New York State Energy Research and Development Authority

NYSERDA Technology and Market Development Program

Semiannual Report Through June 30, 2014

Final Report
September 2014

The New NY WORKS for Energy

nyserda
Energy. Innovation. Solutions.

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.

Core Values:

Objectivity, integrity, public service, partnership, and innovation.

Portfolios

NYSERDA programs are organized into five portfolios, each representing a complementary group of offerings with common areas of energy-related focus and objectives.

Energy Efficiency and Renewable Energy Deployment

Helping New York State to achieve its aggressive energy efficiency and renewable energy goals – including programs to motivate increased efficiency in energy consumption by consumers (residential, commercial, municipal, institutional, industrial, and transportation), to increase production by renewable power suppliers, to support market transformation, and to provide financing.

Energy Technology Innovation and Business Development

Helping to stimulate a vibrant innovation ecosystem and a clean energy economy in New York State – including programs to support product research, development, and demonstrations; clean energy business development; and the knowledge-based community at the Saratoga Technology + Energy Park® (STEP®).

Energy Education and Workforce Development

Helping to build a generation of New Yorkers ready to lead and work in a clean energy economy – including consumer behavior, youth education, workforce development, and training programs for existing and emerging technologies.

Energy and the Environment

Helping to assess and mitigate the environmental impacts of energy production and use in New York State – including environmental research and development, regional initiatives to improve environmental sustainability, and West Valley Site Management.

Energy Data, Planning, and Policy

Helping to ensure that New York State policymakers and consumers have objective and reliable information to make informed energy decisions – including State Energy Planning, policy analysis to support the Regional Greenhouse Gas Initiative and other energy initiatives, emergency preparedness, and a range of energy data reporting.

NYSERDA Record of Revision

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NYSERDA Technology and Market Development Program

Semiannual Report Through June 30, 2014

Final Report

Prepared by:

New York State Energy Research and Development Authority

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September 15, 2014

Table of Contents

List of Tables

1 Introduction

1.1 Public Policy Context

The System Benefits Charge (SBC) Program was established by Order of the New York State Public Service Commission (PSC) in 1998. PSC established the ratepayer-supported SBC and designated the New York State Energy Research and Development Authority (NYSERDA) as the Administrator of the program. The program was re-authorized in 2001 and again in 2006 for five-year terms. For the period 2006 through 2011, program funding was $154 million per year, of which approximately half focused on energy efficiency resource acquisition/deployment activities and half on technology and market development activities.

In its September 20, 2010, petition to PSC to continue the SBC, NYSERDA proposed some modifications to the program, including consolidating and transferring the resource acquisition and deployment activities within the Energy Efficiency Portfolio Standard (EEPS) Program and requesting to extend the current SBC Program by six months to coincide with the December 31, 2011, conclusion of the current EEPS Program. The petition also summarized the history and accomplishments of the SBC Program and described a proposed Technology and Market Development (T&MD) portfolio to serve as the next iteration of the SBC Program.

PSC issued a Notice of Proposed Rulemaking on October 6, 2010 (Case 10-M-0457) and asked for comments on NYSERDA's proposal to be submitted by November 22, 2010. NYSERDA and the Department of Public Service (DPS) also conducted a Technical Conference on November 4, 2010, to provide stakeholders and interested parties with more information on the potential uses of SBC funds for the T&MD Program. PSC issued an Order on December 30, 2010, which "reaffirmed its high level commitment to the continuation of SBC programs and to the important State policy goals they support."[1] The December 30, 2010 Order continued SBC funding through the end of 2011, but deferred a decision on the proposed T&MD Program, pending a more robust stakeholder input process and submission of an Operating Plan.

NYSERDA submitted the T&MD Operating Plan on May 16, 2011, and on June 8, 2011, PSC issued a Notice of Proposed Rulemaking requesting public comment on the Operating Plan by July 25, 2011 with reply comments due August 15, 2011. The Operating Plan requested average annual program funding of $70 million for seven initiatives, plus $15 million for an incremental Combined Heat and Power (CHP) Initiative.

[1] PSC. Case 10-M-0457 and Case 05-M-0090. *Order Continuing System Benefits Charge Funded Programs*. Issued and effective December 30, 2010.

In a PSC Order issued on October 24, 2011, PSC approved the T&MD Operating Plan, including a CHP initiative, for five years (January 1, 2012 through December 31, 2016), at an average annual funding rate of $93.8 million, representing $80 million in program costs and $13.8 million for administration, evaluation, and New York State Cost Recovery Fees.[2] This plan included $65 million in program costs ($76.2 million total) for NYSERDA's "base" T&MD initiatives and $15 million in program costs ($17.6 million total) for a CHP Initiative. Of the $15 million for CHP, $5 million in SBC funds was approved in the Order to be used for the CHP Aggregation and Acceleration Program, and, at NYSERDA's option, for feasibility studies. The remaining $10 million for the CHP Performance Program was to be derived from a source or sources other than the SBC funds approved in the October 24, 2011 Order. NYSERDA was directed to submit a plan for funding the balance of the CHP Initiative by March 31, 2012. Additionally by March 31, 2012, NYSERDA was also directed by the Order to submit an accounting of SBC III funds that were uncommitted as of December 31, 2011 with the option to submit a proposal for use of those funds, as well as SBC III funds that may become uncommitted in the future.

A revised T&MD Operating Plan was filed with PSC on December 22, 2011, updating NYSERDA's May 16, 2011 submittal to comport with the October 24, 2011 Order.[3]

On March 9, 2012, NYSERDA submitted a full accounting of uncommitted SBC III funds as directed in the October 24, 2011 Order. On March 30, 2012, NYSERDA submitted a petition proposing ways to allocate those uncommitted SBC III funds among three primary activities:

- Develop and implement programs to reduce solar photovoltaic (PV) balance-of-system (BOS) costs and support priority solar PV technology development ($10 million),
- Provide cost-sharing support as part of a Brookhaven National Laboratory (BNL) proposal to the U.S. Department of Energy (DOE) solicitation for a New York State Energy Storage Innovation Hub ($10 million, with $2.5 million allocated to the New York Battery and Energy Storage Technology Consortium (NY-BEST)).
- Expand the T&MD Advanced Buildings Program ($5.76 million, including $3 million for an Advanced Buildings Consortium (ABC) and $3.76 million for a deep energy savings initiative in commercial buildings).

NYSERDA requested to apply $1.75 million in uncommitted SBC III funds to New York State Cost Recovery Fee assessments applicable to SBC III. In addition, NYSERDA requested approval to allocate uncommitted SBC III funds to projects committed as of December 31, 2011. A notice inviting comments was issued on May 11, 2012, and requested comments by August 3, 2012.

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2 PSC. Case 10-M-0457 – *In the Matter of the System Benefits Charge IV.* Issued and effective October 24, 2011.

3 NYSERDA, 2011. Technology and Market Development Program Operating Plan for 2012-2016, System Benefits Charge, December 22 and revised November 13, 2012 and February 15, 2013 http://www.nyserda.ny.gov/-/media/Files/General/System-Benefits-Charge/SBC-Five-Year-Operating-Plan.pdf

In addition, on March 30, 2012, NYSERDA submitted petitions to provide funding for the CHP Program and to provide continued funding and expansion of NYSERDA's workforce development initiatives as directed in the October 24, 2011 Order.[4] PSC issued a Notice of Proposed Rulemaking on May 9, 2012, and requested comments by August 3, 2012.

On September 13, 2012, PSC issued an Order and approved, with modifications, NYSERDA's requests in its petition regarding uncommitted SBC III funds.[5] PSC approved the reallocation of SBC III funds into the T&MD portfolio to support T&MD solar PV activities ($10 million) and Advanced Buildings activities ($5.76 million) as well as NYSERDA's support of the BNL proposal and NY-BEST ($10 million, with $2.5 million allocated to NY-BEST).[6] PSC also approved NYSERDA's allocation of SBC III funds to New York State Cost Recovery fee assessments. The PSC did not approve NYSERDA's request to reallocate uncommitted SBC III funds to projects committed as of December 31, 2011 in advance, but directed NYSERDA to submit, for review and approval, any proposals separately. The Order directed NYSERDA to submit, within 60 days, a supplemental revision to its T&MD Operating Plan to account for the approved initiatives. A revised T&MD Operating Plan was filed with PSC on November 13, 2012 to comport with the September 13, 2012 Order. This plan included $75.15 million in average annual program funding plus $12.06 million in average annual funding for administration, evaluation, and cost recovery.

The PSC issued an Order on December 17, 2012 and approved, with modifications, the requests described in the balance of NYSERDA's March 30, 2012 petitions.[7] In this Order, the PSC approved NYSERDA reallocating $35.9 million from the Benchmarking and Operations Efficiency and the Electric Reduction in Master-Metered Buildings Energy Efficiency Portfolio Standard (EEPS) programs and $22.7 million in uncommitted EEPS-1 funds to support the T&MD CHP Initiative. In addition, the Order approved NYSERDA reallocating $24 million in EEPS-1 funds ($12 million in electric funding and $12 million in natural gas funding) to support T&MD workforce development initiatives. PSC also directed NYSERDA to submit by February 15, 2013, a supplemental revision to

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4 Petitions related to adjusting the goals and funding for EEPS programs were also submitted on this date.

5 PSC. Case 10-M-0457 – *In the Matter of the System Benefits Charge IV*. Issued and effective September 13, 2012.

6 Per the September 13, 2012 Order, if the BNL proposal was not selected by US DOE, NYSERDA had seven days to notify the DPS Office of Energy Efficiency and the Environment (OEEE) of this decision and 60 days to submit a proposal on how those funds should be reallocated. On December 5, 2012, NYSERDA notified DPS OEEE of the proposal denial and designated February 5, 2013 as the date for NYSERDA to submit an alternative proposal to use the funds. The due date for this submission was subsequently extended three times and on September 5, 2013, NYSERDA submitted a petition to transfer $7.5 million in uncommitted SBC III funds to a Power Electronics Manufacturing Consortium proposal in response to a US DOE solicitation. In an Order issued December 20, 2013, the PSC approved use of these funds with the same requirements regarding proposal acceptance and denial as described above.

7 PSC. Case 07-M-0548 - Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard and Case 10-M-0457 – In the Matter of the System Benefits Charge IV. Issued and effective December 17, 2012.

its T&MD Operating Plan to comport with the December 17, 2012 Order.[8] With NYSERDA's submission of the revised T&MD Operating Plan on February 15, 2013, this report now aligns with the December 17, 2012 Order. On June 16, 2014, NYSERDA submitted a petition to the PSC to add $7.5 million to the CHP initiative. The petition is currently awaiting Commission action. A SAPA notice was published on July 30, 2014 and party comments are due September 13, 2014.[9]

1.2 T&MD Program Mission and Objectives

The mission of the T&MD Program is to test, develop and introduce new technologies, strategies, and practices that build the statewide market infrastructure to reliably deliver clean energy to New Yorkers.

Specifically, objectives designed to support this mission include:

- Moving new/under-used technologies and services into marketplace to serve as a feeder to help achieve EEPS and Renewable Portfolio Standard (RPS) goals.
- Validating emerging energy efficiency, renewable, and smart grid technologies/strategies and accelerate market readiness in New York State.
- Stimulating technology and business innovation to provide more clean energy options and lower cost solutions, while growing New York State's clean energy economy.
- Spurring actions and investments to achieve results distinct from incentive-based programs.

The nine initiatives that comprise the T&MD portfolio will be assessed based on their ability to support these objectives. Future evaluation reports will present these findings as programs are assessed.

Achievement of T&MD portfolio goals is dependent on long-term or multi-phase investments and for this reason, several of the T&MD initiatives build on the experience and success of programs funded by previous rounds of the SBC Program or other funding sources. Although this desired and necessary continuity of effort makes it difficult to attribute performance results and outcomes to a specific phase of funding, NYSERDA recognizes the importance of attempting to clearly delineate progress made in the T&MD portfolio from earlier or alternate funding sources. Toward this end, NYSERDA intends to count outputs and outcomes supported at least in part by T&MD funds toward T&MD performance milestones and results. Where prior SBC or other funded activities

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[8] NYSERDA was also directed to submit a supplemental revision to its EEPS Operating Plan by February 15, 2013 and did so on that date.

[9] For more information, please visit http://documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=119538&MatterSeq=35164 and http://docs.dos.ny.gov/info/register/2014/july30/toc.html.

are foundational to the success of the T&MD program and illustrative of potential future expectations for the T&MD portfolio, they are highlighted to help convey a more complete picture of possible program benefits, but these achievements will not be tallied toward the T&MD goals unless they have received T&MD funds.

The majority of T&MD activities undertaken to date have been dedicated to issuing solicitations, selecting and launching projects, meeting with stakeholders and scoping programs. Results from foundational SBC III programs (e.g., Smart Grid; Advanced Clean Power; Clean Energy Business Development; and Environmental Monitoring, Evaluation, and Protection) continue to accrue and are reported in more detail in the SBC III annual report. Commercialization benefits from projects started in 2012 will take a few years to materialize and will be reflected accordingly in future reports.

1.3 Organization of the Report

This semiannual report, filed pursuant to the October 24, 2011 PSC Order, describes how the T&MD Portfolio is progressing toward its mission and objectives. The report is divided into the following sections:

- Section 1: Introduction
- Section 2: Portfolio-Level Reporting
- Section 3: T&MD Initiatives
- Section 4: T&MD Program Evaluation Activities
- Appendix A: T&MD Program Advisory Committee Members
- Appendix B: T&MD Program Logic Models
- Appendix C: Evaluation Report Summaries

As all the T&MD programs become fully operational and mature, the content of these semiannual reports will expand and evolve to reflect the activities undertaken within each of the initiatives and how accomplishments to date relate to the T&MD portfolio's mission and the output and outcome metrics established in the Operating Plan.

2 Portfolio-Level Reporting

2.1 Portfolio Level Progress

To establish and implement the T&MD portfolio, NYSERDA has engaged in an intensive outreach process with stakeholders, developed and released competitive solicitations to implement the initiatives within the portfolio, and conducted activities to put the T&MD initiatives into operation. These activities are outlined in the following sections.

2.1.1 Stakeholder Engagement

To comply with the PSC's December 30, 2010 Order, NYSERDA engaged its stakeholders to collect input and advice on the T&MD portfolio. For example, 22 outreach meetings were conducted throughout New York State in 2011 with approximately 225 organizations participating in these meetings. During these meetings, NYSERDA received input on its initial ideas for the T&MD program objectives, priority criteria, and proposed portfolio. In addition, a dedicated webpage was posted on NYSERDA's website to disseminate periodic updates on the portfolio. Lastly, a Technical Conference that was open to the public was held in March 2011. During this meeting, NYSERDA management and staff discussed stakeholder feedback and the preliminary program framework and engaged the attendees in a discussion about the future uses of the T&MD funds.

Stakeholder input will continue to be a critical component as the T&MD initiatives are implemented. A T&MD Advisory Committee was established comprised of national, state, and regional experts in the energy field and held its first meeting in November 2012 to discuss the status of the portfolio and future activities. A second meeting was held June 28, 2013, and a third meeting was held December 10, 2013. The Advisory Committee provides feedback on the progress being made for the T&MD initiatives and market intelligence on trends and potential partnerships within the industry. See Appendix A for a current listing of Advisory Committee members.

Focused stakeholder meetings have been conducted for most of the initiatives supported by the T&MD portfolio. These meetings, as well as future meetings, will assist in providing additional direction and guidance to these initiatives. Stakeholder meetings, workshops and discussions have been held for the following programs:

- Smart Grid and Electric Vehicle Infrastructure.
- Clean Power Technology Innovation.
- Commercial/Industrial Emerging Technology/Accelerated Commercialization (ETAC).
- Multifamily ETAC.
- Residential ETAC.
- Advanced Buildings Technology Development.

- Advanced Buildings Consortium.
- Advanced Energy Codes and Standards.
- Workforce Development and Training and Career Pathways.
- Seed Funding for Start Up (Clean Tech) Companies.
- Innovation/Entrepreneurial Capacity Building.
- Environmental Monitoring, Evaluation, and Protection (EMEP).

Future semiannual reports will continue to track these activities and the input they provide to individual initiative plans. Lastly, as directed in PSC's October 24, 2011 Order, NYSERDA will make a progress presentation to PSC following the submission of this semiannual report and as directed by DPS staff.

2.1.2 Solicitations Released

In the past six months of the T&MD Program, NYSERDA staff has been actively engaged in developing competitive solicitations to acquire implementation contractors, trade allies and customers to support each T&MD initiative. Table 2-1 presents solicitations released, release date, and proposal due date or open enrollment end date. Note that solicitations released prior to January 1, 2014 were included in prior semiannual reports and are omitted from Table 2-1.

Table 2-1. Solicitations Released from January 1, 2014 through June 30, 2014

Some of the solicitations listed in Table 2-1 may have split funding sources, and some solicitations may have been revised since their initial release date.

Solicitation Number	Solicitation Name	Solicitation Release Date	Solicitation Closing Date
PON 2630	NY Advanced Buildings Consortium	1/17/2014	3/20/2014
PON 2664	Clean Energy Training for High School Students	2/7/2014	3/26/2014
PON 2700	CFL Sales Performance Program	1/17/2014	2/13/2014
PON 2870	NY State Acid Deposition & Mercury: Data and Publication Pilot	1/17/2014	12/30/2016
PON 2881	Institutionalizing Integrated Solutions Supporting	3/27/2014	5/29/2014
PON 2951	Cleaner, Greener Communities	5/1/2014	9/30/2015
PON 2912	Acid Deposition and Mercury Research in New York State	5/19/2014	6/30/2014

2.1.3 Implementation of T&MD Initiatives

In addition to the stakeholder engagement and solicitations, other noteworthy program implementation and progress milestones include the following activities, which are each described in greater detail in Section 3.

- The Smart Grid Program has signed nine contracts for technology development and demonstration and pilot projects; signed 14 contracts for research studies on technologies, market barriers and policies related to increased smart grid implementation, including one study that has been completed; and has supported 26 clean energy companies. $18 million has been leveraged to support smart grid infrastructure.
- The Electric Vehicle Infrastructure program has contracted two research studies on technologies, market barriers, and policies related to increased grid powered vehicle implementation; supported three clean energy companies; and developed two business models to advance Grid-Powered Electric Vehicle (GPV) infrastructure. $0.7 million has been leveraged to support electric vehicle infrastructure.
- As part of the Advanced Clean Power Initiative, 22 clean power technology projects are under contract, including two that have been completed, and 22 clean energy companies are receiving support through the Clean Power Technology Innovation Program. Three clean power technologies have reached commercial viability. $24 million has been leveraged to support clean energy technology projects. Two projects have been completed and two discussions with stakeholders have taken place to support the Resource Development component of the program.
- The CHP Aggregation and Acceleration Program pre-qualified 134 pre-packaged CHP systems for its catalog and has committed 15 CHP Aggregation sites, one of which has been installed, for an estimated 2.5 megawatts (MW) in peak load electric generation, 15 gigawatt-hours (GWh) in annual electric generation, and 19,548 million British thermal units (MMBtu) of annual primary energy savings. $1.5 million has been leveraged to support installed CHP systems. The CHP Performance Program has committed funding on 11 projects for an estimated 42 MW in peak load electric generation, 320 GWh in annual electric generation, and 418,000 MMBtu of annual primary energy savings, with $162 million in outside funds leveraged.
- The Emerging Technology and Advanced Commercialization Program has held 11 stakeholder meetings on emerging and underused technologies and strategies. Sixteen reference demonstration projects have been contracted with $0.3 million in leveraged funds and are expected to achieve 54 kilowatts (kW) in peak load electric generation, 6.9 GWh in total electric generation, and 1,614 MMBtu in annual primary energy savings.
- As part of the Advanced Buildings Program, 41 advanced building technology projects have been contracted and 32 clean energy companies are receiving program support. Approximately $45.3 million has been leveraged to support advanced building technologies, and commercial sales of new and improved technologies have reached $0.7 million. In addition, the Advanced Buildings Enabling Demand Response (DR) and Load Management Program has supported interval meter and enabling technology installations comprising approximately 90 MW of demand response in New York State.
- The Advanced Codes and Standards Program has a code compliance assessment in process focusing on existing commercial building renovation projects. This assessment will serve as the framework for all assessments conducted as part of the T&MD portfolio. In addition, production and printing of a Builders' Field Guide is underway, contract execution for publication and printing of a commentary on the pending NYS energy code update has reached its final stages.
- The Proof-of-Concept Center initiative is a five year program designed to bring clean energy technology inventions out of the laboratory and turn academic teams into viable business enterprises. Of the 111 applications submitted to participate in the first cohort, 21 teams have been selected to receive business mentorship and nominal product development support.

