



**NYSERDA**

# **Energy Efficiency Portfolio Standard (EEPS-2) Program**

**Quarterly Report to the  
Public Service Commission**

**Quarter Ending June 30, 2016**

**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**  
**Quarterly Report to the Public Service Commission**  
**Quarter Ending June 30, 2016**

*Final Report*

Prepared by:

**New York State Energy Research and Development Authority**

Albany, NY

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# 1 Introduction

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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, 2016. 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**

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NYSERDA finalized the Home Performance with ENERGY STAR® Process Evaluation Report and the New Construction Program Impact Evaluation Report in the second quarter of 2016.

### 3 Evaluation Status Update

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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	TBD	TBD	TBD	TBD	Last report finalized in April 2015. EEPS-2 closeout Impact Evaluation plans in development.
Existing Facilities	Completed	TBD	TBD	TBD	TBD	Last report finalized in November 2015. EEPS-2 closeout Impact Evaluation plans in development.
Agriculture	TBD	TBD	TBD	TBD	TBD	EEPS-2 closeout Impact Evaluation plans in development.
New Construction	Completed	Completed	Completed	Completed	Completed	Report finalized.
Agriculture Disaster	Completed	Completed	Completed	Completed	Completed	Final report completed July 2014. Program closed. No further evaluations planned.
FlexTech	Completed	TBD	TBD	TBD	TBD	Last report finalized in March 2012. EEPS-2 closeout Impact Evaluation plans in development.
Commercial Existing Buildings Non-Participant Spillover Study	Completed	Completed	Completed	Completed	Completed	Last report finalized in December 2013. No future evaluation plans in this area.
Multifamily Performance Program	Completed	TBD	TBD	TBD	TBD	Last report finalized in February 2015. EEPS-2 closeout Impact Evaluation plans in development.

**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. Program closed. No further plans.
EmPower New York	Completed	TBD	TBD	TBD	TBD	Last report finalized in May 2015. EEPS-2 closeout Impact Evaluation plans in development.
Home Performance with ENERGY STAR®	Completed	Completed	Phase 2 Completed	Phase 2 Q1 - 2016	Phase 2 Q3 - 2016	Draft report under review.
New York ENERGY STAR® Certified Homes	n/a	Q1 2016	Q3 2016	Q1 2017	Q1 2017	In order to best inform possible future program investments, NYSERDA has narrowed the scope of this evaluation to focus on performance of Net Zero Energy projects.

\* TBD indicates that final plans for EEPS-2 closeout evaluation are under development at this time.

**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	Completed	Completed	Completed	Completed	Last process evaluation completed in February 2012. Last market evaluation completed in September 2012. Future Market Evaluation plans are defined within NYSERDA's Clean Energy Fund Market Characterization and Design Chapter (MCDC) and investment plans.
Agriculture	n/a	n/a	n/a	n/a	n/a	Cancelled for EEPS. Future Market Evaluation plans are defined within NYSERDA's Clean Energy Fund MCDC and investment plans.
New Construction	Completed	Completed	Completed	Completed	Completed	Final report completed October 2014. Future Market Evaluation plans are defined within NYSERDA's Clean Energy Fund MCDC and investment plans.
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. Future Market Evaluation plans are defined within NYSERDA's Clean Energy Fund MCDC and investment plans.
Multifamily Performance Program	Completed	Completed	Completed	Completed	Completed	Final report completed August 2014. Future Market Evaluation plans are defined within NYSERDA's Clean Energy Fund MCDC and investment plans.
Point of Sale Lighting	Completed	Completed	Completed	Completed	Completed	Reports for 2012-2013 finalized in May 2014. Program closed. No future evaluations planned.

