of baselines in the more complex industrial energy projects. The concurrent review data set has been expanded to include a sample of data center cooling and IT projects.

Recommendation 2. Conduct research into data center operations, equipment obsolescence, IT equipment efficiency improvements, baseline identification and measure life to inform program support. Data collected by the IPE program can also be used to inform data center cooling baseline estimates. Use the concurrent review mechanism or a rolling sample approach to identify IT projects before the traditional retrospective evaluation cycle enabling evaluation staff to visit sites while it is still possible to evaluate the pre-existing, baseline equipment performance.

Data centers replace their equipment at a very fast rate, many at a rate of every three years, and some as fast as every 18 months. This fast phase poses a challenge for staying ahead of the natural pace of change when relying on the traditional retrospective evaluation cycle. Baseline definition concerns were raised by the Impact Evaluation Team on more than 85% of the data center projects and 50% of the industrial projects. Concurrent review and research will address this, and allow NYSERDA to work on pace with this fast moving industry.

- **Response to Recommendation 2.** As NYSERDA's Industrial team transitions the Industrial and Process Efficiency Program to address more complex process improvement including data center and IT projects, using the concurrent review mechanism on a rolling sample approach will allow for improved baseline estimates and definition.

Recommendation 3. NYSERDA should consider leveraging existing relationships and knowledge of the data center market to identify and promote efficiency best practices in a more market-animating or transformational basis that convinces actors in this fast-paced market to choose higher efficiency options as a matter of course, perhaps reducing the need for direct project-by-project intervention by the Program.

NYSERDA has an established presence in the data center industry, having implemented nearly 40 data center projects and established relationships with the relevant engineering firms and vendors.

- **Response to Recommendation 3.** NYSERDA's has engaged key stakeholders in the data center industry to better understand the IT market place. As NYSERDA transitions away from direct project by project intervention to more market-animating solutions that address market barriers, strategies addressing education and best practices will enable the IT industry to seek higher efficiency options.

Recommendation 4. Continue to support the concurrent review process through 2015 or until the existing funds are exhausted.

The three projects that underwent concurrent review all had RRs near 1.0. This is particularly notable given the exceptional size and/or complexity of these projects. In addition, the process is allowing the Impact Evaluation Team to provide input on data collection strategies early thus increasing the level of M&V rigor for a low incremental cost. Last, the Impact Evaluation Team believes that the many discussions held between the Impact Evaluation Team, Program, site staff, and Program technical assistance staff have educated all parties regarding project costs, savings, and ratepayer funded incentives.

- **Response to Recommendation 4.** As NYSERDA's Industrial team transitions the Industrial and Process Efficiency Program to address more complex process improvement including data center and IT projects, using the concurrent review mechanism on a rolling sample approach will allow for improved baseline estimates and definitions.

NYSERDA Multifamily Performance Program: Impact Evaluation Summary

Evaluation Conducted by: Energy Resource Solutions (ERS) Impact Evaluation Team
ERS, Lead Investigators, April 2015

PROGRAM SUMMARY

NYSERDA’s Multifamily Performance Program² (Program or MPP) provides incentives and technical support to new construction and existing multifamily buildings in NYS with five or more units (and all combinations of market-rate and low-to-moderate income projects) to improve the energy efficiency, health, safety, and security. MPP recruits and relies upon a network of “partners”, qualified to guide Program participants (the multifamily building owners, developers, and managers) through Program processes. This study represents the first impact evaluation of the MPP in its current form.

EVALUATION OBJECTIVE AND HIGH LEVEL FINDINGS³

The Impact Evaluation Team assessed the energy savings attributable to Program-funded projects completed between 2009 and 2011 using two main methods: 1) measurement and verification on a sample (117) of completed projects to quantify the evaluated gross energy savings by project through visits to each site and a mix of IPMVP rigor categories across the sample that included billing analysis (55%), whole building simulation (25%), equipment performance monitoring (15%), verification (5%); and 2) telephone surveys among participating and nonparticipating customers to quantify Program influence in the form of a net-to-gross ratio. The Program electric energy realization rate and net-to-gross ratio (Table 1) are 0.79 and 0.58 respectively.

Table 2. MPP Impact Evaluation Electric Energy and Peak Demand Results (2009–2011)

Metric	Electric Energy (MWh)	Electric Peak Demand (kW)
A – Reported savings	80,426	7,695
B – Realization rate	0.79	0.77
C – Evaluated gross savings (A × B)	63,537	5,925
D – Net-to-gross ratio ⁴	0.58	0.58
E – Evaluated net savings (C × D)	36,851	3,437
F – Relative precision of evaluated net savings at 90% confidence	8%	10%

To meet the 20% source⁴ energy reduction goal, the Program also encourages reduction of other fuel savings, such as natural gas, various grades of fuel oil, and district steam, henceforth referred to as “fossil fuels.” After assessing all fuel savings in the M&V sample, the Impact Evaluation Team determined that 2009–2011 MPP projects reduced source energy use at multifamily facilities by 17% on average; these deep savings are unique and not found in multifamily programs elsewhere in the country. Table 2 presents the impact evaluation results for fossil fuel-saving projects that received SBC and EEPS funding and were completed during 2009-2011.