- As part of the Market Development Program, six Market Research studies have been completed with an additional seven studies underway. In addition, 246 partners have signed onto the New York Products Program. The Business Partners Program has recruited 118 new commercial lighting partners and 90 new HVAC partners. The Education/Behavior Change component of the program has sponsored and supported one LIFE conference and 680 community partnerships have been supported.
- The Workforce Development Program has trained more than 2,700 individuals on renewable and energy efficient technologies; supported 96 disadvantaged, unemployed, or underemployed individuals seeking employment; and has held 179 on-the-job and hands-on renewable energy/advanced technology trainings. Seven community colleges/training organizations have been added to the program's Renewable Energy and Advanced Technology training network, and the program had supported the development of one new certification and supporting curriculum.
- EMEP has contracted 28 new research projects and conducted 15 workshops and briefings. Approximately $5.4 million has been leveraged to support projects and sponsored research. In addition, 18 peer-reviewed scientific journal articles have been published based on program-supported research.

Table 2-2 provides a summary of anticipated T&MD portfolio benefits for the five-year funding period and out years (2017-2020) as well as achievements to date for applicable metrics for the first 2.5 years of program operation. Performance milestone tables (included for each initiative in Section 3 of this report) show progress through June 30, 2014 against the Operating Plan's expected benefits in the 2012-2015 timeframe. Benefits achieved in the first 2.5 years of the T&MD Program should be viewed with two important points of context:

- Most programs are competitively bid, requiring time to develop and issue solicitations, select winning bidders and negotiate contracts. Several solicitations were issued in 2012, 2013, and the first half of 2014.
- Several T&MD programs are continuing and building on successful, long-standing programs funded with prior rounds of SBC monies or other sources. Where possible, existing programs have maximized use of other funds prior to utilizing T&MD funds.

Where such circumstances exist, program metrics are either not reported (NR) and/or relevant context/explanation are provided. An Output/Leading Indicator describes the anticipated immediate results associated with initiative activities. An Outcome/Impact describes expected achievements in the near, intermediate, and longer term.

With regard to on-site energy savings, the level of achieved savings to date should be viewed in the context of the expected ramp up of savings over time. Specifically, two of the three expected contributors to the overall savings goals in NYSERDA's T&MD Operating Plan, the Advanced Codes & Standards and Advanced Buildings programs, anticipated most of their savings to be achieved in late 2014 through 2016 or later. The on-site energy savings reported in the table below do not include savings realized from the Products program. The only programs reporting savings at this point are the Market Development Program, the Emerging Technology and Advanced Commercialization Program, and the CHP Aggregation and Acceleration Program.

Table 2-2. Summary of Anticipated Cumulative T&MD Benefits (at full implementation)[a]

Benefit Description	2012 - 2016	Out Years	Total	Through June 30, 2014
On-site Electricity Savings from Energy Efficiency Projects, Technologies, Replications, and Codes & Standards (Cumulative Annual[b] GWh)	542	648	1,189[c]	407
GWh Savings from Funded Project and Technology Installations	172	1	173	407
GWh Savings from Anticipated Replications not Directly Funded by Program		30	30	NR
GWh Savings from Codes & Standards Activities supported by the Program	370	617	987	NR
On-site Fossil Fuel Savings from Energy Efficiency Projects, Technologies, Replications, and Codes & Standards (Cumulative Annual[b] MMBtu)	3,323,200	2,802,600	6,125,800[d]	556,220
MMBtu Savings from Funded Project and Technology Installations	965,200	7,800	973,000	556,220
MMBtu Savings from Anticipated Replications not Directly Funded by Program		231,800	231,800	NR
MMBtu Savings from Codes & Standards Activities supported by the Program	2,358,000	2,563,000	4,921,000	NR
On-site Demand Reduction from Energy Efficiency Projects, Technologies and Replications (Cumulative MW)	133.0	242.4	375.4	134.5
Demand Reduction from Funded Project and Technology Installations	43.0	5.3	48.3	134.5
Demand Reductions from Anticipated Replications not Directly funded by Program		30.1	30.1	NR
Demand Reductions from Codes & Standards Activities supported by the Program	90.0	207.0	297.0	NR
On-site Generating Capacity Installed from CHP Projects, Technologies, and Replications (Cumulative MW)	18.0	29.5	47.5	44.5[e]

Table 2-2 continued

Benefit Description	2012 - 2016	Out Years	Total	Through June 30, 2014
MWs Installed from Funded Project and Technology Installations	18.0	19.5	37.5	44.5[e]
MWs Installed from Anticipated Replications not Directly Funded by Program		10.0	10.0	NR
On-site Electricity Generated from CHP Projects, Technologies, and Replications (Cumulative Annual GWh)[f]	121	216	337	335[e]
GWhs Generated from Funded CHP Project and Technology Installations	121	155	276	335[e]
GWhs Generated from Anticipated Replications not Directly Funded by Program		61	61	NR
Primary Energy Savings from CHP Installations (Cumulative Annual MMBtus)[f]	157,300	281,125	438,425	437,548[e]
MMBtu Consumed from Funded Project and Technology Installations	157,300	201,825	359,125	437,548[e]
MMBtu Consumed from Anticipated Replications not Directly Funded by Program		79,300	79,300	NR
System-wide CO2 Emission Reductions – On-site and Central Station (Annual Tons)	418,512	432,209	850,721	159,817
Advanced Technologies Reaching Commercial Availability	47	42	89	6
Improved Technologies Adopted by the Market or Further Supported by Deployment Programs	10	9	19	NR
Commercial Sales of New and Improved Supported Technologies (millions)	$26.5	$157.8	$184.4	$1.3
Funding Leveraged (co-funding and outside investment) by NYSERDA's Investment (millions)	$696.5	$103.0	$799.5	$289.8
Clean Energy Businesses Graduating from Incubators	90	72	162	20

Table 2-2 continued

Benefit Description	Benefit Description	Benefit Description	Benefit Description	Benefit Description
Clean Energy Companies Receiving Support	525	200	725	82
Retail and Supply Chain Businesses Partnering with NYSERDA to Increase Market Share of Energy Efficient Products	1,750		1,750	1,774
Clean Energy Training for Practitioners (Trainees)[g]	39,056	9	39,065	3,904
Supply Chain Training to Facilitate Adoption of Energy Efficient Products (Partner Employees)	1,525		1,525	949
Adoption of Clean Energy Business Models, Practices or Strategies	Record will be maintained and reported	Record will be maintained and reported	Record will be maintained and reported	Outcomes to be determined through program tracking and evaluation
Policy Development and Decisions Supported by NYSERDA studies, assessments and data[h]	Record will be maintained and reported	Record will be maintained and reported	Record will be maintained and reported	Outcomes to be determined through program tracking and evaluation
Net Additional Jobs as a Result of NYSERDA Investment[h]	Portfolio Macroeconomic Benefits to be calculated annually and reported	Portfolio Macroeconomic Benefits to be calculated annually and reported	Portfolio Macroeconomic Benefits to be calculated annually and reported	Results for R&D product development activities available mid-2014
Change in GSP as a Result of NYSERDA Investment[h]	Portfolio Macroeconomic Benefits to be calculated annually and reported	Portfolio Macroeconomic Benefits to be calculated annually and reported	Portfolio Macroeconomic Benefits to be calculated annually and reported	Results for R&D product development activities available mid-2015

Table notes are on the next page.

Table 2-2 continued

[a] Energy savings reported in this table are program-reported; evaluation activities have not yet been conducted on these programs. Future reports will present findings from those studies as they are finalized.

[b] Cumulative annual savings refers to the savings that are achieved in a particular year ("annual") from all measures installed ("cumulative") as a result of program activities through the year of reporting; e.g., T&MD cumulative annual savings for 2016 are the energy savings achieved in 2016, as a result of energy efficiency measures installed from January 2012 through December 2016.

[c] MWh associated with CHP systems have been removed from the calculation of on-site electricity savings.

[d] Natural gas usage associated with CHP systems has been removed from the calculation of fossil fuel savings.

[e] These metrics were previously reported based on contracted activity. They are now reported based on committed activity to align with how these metrics are reported for other NYSERDA program portfolios.

[f] Primary Energy Savings for CHP systems (expressed in MMBtu) is based on the difference between the amount of energy displaced at grid-level generators and the energy used on-site by the CHP installations, accounting for both the avoided energy losses over the transmission and distribution system and the energy saved due to replacement of the on-site boiler with more efficient equipment. The energy displaced at grid-level generators is estimated based on the electricity system simulation model used in the New York State Energy Plan process.

[g] Individuals may participate in more than one training.

[h] These benefits will accrue from past investments, as well as T&MD portfolio investments.

2.1.3.1 R&D Demonstration Survey Results

In March 2014, NYSERDA completed a portfolio wide evaluation of its R&D demonstration projects. The full evaluation report is available on the NYSERDA website.[10] A detailed summary of results can be found in Appendix C. High level conclusions of the evaluation are:

- NYSERDA's R&D demonstrations have mostly achieved their objectives while generating substantial impacts.
- Demonstrable savings and technical expertise are important factors for developing replication projects in New York.
- NYSERDA's R&D demonstration portfolio performs well across several measures of cost-effectiveness, with benefits exceeding NYSERDA's investment.
- Participant satisfaction with NYSERDA's R&D Program appears very high.
- Data limitations pose challenges for evaluating NYSERDA's R&D demonstration projects.

2.1.4 Budget and Spending Status

Table 2-3 shows the T&MD program budget and financial status through June 30, 2014. Committed and spent funds are also shown as a percent of the total 2012-2016 budget. As of June 30, 2014, 2.5 years of T&MD activity has been completed of the five-year program (i.e., 50%); thus, as shown in Table 2-3, NYSERDA's funding commitment level is on target at a portfolio level.

[10] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-RD-Demo-Survey-Report.pdf

Table 2-3. Budget and Financial Status for T&MD Programs through June 30, 2014

Totals may not sum exactly due to rounding.

	2012-2016 Budget	Spent Funds	Percent of 2012-2016 Budget Spent	Committed Funds[a,b]	Percent of Budget 2012-2016 Committed
Power Supply and Delivery					
Smart Grid/Electric Vehicle	$61,281,382	$3,201,591	5.22%	$26,845,716	43.81%
Advanced Clean Power	$51,771,962	$4,518,061	8.73%	$35,299,210	68.18%
Combined Heat and Power[c]	$75,000,000	$1,260,639	1.68%	$30,697,586	40.93%
Total Power Supply & Delivery	*$188,053,344*	*$8,980,291*	*4.78%*	*$92,842,512*	*49.37%*
Building Systems					
Advanced Buildings	$75,336,160	$3,824,761	5.08%	$42,451,017	56.35%
Advanced Energy Codes & Standards	$16,679,794	$644,317	3.86%	$9,833,933	58.96%
Total Building Systems	*$92,015,954*	*$4,469,078*	*4.86%*	*$52,284,950*	*56.82%*
Clean Energy Infrastructure					
Market Development	$70,380,281	$17,724,791	25.18%	$29,038,432	41.26%
Clean Energy Business Development	$41,761,046	$4,098,042	9.81%	$23,394,931	56.02%
Environmental Monitoring, Evaluation and Protection (EMEP)	$18,550,048	$1,505,210	8.11%	$8,915,669	48.06%
Workforce Development[c]	$39,000,000	$1,647,671	4.22%	$17,338,252	44.46%
Total Clean Energy Infrastructure	*$169,691,375*	*$24,975,714*	*14.72%*	*$78,687,284*	*46.37%*
Total of All Program Areas	***$449,760,673***	***$38,425,083***	***8.54%***	***$223,814,746***	***49.76%***
Administration (8%)	$39,765,533	$18,001,692	45.27%	$18,001,692	45.27%
NYS Cost Recovery Fee (1.7%)	$7,585,944	$1,370,900	18.07%	$1,370,900	18.07%
Evaluation (5%)	$26,363,458	$1,435,131	5.44%	$9,265,484	35.15%
Grand Total – Portfolio	***$523,475,608***	***$59,232,806***	***11.32%***	***$252,452,822***	***48.23%***

[a] Committed funds include amounts spent plus remaining funding obligated under a contract, purchase order, or incentive award. In addition, committed funds include planned funding for contracts awarded and under negotiation and planned funding under active development through solicitations with specific due dates.

[b] Committed funds may decrease from period to period as a result of the disencumbrance/cancellation of contracts, or due to the actual award amount(s) resulting from a due date solicitation being less than the planned award.

[c] Funding was increased in PSC's December 17, 2012 Order.

3 T&MD Initiatives

This section provides a status update on each of the T&MD initiatives, including budget status and highlights of early achievements during the first 2.5 years of the five-year funding period. As noted in Section 2, benefits achieved in the first 2.5 years of the T&MD program should be viewed with two important points of context:

- Most programs are competitively bid, requiring time to develop and issue solicitations, select winning bidders and negotiate contracts. Several solicitations were issued in 2012, 2013, and the first half of 2014.
- Several T&MD programs are continuing and building on successful, long-standing programs funded with prior rounds of SBC monies or other sources. Where possible, existing programs have maximized use of other funds prior to utilizing T&MD funds.

Where such circumstances exist, program metrics are either not reported (NR) and/or relevant context/explanation are provided. An Output/Leading Indicator describes the anticipated immediate results associated with initiative activities. An Outcome/Impact describes expected achievements in the near, intermediate, and longer term.

3.1 Power Supply and Delivery Initiatives

Table 3-1 shows the Power Supply and Delivery and Combined Heat and Power budget and financial status through June 30, 2014. Committed and spent funds are also shown as a percentage of the total 2012-2016 budgets. Later sections describe progress for each area of this initiative.

The level of committed funding in a few program areas appears to be lower than might be expected at this point in time. Reasons are as follows:

- For Electric Vehicles (EV), in late 2011, $8 million in non-T&MD funds became available to NYSERDA to support the installation for electric vehicle charging infrastructure and explore approaches that overcome business impediments to private sector investment in publicly accessible EV charging. This funding leveraged an additional $1 million in federal funding designated to support regional EV readiness. Based on the availability of these funds, launch of the T&MD Electric Vehicle Infrastructure work has been delayed until the non-T&MD funds are exhausted.
- For Resource Development, NYSERDA is first engaging in a study of cost reduction opportunities for Off-Shore Wind (OSW) before acting further on its T&MD plans. Using Foundation funds, the University of Delaware will conduct the cost reduction assessment under the oversight of NYSERDA and other advisors. This effort is expected to be completed in summer 2014, at which point NYSERDA's T&MD research and outreach plans will be revisited.
- Interest in the CHP market has increased as a result of the program's new catalog sales approach (predefined units make selection easier and cheaper for customer) and aggressive marketing program (regular CHP Expos event). Industry participants have reported customer sales cycles have been reduced to almost 3 months (as opposed to 12-15 months) and are attributing this reduction to the change in practices. There are currently 13 approved vendors and 141 approved CHP systems.

Table 3-1. Power, Supply, & Delivery Budget and Financial Status through June 30, 2014

Totals may not sum exactly due to rounding.

	2012-2016 Budget	Spent Funds	Percent of 2012-2016 Budget Spent	Committed Funds[a,b]	Percent of Budget 2012-2016 Committed
Smart Grid/Electric Vehicle					
Smart Grid	$47,284,415	$3,025,705	6.40%	$20,850,592	44.10%
Electric Vehicle	$13,996,967	$175,886	1.26%	$5,995,124	42.83%
Total Smart Grid/Electric Vehicle	*$61,281,382*	*$3,201,591*	*5.22%*	*$26,845,716*	*43.81%*
Advanced Clean Power					
Technology Innovation	$27,826,749	$3,955,103	14.21%	$27,220,588	97.82%
Resource Development	$13,945,213	$479,743	3.44%	$507,231	3.64%
Solar Cost Reduction	$10,000,000	$83,215	0.83%	$7,571,391	75.71%
Total Advanced Clean Power	*$51,771,962*	*$4,518,061*	*8.73%*	*$35,299,210*	*68.18%*
Combined Heat & Power[c]					
CHP Aggregation & Acceleration	$25,000,000	$308,339	1.23%	$2,703,408	10.81%
CHP Performance	$50,000,000	$952,300	1.90%	$27,994,178	55.99%
Total Combined Heat & Power	*$75,000,000*	*$1,260,639*	*1.68%*	*$30,697,586*	*40.93%*
Grand Total - Power, Supply, & Delivery Initiatives	***$188,053,344***	***$8,980,291***	***4.78%***	***$92,842,512***	***49.37%***

[a] Committed funds include amounts spent plus remaining funding obligated under a contract, purchase order, or incentive award. In addition, committed funds include planned funding for contracts awarded and under negotiation and planned funding under active development through solicitations with specific due dates.

[b] Committed funds may decrease from period to period as a result of the disencumbrance/cancellation of contracts, or due to the actual award amount(s) resulting from a due date solicitation being less than the planned award.

[c] Funding was increased in PSC's December 17, 2012 Order.

3.1.1 Smart Grid and Electric Vehicle Infrastructure

3.1.1.1 Smart Grid

The Smart Grid Program is designed to promote product development and demonstrations targeted at ensuring high levels of security, quality, reliability and availability of electric power; improving economic productivity; and minimizing environmental impacts while maximizing safety and sustainability. A smarter grid will be characterized by the widespread application of advanced sensing, communication and control devices, and other uniform diagnostic systems to support real-time visualization of electric grid operating conditions. This smarter grid is expected to reduce energy losses, extend equipment life, reduce operating costs, increase system resiliency to disruptions, support quicker restoration after disruptions, support the integration of distributed energy resources and increase the throughput or transfer of electric energy between regions of the State. A smarter grid will also be essential to accelerating adoption of grid-powered electric vehicles (GPV) and associated infrastructure. Projects funded through program activity must demonstrate significant statewide public benefit and quantify all energy, environmental, and economic impacts. Technology demonstrations, product development, research studies, and engineering studies are all eligible for funding support through periodic program solicitations.

The following program activities have been performed as of June 30, 2014, in an effort to meet the previously-stated milestones and anticipated results:

- NYSERDA met periodically with stakeholders consisting of the public, investor-owned, municipal and cooperative utilities in New York State and other stakeholders, including the New York Smart Grid Consortium and the New York Battery and Energy Storage Technology (NY-BEST) Consortium to solicit input into the new Smart Grid Program design.
- The EPTD Smart Grid Program solicitation (PON 2715) was released June 10, 2013. This second solicitation under the T&MD plan made $10 million available over two rounds with due dates of August 14, 2013 and February 12, 2014. PON 2715 resulted in 67 proposals that requested more than $28 million in funding. Eighteen smart grid projects were selected to be funded that represent a commitment of $6.7 million of NYSERDA funding and are leveraged by an additional $7.9 million of private sector co-funding and investment.
- Projects stemming from PON 2715 include developing an aerial weather damage assessment system to aid utilities with storm restoration, multiple engineering studies to develop microgrids, studying the impacts of utility scale solar photovoltaic installations, and demonstrating a utility distribution to microgrid interface.
- In 2013, the New York Legislature directed NYSERDA, working with others, to develop recommendations regarding the establishment of microgrids in New York State to support critical public services in the event of electric grid disruption. The Smart Grid Program led the initiative, in partnership with the Department of Homeland Security and Emergency Services and Department of Public Service, and contracted with several consultants to complete the activity. General Electric, EPRI, Industrial Economics, and Pace University were contracted to perform specific tasks.

- NYSERDA has historically funded smart grid projects with SBC III resources. Benefits from this SBC III smart grid investment continue to accrue and were reported in the 2013 SBC III annual report finalized in June 2014. Prior historical accomplishments can be found in the SBC III annual report through December 31, 2012.[11]
- Battery and Energy Storage Test (BEST) and Commercialization Center: the New York Battery and Energy Storage Technology Consortium (NY-BEST) was awarded $3,500,000 through the Regional Economic Development Council process in 2011, of which $2,500,000 is being provided through NYSERDA in SBC funds and $1,000,000 through Empire State Development Corporation (an additional $3,445,000 in Clean Air Intersate Rule funds was also provided). This facility is located at Eastman Business Park in Rochester and leverages roll-to-roll manufacturing and coating capabilities that are located at the Park. The facility was completed during this reporting priod and commenced operations in May 2014 for customer testing of battery systems. Access to battery testing capabilities is a critical element in the advancement of new storage technologies. Few facilities exist for developmental testing and characterization capabilities of energy storage devices due to the expensive and specialized equipment and technical staff necessary. To fill this need and accelerate energy storage commercialization, NY-BEST established a Test and Commercialization Center whereby NY-BEST refurbished the leased space at Eastman Business Park and equipped the facility and DNV GL was competitively selected by NY-BEST to serve as operating partner of the facility. The Test and Commercialization Center includes specialized multi-channel, performance and life-cycling testing equipment and will perform testing on battery and energy storage systems ranging from single cell testing to large integrated systems over one megawatt. Specifically, the Center will test individual cells, combinations of multiple cells, battery modules, and full systems including associated controls and power electronics. The Center will offer performance testing, life-cycling testing, accelerated aging testing, validation tests, as well as certification tests directly related to individual energy systems and/or components thereof. In addition, commercialization guidance is available through NY-BEST staff ad DNV GL's consulting expertise.