**Table 3-2 continued**

EEPS Program	Process and Market Evaluation Schedule					
	Detailed Evaluation Plan Submittal	Project Kick-off	Data Collection Complete	Draft Report	Final Report	Notes
EmPower New York	Completed	Completed	Completed	Completed	Completed	Last process evaluation completed in July 2010. Future Market Evaluation plans for Low to Moderate Income are defined within NYSERDA's MDCD.
Home Performance with ENERGY STAR®	Completed	Completed	Completed	Completed	Completed	Report finalized.
New York ENERGY STAR® Certified Homes	n/a	n/a	n/a	n/a	n/a	NYSERDA's MDCD includes plans for a Net Zero Energy Homes market assessment in 2016. This study takes the place of an EEPS Market Evaluation focused on ENERGY STAR Homes.
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**

<b>Total Number of Recommendations</b>	<b>Through June 30, 2016</b>
Made to Date <sup>1</sup>	226
Implemented to Date	160
Rejected to Date	22
Currently in Progress	44

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

## **4 Other Information**

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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 2016.

## **Appendix A: Completed Evaluation Summaries**

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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 reports in the second quarter of 2016:

- Process evaluation of the Home Performance with ENERGY STAR Program.
- Impact evaluation of the New Construction Program .

# **NYSERDA Home Performance with Energy Star: Process Evaluation/Market Assessment Summary**

*Evaluation Conducted by: Research into Action, Inc.*

*Survey Research Conducted by: Abt SRBI*

## **PROGRAM SUMMARY**

The Home Performance with Energy Star (HPwES) program, offered by NYSERDA, offers a simple step by step process to help customers reduce energy bills. First, customers apply for a free whole-home energy audit performed by participating contractors. Results of the audit are then used by contractors to develop a customized set of energy efficiency upgrades for the customer's residence. Certain energy efficiency upgrades may also qualify for a program rebate equal to 10 percent of the cost of improvements (up to \$3,000), paid to either the contractor or participating customers upon project completion. Customers can also apply for low-interest loans offered by NYSERDA as an alternate option for financing.

## **EVALUATION OBJECTIVE AND KEY FINDINGS**

This evaluation aimed to assess the activities and progress of HPwES, uncover potential strengths and weaknesses of the program's processes, explore the benefits and concerns associated with HPwES participation, and to characterize current and emerging home improvement markets in New York State. Key conclusions from this study include:

- Approximately 73 percent of HPwES projects included a single system (i.e., heating ventilation and air conditioning, shell system, etc.) improvement only, while the remaining 27 percent were comprised of multi-system upgrades. Program theory suggested that building systems training, through the Building Performance Institute (BPI), would enable contractors to more proficiently sell whole-building projects. But, while contractors indicated that this training was useful for explaining energy audit recommendations, most performed upgrades within their specialty.
- Home energy audit results proved influential for customers considering home energy upgrades. Both participating and nonparticipating contractors felt that whole-home audits helped to stimulate energy efficiency projects within the residential market.

## **DETAILED FINDINGS: PROGRAM PERFORMANCE AND MARKET CHARACTERIZATION**

**HPwES Program Performance:** During 2012-2013, approximately 25 percent of households that received an energy audit participated in the HPwES program to install recommended measures. HPwES participants during this period represented about 0.3 percent of the New York State single-family, owner-occupied households. Participating households from the same time period also accounted for greater than 5 GWhs of program-reported gross electric savings, along with greater than 400,000 MMBtus of program-reported gross natural gas and delivered fuel savings.

**Market Characteristics for Households and Contractors:** Nearly half (44 percent) of respondent, nonparticipant New York State homeowners, in one- to four-unit dwellings, reported that they had completed an energy-specific home improvement project of \$2,000 or more in the past two years. A majority (60 percent) of those respondents indicated that they installed at least one of the HPwES core measures (HVAC, air sealing, and installation), while nine percent performed projects across all three core measures. Only eight percent of nonparticipant respondents surveyed reported having a home energy audit before their project, but those that did found it helpful and effective. Finally, HPwES participating households comprised roughly one percent of single-family households undergoing energy upgrades in New York State during the study period.