² MPP was established in 2006 by consolidating the multifamily components of predecessor programs to simplify customer interactions with NYSERDA.

³ NYSERDA’s activity in the multifamily market may undergo changes per the New York State Public Service Commission’s Clean Energy Fund (CEF) proceeding. As the extent or details of these changes are not yet known, the Impact Evaluation Team recommends that careful consideration is exercised when assessing the applicability of this study’s results to future multifamily programs in New York State.

⁴ Program goals reflect electric savings at the power plant, and the term *source* is therefore used throughout this report. Source MMBtu savings is the sum of the fossil fuel energy savings plus the site-reported electric savings converted to source MMBtu.

Table 3. MPP Impact Evaluation Fossil Fuel Results – SBC and EEPS Funding (2009–2011)

Metric	Fossil Fuel Energy (MMBtu)
A – Reported savings	995,146
B – Performance factor¹	0.60
C – Evaluated gross savings (A × B)	597,088
D – Net-to-gross ratio	0.55
E – Evaluated net savings (C × D)	328,398
F – Relative precision of evaluated net savings at 90% confidence	11%

¹ Since projects completed between 2009 and 2011 were primarily SBC-funded and targeted electric savings only, this table uses the term “performance factor” to distinguish from a “realization rate.” Careful consideration must be taken when applying this impact evaluation’s results to natural gas savings of later EEPS-funded projects.

DETAILED IMPACT EVALUATION FINDINGS

A realization rate of one (1.0, sometimes expressed as 100%) indicates that the evaluated gross savings are identical to the program-reported savings. RRs not equal to one indicate positive or negative differences between evaluated gross savings and program-reported savings. The evaluators assessed the key contributors to the electric energy realization rate (RR) of 79% and the fossil fuel performance factor of 60%. Table 3 outlines these key drivers, which apply to all projects.

Table 4. MPP Key Differences Influencing Electric and Fossil Fuel Measure Performance

Reason for RR Other Than One	Number of Observations	Overall Electric RR % Change	Overall Fossil Fuel Performance Factor % Change
Difference in quantity installed	84	-12%	-5%
Difference in equipment operating efficiency	77	+2%	-6%
Difference in equipment loading profile	55	+2%	-7%
Difference in installed control strategy	31	-2%	+1%
Inaccurate pre-project characterization	26	-4%	-4%
Difference in equipment hours of operation	26	-3%	-1%
Difference in installed equipment technology	18	-3%	-1%
Baseline adjustment to reflect code	15	-2%	-2%
Difference in installed equipment size	15	+2%	-1%
Unknown applicant algorithm or assumptions	10	+3%	+3%
Inoperable installed equipment	9	-7%	-2%
Inaccurate fuel-specific accounting after switch	7	+0%	-5%
Inaccurate occupancy estimate	5	+1%	-3%
Other ¹		+2%	-7%
Total difference		-21%	-40%

¹ Other categories individually contribute less than 1% to the kWh and MMBtu RR reduction, examples of which include: differences in modeling software, differences in cooling or heating interactivity, incorrect reference to billing data, ineligible measures, and inaccurate plug loading estimates

The net-to-gross (NTG) ratio indicates the proportion of savings attributable to the Program above and beyond the level of efficiency investment that would have occurred in the absence of the Program. Energy savings attributable to the Program’s incentives were reduced for the following reasons: 1) virtually all decision-makers associated with the largest projects indicated that their primary goal was the enhanced marketability of rental units, and not necessarily energy savings; 2) many projects received funding from multiple, non-NYSERDA sources; and 3) a high percentage of projects involved the replacement of old equipment and the participating owner was already planning to install energy efficient equipment before learning about the Program. Factors that serve to increase the influence of the MPP were incentives and loans because they were critical to meeting financial requirements; and they also allowed project scope to be expanded.

The detailed net-to-gross (NTG) ratio results for the electric and fossil fuel domains are presented in Table 4. NTG results reveal a medium level of Program influence as indicated by NTG ratios of 0.58 for electric (kWh) and 0.55 for fossil fuels (MMBtu). The full evaluation report provides more detail and context around these moderate net-to-gross ratio results.