A Program Theory and Logic Model Report was completed for the Smart Grid Program in December 2013. The full report is available on NYSERDA's website.[12]

Table 3-2 shows performance milestones and results for the Smart Grid Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

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[11] The 2012 SBC III report is available at http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/-/media/Files/Publications/PPSER/NYES-Program/2012/2012-SBC III-post-program-annual-report.pdf

[12] Electric Power Transmission and Distribution Smart Grid Program Theory and Logic Model. http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-EPTD-Smart-Grid-Program.pdf

Table 3-2. Smart Grid Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Sign contracts for 29 technology development, demonstration and pilot projects, including several large flagship projects	7	9	10	0
	Complete 29 technology development demonstration and pilot projects, including several flagship projects			5	NR
	Sign contracts for 8 research studies on technologies, market barriers and policies related to increased smart grid implementation in New York State	2	10	3	4
	Complete 8 research studies on technologies, market barriers and policies related to increased smart grid implementation in New York State			2	1
	34 clean energy companies receiving support	8	19	12	6
	Facility operator agreement executed with 3rd party for Commercialization Center	Executed Agreement	NR[a]		NR[a]
Outcomes/ Impacts	$112 million leveraged funds (co-funding and outside investment) for smart grid infrastructure (millions)	$18.0	$12.9	$42.0	$0.19
	$7 million in leveraged funds (co-funding and outside investment) for the Commercialization Center (millions)	$2.0	NR[a]	$2.0	NR[a]
	$10 million in revenue generated from facility use of the Commercialization Center	$0.15	NR[a]	$2.2	NR[a]
	41 product development tests (technology readiness level (TRL) 7+) in the Commercialization Center	2	NR[a]	8	NR[a]
	25 tested or prototyped products commercialized from the Commercialization Center	1	NR[a]	4	NR[a]

[a] Commercialization center funding approved in September 2012. Center is under development.

3.1.2 Program Evaluation Activities

NYSERDA completed an early stage process evaluation of the Smart Grid Program in April 2014. The full report is now available on NYSERDA's website.[13] Preliminary results were included in the last semiannual report. Appendix C includes a more complete summary of that work.

3.1.2.1 Electric Vehicle Infrastructure

The Electric Vehicle (EV) Infrastructure efforts includes engineering studies, product development, demonstration projects and pilot programs to validate technology that minimizes negative grid impacts from Grid Powered Vehicle (GPV) charging, develops GPV-to-grid communication technologies and control processes, and promotes new business models to exploit the benefits of vehicle storage to the distribution system. The Electric Vehicle Infrastructure program partially funds the Behavior Research Program further discussed in Section 3.2.1.2.

In late 2011, $8 million in non-T&MD funds became available to NYSERDA to support the installation for electric vehicle charging infrastructure and explore approaches that overcome business impediments to private sector investment in publicly-accessible EV charging. This funding leveraged an additional $1 million in federal funding designated to support regional EV readiness. The projects are installing more than 900 charging ports at more than 350 locations throughout the State. To date, nearly 400 of the charging ports have been installed and are operational. NYSERDA is collecting usage data on each of these charging ports. Based on the availability of these funds, a decision was made to delay the launch of the T&MD Electric Vehicle Infrastructure work until the non-T&MD funds were exhausted.

Although the charging station hardware and installation costs were not SBC-funded, SBC III and T&MD funds are being used to support monitoring of site utilization and reporting on business model success with the contractor selected through PON 2392 Electric Vehicle Supply Equipment (EVSE) Support. This support includes analysis of charging station usage and the development of a clearinghouse website for information about GPVs in New York State.

[13] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-Electric-Power.pdf

In late 2013, a new solicitation offered $2 million in T&MD funds for the EV-Enabling Technology Demonstration Program (PON 2755). This program sought to fund studies and demonstrations of technologies, policies, and business models that can help make GPVs more economically viable and reduce their impacts on the electric grid.

In January 2014, NYSERDA made 13 awards totaling $1.4 million. To date, only one contract is signed and executed, but others are nearing completion. Projects will be undertaken over the coming 12 to 24 months. Another similar policy and demonstration solicitation will be issued in late 2014.

Electric vehicle and electric transportation hardware and business development projects were eligible under NYSERDA's Advanced Transportation Technologies solicitation (PON 2781). Under this solicitation, 10 electric transportation product development projects were selected which will be funded using $2 million of TM&D funds. Funded projects include wireless EV charging, an advanced EV fast charger, EV electric motors, and ambulance idle reduction as well as several other electric transportation products.

Table 3-3 shows performance milestones and results for Smart Grid Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Table 3-3. Electric Vehicle Infrastructure Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Sign contracts for 25 grid powered vehicle technology development, demonstration and pilot projects	4	NR[b]	9	0
	Complete 25 grid powered vehicle technology development, demonstration, and pilot projects			3	0
	Contract 8 research studies on technologies, market barriers and policies related to increased grid powered vehicle implementation in New York State	4	NR[b]	2	2
	Complete 8 research studies on technologies, market barriers, and policies related to increased grid powered vehicle implementation in NY			4	0
	30 clean energy companies receiving support	5	NR[b]	10	2
	Develop business models to advance GPV infrastructure				2
Outcomes/ Impacts	$42 million in leveraged funds (co-funding and outside investment) for electric vehicle infrastructure (millions)	$4.0	NR[b]	$14.0	$0.7
	4 electric vehicle technologies reaching commercial availability			1	0

[b] Non-T&MD funds are being used to support this effort and to further leverage limited T&MD funds in the near term. Metrics associated with T&MD funding will be included in future reports. 28 proposals were selected to install changing capability of 860 sites. $1.0 million in federal funding was leveraged.

3.1.3 Advanced Clean Power

3.1.3.1 Clean Power Technology Innovation Program

The Clean Power Technology Innovation Program works to advance clean power technology, assist New York State innovators in product development, and overcome barriers and institutional impediments to the widespread use of renewable power. Reducing the cost of solar PV installations is an initial focus. This effort is targeting the reduction of balance-of-system (BOS) costs that include all costs with the exception of the solar PV module. The program also supports energy storage, wind, hydro, and fuel cell product development, building on projects funded in the last round of the SBC program. The following summarizes program activities during the period ending June 30, 2014.

The Advanced Clean Power Technologies solicitation (PON 2569) was released July 2, 2012. This $10.25 million solicitation had two proposal due dates: August 29, 2012 and June 13, 2013. Fifty-one proposals were received in the first round of the solicitation and 23 proposals were received in its second round. Twenty-one projects totaling $9.9 million were approved for funding. All projects are currently under contract. A majority of the projects selected are for the development of new clean energy technologies. Some examples of these products are a hydrokinetic energy conversion system, battery and flywheel storage products, solid oxide fuel cells, hydrogen-bromine fuel cells, and several solar photovoltaic and wind turbine development and performance improvement projects.

Table 3-4 shows performance milestones and results for the Technology Innovation program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Commercialization metrics for projects that only received SBC III funding are not report here; those metrics are reported in the SBC III annual report. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Table 3-4. Technology Innovation Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Contract 51 clean power technology projects	15	12	26	10
	Complete 51 clean power technology projects			10	2
	64 clean energy companies receiving support	19	12	32	10
Outcomes/ Impacts	8 clean power technologies reach commercial availability			1	3
	$55 million in commercial sales of supported clean power technologies (millions)	$1.0	NR	$1.0	$0.6
	$65 million of leveraged funds (co-funding and outside investment) for clean power technology projects (millions)	$20.0	$11.3	$32.0	$9.7

3.1.3.2 Resource Development Program

The Resource Development Program is focusing on activities that will stimulate the development of new renewable energy supplies, technologies, and businesses in the renewable energy industry with the greatest potential to meet near-to-intermediate-term energy and environmental goals. Similar to previous efforts to address market barriers that helped develop land-based wind energy in Upstate New York, this program concentrates on the gap in understanding offshore wind energy. Marine resource and site assessment activities will increase knowledge of coastal marine energy assets and their suitability for power development and improve understanding of the capacity in New York State to manufacture, construct, and service new marine-based electrical generation projects and components.

Offshore Wind Benefit-Cost Study

NYSERDA is conducting a comprehensive benefit-cost study for potential offshore wind projects in the Atlantic Ocean. This work will estimate costs, performance, operation and economic impacts to New York State to enable policy makers in New York State to fully evaluate competing options for meeting long-term energy and environmental objectives. Electrical system cost impacts and costs associated with a significant build-out of offshore wind capacity will be modeled, and the expected benefits to the New York State economy and environment will be estimated. Important aspects of permitting, port infrastructure, and operation and maintenance service opportunities will be considered.

Offshore Wind Policy Study

An Offshore Wind Policy Study to investigate mechanisms for supporting offshore wind is underway. This study will review existing offshore wind policies in Europe and U.S. Atlantic coast states, discuss strengths and weaknesses of these policies, review application of these policies within New York State, suggest potentially beneficial supporting policies and market mechanisms in New York State, and identify opportunities for mutually beneficial collaboration between New York State and other U.S. Atlantic coast states.

University of Delaware Offshore Wind Cost Reduction Assessment

This study from the University of Delaware looks to identify cost reduction strategies for offshore wind. Offshore wind is capital intensive and remains within the early stages of development in the U.S. A thorough examination of cost reduction levers available to the state is thus a critical step in establishing plans for its development. The specific objectives of this study are to:

- Identify areas of cost reduction for offshore wind that are expected to take place in world markets, primarily Europe.
- Identify cost reduction pathways that apply to offshore wind in U.S. waters.
- Identify specific cost reduction factors that would reduce cost impacts of offshore wind to New York State and describe activities that New York State could undertake to achieve a meaningful reduction in the cost of offshore wind.
- Provide a roadmap of cost reduction strategies for consideration by New York State, including their sequencing.

It is anticipated that the results of this study will be used by NYSERDA to inform its decision making on if, when, and how to pursue an offshore wind program as a part of the State's energy plan for the second half of this decade.

Offshore Wind Research Plan Development

Program staff is collaborating with the New York Department of State (DOS) and other stakeholders to address barriers to off-shore wind development. Issues under study include strategies for project cost reductions, suitable areas for development, and appropriate marine spatial planning initiatives and other research that should be conducted to promote responsible development. One form of stakeholder engagement process, a joint NYSERDA and DOS formal request for information (RFI), may be used to identify research areas of critical importance to New York State and the industry at large. The release of such an RFI is pending assessment of the Benefit-Cost, Policy Options, and Cost Reduction Assessments.

Bureau of Ocean Energy Management (BOEM) NYS Offshore Wind Task Force

NYSERDA is a member of this task force led by DOS. BOEM organizes this task force to provide guidance and advice on New York State interests and impacts of siting offshore energy projects in federal waters off of New York State. NYSERDA has been an active participant and presenter at these meetings.

DOS Coastal Resources Offshore Amendment to Coastal Zone Management Program (CZMP)

NYSERDA continues to have close collaboration with and provide technical support to the DOS Coastal Resources program as it develops screening criteria for establishing a revised coastal zone planning process related to offshore wind energy. The DOS Atlantic Ocean Study maps physical and biological information to aid in the study of areas off the coasts where wind development may be suitable for State and federal consideration under the U.S. Department of Interior's Smart from the Start Initiative aimed at accelerating the federal process for leasing offshore tracts for wind energy.

Northeast Wind Resource Center

NYSERDA is an active supporter of the NREL-funded Northeast Wind Resource Center (NWRC). The NWRC's purpose is to provide credible information, targeted outreach, and direct engagement with stakeholders and decision makers about offshore wind energy. The NWRC plans to support the development of a viable offshore wind industry by:

- Collecting and disseminating web-based information by creating an NWRC-specific website and by maintaining websites for the U.S. Offshore Wind Hub, the Offshore Wind Accelerator Project, and the Maine Ocean and Wind Industry Initiative.
- Developing strategies to increase opportunities for multistate collaboration.
- Sponsoring regular webinars, workshops, and meetings.
- Coordinating with other regions (e.g., Southeast Coastal Wind Coalition).

Table 3-5 shows performance milestones and results for the Resource Development Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Table 3-5. Resource Development Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	6 studies, surveys, and plans contracted	3	2	2	0
	6 studies, surveys, and plans completed	1	0	1	2
	3 engagements with stakeholder organizations and consortia in support of developing a research/program agenda	2	2	1	0
Outcomes/ Impacts	$2.5 - 5.0 million of leveraged funds (co-funding and outside investment) (millions)	$0.5	$0.0	$1 - $1.5	$0.0

3.1.3.3 Solar Cost Reduction[14]

This program will help achieve the goals of the NY-Sun Initiative[15] through activities that reduce the balance-of-system (BOS) costs of solar PV installations and that support priority PV technology development in New York State. BOS costs include non-module hardware, labor, design, permitting and interconnection, and can amount to approximately one-half of the installed cost of a PV system. A dialogue with representatives of the industry, permitting authorities and various stakeholders will be conducted through workshops and other means to develop a thorough understanding of the PV project development process and the elements that constitute BOS cost components. Based on this information, activities are likely to include, but not be limited to:

- Development of training programs and materials to educate local government planners, code officials, fire department personnel, home owner associations, and other local stakeholders;
- Development and promotion of streamlined and standardized procedural requirements for permitting and interconnection;
- Programs and materials to address electrical requirements, safety practices, and the requirements of the National Electric Code and State law;
- Development of new business models that reduce business or financing costs associated with PV systems;
- Development of best practices for incorporating PV into new buildings and making buildings "PV-friendly" for easy PV retrofit at a later time, and educating architects and developers on these practices;
- Demonstration of new and underused technologies that have the potential to reduce the installed cost of PV systems; and
- A series of strategic pilot demonstration projects that optimize the full value of all BOS cost reductions when implemented as a fully-integrated PV system.

In September 2012, PSC approved the transfer of $10 million of SBC3 funds to a PV BOS cost reduction effort. Six million dollars of that funding was allocated to an R&D program designed to attract projects that focus on reducing PV BOS costs (non-module costs of solar systems), such as overall equipment and installation costs and standardization and streamlining of procedures for permitting and interconnection. A solicitation was released with two due dates, July 30, 2013 and January 30, 2014. The $10 million solicitation was a collaboration with NYPA, who provided an additional $5 million to be administered by NYSERDA. A total of 13 projects will be funded equally between NYSERDA and NYPA.

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[14] The September 13, 2012, Order in Case 10-M-0457, *Order Authorizing the Reallocation of Uncommitted System Benefits Charge III Fund,* included $10 million for a new initiative within the Advanced Clean Power Program focused on reducing the balance-of-system costs for solar PV installations and the development of priority PV technology.

[15] In his 2012 State of the State Address, Governor Cuomo announced the NY-Sun initiative, designed to install, in 2013, four times the customer-sited PV capacity installed in 2011, while protecting the ratepayer by keeping costs under control.

Table 3-6 shows performance milestones and results for the Solar Cost Reduction program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Table 3-6. Solar Cost Reduction

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	200 training sessions on aspects of PV for authorities having jurisdiction, local officials and trainers	180	NR[d]	20	NR
	2,000 trainees attending training sessions on aspects of PV for authorities having jurisdiction, local officials and trainers	1,800	NR[d]	200	NR
	10 projects to develop tools/practices, studies/surveys, or workshops/engagements, to reduce PV costs contracted	7	NR[d]	2	0
	10 projects to develop tools/practices, studies/surveys, or workshops/engagements, to reduce PV costs completed			5	0
	10 BOS technology development or demonstration projects contracted	7	NR[d]	3	0
	11 BOS technology development or demonstration projects completed			2	0
	9 clean energy companies receiving support	6	NR[d]	2	1
	10 Workshops/engagements as a result of BOS projects	1	NR[d]	4	1
Outcomes/ Impacts	7 tools/practices, studies/surveys to reduce PV costs available for use in the market			3	$0.0
	$13.2M of leveraged funds (co-funding and outside investment) for BOS projects	$5.5	NR[d]	$5.0	$0.1

[d] In September 2012, the PSC approved the transfer of $10 million of SBC3 funds to a PV BOS cost reduction effort. These metrics will be tracked in future reports.

3.1.4 Combined Heat and Power (CHP)

3.1.4.1 CHP Aggregation and Acceleration Program

The CHP Aggregation and Acceleration Program will develop and transform the marketplace for CHP systems from 50 kW to 1.3 MW, the nameplate capacity range of a majority of NYSERDA's previous CHP projects. The program will accomplish this transformation by (1) compiling a vetted catalog of pre-qualified equipment, and (2) creating and validating rules-of-thumb for simplifying the analysis used to determine the capacity needs of a given site. This focus on prepackaged CHP modules that include all major components will reduce the need for (and thus reduce the costs of and opportunities for errors during) equipment-integration engineering and assembly; nevertheless, site-specific engineering regarding placement of equipment at the site and tie-ins to the site's infrastructure will still be necessary.

In June 2012, NYSERDA issued RFI 2568, which invited vendors of packaged CHP systems to submit "equipment cut sheets" for vetting by a NYSERDA-assembled Technical Evaluation Panel. This program and RFI 2568 were highlighted during NYSERDA's CHP Conference held in New York City in June 2012 with 150 stakeholders in attendance. NYSERDA issued the catalog that specifies the eligible equipment along with each item's assigned incentive and the program's system sizing rules-of-thumb in February 2013. Upon issuance of the catalog, NYSERDA began accepting open enrollment first-come/first-served applications for the program. The program and opportunities to add items to the catalog will remain open continuously until the end of 2016 or until funds are exhausted, whichever occurs first.

In April 2014, the program received supplemental funding through the Indian Point Energy Center (IPEC) fund established by the PSC, which will provide the majority of project funds for sites located in the Con Edison service territory who pay into the Monthly Adjustment Charge (MAC). The project capacity and performance for these sites has been pro-rated to reflect the split funding received via SBC IV and IPEC funds.

Interest in the CHP Aggregation and Acceleration Program has continued to grow with a total of 13 approved vendors and 128 prequalified and conditionally qualified CHP systems. To date 20 projects have received SBC IV funding with a projected peak reduction of approximate 0.8 MW attributable to SBC IV funds.[16] Nearly 600

[16] An additional 3.3 MW of peak reduction funded through the Acceleration Program is attributable to the IPEC funds as directed by the Public Service Commission's ("Commission") Order Accepting IPEC Reliability Contingency Plans, Establishing Cost Allocation and Recovery, and Denying Request for Rehearing, issued April 18, 2013, and submitted by Consolidated Edison on February 3, 2014. The IPEC funding will supplement project incentives for the CHP Acceleration Program under Program Opportunity Notice (PON) 2568. To be eligible for IPEC incentives, a project must be located a site in Con Edison's electric service territory where the customer pays the Plan portion of the MAC.

industry partner, building owners, and managers have attended four CHP Expos held to educating building owners and managers about CHP and the funding opportunities available.

NYSERDA has historically funded CHP projects with SBC III resources. Benefits from this SBC III investment continue to accrue and were reported in the 2012 SBC III annual report finalized in June 2013 (Prior historical accomplishments can be found in the SBC III annual report through December 31, 2013.)

A Program Theory and Logic Model was completed for the CHP Aggregation and Acceleration Program in the first half of 2014. The logic model diagram is included in Appendix B (and the full Program Theory and Logic Model report is available on NYSERDA's website.[17]

Table 3-7 shows performance milestones and results for the CHP Aggregation and Acceleration Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Energy savings reported in this table are program-reported; evaluation activities have not yet been conducted on these programs. Future reports will present findings from those studies as they are finalized. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

[17] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-PLM-CHP-Acceleration.pdf

Table 3-7. CHP Aggregation and Acceleration Performance Milestones and Results
NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	20 Pre-packaged CHP Systems "pre-qualified" for catalog	10	64	8	70
	37 CHP Aggregation Sites- Contracted	15	14	15	1
	37 CHP Aggregation Sites- Installed	3	0	18	1
	10 Technology transfer activities such as development and dissemination of "Best Practices" guidebooks, analyses of barriers busting policy and technology initiatives, conferences, and web-based materials	4	NR[e]	4	NR[f]
	12.5 MW peak load electric generation- Committed	5.00	2.25	5.00	0.22[g]
	76.25 GWh/yr peak load electric generation- Committed	30.5	13.7	30.5	1.3[g]
	99,125 MMBtu/yr primary energy savings- Committed	39,650	17,803	39,650	1,745[g]
Outcomes/ Impacts	12.5 MW peak load electric generation- Installed	1.00	NR[h]	6.00	0.08[g]
	76.250 GWh/yr electric generation- Installed	6.1	NR[h]	36.6	0.5[g]
	99,125 MMBtu/yr primary energy savings- Installed	7, 930	NR[h]	47,580	634[g]
	$50 million in leveraged funds (co-funding and outside investment) for installed CHP systems (millions)	$20.0	NR[h]	$20.0	$1.5[g]
	Streamline the approval process to allow firing-up of a newly installed CHP system in NYC				NR[i]

[e] NYSERDA has presented information at 10 conferences, 2 webinars, and other industry events reaching an audience of nearly 3,730 stakeholders. NYSERDA has also hosted 4 regional CHP Expos reaching a targeted audience of 215 industry participants.