Survey data collected from both HPwES participating and non-participating contractors demonstrated a sizable difference in work scope relating to energy efficiency. Only a small proportion of nonparticipant contractors (20 percent) reported performing home energy audits during a project, while 62 percent of participating contractors report performing a home energy audit for projects outside of the HPwES program. Nonparticipating contractors also reported installing energy efficient measures roughly 57 percent of their jobs while participating contractors reported doing so in 79 percent of projects.

All contractor firms participating in the HPwES program reported employing at least one contractor with BPI training (as required by the program rules), while only 2 percent of nonparticipating contractor firms specified the same. Additionally, 94 percent of participating contractors indicated that they employed at least one contractor with training from a non-BPI professional organization, while only 39 percent of nonparticipating contractors reported having an employee with similar training.

**Preliminary Evidence of Additional Market Adoption and Market Effects:** Nearly half (44 percent) of HPwES audit-only customers reported installing a recommended measure outside of the program. Additionally, 12 percent of participating households (those who completed work through HPwES) reported making an upgrade from their audit that was not installed through the HPwES program. Surveys of nonparticipant home energy upgraders also indicated that 12 percent had considered participation for a project, but most felt that they were ineligible or that participation would be too costly or burdensome.

Preliminary evidence also pointed towards HPwES program influence upon contractors' market behavior. Participating contractors reported installing energy efficiency measures in 79 percent of their projects, and performing a diagnostic energy audit in 62 percent of projects occurring outside of the program. Many Contractors also indicated an increase in staff expertise (83 percent), services offered (71 percent), projects completed (69 percent), investment in new equipment (65 percent), revenue per project (62 percent), number of employees (60 percent), and profitability (40 percent) due to their participation in HPwES. A majority of participating contractors (65 percent) also felt that the program-required affiliation with BPI helped to differentiate them from their competitors, and 62 percent also preferred to hire BPI-certified employees.

## EVALUATION METHODS AND SAMPLING

Between January 2014 and January 2015, the evaluation team conducted a document review, database analysis, and collected data from six different groups (see Table 1). The team conducted interview surveys with HPwES contractors active in 2012 or 2013, in September and October 2014. Between September and December 2014, the team, including NYSERDA's survey contractor Abt SRBI, surveyed both HPwES participants with completed projects in 2012 and 2013, and 2012-13 Green Jobs Green New York (GJGNY) audit recipients who had not completed HPwES projects (audit-only households). The audit-only sample included both natural gas-heated homes and delivered fuels-heated homes. The natural gas sample was conducted through the Impact Evaluation team's larger survey, and included only those who had not installed any major measures since their audit.

The nonparticipant home energy upgrade survey conducted in January 2015, required the team to survey non-participant New York State homeowners who had completed at least \$2,000 in home improvement projects in the past two years. Each of the nonparticipating consumers had included some energy-related upgrades (i.e., windows, appliances, etc.). This group was screened for upgrades in either the "other" or the "core upgrades" sections for those who likely qualify for Assisted HPwES based on income. The team used an incidence test to develop quotas.

For the nonparticipant contractor survey conducted in December 2014, the evaluation team used internal information along with Standard Industrial Classification (SIC) codes from InfoUSA to identify and classify New York State residential contractors into four categories: general contractors and one of three types of specialty contractors (HVAC, insulation, or “other” residential specialty). These lists were matched with NYSERDA and BPI contractor lists.