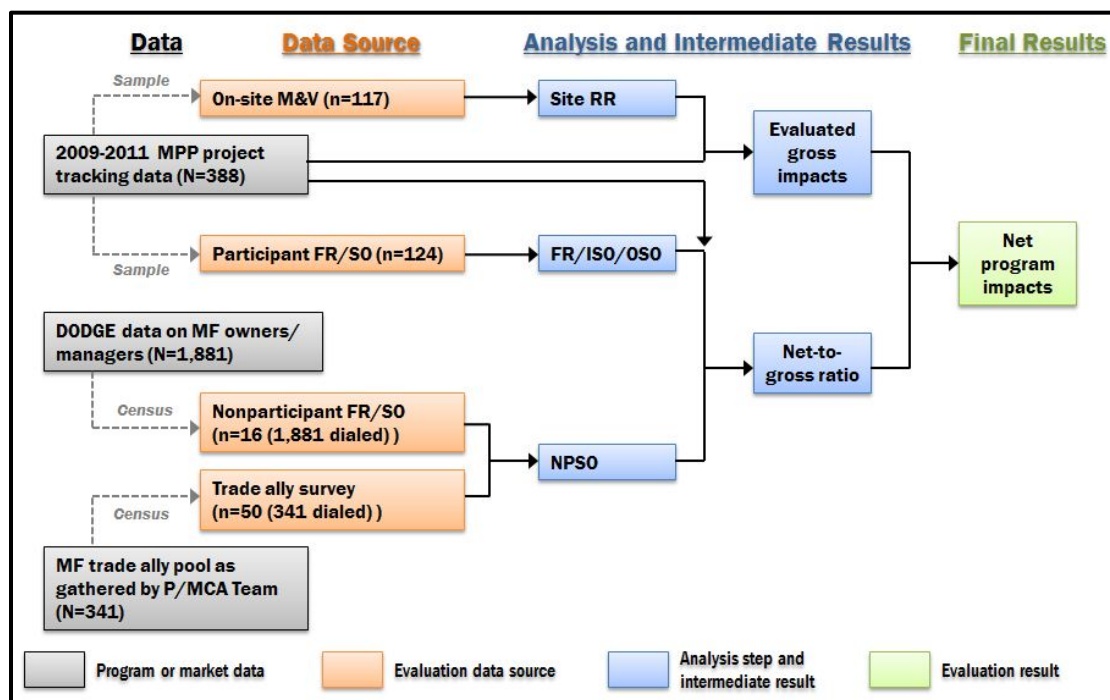
Table 5. Net-to-Gross Components and Ratio

	Free Ridership (%)	Inside Spillover and Outside Spillover (%)	Non-Participant Spillover (%)	Net-To-Gross Ratio
Electric	44%	1%	<<1%	0.57
Fossil fuels	48%	2%	0.0	0.54
NTG = 1 – Free Ridership + Inside Spillover + Outside Spillover + Non-Participant Spillover				

EVALUATION METHODS AND SAMPLING

Figure 1 provides an overview of the M&V and the NTG methods and their merging together to determine the Program’s evaluated net savings.

Figure 1. Overall MPP Impact Evaluation Approach



Recommendations and Program Administrator Response

The Impact Evaluation Team observed opportunities to improve Program effectiveness and savings estimation in the future to hopefully narrow the variation in RRs. The two recommendations are as follows:

Recommendation 1: Enhance the Program’s savings tracking system to more robustly track fuel-specific savings by measure.

The Program’s current tracking database is limited in tracking fuel-specific impacts for dual-fuel or fuel-switch projects. The evaluators recommend the creation of multiple fuel-specific savings fields for each project and measure within the Program’s tracking database to better track fuel-specific savings and penalties for measures affecting more than one fuel type. The Impact Evaluation Team acknowledges that the Program has taken steps to more accurately estimate fuel impacts by measure, namely with the transition from TREAT to eQUEST modeling software. This recommendation would ensure that the Program’s improved fuel-specific savings estimates are appropriately tracked and reported by measure.

Response to Recommendation 1: The CRIS database used to track fuel savings has been adapted to better assess oil savings and the subsequent new gas consumption when projects are undergoing fuel switching for which the Program is reporting savings, i.e. where a project is receiving RGGI funds for oil savings.

Recommendation 2: Broaden the role of utility bills in Program self-evaluation and performance prediction.

Currently, the Program collects pre-project utility consumption data for all applicants and post-project utility consumption data for the projects that apply for the performance payment a year after project completion. The Program has investigated past project performance through billing analysis. The evaluators recommend that this self-evaluation process continue and be expanded to include the projects that do not apply for the bonus incentive⁵. This broader analysis allows the Program to potentially identify specific measures, performance partners, modeling approaches, building types, or locations that led to unexpected savings results. Real-time feedback (once post-project consumption data is available) could lead to actionable adjustments to optimize Program effectiveness as soon as possible.

Response to Recommendation 2: As the NYSERDA Multifamily team reassesses MPP for release of Version 7.0 under the Clean Energy Fund, it is seriously considering alternatives that would allow for in-house calculation of a building's baseline and its post-construction consumption using utility consumption data. Such an alternative has been deemed desirable for a wide range of reasons including the one recommended by the Impact Evaluation team. The adoption of such a strategy is highly dependent on the effectiveness of the Electronic Data Interchange system between NYSERDA and the utilities.

With respect to attribution, certain types of measures were found to have higher FR, due largely to their becoming common practice. Such measures include energy efficient cooling systems, boilers, and low-emissivity windows. To maximize the Program's impact going forward, the MPP should take steps to de-emphasize common-practice measures, while instead promoting measures and higher-efficiency equipment that are less prevalent within the New York multifamily market. This shift will benefit the Program not only in its current environment but also in future contexts under consideration in ongoing Clean Energy Fund proceedings.

⁵ The Impact Evaluation Team acknowledges that this expanded self-evaluation would require additional effort from Program staff to obtain, process, and analyze pre- and post-project utility bills. This process is estimated to take 4-6 hours per additional project on average.

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