[f] NYSERDA has presented information at 10 conferences, 3 webinars, and other industry events reaching an audience of nearly 13,000 industry participants. NYSERDA has also hosted 4 regional CHP Expos reaching a targeted audience of 565 industry participants.

[g] Pro-rated on split funded projects to reflect portion of capacity funded by SBC4 monies.

[i] In February 2014 the NYS Public Service Commission updated the Standardized Interconnection Requirements for distributed generation. The updates included a provision which allows a streamlined approval process for inverters of 300 kW or less.

[h] Program solicitation released in Q1 2013. Future reports will show progress toward these metrics.

3.1.4.2 CHP Performance Program

The CHP Performance Program funds installations of CHP systems using energy, summer peak demand, efficiency, and environmental performance-based payments. The program funds clean, efficient, cost-effective gas fired systems using site-specific designs. In accordance with the PSC Order, systems are required to meet a minimum fuel conversion efficiency of 60% and a maximum of 1.6 pound/MWh of NO_x emissions.[18] To quantify the performance-based payments, the program applies rigorous, multi-year system performance measurements, which is a groundbreaking approach for energy efficiency program administrators.

Additional incentives are geared toward projects that:

- Offer greater potential value to the distribution system.
- Operate at higher overall efficiency levels.
- Are located at critical infrastructure, including facilities of refuge.

Additional incentives for projects that offer greater potential value to the distribution system will initially be limited to the Con Edison service territory. NYSERDA will work with the other investor-owned utilities to identify analogous opportunities.

The CHP Performance Program was released by Governor Andrew M. Cuomo on May 2, 2013. The program has committed funding on 11 projects for an anticipated summer peak demand reduction of 42 MW and 320,000 MWh of annual generation.

The CHP Performance Program's T&MD funding also assists end users developing CHP solutions with cost shared feasibility studies using NYSERDA's FlexTech Program.

Table 3-8 shows performance milestones and results for the CHP Performance Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

[18] PSC. Case 07-M-0548 - Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard and Case 10-M-0457 – In the Matter of the System Benefits Charge IV. Issued and effective December 17, 2012.

Table 3-8. CHP Performance Program Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	16 Projects Performance Based- Committed	2	7	7	4
	16 Projects Performance Based- Installed			1	0
	25 MW peak load electric generation- Committed	3.00	29.00	11.00	13.00
	200 GWh/yr electric generation- Committed	20.0	240.0	90.0	80.0
	260,000 MMBtu/yr primary energy savings- Committed	26,000	310,000	117,000	108,000
Outcomes/ Impacts	25 MW peak load electric generation – Installed			2.00	0
	200 GWh/yr electric generation – Installed			10.0	0
	260,000 MMBtu/yr primary energy savings - Installed			13,000	0
	$250 million in leveraged funds (cofounding and outside investment)	$30.0	$140.0	$110.0	$22.0

3.2 Building Systems Initiative

Table 3-9 shows the Building Systems budget and financial status through June 30, 2014. Committed and spent funds are also shown as a percentage of the total 2012-2016 budget. The following sections describe progress for each area of this initiative.

The level of committed funding in the Emerging Technology/Accelerated Commercialization area appears to be lower than might be expected at this point in time. For the Residential ETAC activities, NYSERDA expects to encumber all the available funds by the end of Quarter 4, 2014, as a result of two PONs. For the Multifamily ETAC activities, NYSERDA expects to encumber all the available funds by Quarter 4 2014, as a result of two rounds of PON 2725. The first round closed in November 2013 with a Technical Evaluation Panel selecting proposals in January 2014.

Table 3-9. Building Systems Budget and Financial Status through June 30, 2014

Totals may not sum exactly due to rounding

	2012-2016 Budget	Spent Funds	Percent of 2012-2016 Budget Spent	Committed Funds[a,b]	Percent of Budget 2012-2016 Committed
Advanced Buildings					
Emerging Technology/Accelerated Commercialization	$32,446,214	$384,991	1.19%	$4,495,490	13.86%
Technology Development	$33,613,215	$1,759,383	5.23%	$34,108,640	101.47%
Demand Response	$9,276,731	$1,680,387	18.11%	$3,846,887	41.47%
Total Advanced Buildings	*$75,336,160*	*$3,824,761*	*5.08%*	*$42,451,017*	*56.35%*
Advanced Energy Codes & Standards	$16,679,794	$644,317	3.86%	$9,833,933	58.96%
Grand Total - Building Systems Initiatives	***$92,015,954***	***$4,469,078***	***4.86%***	***$52,284,950***	***56.82%***

[a] Committed funds include amounts spent plus remaining funding obligated under a contract, purchase order, or incentive award. In addition, committed funds include planned funding for contracts awarded and under negotiation and planned funding under active development through solicitations with specific due dates.

[b] Committed funds may decrease from period to period as a result of the disencumbrance/cancellation of contracts, or due to the actual award amount(s) resulting from a due date solicitation being less than the planned award.

3.2.1 Advanced Building Technologies

3.2.1.1 Emerging Technology/Accelerated Commercialization (ETAC) – Buildings

The ETAC Buildings component is a new, deliberate approach to accelerating commercial introduction of emerging or underused building technologies and strategies. ETAC will serve as a feeder effort to support EEPS and other New York State clean energy programs and encourage market adoption without additional ratepayer support. This effort focuses on three market sectors: commercial/institutional, multifamily, and residential. Activities to date in each sector are described in this section.

ETAC-Commercial/Institutional

NYSERDA's ETAC-CI open enrollment program, launched in May 2013, consists of two program tracks: Energy Performance Validation and Focused Demonstrations. Both program tracks are targeted to technology developers and owners of multiple buildings who wish to gain independent validation of performance for a product, technology, or approach that is commercially available, yet not in widespread use, and accelerate market acceptance. Projects in both tracks receive a custom NYSERDA-funded performance measurement and verification (M&V) study. Projects in the Focused Demonstration track may receive NYSERDA funding to support installation and project costs, but must fall within one of NYSERDA's identified Targeted Categories, and must provide prior independently-verified performance data.[19] Project results and validated performance information will be shared through targeted, deliberate outreach to the market, administrators of other programs in New York State, and Department of Public Service staff.

The open enrollment program was revised in May 2014 to increase funding available through the Focused Demonstration program track from $150,000 to $250,000, to add flexibility to demonstration host site requirements, and to emphasize market acceleration. By the end of June 2014, 11 applications had been received, with eight approved (six contracted), two under review, and one rejected for incompleteness. Of the six contracted projects, four are Focused Demonstration projects and two are Energy Performance Validation projects. Technologies being demonstrated include advanced lighting and shading controls, remote energy analytics (two projects), HVAC packaged rooftop unit advanced controls, steam radiator controls, and a building energy management system.

A competitive solicitation (PON 2844) targeted at larger-impact projects is under development for release in the third quarter of 2014.

[19] NYSERDA's Targeted Categories are priority categories of technologies or approaches into which a project must fit in order to be eligible for the Focused Demonstration ETAC track. NYSERDA's Targeted Categories are reassessed periodically and are subject to change in the future. NYSERDA's current Targeted Categories can be found here: http://www.nyserda.ny.gov/etac-ci-categories.

ETAC-Multifamily

One Multifamily ETAC project has completed the contract collaboration process. The two other projects are in the contract collaboration process now. Now that these projects are about to commence, the team is preparing a second round of the ETAC Multifamily solicitation. Once the solicitation amount and project funding cap are established, and management approval is received, the solicitation will be released. We anticipated this occurring in the first half of September 2014. The three projects already selected include the following technologies: LED lighting and occupancy sensors, controls for two-pipe steam systems, and domestic hot water demand controls.

The Multifamily Deep Energy Retrofit Competition is currently on hold. NYSERDA is exploring various options to replace this initiative and will update the Operating Plan once a decision is made.

The Multifamily Mixed Use Pilot Program is also currently on hold. NYSERDA is exploring various options to replace this initiative and will update the Operating Plan once a decision is made.

ETAC-Residential

ETAC- Residential Solid State Lighting (SSL) Demonstrations (PON 2752) was released in November 2013 with the objective of increasing market adoption of SSL for residential applications by showcasing the reduction in electric demand that SSL, lighting system design, and control integration can achieve in New York State's homes. Demonstration projects must incorporate specific technology transfer strategies and activities to communicate results and best practices to the various stakeholders in the residential energy field. The solicitation resulted in three contracts. The contract awards will result in 10 demonstration projects across existing homes and new construction projects in New York State.

Program activities planned for the third and fourth quarters of 2014 include the continued development of the residential ETAC clearinghouse, with the objective of increasing the number of candidates listed, and engaging product manufacturers to encourage their involvement in demonstration projects. In addition, NYSERDA will release the second solicitation in support of the residential ETAC initiative, which will focus on a broader set of eligible technologies.

A Program Theory and Logic Model was completed for the Advanced Buildings: ETAC Program in the first half of 2014. The logic model diagram (Figure B-2) is included in Appendix B and the full Program Theory and Logic Model report is available on NYSERDA's website.[20]

Table 3-10 shows performance milestones and results for the ETAC Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

[20] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-PLM-Advanced-Buildings.pdf

Table 3-10. Emerging Technology/Accelerated Commercialization Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	13-22 stakeholder meetings on emerging and underused technologies and strategies	7 - 10	11	5 - 9	0
	38-70 knowledge/technology transfer activities across the commercial and residential sectors (webcasts, reference case studies, and other knowledge transfer mechanisms)	8 - 18	NR[j]	17 - 26	0
	17-36 contracted reference demonstration[k] projects across the commercial and residential sectors (including large-scale demonstrations)	3 - 6	NR[j]	8 - 14	9
	17-36 Contracted Reference demonstration projects across the commercial and residential sectors (including large-scale demonstrations)	1 - 2	NR[j]	5 - 14	0
Outcomes/ Impacts	$6.5-13 million of leveraged funds (co-funding and outside investment) for demonstration projects (millions)	$1 - $3	NR[j]	$3.5 - $5.5	$1.9
	10.5 GWh of energy savings from supported demonstration projects[l]	2.0	NR[j]	4.2	7.0
	78,000 MMBtus of energy savings from supported demonstration projects[l]	5,000	NR[j]	31,200	1,614
	2,300 Peak kW reduction	550	NR[j]	700	54
	8-17 improved technologies adopted by the market or further supported by deployment programs			0-2	NR

[j] Scoping meetings held. Solicitations issued for Multifamily, Commercial/Industrial (C/I) and Residential ETAC projects. One C/I project contracted.

[k] For this program, a demonstration project is defined as a highly visible, large-scale demonstration of a technology or technologies at one or more sites. For example, a demonstration of load-shedding ballast in several building locations would be considered a demonstration.

[l] It is difficult to estimate savings for new feeder programs. Estimates are conservative given the difficulty of assessing replication impacts, and are based on previous NYSERDA evaluation studies of replication from demonstration projects.

3.2.1.2 Technology Development

Under the Technology Development area, NYSERDA will undertake targeted building technology development activities that address the technical and economic barriers and opportunities for new or emerging products. As a complement to Technology Development, NYSERDA plans to establish an Advanced Building Consortium to guide and conduct targeted high priority technology development and demonstration projects and to help accelerate the introduction of emerging technologies to New York State markets.

A proposed program design for Technology Development and the Advanced Building Consortium (ABC) was developed and presented to a diverse group of stakeholders that included technology developers, builders, financial and real estate industries, design professionals, public and private sector building owners and operators, academic and research organizations, code agencies and organizations, manufacturers and suppliers, building trades, and utility program representatives. A total of 177 stakeholders attended meetings held in April and May of 2012 in Buffalo, Syracuse, Albany, and New York City. Types of stakeholders present included technology developers, builders, financial and real estate industries, design professionals, public and private sector building owners and operators, academic and research organizations, code agencies and organizations, manufacturers and suppliers, building trades, and utility program representatives. Feedback on the proposed approach for Technology Development activities and the establishment of an Advanced Building Consortium was generally positive. Stakeholders were also in favor of simplifying and expediting the proposal submission and award process. Stakeholder input was incorporated into the program design where possible.

NYSERDA issued PON 2606 Advanced Buildings Program for $25 million in November 2012, comprising $22 million from T&MD, and $3 million from R&D statutory funds in November 2012. This was a broad solicitation with six rounds for building-related technology development and pilot demonstration projects. Rounds 1 through 3 of PON 2606 received 193 proposals, with requests for funding totaling $31.5 million. Under Round 1, 14 proposals were awarded $2.3 million; under Round 2, 20 proposals were awarded $4.9 million; and under Round 3, 11 proposals were awarded $1.9 million. Round 4 was due on June 4, 2014. Forty-six proposals requesting $10.3 million were received and reviewed by a Technical Evaluation Panel in July 2014.

Awarded projects from Rounds 1 through 3 span research, product development, and pilot demonstrations and include activities in the solid state lighting, new building materials and construction techniques, technologies to enhance boiler efficiency, technologies to enhance heat pumps, technologies to enable smart buildings, and integration of renewable energy and energy storage technologies in buildings.

The solicitation framework for an ABC was approved by senior NYSERDA management, and PON 2630 was released in early 2014. The PON will establish and support one ABC that will introduce new and integrated building products and services that will be adopted more rapidly into the market. The consortium will focus on building integration, whole building practices, and resiliency to infrastructure disruptions. Consortium projects will lead to buildings with high energy performance when the electric grid is available, and greater resiliency for occupants and businesses during electric grid disruptions. PON 2630 received 8 proposals, which were reviewed by a Technical Evaluation Panel in March 2014. Further action is pending the outcome of the corporate strategic assessment and its alignment with the ABC.

A Program Theory and Logic Model was completed for the Advanced Buildings: Technology Development Program in the first half of 2014. The logic model diagram (Figure B-3) is included in Appendix B and the full Program Theory and Logic Model report is available on NYSERDA's website.[21]

Behavior Research Program

NYSERDA's Behavior Research Program (2010 – present) works with Action Research, Inc. (Action Research), and clean energy programs in New York State to implement and evaluate behavior pilots to identify successful pilot interventions that use behavior principles of decision making to influence energy-related decisions. The research pilots have been documented in a series of case study reports. Funding to demonstrate successful pilot interventions at a larger scale will be available through NYSERDA's Behavior Demonstration Program. Action Research has designed two innovative behavioral pilots. The first pilot is pending approval for implementation in the summer of 2014. The second pilot will be implemented in the fall of 2014, pending availability and testing of the metering devices. Action Research has also developed five case study documents that summarize the outcomes of completed pilot projects. The Behavior Research Program has conducted training on the basics of behavior research guidelines and will provide a series of instructional webinars in 2014. In collaboration with NYSERDA, they presented highlights of the Behavior Research program at the Garrison Institute's Climate Mind and Behavior Symposium in June 2013.

[21] Available on the NYSERDA website at: http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-PLM-Advanced-Buildings-Technology-Development.pdf

Table 3-11 shows performance milestones and results for the Technology Development Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Anticipated achievements and results are estimates based on savings per program dollar invested in projects. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Table 3-11. Technology Development Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	46-74 advanced building technology projects contracted (including some large-scale projects)	23 - 36	25	18 - 29	14
Outputs/ Leading Indicators	46-74 advanced building technology projects completed (including some large-scale projects)			23 - 36	NR
Outputs/ Leading Indicators	23-37 clean energy companies receiving support	12 - 18	16	9 - 14	16
	15-30 stakeholders engaged in the Advanced Buildings Consortium (ABC)	5 - 10	NR	10 - 15	NR
	16-35 ABC stakeholder meetings, advisory meetings, workshops, conferences, events, etc.	2 - 5	4	8 - 20	0
	3-5 product development projects completed associated with the ABC			1 - 2	NR
	3-5 building practices and products demonstrated in the market associated with the ABC			1 - 2	NR
	10-15 clean energy companies receiving support through ABC	3 - 5	NR	6 - 8	NR[m]
Outcomes/ Impacts	$14-23 million in leveraged funds (co-funding and outside investment) for advanced building technologies (millions)	$7.0 - $10.0	$20.7	$5.0 - $10.0	$4.2
	6-11 advanced building technologies reach commercial availability			1 - 3	4
	$83-120 million of commercial sales of new and improved supported technologies				$0.7
	$4-6 million in leveraged funds (co-funding and outside investment) for ABC technologies			$2.0 - $3.0	NR
	11-19 publications, policy research, briefings, market intelligence & code reform through ABC			5 - 9	NR

[m] NYSERDA has received proposals but they are currently on hold to move forward.

3.2.1.3 Enabling Demand Response (DR) and Load Management

Under the Enabling Demand Response (DR) Load Management Program, NYSERDA will help increase participation and reliability of performance in utility and New York State Independent System Operator (NYISO) programs. These outcomes can suppress wholesale energy costs, reduce congestion costs, increase reliability, and provide other benefits. The development of enabling DR technologies and new demand management models through this program will increase the technical potential of DR in New York State.

Existing Facilities Program (PON 1219) is the active solicitation offering open-enrollment incentives for DR projects across New York State. Enhanced incentives are currently offered in Con Edison territory via the Demand Management Program. Clean distributed generation projects are eligible in Con Edison territory exclusively and load curtailment projects and energy storage projects are eligible statewide. The incentives for DR are $100 or $800 per kW for Upstate or Downstate, respectively, and the incentives for energy storage are $300 per kW in Upstate or $2,600 or $2,100 per kW for Downstate thermal or battery storage, respectively. Demand Management Program DR projects are required to enroll in the NYISO ICAP/SCR program. The NYSERDA Existing Facilities Program also offers pre-qualified incentives for interval meters on a per-unit basis. Interval meters must enable at least 40 kW worth of demand response in an approved DR program. The prescriptive incentive is $1,500 per meter or 100% of project cost, whichever is less.

Since January 2012, the program has supported interval meter and enabling technology installations representing approximately 90 MW of demand response.

NYSERDA has historically funded DR projects with SBC III resources. Benefits from this SBC III DR investment continue to accrue and were reported in the 2013 SBC III annual report finalized in June 2014 (Prior historical accomplishments are in the SBC III annual report through December 2012).[22]

Table 3-12 shows performance milestones and results for the Demand Response Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

[22] The 2012 SBC III report is available here: http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/-/media/Files/Publications/PPSER/NYES-Program/2012/2012-SBC III-post-program-annual-report.pdf.

Table 3-12. Demand Response Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators (MW)	46 MW Registered	9.00	57.00	14.00	33.00

3.2.1.4 Advanced Energy Codes and Standards

The Advanced Codes and Standards Initiative consists of two components: a set of code activities targeted at the commercial and residential building sectors in New York State, and a set of standards activities directed at influencing state and national appliance and equipment standards and specification setting processes for various equipment types. Activities within these areas are described in the following sections.

3.2.1.5 Annual Statewide Compliance Assessments

Statewide compliance assessment studies provide a means to track compliance trends associated with changing codes and standards. These assessment studies help identify where program intervention may be needed. Compliance assessments will occur as a phased effort. The first effort, currently underway, concentrates on existing commercial building alterations. Release of the final report on the results of this study is anticipated for the third quarter of 2014.

Future efforts will evaluate commercial new construction and residential new construction and alteration, and will update the initial commercial alteration study. A solicitation for this effort is expected for release in the fourth quarter of 2014, and will provide findings based on all studies undertaken within the five-year assessment period, including data from the T&MD and NYSERDA's American Recovery and Reinvestment Act (ARRA) compliance assessment studies.

3.2.1.6 Development and Delivery of Advanced Training and Tools

Training to support new and advanced codes and standards is critical, particularly at points of adoption. Training efforts will build on those developed using American Recovery and Reinvestment Act of 2009 (ARRA) funds, with new or enhanced approaches and topics that address areas of low compliance or code change.

Stakeholder meetings with DOS, Pace Energy and Climate Center, and various contractors performing work under ARRA occurred to review overall concepts for T&MD activities. Further meetings were held in June 2013 with code officials representing the statewide membership organization and select municipalities. The first solicitation associated with this task, New York State Energy Code Training (PON 2693), was released in August 2013. Proposals were received in October 2013. Contractors to deliver energy code training through the end of 2016 were competitively selected and training is anticipated to begin in early 2015.