**Table 1. Summary of Data Collection Activities and Sampling**

<b>Group</b>	<b>Population</b>	<b>Completes</b>	<b>Method</b>	<b>Survey Dates</b>
Program and implementation staff	13	13	In-depth phone interview	
Participating contractors	231	52	Phone interview	September to October, 2014
Participant households (Market rate)	7,116	400	Phone survey	November to December, 2014
Participant households (Assisted)	3,805	170	Phone survey	November to December, 2014
Audit-only households (Natural gas)	17,422	202	Web or phone survey with Impact Evaluation team	September to December, 2014
Audit-only households (Delivered fuels)	680	110	Web survey	September to December, 2014
Nonparticipant home energy upgraders (Other upgrades)	NYS nonparticipant homeowners in 1-4 unit buildings	208	Web panel survey	January, 2015
Nonparticipant home energy upgraders (Core upgrades)	NYS nonparticipant homeowners in 1-4 unit buildings	323	Web panel survey	January, 2015
Nonparticipant home energy upgraders (Assisted)	NYS nonparticipant homeowners in 1-4 unit buildings	239	Web panel survey	January, 2015
Nonparticipant contractors (General Contractor)	8,406	65	Phone survey	December, 2014
Nonparticipant contractors (HVAC specialty)	2,488	41	Phone survey	December, 2014
Nonparticipant contractors (Insulation specialty)	226	11	Phone survey	December, 2014
Nonparticipant contractors (Other specialty)	1,810	12	Phone survey	December, 2014

## RECOMMENDATIONS AND PROGRAM ADMINISTRATOR RESPONSE

The following recommendations were made by the evaluators conducting this study. NYSERDA's initial response to these recommendations is also summarized below and will be tracked over time.

**Recommendation 1:** Train contractors in more than building science; train them how to *sell* and install home energy upgrades outside of their specialty, and support them with ongoing engagement.

**Response to Recommendation 1:** Pending.

**Recommendation 2:** Continue providing free or reduced-cost home energy audits to facilitate market engagement with the whole-house approach and support market transformation.

**Response to Recommendation 2:** Pending.

**Recommendation 3:** Support market transformation and the ability to pivot and modify programs early with focused tracking studies that track market indicators at regular intervals.

**Response to Recommendation 3:** Pending. Will be considered as NYSERDA develops new strategies in this program area.

**Recommendation 4:** Use the core set of research objectives and indicators in the program theory and logic model to track market progress. When updating, ensure that measurement is often enough to track both old and new indicators to permit comparisons before the old indicator is dropped.

**Response to Recommendation 4:** Pending. Will be considered as NYSERDA develops new strategies in this program area.

# **NYSERDA New Construction Program Impact Evaluation Summary**

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

## **PROGRAM SUMMARY**

The New Construction Program (NCP or Program) serves commercial, industrial, agricultural, and multifamily new construction projects providing a range of services and incentives designed to achieve cost-effective savings and the transformation of new construction practices.

Whole building incentives are tiered and custom incentives are established at a fixed rate per kWh and kW. Greater financial assistance is provided to customers with projects achieving higher levels of energy savings. Prequalified incentives (PQ or standardized incentives for specific equipment) were also available to participant projects<sup>2</sup>.

The NCP addresses a multifaceted and technically sophisticated market, including building developers, owners, design firms, and contractors. It has been in existence since 2000 and has changed considerably since its inception and over the period receiving evaluation. The Program continues to change, enabling it to maintain influence in this challenging market

## **EVALUATION OBJECTIVE AND HIGH LEVEL FINDINGS**

The objectives of this impact evaluation were as follows:

- Estimate the evaluated gross savings for the Program (electric energy and demand savings). All projects in the sample received a high level of evaluation rigor including on-site metering and calibrated modeling at the measure or whole-building level.
- Provide input to NYSERDA on current projects by conducting preconstruction reviews to review baseline assumptions and modeling approach<sup>3</sup>.
- Provide information that will be useful to NYSERDA in planning future new construction program offerings.

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

## **DETAILED IMPACT EVALUATION FINDINGS**

The 2012 to 2013 evaluated gross savings are based on project-specific measurement and verification (M&V) performed on a statistically valid sample of 63 participant projects from that period. The primary evaluation population included 392 projects completed in 2012 and 2013 with project enrollment dates ranging from February 2002 through April 2013. The results are shown in Table-1 below.

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<sup>2</sup> The NCP ceased offering prequalified incentives for new construction projects in March 2015.