Training will be held in traditional, classroom settings and focus on specific topics relevant to the energy code, as amended in New York State based on the International Energy Conservation Construction Code. It is expected that amendments to commercial provisions will take effect in late 2014 and that amendments to residential provisions will take effect in late 2015.

As described in the T&MD Operating Plan, the Advanced Codes and Standard program will issue a solicitation specific to updates to its energy code training and support website (www.nyserdacodetraining.com), inclusive of the following tasks:

- Hosting maintenance, customer support, and improvements to web design and architecture.
- Providing access to technical energy code content and educational tools.
- Updating online energy code training modules.

A solicitation specific to these website tasks is expected in late 2014.

3.2.1.7 Technical Support, Studies, and Resources

Technical consulting and other research firms will be competitively selected to provide technical and administrative support Advanced Codes and Standards program efforts, including new strategies to improve compliance and enforcement.

Initial efforts leading to the first solicitation in this area are in progress. This solicitation is anticipated for release during the last quarter of 2014 and will include the study topics:

- *Statewide Energy Code Database*: Feasibility (and pilot) study of a statewide database to permit evaluation of Energy Code compliance.
- *Targeted Energy Measures 2015-2035*: Identify training and support needs associated with broader NYSERDA initiatives, including opportunities for energy saving, GHG reduction, and energy performance in new and existing buildings.
- *Future Codes and Guidelines*: Evaluate existing, proposed, and emerging codes to improve integration of renewable technologies and ultra-low energy buildings, including stretch code options.
- *Regulatory Support*: Provide technical regulatory assistance to the NYS Department of State for adopting proposed codes, including required demonstration of the 10-year payback period.
- *Emerging Issues*: Evaluate building science and durability issues related to energy performance.

3.2.1.8 Pilots and Expanded Implementation Assistance

NYSERDA received proposals in response to Energy Code Support Services for Municipalities (RFP 2694) on June 17, 2014. A Technical Evaluation Panel recommended awards based on a review and ranking of proposals, and awards are expected to be made in the fourth quarter of 2014. The following initiatives are planned:

- Direct support to municipalities (Plan Review and Inspection Report, and general energy code support services).
- Publication of a Code Enforcement Manual.
- Development of guidelines for an advanced energy code (stretch code) for optional local adoption.
- Statewide Energy Code Conference.
- Optional pilot programs as proposed by the market.

A Program Theory and Logic Model was completed for the Advanced Codes and Standards Program in July 2013. The full Program Theory and Logic Model report is available on NYSERDA's website.[23]

Table 3-13 shows performance milestones and results for the Advanced Energy Codes & Standards Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

[23] Advanced Codes and Standards Final Initiative Level Logic Model Report. http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-Advanced-Codes-Standards.pdf

Table 3-13. Advanced Energy Codes & Standards Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Conduct 5 annual code compliance assessments	2	0[n]	2	0[n]
	Conduct 3 compliance efforts with appliance and equipment vendors to assess conformance to State and federal standards	1	NR	1	NR
	Develop 12-16 new or expanded code training modules	6 - 8	NR	6 - 8	17
	Train 15,000 individuals on code requirements	7,000	NR	6,000	NR
	Develop or update educational or other tools to help support code compliance and NYS appliance/equipment standards		NR		In progress
	Issue 2 competitive solicitations to hire consulting and market research firms to provide program support	1	NR	1	0
	Issue 2 competitive solicitations for pilots and program implementation assistance	1	NR	1	0
Outcomes/ Impacts	Code compliance efforts lead to 631 GWh of cumulative annual electricity savings	84.0	NR	140.0	NR
	Code compliance efforts lead to 129 MW of cumulative annual peak demand savings	18.00	NR	28.00	NR
	Code compliance efforts lead to 4,921,000 MMBtu of cumulative annual fossil fuels savings	575,000	NR	1,057,000	NR
	Equipment and appliance standards efforts lead to 356 GWh of energy savings		NR	5.0	NR
	Equipment and appliance standards efforts lead to 168 MW of annual peak demand savings			2.00	NR

[n] Results of compliance assessment focusing on commercial renovation and alteration expected to be made available July 2014.

3.3 Clean Energy Infrastructure Initiatives

Table 3-14 shows the Clean Energy Infrastructure budget and financial status through June 30, 2014. Committed and spent funds are also shown as a percent of the total 2012-2016 budget. Later sections describe progress for each area of this initiative.

Table 3-14. Clean Energy Infrastructure Budget and Financial Status through June 30, 2014

Totals may not sum exactly due to rounding

	2012-2016 Budget	Spent Funds	Percent of 2012-2016 Budget Spent	Committed Funds[a,b]	Percent of Budget 2012-2016 Committed
Market Development					
Market Research	$4,640,141	$1,337,493	28.82%	$3,311,157	71.36%
Market Pathways	$55,710,000	$13,525,499	24.28%	$19,651,161	35.27%
Education/Behavior	$10,030,140	$2,861,799	28.53%	$6,076,114	60.58%
Total Market Development	*$70,380,281*	*$17,724,791*	*25.18%*	*$29,038,432*	*41.26%*
Clean Energy Business Development					
Innovation Entrepreneurial Capacity	$36,761,046	$2,870,531	7.81%	$20,325,459	55.29%
Market Intelligence	$1,688,584	$436,008	25.82%	$734,222	43.48%
Direct Support for Business	$2,400,000	$328,671	13.69%	$1,750,975	72.96%
Marketing	$911,416	$462,832	50.78%	$584,275	64.11%
Total Clean Energy Business Development	*$41,761,046*	*$4,098,042*	*9.81%*	*$23,394,931*	*56.02%*
EMEP	$18,550,048	$1,505,210	8.11%	$8,915,669	48.06%
Workforce Development					
Renewable Energy/Advanced Technologies	$15,000,000	$742,057	4.95%	$8,087,609	53.92%
Energy Efficiency	$24,000,000	$905,614	3.77%	$9,250,643	38.54%
Total Workforce Development	*$39,000,000*	*$1,647,671*	*4.22%*	*$17,338,252*	*44.46%*
Grand Total - Clean Energy Infrastructure	***$169,691,375***	***$24,975,714***	***14.72%***	***$78,687,284***	***46.37%***

[a] Committed funds include amounts spent plus remaining funding obligated under a contract, purchase order, or incentive award. In addition, committed funds include planned funding for contracts awarded and under negotiation and planned funding under active development through solicitations with specific due dates.

[b] Committed funds may decrease from period to period as a result of the disencumbrance/cancellation of contracts, or due to the actual award amount(s) resulting from a due date solicitation being less than the planned award.

[c] Funding was increased in PSC's December 17, 2012 Order.

3.3.1 Market Development

The Market Development initiatives help to create the foundation for long-term changes in the market for the delivery of products and services that address energy efficiency and the adoption of renewable energy technologies. Strategies address the supply chain, consumer behavior, market barriers, and education. Market Development activities identify new market opportunities and keep the supply chain informed about technological innovations and provide the technical tools, resources, and training necessary to promote energy efficiency and renewable options to consumers.

3.3.1.1 Market Research

The Market Research component identifies market and institutional barriers to technology and product adoption, obtains critical early stage information and insights to guide investment decisions, and further advances the reach of T&MD and EEPS programs and other public policy goals. Its goal is to amass specific market intelligence and identify program opportunities to increase implementation efficiency and effectiveness.

Since the start of the program in 2012, eight projects have been completed, including:

- A multi-organization supported research project conducted by the American Council for an Energy-Efficient Economy (ACEEE) reviewed next-generation energy efficiency program designs and approaches. The research was published[24] in a technical report and offers insight on how NYSERDA could broaden and deepen its energy efficiency programs.
- Three market research activities were conducted in support of the development of the NY Green Bank:[25]
    - A study that characterized the market demand for financing resiliency-related energy projects in the healthcare and large multifamily housing customer sectors located within counties affected by Superstorm Sandy.
    - A study that assessed and summarized solar photovoltaic (PV) financing for the residential, small/medium commercial, and large commercial segments of the New York State marketplace based on interviews with New York State solar PV installers and financiers.
    - A study building on previous financing market research that assessed market demand for clean energy financing products in New York. NYSERDA is using the results of this research to evaluate different products and outline a set of near-term and long-term activities for the newly created NY Green Bank.

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[24] York, Dan, Maggie Molina, Max Neubauer, Seth Nowak, Steven Nadel, Anna Chittum, Neal Elliott, Kate Farley, Ben Foster, Harvey Sachs, and Patti Witte. 2013. "Frontiers of Energy Efficiency: Next Generation Programs Reach for High Energy Savings". January, ACEEE Research Report U131. http://www.aceee.org/press/2013/01/new-report-reveals-how-next-generati

[25] In the 2013 State of the State address, Governor Andrew M. Cuomo introduced the creation of the $1 billion NY Green Bank to leverage public dollars with a private sector match to spur the clean tech economy. http://www.governor.ny.gov/NY/2013-State-of-the-State.

- Market research on the NYSERDA Residential Point-of-Sale Lighting Program provided information on how resources could be used to market and deploy the program in the most efficient and effective way. The lighting market is in the midst of rapid change with the increased availability of halogen bulbs, the introduction of more affordable LEDs, federal standards that have essentially phased out the common incandescent bulb, and consumer confusion regarding the overwhelming choice of unfamiliar bulbs available. This effort also examined the New York Products Program and explored ways to continue to increase use of energy-efficient products.
- As a follow-up to the National Renewable Energy Laboratory (NREL) 2011 Solar PV Balance of System (BOS) cost survey, NYSERDA collaborated with NREL on its updated national survey and developed a New York State-specific PV BOS cost survey to gather state-specific information to establish a New York State baseline for nonhardware PV costs.
- A multi-organization supported research project with ACEEE that explored the opportunities for scaling up savings from commercial and residential retrofits. The project included a review of comprehensive commercial retrofit efforts to date including efficiency program activity as well as State and local programs targeting the commercial sector. In addition, the project included a review of recent data on commercial retrofits to develop estimates of the savings potential of a shift to more comprehensive retrofits. This research and analysis resulted in recommended actions and best practices for program administrators to increase program participation and improve program outcomes. For the residential sector, the project reviewed existing deep retrofit programs and analyzed cost and savings data to better understand the most promising opportunities for savings in terms of technical and economic potential and consumer and builder acceptance.
- An effort in support of the NY-Sun Initiative related to the restructuring of NYSERDA's Standard Offer PV program. Analyses were performed and tools developed to investigate the value of transition to a megawatt block structure, wherein the incentive levels would be lowered on a regional basis in response to achieving a designated threshold amount of megawatts under contract.

Work is ongoing on a variety of other market research activities, including the following:

- A data center market research study underway to help characterize the data center market in New York State and identify opportunities for maximizing energy efficient technologies and practices in that market. This study includes energy use surveys and other research methods to assess energy savings potential, major market trends driving demand for information technology computing in New York State, and opportunities to implement energy efficient data center technology and best practices. Unlike previous work, this study is conducting primary research in the data center market across New York State from the server level up to free standing dedicated data center buildings. The Cadmus Group was selected for this effort in the third quarter of 2013 and work began in early 2014. Completion of this study is anticipated by the end of the 2014 calendar year.
- An investigation of opportunities to assess growth prospects for New York's Clean Energy Economy (CEE) and to characterize the unique strengths of New York's CEE, including regional clusters.[26] The study scope and timing will be coordinated with NYSERDA's ongoing Corporate Strategy Assessment.

[26] Clusters are geographic concentrations of interconnected companies and institutions in a particular field. Industry "clustering" in the CEE and elsewhere has increasingly been recognized as providing a useful and practical framework for shaping economic policy, catalyzing "bottom-up" strategy and execution, and coordinating fragmented policy offerings.

- A multi-state research project being conducted by Northeast States for Coordinated Air Use Management (NESCAUM) to study awareness, knowledge, motivation, intention, and behavior of new light-duty motor vehicle buyers' with respect to electric vehicle technologies. The project includes a statewide survey of new car buying households potentially followed by in-depth interviews with a subset of survey respondents to measure consumer awareness and knowledge of, as well as motivation and intention toward electric vehicles. The results will inform program and policy design that serve to grow a New York State electric vehicle market in support of the Charge NY Plan.[27]
- A complementary effort to the Standard Offer PV program analysis that is looking at the potential restructuring of the Competitive PV program.
- Two complementary studies that focus on identifying the technical and economic potential for a variety of heat pump technologies and combined heat and power systems, building on the work performed for the Energy Efficiency and Renewable Energy Potential Study.
- An objective, market-oriented Corporate Strategy Assessment (CSA) to aid in the development of NYSERDA's Clean Energy Fund Proposal. The CSA will identify where and how NYSERDA can be most effective, allowing NYSERDA to become more innovative, transformational, and responsive to customers.

Table 3-15 shows performance milestones and results for the Market Research Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

[27] Governor Andrew M. Cuomo gave his State of the State address on January 9, 2013. http://www.governor.ny.gov/sites/default/themes/governor/sos2013/2013SOSBook.pdf

Table 3-15. Market Research Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Conduct 4-6 research studies	2-3	6	1 - 2	2

3.3.1.2 Market Pathways

The Market Pathways component works across the supply chain and sectors to promote the stocking, specification, sales, installation, maintenance, and use of energy-efficient products and strategies. NYSERDA provides tools, business strategies, and business and marketing materials to manufacturers, suppliers, distributors, retailers, service providers, designers, specifiers, contractors, and builders. The following sections describe progress in key areas.

New York Products Program

The New York Products Program was formerly known as the Energy $mart[SM] Products Program. The Program assists businesses that supply emerging, underutilized, or high first cost/high efficiency products. The Program currently has 872 retail and 76 manufacturer partners. Since January 2012, 46 new retailer partners and 52 new manufacturer partners have signed on to the program. The new manufacturer partners include 41 lighting, three appliance, 5 HVAC and three consumer electronics manufacturers. Since 2012, Program Partners have implemented 227 special promotions for a total of $1,643,946 in product buy-downs, including 89 approved promotions for 2014 totaling $2,525,038 that are currently being implemented. Combined, promotions are expected to save more than 13,000 MWh and 8,098 MMBtu annually.[28] The buy-down promotions provide a lower cost to the consumer at the point-of-purchase for a range of products including, but not limited to, informational energy usage displays, advanced power strips, energy management devices, lighting, appliances, and electronics. Promotional displays for these products feature educational messaging for consumers to help them choose the right product for the application, in addition to providing information on energy and environmental benefits of the promoted products.

A Program Theory and Logic Model was completed for the Products Program in November 2013. The full Program Theory and Logic Model report is available on NYSERDA's website.[29]

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28 These numbers show a reduction from the June 30, 2013 report to account for an error in how MMBtu savings were calculated.

29 New York Products Program Final Revised Logic Model Report. http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-NY-Products-Program.pdf

NYSERDA has historically funded activities in this area with SBC III resources under the Market and Community Support Program. Benefits from this SBC III investment continue to accrue and were reported in the 2013 SBC III annual report finalized in June 2014.Prior historical accomplishments can be found in the SBC III annual report through December 31, 2012.[30]

During the first half of 2014, NYSERDA completed a process, market and market-based impact evaluation of the New York Products Program. A summary of this evaluation is found in Appendix C and the full study can be accessed on the NYSERDA website.[31]

Business Partners Programs

The Business Partners Programs help NYSERDA's service providers in the commercial midmarket supply chain address the primary factors affecting customers' operations, business models, and energy decisions. The programs help these service providers understand energy decision making processes, barriers, attitudes, and opportunities. New market opportunities are identified and the supply chain is informed of technological innovations and provided the technical tools, resources, and training necessary to promote profitable energy efficiency options to their customers.

Across all technology sectors, the scopes of work are structured such that the implementation contractor has a more active role as a change agent for these sectors. The contractor's role will be one of identifying both opportunities and overcoming barriers toward deploying such opportunities, recommending strategies to NYSERDA, establishing the program design, and implementing the new activities to meet NYSERDA's goals for recruitment, training and energy savings. At the same time, the contractors' activities will provide the Partners Program opportunities to expand their business services and increase their profitability.

ICF Resources is the implementation contractor for the Commercial Lighting Business Partners Program. The core elements of the lighting program focus on providing educational and technical support to Lighting Business Partners (lighting contractors, distributors, manufacturer representatives, architects, engineers, and energy service companies [ESCOs]) that incorporate lighting quality elements into their interior energy-efficient lighting projects.

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30 The 2012 SBC III report is available at http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/-/media/Files/Publications/PPSER/NYES-Program/2012/2012-SBC3-post-program-annual-report.pdf

31 New York Products Program available at http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014%20New%20York%20Products%20Program%20Evaluation.PDF

DNV GL is the implementation contractor for the HVAC Business Partners Program. The core elements of the HVAC Business Partners Program focus on providing HVAC Business Partners (commercial HVAC firms; refrigeration firms; and large scale institutional, government, and commercial entities providing in-house roof top unit [RTU] maintenance services) quality maintenance strategies and tools. In accordance with ASHRAE/ACCA Quality Maintenance Standard 180, partners learned to evaluate and upgrade commercial RTU units beyond what is typically offered as standard practice.

ICF Resources is the implementation contractor for the Motor Systems Business Partners Program. The core elements of the previous Motors Program focused on providing educational and technical support to NYSERDA's Partners (motor suppliers, repair shops, electrical companies, manufacturers, and distributors) who perform motor inventories and sell and promote National Electrical Manufacturers Association (NEMA) Premium® motors and variable speed drives (VSDs). The program included these activities as part of a comprehensive approach to motor management services and plans.

Based on research performed while revising the solicitation for the Motors Program, staff expanded the Motors Program to include other motor-driven systems, applications, and best practice motor repairs. The solicitation for the Motor Systems Business Partners Program Implementation Contractor was reissued in July 2013, and ICF was selected to implement the Program. In their proposal, ICF identified the motor-driven systems prevalent in New York State (e.g. distribution via application, electric load, and building-sector) and approaches to market intervention, scope, services, and products that, if adopted by the motor and motor system repair supply chain, will lead to higher quality installations and services that expand energy savings opportunities.

Current program scopes of work for the Lighting and HVAC Programs require the contractors to provide NYSERDA with a semiannual review and assessment of program goals, progress to date, market research results, and recommended adjustments to program offerings. These adjustments will help differentiate the NYSERDA Business Partners Programs from utility trade ally programs. As a result of the first semiannual review, the Commercial Lighting Business Partners program incorporated a streamlined incentive strategy for interior lighting projects, began adding the site lighting module, and performed eight lighting expos across the State. The HVAC Business Partners Program is adding an economizer module, evaluating an approach for incorporating HVAC quality maintenance (QM) into county and local government agencies, and has aligned efforts with the DOE Advanced RTU Campaign to incorporate end-user, portfolio-wide RTU inventories with a structured outreach program. This strategic optimization will promote customer awareness portfolio-wide for RTU inventory, maintenance, and replacement. This package initiative will establish a scalable approach to targeted RTU QM and replacement opportunities for both our midstream actors as well as their end users.

Recruitment efforts are ongoing for the Commercial Lighting Business Partners Program, including recruiting 51 new Partner firms since December 2013 and re-signing 151 previous Business Partners during the first quarter of 2014. The HVAC Business Partners Program, with 90 new Partners, has exceeded its 2013 recruitment goal of 75 new Partner firms. Energy savings activity in the Commercial Lighting program was limited in 2013, resulting in less energy savings achieved than originally projected. However, with new incentives implemented in the fourth quarter of 2013, the Commercial Lighting Program achieved 3.08 GWh in energy savings during first two quarters of 2014, bringing the total since its inception in 2012 to 5.68 GWh. The HVAC Program has increased its energy savings to date to 2.24 GWh based on 1,478 QM projects. The original (2012) Motors Program added an additional 0.5 GWh of energy savings, and with its re-issuance this year, a rapid increase is expected. Total Business Partners Programs energy savings to date has reached 8.42 GWh out of 40 GWh expected through the end of 2016.

Innovative Strategies

Innovative Strategies is designed to support the identification and demonstration of sector-specific approaches, tools, and strategies for demonstrating and verifying energy savings and to broadcast the energy efficiency message to building owners, operators, and the financial sector. Opportunities to standardize efforts will be identified where appropriate, and credibility will be provided to approaches that reduce the barriers to financing energy efficiency projects that are not addressed by EEPS programs. The goals of the Commercial/Industrial Emerging Technologies and Advanced Commercialization (ETAC-CI) initiative are to identify, demonstrate, and accelerate adoption of newer, under-used energy-saving technologies and strategies in the State. Given the complementary nature of these programs, funds from Innovative Strategies will be used to augment the ETAC-CI competitive solicitation, planned for issuance during the first quarter of 2014. The solicitation will be divided into two categories: Category A for large-scale demonstrations of underused energy-efficient technologies and technology bundles, primarily funded through ETAC; and Category B for demonstrations of approaches, tools, and strategies, which will be funded through Innovative Strategies.

Conventional financing methods often do not meet the needs or business decisions of all sectors who wish to finance energy efficiency improvements. Other types of proven financing vehicles are available but are not as well known in the marketplace. Under Innovative Strategies, NYSERDA plans to improve awareness of alternative financing approaches for several Commercial/Industrial/Institutional (CI&I) sectors by identifying conventional and innovative financial strategies that best serve those sectors. Gaps and opportunities for further NYSERDA research and NY Green Bank-related activities will also be identified.

Efforts are also underway to survey the landlords, tenants, brokers/management companies, engineers, and attorneys who attended presentations on energy aligned lease clauses, to determine if they have adopted an energy aligned lease clause or another form of energy-aligned or green lease language, and describe other strategies they may have taken to overcome the split-incentive issue, off-balance sheet financing opportunities, and differences in tax treatments. It is expected that such activities will inform NYSERDA and NY Green Bank program staff in terms of financing availability, needs and opportunities to improve access to energy efficiency financing for the CI&I sectors.

Table 3-16 shows performance milestones and results for the Market Pathways Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Energy savings reported in this table are program-reported; evaluation activities have not yet been conducted on these programs. The recently completed evaluation on efficiency products with Energy $mart Partners only covered 2012. The methodology for estimating energy savings based on these results may be revised in future reports. Future reports will present findings from those studies as they are finalized. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Table 3-16. Market Pathways Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Enlist 1,240 Energy $mart Products partners participants	940[o]	879	200	69
	Enlist 510 Midstream Partner participants	430[p]	728	55	98
	Train 500 Product Partner employees on sales of high efficiency equipment	200	131	200	115
	Train 1,025 Midstream Partner business owners or their staff on advanced strategies and technologies (Midstream Partner business owners and their staff may participate in more than one training.)	375	577	375	126
	Investigate, catalog and communicate innovative energy efficiency investment strategies through 6-9 fact sheets and 10 seminars	3 - 4 fact sheets, 4 seminars/ webinars	NR	2 - 3 fact sheets, 4 seminars/webinars	0[q]
	Facilitate 30-45 customers accessing innovative energy efficiency investment strategies	20 - 25	NR	5 - 10	0[r]
	Energy-aligned leasing (EAL) arrangements (10-15) and other approaches to split incentive issue	4 - 6 EAL evaluations, 4 seminars/webinars	1 EAL pilot	4 - 6 EAL evaluations, 4 seminars/webinars	0[s]

Table 3-16 continued

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
	Provide supply chain with tools, strategies, marketing materials, and information to incorporate into their businesses operations (9-12 factsheets; 9-12 seminars)	4-5 fact sheets, 4-5 seminars/webinars	2 fact sheets, 67 seminars/webinars	4-5 fact sheets, 4-5 seminars/webinars	50 seminars/webinars
Outcomes/ Impacts	125 GWh saved through supporting emerging technologies and higher efficiency products with Energy $mart Partners (some savings may overlap with end user incentive programs)	50.0	57.0	50.0	13.0
	895,000 MMBtu saved through supporting emerging technologies and higher efficiency products with Energy $mart Partners	254,000	118,803	419,000	352,935
	Increase market share of 3-6 technologies and higher efficiency products	1 - 3	NR	1 - 3	NR
	37 GWh saved through Midstream Partner projects	15.0	2.3	15.0	6.2
	Complete 20-35 customer projects that accessed innovative energy efficiency investment strategies	5 - 8	NR	10 - 15	0[r]

[o] Includes approximately 840 of NYSERDA's current program partners expected to renew their participation agreements and 400 new partners signed up by the end of the program.

[p] Includes approximately 400 current program partners expected to renew their participation agreements and 110 new partners signed up by the end of the program.

[q] NYSERDA executed a contract with a consulting firm to create an energy efficiency financing strategies fact sheet. The contract was signed in the second quarter of 2014 and the final report is expected to be available in the third quarter of 2014.

[r] These efforts have been accomplished under other funding sources, such as RGGI and GJGNY.

[s] The EAL pilot completed in 2012 resulted in 48 presentations given to 660 people in a variety of audiences including landlords, tenants, real estate attorneys, brokers, engineers and industry groups. Continuing efforts are currently being conducted by NRDC.

3.3.1.3 Education to Change Behavior and Influence Choices Component

Economic Development Growth Extension Program

The Economic Development Growth Extension (EDGE) Program is facilitated by Regional Outreach Contractors (ROCs) who perform outreach, education, and promotion of NYSERDA program opportunities to residents, businesses, institutions, and local governments across the State. Formerly known as the Energy $mart Communities Program, EDGE educates New Yorkers about the role that energy efficiency and renewable power can play in reducing energy costs and providing clean, reliable energy for homes, schools and workplaces. The EDGE Program was designed to include support for Governor Andrew M. Cuomo's Regional Economic Development Council initiative by aligning the program territories geographically and providing direct support to advance the strategic priorities and regionally significant projects identified in each region. Through this alignment with the Regional Councils, NYSERDA provides a greater level of education and adoption of energy-efficiency practices at the community level. NYSERDA has contracted with the New York State Economic Development Council and Solar One, a team that includes regionally-based economic development organizations to provide on-the-ground outreach support. Through June 30, 2014, EDGE Program ROCs have established 680 new partnerships that have led to 1,416 referrals. They have also participated in more than 612 public outreach events including the Consolidated Funding Application Workshops held across the State to support the efforts of the Regional Economic Development Council initiative.

A Program Theory and Logic Model was completed for the EDGE Program in December 2013. The full Program Theory and Logic Model report is available on NYSERDA's website.[32]

Behavioral Demonstrations

The Behavioral Demonstrations program, formerly Behavioral Pilots, will support further penetration of new products and practices through behavior change strategies. Emerging informational platforms will be demonstrated and tactics will be explored and tested in order to demonstrate how large-scale adoption of energy-efficient behavior can be achieved with little or no financial incentives.

[32] Economic Development Growth Extension (EDGE) Program Final Initiative Level Logic Model Report. http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-EDGE-Program.pdf

The program design has received NYSERDA management approval and the solicitation was released on July 16th, 2014. Project proposals are due on September 15th, 2014. Based on the advisory group feedback from the meeting held July 2012, the draft solicitation emphasizes the following points:

- Eligible projects must build on tested, successful behavioral strategies. The goal of this program is demonstrate at a larger scale the efficacy of strategies previously applied at the research or pilot level.
- Proposals must include strict implementation plans that incorporate experimental design. Specifically, implementers are required to utilize experimental groups, control groups, and baselines to statistically analyze the impact of the applied behavioral intervention.
- Demonstrations will also be required to examine the persistence of the effects of the behavioral intervention up to two years after its withdrawal. This requirement will start to address the lack of persistence data related to behavioral strategies.

Low-Income Forum on Energy (LIFE)

The Low-Income Forum on Energy (LIFE) is the longest running statewide low-income energy dialogue in the United States. LIFE brings together a diverse range of parties committed to addressing the challenges and opportunities facing low-income New Yorkers as they seek safe, affordable, and reliable energy. Guided by a steering committee composed of State agencies, utilities, and community-based organizations, the program undertakes several initiatives to increase awareness of low-income energy issues. The 2014 LIFE Statewide Conference was held on May 28-29 in Albany, NY. The conference featured 36 workshops on energy policy, consumer protection, emerging energy issues, program updates, and best practices. In addition, three individuals working in the low-income energy field were presented with 2014 LIFE achievement awards. A total of 224 individuals representing 105 organizations attended the conference. In 2013, a series of six Regional Meetings across the State featuring presentations on energy affordability, consumer protections, emerging energy issues, best practices, and program updates was held. The meetings were attended by 374 individuals from 170 different organizations. In addition, the LIFE program has presented 23 webinars to 601 attendees and distributed 25 electronic newsletters to a network of more than 5,000 individuals since the beginning of 2012.

Table 3-17 shows performance milestones and results for the Education/Behavior Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Table 3-17. Education/Behavior Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Sponsor and support 5 annual LIFE conferences[t]	2	1[u]	2	0
	Support 600 community partnerships	250	510	250	170
	Sponsor up to 8-12 behavioral pilots	5 - 8	NR	3 - 4	NR
Outcomes/ Impacts	Complete and evaluate 8-12 behavioral pilots			3 - 4	NR

[t] The LIFE program anticipates sponsoring, planning and supporting a total of seven LIFE conferences and Regional meetings.

[u] In addition to one Statewide Conference, six Regional Meetings were also supported by the LIFE program.

3.3.2 Clean Energy Business Development

3.3.2.1 Innovation/Entrepreneurial Capacity Building

Proof-of-Concept Centers

The mission of the Proof-of-Concept Centers (POCCs) is to accelerate the translation of research into marketable products. This translation is primarily accomplished by fostering successful pre-startup companies. Generally, the next step for these companies is to participate in a business mentoring or incubation program. NYSERDA is investing approximately $5 million in seed money at each center over a five-year period. The centers are expected to operate independently after NYSERDA funding ends.

The objectives of the POCC initiative are to:

- Accelerate the commercialization of innovations out of research institutions and into the marketplace, particularly through startups.
- Early in the research and development phase, match emerging clean energy technologies that have scalable commercialization potential, based on real market need, with the investment community.
- Establish sustainable regional innovation ecosystems of potential investors and entrepreneurs in clean energy technologies and solidify the POCC linkages to them.

Specifically, the three POCCs have been established by:

- Columbia University (New York City), partnering with Brookhaven National Laboratory, Stony Brook University and Cornell University's NYC Tech, a new campus located in New York City.
- New York University (NYU-Poly), in partnership with the City University of New York (CUNY), and High Tech Rochester Inc. (HTR), a nonprofit venture development organization based in the Rochester area, which has opened the NYSERDA POCC to serve western and central New York. HTR is working with a number of academic partners including University of Rochester, Rochester Institute of Technology, SUNY Research Foundation, Alfred University, Cornell University, Clarkson University and the University at Buffalo, as well as multiple industry and investor partners.

The Columbia University and NYU programs have joined to create an outward-facing brand called PowerBridge NY. They are working together to run competitions, organize mentors and co-sponsor events. The program is designed to address critical gaps in the current research-to-commercialization continuum by combining the technology push with the market pull by accelerating the rate at which research originating in universities in and around the New York City region enters the marketplace through licenses and new startup companies. Fifty-five preliminary applications were submitted by the academic teams and then reviewed by panels of investment and technical judges in early December 2013. The 13 teams selected to move forward participated in a series of training sessions focused on customer validation and business model development. The 13 teams pitched their business

models to the judges on March 5, 2014. Ten of the teams – five from each university – received full funding for the next phase of the effort. The remaining three teams received partial support.

The HTR program has been branded NEXUS-NY (New Energy Xcelerator for Upstate New York). This program combines the Lean Startup methodology of early customer interviews and product validation with connections to business mentors, subject matter experts, and resources for designing and building prototype devices that will bridge gaps faced by clean technology innovators throughout the state. It also enables these innovators to transform their future research activities, with the potential for connecting future discoveries to marketplace needs at an earlier stage than the current university commercialization process allows. NEXUS-NY selected 12 teams from the 56 applications they received to enter the first phase of the program, and selected 8 of these teams to move into the second phase.

Emerging Clean Energy Business Development

The Clean Energy Business Incubator program was initiated in 2009 with funding from SBC III. The purpose of these incubators is to foster the viability and growth of young early stage clean energy companies, most of which are still in the process of developing new products and have yet to earn revenue from commercial operation. To date, half of the program has been funded with SBC III resources alone and benefits were reported in full in the 2013 SBC III Annual Report finalized in June 2014. (Prior historical accomplishments can be found in the SBC III annual report through December 31, 2012).[33] The program is currently transitioning to T&MD funding, and is partially reported here.

A Program Theory and Logic Model was completed for the CEBD Program in 2013. The full Program Theory and Logic Model report is available on NYSERDA's website.[34]

Table 3-18 shows performance milestones and results for the Innovation/Entrepreneurial Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

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[33] The 2012 SBC III report is available at http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/-/media/Files/Publications/PPSER/NYES-Program/2012/2012-SBC3-post-program-annual-report.pdf

[34] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-Clean-Energy-Business-Development.pdf

Table 3-18. Innovation/Entrepreneurial Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Support 405 clients in incubators or POCCS[v]	65	32[w]	90	63[w]
Outcomes/ Impacts	Help clean energy businesses attract $150 million in leveraged funds (co-funding and outside investment) (millions)	$40.0	$51.1	$45.0	$4.0
	Graduate 162 businesses from incubators	36	19	36	1
	40 advanced technologies reaching commercial availability	5	0	10	0
	$20 million in commercial sales of new and improved supported technologies (millions)[x]	$2.5	NR	$5.0	NR
	486 incremental FTEs associated with incubator graduates	108	76	108	18

[v] Because POCCs are a new NYSERDA initiative, estimating program outcomes requires the use of surrogates. One leading example is the Deshpande Center at MIT. Since beginning operation in September 2002, through the end of 2010, the Center reviewed more than 500 proposals and funded 80 projects with $11 million in grants. This investment has resulted in the creation of 23 companies that raised more than $300 million in funding and have more than 400 employees. The Center funds approximately 18 projects per year. Translating these outcomes to New York's new POCCs must take into account the limited technology/market focus of the New York program and the time required to establish a program and build momentum.

[w] Because clients have been continually supported across NYSERDA funding streams it is difficult to apportion the number of clients served into one funding source. Therefore, this number represents the total clients currently being served and the total clients that have graduated during the lifetime of three incubators that have received both SBC3 and T&MD funding.

[x] This estimate is only for sales dollars. The program will support a variety of technologies making it difficult to forecast the value of sales. In addition, some of the products developed through incubators may participate in other NYSERDA product development efforts.

3.3.2.2 Market Intelligence

New York State Clean Energy Innovation Metrics

NYSERDA worked with SRI International to research and prepare a report on clean energy technology metrics. To determine the metrics to present, focus groups were held involving nearly 100 individuals including entrepreneurs affiliated with cleantech startup companies, cleantech investors, executives, and other representatives of larger, more established technology companies, directors of cleantech incubators, representatives from cleantech industry consortia, universities conducting cleantech research, and other cleantech organizations.

The report reveals New York State's strong record of support for existing and emerging clean energy technology companies and creation of an environment conducive to innovation, entrepreneurship and technology-led growth. For example, New York State's commitment to growing cleantech is demonstrated by its national rank in the top five in many key cleantech economic indicators:

- 1st overall in wind patenting.
- 2nd in overall cleantech patenting.
- 2nd in electric and gas energy efficiency investment.
- 3rd in state energy efficiency policies.
- 3rd in university research expenditures.
- Top three in science, technology, engineering, and mathematics (STEM) degrees awarded and venture capital investment
- 4th in a number of cleantech companies and green goods and services employment.

This first report and analysis was funded under SBC III. Future iterations of the report will be supported under T&MD funding and will be used to inform future T&MD programs.

A Program Theory and Logic Model was completed for the CEBD Program in 2013. The full Program Theory and Logic Model report is available on NYSERDA's website.[35]

Table 3-19 shows performance milestones and results for the Market Intelligence Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

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[35] The CEBD document is available on the NYSERDA website at http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-Clean-Energy-Business-Development.pdf

Table 3-19. Market Intelligence Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Create 5 annual 'benchmark reports on clean energy business and financial indicators for New York State	2	0	2	0
	Support dissemination of clean energy benchmark information through 500 website downloads	100	NR	200	75

3.3.2.3 Direct Support for Business Acceleration Program

The NYSERDA Entrepreneurs-in-Residence (EIR) program offers experienced entrepreneurial coaching to NYSERDA contractors and incubator clients. Some of the general outcomes and observations from the program show that companies struggle with customer delivery and engagement and the development of an overall business strategy. Most of these companies are founded by technical entrepreneurs, and prefer to focus on technology development more than commercialization.

The NY EXCEL (New York Executive Clean Energy Leadership) program at Skidmore College targets experienced entrepreneurs and executives about the markets, financing models, permitting requirements, technology solutions and other unique aspects of the cleantech industry that make it a challenge to start successful energy efficiency and clean energy businesses. NY EXCEL will help participants build the necessary networks and provide direct, one-on-one mentoring to help participants create successful cleantech businesses that will grow jobs in New York State. The ultimate goals of NY EXCEL are to increase the number of clean energy entrepreneurs in the State, create well-paying jobs in New York communities, and provide solutions for addressing the long-term challenge of energy independence. The first class will begin in the summer of 2014.

New York University is developing the Clean Start Program for professionals with 5-10 years of experience who have targeted a transition into the clean energy sector. The Clean Start curriculum combines business and technology to create a hybrid platform for professionals to team up with leaders of New York's clean energy economy—from startups, industry members, and utilities. The 120-hour evening and weekend part-time curriculum is designed to attain a professional certificate from the NYU School of Continuing and Professional Studies Center for Global Affairs. The first class will begin in the fall of 2014.

Startup and early stage clean energy technology companies face a number of challenges when trying to grow to scale and bring new products to market. The Commercialization Toolkit program was designed to provide a more standardized and accessible framework for guiding company development, an easy way to assess overall business readiness including commercial and technology factors, and a ready-made suite of resources tailored to the specific needs of clean economy entrepreneurs as they pursue successful commercialization of their offerings. Following a competitive solicitation, the NECEC Institute, in partnership with the New York University Polytechnic School of Engineering's New York City Accelerator for a Clean and Resilient Economy (NYC ACRE) and Pure Energy Partners, was selected to create an entrepreneur-friendly roadmap guiding the process from ideation to commercialization.

Table 3-20 shows performance milestones and results for the Direct Support for Business Acceleration Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Table 3-20. Direct Support for Business Acceleration Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Provide support for 150 companies with new and improved products serving New York State markets	59	85	59	11
Outcomes/ Impacts	Transition 45 business executives to the clean energy technology industry.	10	NR	18	NR

3.3.3 Workforce Development Initiative

New York State's ambitious energy and environmental goals can be met only with an adequate supply of trained workers with applied skills in energy efficiency, renewable energy, and advanced technologies. The Workforce Development (WFD) Initiative focuses directly on practitioners who ensure quality installations, services and maintenance for these technologies. The program is designed to address the ongoing need for workers with skills that will result in quality installs and thus energy efficiency and energy production. The PSC Order in Case 10-M-0457, *Order Continuing the System Benefit Charge and Approving an Operating Plan for a Technology and Market Development (T&MD) Portfolio of System Benefits Charge Programs* (the Order), authorized NYSERDA to use $24 million of EEPS program funds that were uncommitted as of December 31, 2011, to fund a WFD energy efficiency initiative within the T&MD portfolio.

The PSC Order also authorized the use of $15 million in T&MD funds to support renewable energy and advanced technologies. The average annual budget is $7.8 million. Activities for the renewable energy and advanced technologies components began in 2012 while activities related to the energy efficiency component began in 2013 and ramped up quickly with the issuance of multiple solicitations.

NYSERDA continues to design programs and solicitations to expand the training network in targeted areas, to address identified needs, and to integrate new technology education into existing programs.

Through June 30 2014, NYSERDA has issued a total of eight solicitations for WFD under T&MD:

- PON 2033 Clean Energy On-the-Job Training (open enrollment): Originally issued under Green Jobs - Green New York (GJGNY) in June 2011, this solicitation added $750,000 in T&MD funds to expand program eligibility beyond energy efficiency and solar thermal technologies to include all renewable and advanced technologies. In December 2013, $500,000 of T&MD funds were added to support energy efficiency in the SBC territory, allowing GJGNY funding to support Long Island activities. Under the program, eligible businesses can apply to receive 50% wage reimbursement for new hires. As of June 30, 2014, NYSERDA has executed on-the-job (OJT) agreements with 34 businesses seeking to hire new employees or advance incumbent workers. To date, 139 people have been hired from NYS Department of Labor's New York State Career Centers Lists and 20 incumbent employees have been approved for off-site training. Approximately $920,003 in wage and training subsidies have been awarded.
- PON 2397 Clean Energy Certification and Accreditation Incentives (open enrollment): Originally issued under GJGNY in February 2012, this solicitation added TM&D funding of $400,000 in February 2013 and $2,398,639 in August 2013 for an open enrollment solicitation offering financial incentives to help offset the costs associated with obtaining third-party certifications, Building Performance Institute accreditation and Interstate Renewable Energy Council (IREC) Institute for Sustainable Power Quality (ISPQ) training program accreditation and company accreditation.