<sup>3</sup> Three approaches were assessed, one approach was eliminated upon further assessment, the remaining two produced similar results however the precision of the simple average was better.

**Table-1. NCP Program-Reported Savings Evaluation Results 2012–2013**

Parameter	Program-Reported Savings	Realization Rate	Evaluated Gross Savings	Relative Precision
Electric energy (MWh/yr) 2012–2013	115,862	89%	103,117	9%
Peak demand (MW) 2012–2013	37	70%	26	13%

The evaluation also derived realization rates (RRs) for the period from January 2009 through December 2011 by employing a simple average<sup>4</sup> of the RRs for program years (PYs) 2007–2008 and PYs 2012–2013 with the results shown in Table-2.

**Table-2. NCP Program-Reported Savings Evaluation Results 2009–2011<sup>5</sup>**

Parameter	Program-Reported Savings	Realization Rate	Evaluated Gross Savings
Electric energy (MWh/yr) 2009–2011	153,204	84%	128,692
Peak demand reduction (MW) 2009–2011	42	61%	26

## EVALUATION METHODS AND SAMPLING

The sample was developed using stratified ratio estimation because it typically requires a lower sample size for a targeted level of precision when there is a strong correlation between the program-reported savings and the evaluated gross savings. The sample frame included all completed projects that received electric measure incentives from January 1, 2012 through December 31, 2013 (the NCP sample unit is a newly constructed or renovated commercial or industrial building; each building is a project). An overview of the sampling plan is shown in Table-3.

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<sup>4</sup> Three approaches were assessed, one approach was eliminated upon further assessment, the remaining two produced similar results however the precision of the simple average was better.

<sup>5</sup> RRs reflect the average of RRs for the years immediately prior to and after the 2009–2011 period.

**Table-3. NCP Sample Plan Overview of On-Site Sampling**

Sampling Content	Sampling Approach	Comments
Sample frame	Program-reported data; all projects completed between January 1, 2012 and December 31, 2013	Program-reported data provided by NYSERDA.
Method	Stratified ratio estimation	Correlation between program-reported and evaluated gross savings was expected to be moderate; the kWh error ratio from the previous PY2007/2008 evaluation was greater than 1.0.
Variable to estimate	RR for annual electric energy and demand savings	M&V to establish evaluated gross savings and RR is calculated as the ratio of the evaluated gross savings to the program-reported savings.
Primary sampling unit	Project	A “project” refers to any newly constructed or renovated building that participated in the NCP during the period of study.
Primary stratification variable	Size	Size was determined by the annual electric energy savings (kWh)
Post-hoc stratification variables	Upstate/downstate, project analysis approach and PON <sup>1</sup>	Post hoc stratification and analysis was conducted to estimate RRs by location, analysis approach and program offering.

<sup>1</sup> PON – Program opportunity notice; the NCP issues updated PONs to reflect the adoption of new codes and other changes in program design and funding. Due to the varied duration of new construction projects, a substantial number of PONs was included in the population and the sample.

### Preconstruction Review

The impact evaluation also provided preconstruction review of seven projects in the design phase to identify potential issues with or vulnerabilities of project savings before the project analysis was finalized, while this input was highly actionable. The process included a high-level review of project models, a memo summarizing findings to Program staff, and conference calls with the project technical assistance (TA) provider, Program staff, and the evaluator to discuss findings. These projects will be constructed in the future. Therefore, the preconstruction review projects had no overlap with the retrospective impact evaluation population. Future evaluations will need to consider the projects that received preconstruction review separately in the sampling strategy.

### Concepts for Consideration in Future Program and Evaluation Planning

Rather than recommendations, the contractors presented new ideas developed from the research conducted for this study and the market expertise of the Impact Evaluation Team. Because the new construction market evolves rapidly, it is useful to consider potential new innovations that have not been proven or even used elsewhere to maintain NYSERDA’s leadership role as the Program evolves under the Clean Energy Fund.