- PON 2762 Workforce Training for Energy Efficiency: This PON, which closed on September 10, 2013, offered $9.3 million to market and deliver energy efficiency training in all sectors across the state over a two-year period. The cap per training entity was $600,000. The solicitation was designed to focus on market sectors and technologies, including but not limited to: new construction; existing homes and commercial buildings; operation and maintenance; low-income programs; healthcare and commercial/industrial facilities; heating, ventilation, and air conditioning (HVAC); lighting; advanced controls; building management systems; weatherization and air sealing techniques and climate change resiliency. Twenty-six proposals were received, and 16 contracts have been awarded.
- PON 2774 Career Pathways Training Partnerships for Energy Efficiency & Renewable Energy: This PON, which closed on September 23, 2013, provided $3.85 million to support entry-level technical training for career pathways leading to jobs in clean energy. The solicitation was designed to implement technical training for Energy Efficiency (EE), Renewable, Energy (RE), and advanced technologies (AT). It also offered financial support to training providers for internships, apprenticeships, and on-the-job training to support the transition from training to work in the field. Seven proposals were received, and five contracts were awarded.
- PON 2664 (Round 1) Clean Energy Training for High School Students: This PON, which closed on June 10, 2013, provided $1.5 million for the development and implementation of educational training programs in EE, RE, and AT for high school students. Proposers were asked to develop and implement programs that prepare students for careers and/or post-secondary education, with a focus on science, technology, engineering, and mathematics (STEM) skills. Fourteen proposals were received, and six contracts were awarded. PON 2664 (Round 2), which closed on March 26, 2014, provided an additional $1.75 million. In Round 2, seven proposals were received and four contracts were awarded.
- PON 2673 Renewable Energy and Advanced Technology Training: This $2.5 million competitive solicitation, which closed on May 28, 2013, sought proposals for training to support installation and operation of RE systems and advanced or emerging energy technologies (AT) in the State. The solicitation sought programs designed to train workers to better design, install, inspect, operate, maintain, and monitor systems, technologies, and measures on the customer side of the meter. Funding was available in two other categories (new certifications and credentials) and for training solar thermal inspectors. 14 proposals were received, and 5 contracts were awarded.
- PON 2841 Workforce Development and Training for Renewable Energy and Advanced Technologies: This PON provides $4 million for training that supports installation and operation of renewable energy (RE) systems and advanced or emerging technologies. Proposers could apply for funding to develop (Category A) and deliver (Categories A and B) RE/AT technical training that addresses areas such as: customer-sited RE system design, installation and operation/maintenance; RE/AT equipment manufacturing; AT and strategies that can contribute to net-zero energy buildings; smart grid and electric vehicle infrastructure; and, data monitoring. The PON specified that funds for training delivery are for the express purpose of directly reducing the costs of training for students. In Round 1, which closed on March 19, 2014, seven proposals were received and four contracts were awarded. Round 2 closed on July 16, 2014.
- RFP 2690 Implementation Support for Workforce Development and Training: This competitive solicitation, which closed on June 18, 2013, offered $1.2 million to select one contractor for implementation and support services for the WFD Program. The Implementation Contractor, in coordination with NYSERDA, will be responsible for various implementation activities to help clean energy training and standards to gain wide-scale market acceptance. Seven proposals were received, and one contract was awarded.

- RFP 2697 NY-Sun PV Balance of System Training and Education Program: This competitive solicitation, which closed June 6, 2013, offered $3.5 million to proposers to support education and training on solar PV for local officials. Targeted audiences include code enforcement officers; building and electrical third party inspectors; fire inspectors; commissioners of public safety; building department plan examiners; village engineers, and other public officials who might have a role in the permitting; inspection or approval process for a solar PV system or who might encounter a solar PV system in their work environment (e.g., firefighters and other first responders). This solicitation is part of a comprehensive strategy to streamline the permitting and approval process and ultimately reduce the costs of purchasing and installing solar PV systems. Six proposals were received, and one contract was awarded.

A Program Theory and Logic Model was completed for the WFD Program in December 2013. The full Program Theory and Logic Model report is available on NYSERDA's website.[36]

Table 3-21 and Table 3-22 show performance milestones and results for the Workforce Development Program through June 30, 2014. They include only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Program Evaluation Activities

NYSERDA recently completed an early stage process evaluation of the Workforce Development Program. Preliminary findings and recommendations from this study were summarized in the last semi-annual report. The full report is now available on NYSERDA's website.[37] NYSERDA's response to recommendations resulting from the evaluation is included in Appendix C.

[36] Workforce Development Final Program Theory and Logic Model Report. http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-Workforce-Development.pdf

[37] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-EMEP-Workforce-Development.pdf

Table 3-21. Workforce Development – Renewable Energy Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Technical training on RE/AT for 2,000 incumbent workers and high school students preparing for technical careers	500	1,462	1,000	0
	Support 480 disadvantaged, unemployed or underemployed individuals seeking entry-level employment	90	NR	200	48
	OJT and Hands-on RE/AT Training for 680 individuals	150	40	380	53
	Develop advanced courses to be integrated components of college certificate and degree programs & trades trainings	2	NR	4	NR
	Additional Community Colleges and training organizations added to training network	2	2	3	0
	Identify need for and support development of new certifications and supporting curriculum	0	NR	2	1
Outcomes/ Impacts	Leverage federal and third-party funding to support workforce development (millions)	$0.75	NR	$2.25	0

Table 3-22. Workforce Development – Energy Efficiency Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Technical training on EE for 13,793 incumbent workers and high school students preparing for technical careers	3,448	NR	5,517	1,314
	Support 3,200 disadvantaged, unemployed or underemployed individuals seeking entry-level employment	800	NR	1,280	48
	OJT and Hands-on EE Training for 1,867 individuals	467	NR	747	86
	Community Colleges and other training organizations added to training network[y]	2	NR	3	5
	Identify need for and support development of new certifications and supporting curriculum	0	NR	2	0
Outcomes/ Impacts	Leverage federal and third party funding to support workforce development (millions)	$0.1	NR	$3.75	$0.2

[y] Community Colleges may offer renewable energy, advanced technology and energy efficiency courses.

3.3.4 Environmental Monitoring, Evaluation and Protection (EMEP)

EMEP provides knowledge to reduce the adverse impacts associated with electricity generation that damages New York's ecosystems and the health of its citizens, and it assists planning efforts for cleaner alternative options. Additionally, informing the clean energy technology industry about life cycle environmental impacts early in the development stage can minimize unanticipated negative effects and document the energy and environmental attributes of products. EMEP also provides critical energy-related environmental research to help support the regulatory responsibilities of a range of other agencies in New York State including the Department of Environmental Conservation, Department of Health, Department of State, and the Office of the Attorney General.

As planned, the EMEP program has initiated the updating of the multi-year environmental research plan with input from policymakers, scientists and stakeholders. Meetings on eight topics have been conducted to date:

- Ecosystem Response to the Deposition of Sulfur, Nitrogen and Mercury.
- Greenhouse Gas Reduction Strategies.
- Environmental Issues Related to Kinetic Hydropower.
- Air Quality and Health.
- Climate Change Adaptation.
- Climate Change Mitigation.[38]
- Wind Energy Impacts.
- High-Volume Hydraulic Fracturing for Natural Gas Extraction.

A comprehensive assessment of ecosystem monitoring activities in New York State, funded with SBC III funds, continues to guide a more efficient and coordinated approach to environmental monitoring activities in the State, some of which are now being supported through EMEP. In addition, 28 research projects with a focus on acid deposition and mercury monitoring have been contracted, and 15 workshops and briefings have been conducted. The biennial EMEP conference was conducted on November 6-7, 2013 in Albany, and 245 attendees were on hand for eight environmental science and policy sessions. The conference brought together scientists and policymakers to help guide decisions through sound science, and feedback from the attendees has been overwhelmingly positive.

As noted earlier, NYSERDA has historically funded EMEP projects with SBC III resources, and benefits are reported in the SBC III annual reports[39]. Prior historical accomplishments can be found in the SBC III annual report through December 31, 2012.[40]

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[38] Although the climate change research is eligible for T&MD funding, to date a majority has been funded through the Regional Greenhouse Gas Initiative.

[39] For Program and Evaluation Reports, please visit: http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/NYE$-Evaluation-and-Status-Reports.aspx.

Table 3-23 shows performance milestones and results for the EMEP Program through June 30, 2014. It includes only performance milestones with anticipated achievements in the first two two-year periods of the five-year program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of an anticipated achievement or result in a particular time period.

Program Evaluation Activities

NYSERDA recently completed citation analysis for the EMEP program. The analysis indicated that EMEP funding supports research that is being widely disseminated in the academic literature. Findings from this study were summarized in the last semiannual report. The full evaluation report is now available on NYSERDA's website.[41]

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[40] The 2012 SBC III report is available at http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/-/media/Files/Publications/PPSER/NYES-Program/2012/2012-SBC3-post-program-annual-report.pdf.

[41] Environmental Monitoring, Evaluation, and Protection (EMEP) Citation Analysis

Table 3-23. Environmental Monitoring Performance Milestones and Results

NR = Not Reported. See explanation at the beginning of Section 3.

Category	Performance Milestone	2012-2013 Anticipated Achievement	2012-2013 Results	2014 - 2015 Anticipated Achievement	2014-2015 Results (Through June 30, 2014)
Outputs/ Leading Indicators	Update multi-year EMEP research plan with input from policymakers, scientists, and stakeholders		Update initiated, 6 meetings held		NR
	Sign 60 contracts for research studies, including several large flagship projects	23	27	28	1
	Hold 5 Program Advisory Group meetings	2	2	2	0
	Hold 5 Science Advisory Committee Meetings	2	2	2	0
	Sponsor 14 workshops, conferences or seminars	5	4	6	1
	Complete 65 research studies	5	NR	23	3
	Convene 30 briefings on research projects with policy-makers or other stakeholders	12	13	12	2
Outcomes/ Impacts	$11 million in leveraged funds (co-funding and outside investment) to support projects and sponsored research (millions)	$3.5	$3.2	$4.5	$2.2
	Publish 119 peer-reviewed scientific journal articles based on program-supported research	10	8	35	10

4 T&MD Program Evaluation Activities

NYSERDA is actively working with third-party evaluation contractor, Industrial Economics (IEc), to conduct evaluation of the T&MD programs. During the first half of 2014, a comprehensive plan was developed for evaluation of the T&MD programs over the next three and six years. This plan will be used by NYSERDA and IEc to guide the evaluation efforts and will be updated as needed. This section summarizes evaluation work completed, underway and planned for the T&MD programs. Some evaluations are program-specific, while others are done at a higher level to inform and optimize the portfolio level results.

4.1 Program Theory and Logic Models

Program Theory and Logic Model (PTLM) reports are typically developed early in the program time line, and updated as changes are made. PTLM reports inform evaluation work by documenting the relationships between program activities, outputs, and short/medium/long-term outcomes the program intends to induce.

Prior to 2014, PTLM activities were completed and reports posted to NYSERDA's website for the following programs/areas:

- Smart Grid[42]
- Advanced Codes and Standards[43]
- Economic Development Growth Extension[44]
- New York Products[45]
- Clean Energy Business Development[46]
- Workforce Development[47]

[42] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-EPTD-Smart-Grid-Program.pdf

[43] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-Advanced-Codes-Standards.pdf

[44] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-EDGE-Program.pdf

[45] http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/NYE$-Evaluation-Contractor-Reports/2012-Reports/Market-Analysis.aspx

[46] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-Clean-Energy-Business-Development.pdf

[47] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-Workforce-Development.pdf

During the first half of 2014, PTLMs have been completed, reports posted on NYSERDA's website, and logic model diagrams in Appendix B for the following programs/areas:

- CHP Aggregation and Acceleration[48]
- Advanced Buildings: ETAC[49]
- Advanced Buildings: Technology Development[50]

PTLMs are planned or are underway for the following programs/areas:

- Electric Vehicle
- Clean Power Technology Innovation
- Solar Cost Reduction
- Demand Response
- Market Development Initiative (Commercial/Industrial component)

Following the development of a PTLM, NYSERDA typically engages in an Evaluation Readiness Review[51] to help identify whether a program has various factors, or when such factors will be in place, to ensure an evaluation is justified, feasible, and likely to provide useful information. For example, programs must have appropriate data tracking to support evaluation. Evaluation Readiness Reviews have been completed for several programs to date and have helped identify areas to strengthen or solidify in order to lay the groundwork for the most productive evaluations.

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48 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-PLM-CHP-Acceleration.pdf

49 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-PLM-Advanced-Buildings.pdf

50 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-PLM-Advanced-Buildings.pdf

51 Formerly known as Evaluability Assessment.

4.2 Process Evaluation

Process Evaluation reviews oversight and operations, gauges customer satisfaction, and recommends process and efficiency improvements. The goal of Process Evaluation is to inform real-time adjustments and maximize program efficiency and effectiveness through actionable recommendations. The T&MD Operating Plan identified that formative process evaluations would be conducted on most programs during the early stages of implementation and repeated periodically to examine program efficiency and effectiveness in light of the program's stated outcomes and impacts. Process evaluations are typically conducted through in-depth interviews resulting in a qualitative assessment and will be supported by secondary research, such as review of program documents, as appropriate. Evaluations of NYSERDA's organizational processes (e.g., competitive solicitation) may also be conducted.

Prior to 2014, focused process evaluations were completed for the following T&MD programs. Each of these process evaluation reports is available on the NYSERDA website.

- Smart Grid[52]
- Workforce Development[53]
- EMEP[54]

The first set of process evaluations which are or will be underway in the near term cover the following programs, with completion date indicated in parentheses:

- Solar Cost Reduction (Q1 2015)
- Technology Development (Q2 2015)
- Advanced Codes and Standards (Q4 2016)[55]
- EDGE (Q2 2015)

Most other T&MD programs are expected to have process evaluations before September 2016.

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52 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2013ContractorReports/2013-PLM-EPTD-Smart-Grid-Program.pdf

53 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-EMEP-Workforce-Development.pdf

54 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-EMEP-Citation-Analysis.pdf

55 Process evaluation completion date is indicative of pre- and post-training surveys, which are ongoing throughout the life of the program.

4.3 Market and Impact Evaluation

The IEc team will also assist NYSERDA in evaluating the T&MD portfolio's near-and long-term impacts through full-scale impact and market evaluations. Early evaluation activities will include collecting baseline information to identify the program effects on the number and knowledge base of market participants and whether barriers to more widespread technology adoption are being effectively addressed. Later evaluation activities will examine longer-term impacts such as technology commercialization and replication. Some methods expected to be used in assessing program impacts include surveys and interviews with program participants and nonparticipants, Delphi panels, case studies, on-site measurement and verification of energy savings for certain technologies, technology commercialization tracking, technology transfer, bibliometric tracking and citation analysis.

This area includes the following three primary activities, which are briefly described as intended to apply to the T&MD programs:

- **Market characterization** will describe a specific market or market segments, including size of the market, key market actors, distribution channels, market actor awareness and knowledge, key market drivers and opportunities, and market barriers. The market characterization assesses the market before or early in the commencement of a specific intervention or program, for the purpose of guiding the intervention and/or facilitating future evaluation of effectiveness.
- **Market impact assessment** is used to analyze the extent to which a market has been transformed by specific program interventions or programs. Market impact assessment describes changes in market actor awareness and knowledge, key market drivers and opportunities, and market barriers, as well as the value of the program perceived by key market actors. Market assessment also collects and tracks information on key indicators the program is expecting to influence (i.e., the adoption of clean energy and energy-efficient products, services, or practices). Market impact assessments may require a previous market characterization study, as previously defined.
- **Energy impact evaluation** will address program-specific, directly induced quantitative changes (e.g., kWh, kW, and therms) attributable to the T&MD programs. This is distinguished from market impact assessments, previously described, which assess other program outcomes distinct from energy and demand savings.

During the first half of 2014, a market/impact evaluation was completed for the NY Products Program.[56] A summary of this evaluation is in Appendix C.

[56] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014%20New%20York%20Products%20Program%20Evaluation.PDF

Market/Impact evaluations are planned or are underway for the following programs/areas (with expected completion date):

- ETAC Market Assessment (Q1 2015)
- Advanced Codes and Standards Market Assessment (Q4 2014)
- Clean Energy Business Development Market Assessment (Q2 2015)

Most other programs are expected to have a market/impact evaluation by September 2016.

4.4 Higher Level Studies

In addition to evaluation activities, NYSERDA also plans to conduct studies organized around one or more high-level research questions that focus on data, impacts, and processes across programs. The studies reflect a range of evaluation activities, including evaluation readiness reviews, market characterizations, process evaluations, and market and energy impact assessments. The list of high level studies is likely to evolve over time to meet the needs of NYSERDA's portfolio. Currently, this list includes but is not necessarily limited to the following activities:

- **Data and resources:** How can the NYSERDA R&D Metrics Database and the existing data from prior evaluations best support evaluation efforts for the T&MD portfolio?
- **Solicitation process and markets:** How well is NYSERDA's current solicitation process reaching intended markets and soliciting high-quality proposals?
- **NYSERDA's reputation:** What is the effect of NYSERDA's reputation on support for products and innovations, and how can NYSERDA best use its institutional credibility to support products and innovations?
- **Portfolio performance:** What are the effects of NYSERDA's shift from focus on technology development to its newer, broader focus on technology and business development?
- **R&D demonstration project impacts:** What are the direct and replication impacts of NYSERDA demonstration projects and how do these evolve and accumulate over time?
- **Informing decisions and policy:** How can NYSERDA and external organizations effectively incorporate learning from past NYSERDA projects into decisions about the design of programs and policies?

Some of these studies are being scoped out or are underway. During the first half of 2014, the R&D demonstration project impact study was completed.[57] This study updated a prior similar evaluation and addressed R&D demonstration projects completed in 2008-2010. A summary of this work is in Appendix C.

[57] http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-RD-Demo-Survey-Report.pdf

Appendix A: T&MD Program Advisory Committee Members

Richard Adams
Manager
NREL Innovation and Entrepreneurship
Center, Center for Renewable Energy
Economic Development

Anthony Collins
President
Clarkson University

Mark Duvall
Director
Electric Transportation and Energy Storage
Electric Power Research Institute (EPRI)

Kate Fish
Executive Director
Adirondack North Country Association

Colleen Gerwitz
Director
Office of Energy Efficiency and the Environment
NYS Department of Public Service

Maria Gotsch
President and CEO
NYC Investment Fund

Jeff Harris
Senior Vice President for Programs
Alliance to Save Energy

Christopher Hayter, Ph.D.
Executive Director, Policy Evaluation and Transportation
The New York Academy of Sciences

Dave Hewitt
Executive Director
New Buildings Institute

Franz Litz
Executive Director
Pace Energy and Climate Center

Sergej Mahnovski, Ph.D.
Director of Energy Policy
NYC Mayor's Office

James Misewich, Ph.D.
Associate Laboratory Director
for Basic Energy Sciences
Brookhaven National Laboratory (BLN)
Energy Sciences and Technology Department

Steven Nadel
Executive Director
American Council for an Energy-Efficient Economy (ACEEE)

Christopher Raup
Manager, State Regulatory Affairs
Consolidated Edison Company of New York, Inc.

Robert Simpson
President and CEO
CenterState Corporation for Economic Opportunity

Susan Stratton
Executive Director
Northwest Energy Efficiency Alliance (NEEA)

Valerie Strauss
Interim Executive Director
Alliance for Clean Energy New York

David Terry
Executive Director
National Association of State Energy Officials/ASERTTI

Sue Tierney
Managing Principal
Analysis Group, Inc.