- Design<sup>6</sup> – ASHRAE Guideline 36: High Performance HVAC System Sequences of Operations (GL 36), still in draft format and out for public review, could be used to advance more efficient sequences of operation than those that are often employed even in energy efficient buildings. Advancing industry knowledge of this guideline could support continued improvement of energy performance in new buildings. The following approaches could be considered:
  - Provide training to the technical support providers, members of the design community, and controls contractors on GL 36.
  - Incorporate discussion of GL 36 into charrettes and in meetings with design engineers so that it is cited as a project reference in the basis-of-design documents and project specifications.
- Construction – There are two major opportunities to influence the control programming that is implemented during construction. The NCP could foster improved controls by advancing the following activities during the controls submittal process and functional performance testing:
  - Consider supporting use of a pre-submittal meeting as a standard part of the commissioning provider and TA scopes of work regardless of whether required by a program offering.<sup>7</sup> The pre-submittal meeting is an important element of increasing energy efficiency in new buildings; the commissioning provider, design engineer, TA provider, and controls contractor review the specified sequences of operations and agree on how the sequences will be translated and implemented. The results are reflected in the control submittal, which should be reviewed by the design engineer and the commissioning provider. As a result of the meeting, the commissioning provider will have a clear understanding of the control sequences that are necessary to deliver the reported energy savings.
  - Consider supporting inclusion of specific documentation of the control sequences necessary to generate project savings as part of the commissioning-provider scope of work to ensure functional performance testing provided as part of the commissioning process includes the energy savings sequences.
- Key performance indicators (KPIs) that relate to energy use at the system and building level can help address persistence of control measures. Many participants were interested in receiving data on their buildings from this evaluation, suggesting possible increasing market interest in feedback on building performance. In some cases, participant buildings did not include any building-level metering, which is now a prerequisite for Leadership in Energy and Environmental Design (LEED) Version 4. The NCP could consider the following actions to advance the use of energy-related KPIs in the market.
  - Consider requiring building-level metering of all fuels including chilled water and steam from central plants at the building level as a prerequisite for NCP participation.<sup>8</sup>
  - Consider promoting key performance indicators and feedback systems such as dashboards that participants can use to monitor and improve the performance of buildings and systems.

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<sup>6</sup> This idea comes from the recent emergence of this new guideline which provides a unique resource that design professionals and controls contractors can use to improve the efficiency of HVAC designs and the ability to implement those designs so they work as intended. Failure of control strategies to work as intended was a source of significant unrealized savings.

<sup>7</sup> This recommendation is a result of the fact that while many of the evaluated projects included commissioning, the control sequences necessary to achieve the reported savings were not always programmed. In the Impact Evaluation Team’s direct experience working on new construction projects, these pre-submittal meetings significantly improve the outcome of the commissioning process.

<sup>8</sup> The affected buildings tend to be on campuses and associated with customers that report lower program influence. The addition of minimum requirements, beyond what the projects currently include could also increase participant recognition of program influence.

- For larger projects, consider including performance verification as part of the Program's offering. Incorporating performance verification into project development and delivery will increase market familiarity with the benefits of verifying energy savings, improve program RRs by verifying measure performance, and increase energy efficiency as building operators and owners review and improve building performance.
- In order to better understand the Program's influence over time, we recommend that the Program work with large repeat customers to document both the planned levels of energy efficiency and the stretch levels of efficiency that are driven by the Program. Adoption of a stretch efficiency measure, such as use of separate systems for space conditioning and ventilation (a strategy that has been repeatedly shown to reduce building energy consumption) could be advanced and supported by the Program early on. Once documented as successful, the measure could be standardized as a customer minimum requirement for new construction on future participating projects.



NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975.

To learn more about NYSERDA's programs and funding opportunities, visit [nyserderda.ny.gov](http://nyserderda.ny.gov) or follow us on Twitter, Facebook, YouTube, or Instagram.

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