Cheri Warren
Vice President, Asset Management
National Grid

Jane Weissman
Executive Director
Interstate Renewable Energy Council, Inc. (IREC)

Ed Wisniewski
Executive Director
Consortium for Energy Efficiency (CEE)

Appendix B: T&MD Program Logic Models

Figure B-1. Combined Heat and Power Aggregation and Acceleration Program Logic Model Diagram

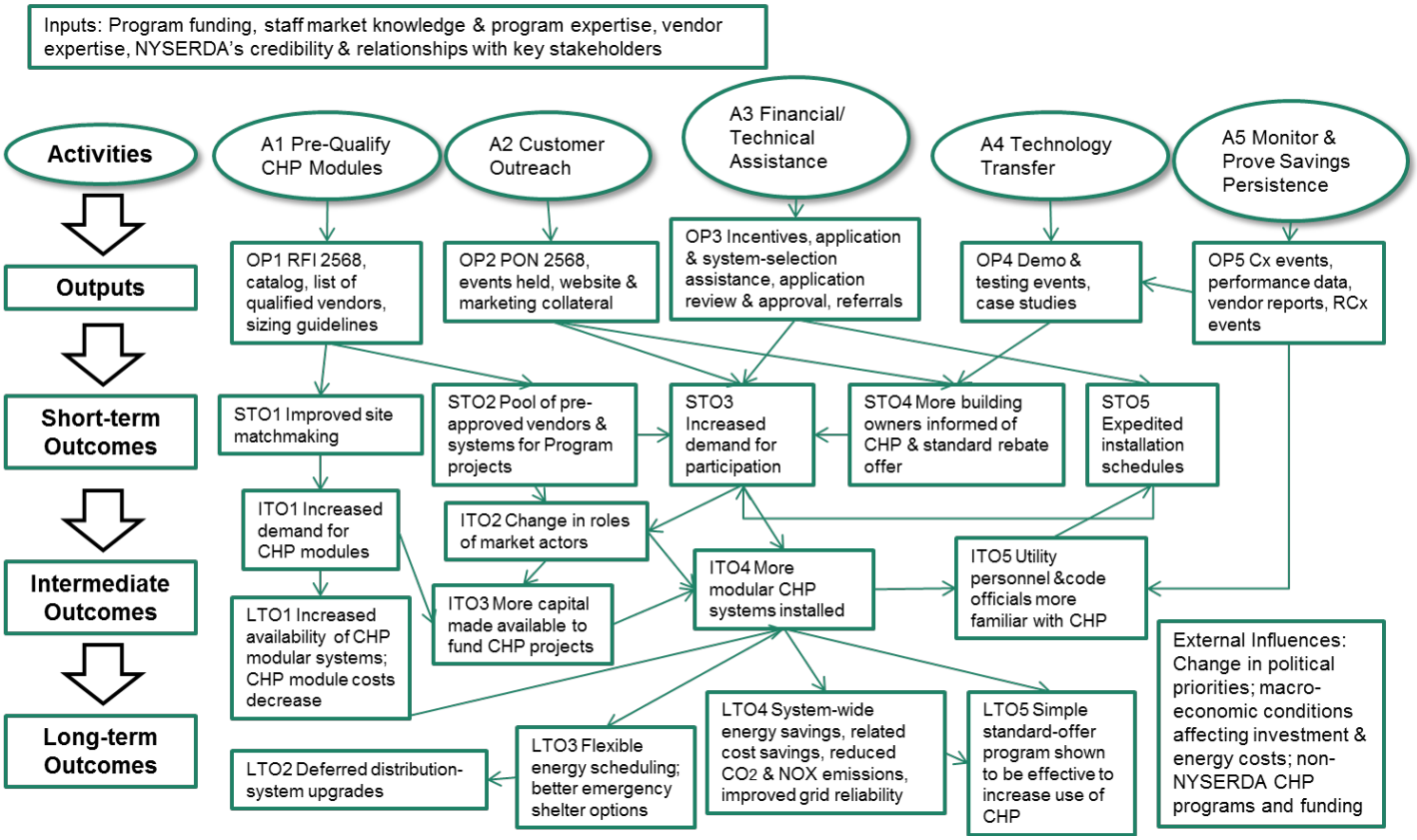


Figure B-2. Advanced Buildings Emerging Technologies/Accelerated Commercialization (ETAC) Program Logic Model Diagram

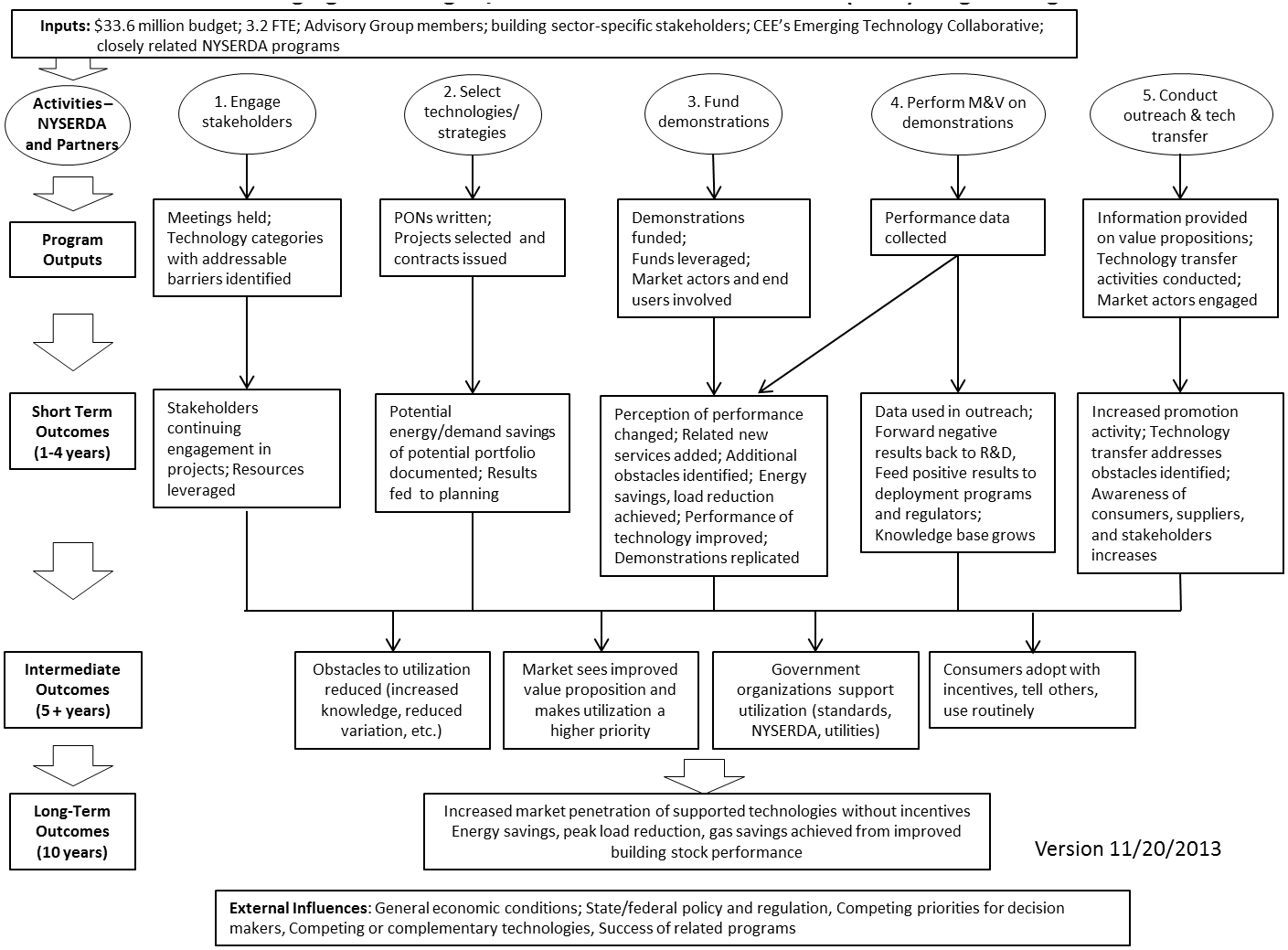
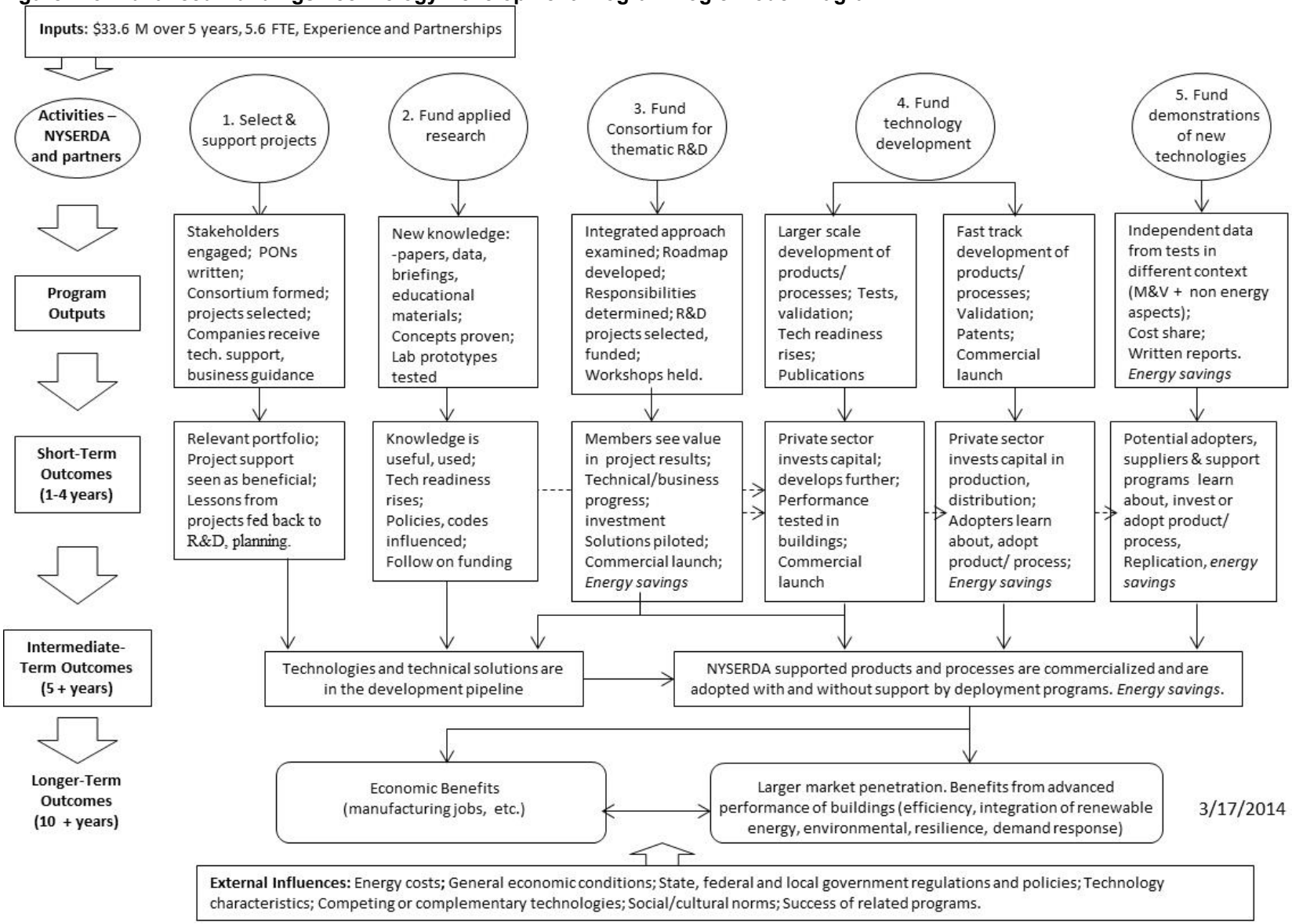


Figure B-3. Advanced Buildings Technology Development Program Logic Model Diagram



Appendix C: Evaluation Report Summaries

Smart Grid Program Early Process Evaluation

Conducted by: Navigant Consulting, April 2014.

Program Summary

NYSERDA's Electric Power Transmission & Distribution (EPTD) Smart Grid initiative promotes the systematic modernization of the electric grid by designing and managing programs focused on improving the reliability, efficiency, security, and overall performance of the electric power delivery system in New York State.[2] Program offerings provide opportunities for sharing risks associated with research, development, and demonstration (together, RD&D), and validation of innovative Smart Grid technologies and applications that improve asset utilization, improve efficiency, maintain strict security, lower consumer costs, and lower the carbon intensity of the electric-power sector. The initiative's focus includes efforts to expand grid functionality, such as through advanced energy storage, advanced monitoring, automation, management and controls, innovative demand response, integration of renewable resources, and electric vehicles. NYSERDA funds its projects through competitive solicitations issued throughout the year.

Evaluation Objectives, Approach and High Level Findings

The evaluation was comprised of the following components:

1. **Program and Stakeholder Review**: Evaluators conducted a review of program materials and in-depth interviews with program staff to document the program design and objectives, explore the alignment of expectations across program staff, evaluate internal communication and collaboration pathways, and identify areas for internal program improvement. In addition, evaluators completed in-depth interviews with 14 external stakeholders relevant to NYSERDA Smart Grid activities to examine stakeholder awareness of EPTD program activities, explore alignment of the program with stakeholder objectives, identify issues for further investigation; and evaluate stakeholder perception of program funding strategies.

2. **Benchmarking**: Evaluators reviewed EPTD projects to identify technologies that are well-supported by the program and to identify any program funding gaps. Evaluators then benchmarked the EPTD program against American Recovery and Reinvestment Act (ARRA) investments in Smart Grid transmission and distribution (T&D) programs across North America. The EPTD program is more focused on grid-based (that is, T&D) modernization than on end-use applications (such as advanced metering infrastructure [AMI] and smart appliances), and EPTD staff noted that a key driver of program activity is the desire to fill technology gaps within the Smart Grid domain, particularly in the grid-based aspect of the domain. Evaluators used this program context to focus its benchmarking efforts.

3. **Infographic**: Evaluators used observations made during the benchmarking assessment to create an infographic that depicts the spectrum of Smart Grid T&D technologies within the larger electric grid topography. The infographic depicts the categorical investment allocation – by both EPTD and ARRA-funded Smart Grid programs – by technology class to help EPTD staff compare their investment decisions to those made on a national scale, while providing a graphical context for the investment decisions.

The findings and recommendations developed by evaluators are designed to provide NYSERDA with information that can be used to increase the effectiveness of program operations.

Evaluators identified the following findings as a result of the Program and Stakeholder Review and Benchmarking efforts.

Stakeholders Desire Increased Communication Regarding Program Activity: Internal and external stakeholders noted that the EPTD program could improve its communications with stakeholders. Interviewees stated that increased communication of Program Opportunity Notice (PON) awards, as well as participating project progress updates and results, would add value to program efforts and promote stakeholder awareness of and involvement in program activities.

Stakeholders Agree That EPTD's Portfolio Investment Strategy Is Prudent: Given the scope of the T&D technology spectrum, stakeholders considered the EPTD program's strategy of making small investments across multiple technologies the most appropriate way to achieve program objectives. In addition, stakeholders felt that program investments, which are currently distributed among research studies, engineering studies, product development, and demonstration projects, are appropriately aligned with the investment needs of each of these project types. Demonstration projects, for example, receive a higher proportion of investment dollars than engineering or research studies or product development. This strategy, which is aligned with the expectations and needs of many external stakeholders, reflects a rational distribution of research and development (R&D) dollars, as demonstration projects tend to require greater investments in hardware and implementation. Stakeholders noted, however, that there appears to be a need to identify transitional funding for projects or technologies that have successfully completed the demonstration phase and are ready for scaling.

EPTD Investments Are Aligned With Broader Market Trends: Evaluator's assessment of the EPTD program's technology investments shows strong alignment with national trends in Smart Grid technology investments within the T&D domain. This alignment confirms that the EPTD program is effectively focusing its resources to fill technology gaps identified by program staff and the stakeholder community. This alignment may help spur broader economic development from program investments (such as broader use of existing technologies, commercialization of new technologies, and development of new business models in the T&D domain) as private investors respond to program accomplishments.

Evaluation Recommendations

Evaluators identified the following recommendations for EPTD program staff based on the tasks completed in this evaluation. As program staff take action on these recommendations, updates will be provided in future semi-annual reports.

Recommendation 1: Work collaboratively to develop a formal definition of Smart Grid – EPTD staff and external stakeholders would like a more formal definition of the term Smart Grid in New York State. All stakeholders agreed that a consistent definition would help the EPTD program and Smart Grid initiatives promoted by other organizations throughout the state be more strategic in terms of funding specific types of projects, technologies, and strategies. Stakeholders felt that a collaborative process involving EPTD staff, energy regulators, and other relevant stakeholder groups was needed to better articulate Smart Grid policy framework for the state. Stakeholders viewed this as an essential task and agreed that the impact of EPTD projects would likely be increased if the EPTD program had a clearly articulated vision for how individual projects fit into a comprehensive Smart Grid policy framework.

Recommendation 2: Enhance external communications and project information-sharing – EPTD program staff currently make a number of efforts to communicate the program to interested external stakeholders. These efforts include presenting project information on the NYSERDA website and meeting annually with program stakeholders to discuss EPTD projects and the program's direction. External stakeholders felt that the EPTD information dissemination process could be improved, however. Based on this feedback, as well as an examination of best practices, evaluators recommend enhancing the information dissemination processes used by the EPTD program to improve stakeholder awareness of program activities and the details of specific projects within the program. Examples include providing case summaries of participating projects and corresponding lessons learned, improving access to project information including technology advancements and performance characteristics, and scheduling events (such as webinars and stakeholder meetings) to share project information. These efforts will foster stakeholder awareness of and enthusiasm for EPTD activities and projects and will strengthen existing relationships and feedback loops between stakeholders, project representatives, and the program.

Recommendation 3: Consider developing metrics for measuring the economic impacts of EPTD investments – As noted in the EPTD program logic model, objectives of the program include increasing private investment and promoting the adoption of new business models in the T&D domain.[1] Evaluators recommends that EPTD staff consider expanding their existing project review process by capturing three types of economic metrics at the conclusion of each project to serve as tracking mechanisms for the projects. The metrics include benefits resulting – either directly or indirectly – from NYSERDA's investment in a particular project. Suggested metrics categories include: **system benefits** (such as improved statewide T&D system condition monitoring), **state economic benefits** (such as private investment generated by program activity), and **business growth** (such as new technologies commercialized by companies that received EPTD funding). EPTD staff should track these metrics beyond the lifecycle of the Program Opportunity Notice (PON) awards to assess EPTD investments over a broader time horizon.

[1] Navigant and Research Into Action, Electric Power Transmission and Distribution (EPTD) Smart Grid Program, Final Program Theory and Logic Model Report, December, 2013.

New York Products Program Market Characterization, Assessment, Process, and Market-Based Impact Evaluation Summary

Conducted by: Apex Analytics LLC, and Research Into Action, July, 2014

Program Summary

The New York Products Program (NYPP; previously called the New York Energy $mart[SM] Products Initiative), established in 1999, seeks to increase sales of residential energy-efficient appliances, lighting, power management devices, and home electronics products. NYPP works on the supply side with retailers and manufacturers and on the demand side by marketing to consumers. NYPP's overall goal is market transformation: to increase awareness of and demand for energy-efficient products, including ENERGY STAR® certified appliances, lighting, and home electronics**.**

Evaluation Objectives and High-Level Findings

This study focused on activities from program years 2010 through 2012. The primary objectives of this study were to examine the program design and delivery to understand the current program's successes and challenges, provide data and information to inform Program decision-making, and assess the NYPP's progress based on changes in markets over time with a specific focus on key progress metrics**.**

Participation to Date

As of December 31, 2012, the NYPP had 188 participating partners, representing 823 active retail store fronts by the end of 2012. Independent retailers comprised a minority of the storefronts (19%), while the majority (81%) were part of a chain. During the 2010-2012 timeframe the Program also offered 423 full retailer training sessions with a total of 3,185 participants. During this same time period, the NYPP paid 6,237 incentives worth $13.7 million to participating retailers and manufacturers, with a large shift in these incentives focused towards manufacturer buydowns. Cumulatively, from the time of its inception in 1999 to the end of 2012, the Program paid 28,897 incentives worth over $29.5 million.

Market Characterization – Findings

"Big box" retailers continue to dominate the market based on the results of the distribution channel analysis: Over 60% of the consumer survey respondent purchases came from the top five "big box" retailers, with the highest concentration for refrigerators (70%) and lowest for room air conditioning units (49%). Market share was estimated for all products through the residential end-use customer survey, sales data from the National NYPP Partners, and

NYSERDA ENERGY STAR Partners. NYSERDA area ENERGY STAR market shares were high for all products studied, with the highest market share being obtained by dishwashers (75%), followed by clothes washers (61%), refrigerators (54%), and room air-conditioners (48%).

Market Assessment – Findings

Consumer awareness and understanding of the ENERGY STAR label has effectively plateaued: aided awareness was 89% in 2010 and is slightly lower at 86% in the current (2013) telephone survey of residential end-use customers.

Market share analysis indicates that the ENERGY STAR market share of most appliances has increased only slightly since 2009. A portion of this increase can be traced to the American Recovery and Reinvestment Act (ARRA) rebates (both within New York State and nationally), available through most of the evaluation timeframe of 2010-2012 (though most of the rebates occurred in 2010). Market shares in NYSERDA territory are no longer any higher than shares in non-Program areas. The incremental cost analysis showed that ENERGY STAR features are typically bundled with high end features, the reason that simple prices are higher than modeled analyses (this is particularly true for refrigerators) and the incremental cost has actually gone down or stayed flat when modeled and controlled for covariates and inflation.

Estimated Net Savings - Findings

The Evaluation team examined data from a multitude of resources related to ENERGY STAR products in order to estimate net savings attributable to NYPP activities. Market lift of ENERGY STAR products was somewhat evident in NYSERDA-only partners, of limited impact for retailers that team with both NYSERDA and also work with national ENERGY STAR program (big box), and not evident at all for retailers outside of the program but within the NYSERDA area. The 2010-2012 Program resulted in the installation of 154,966 ENERGY STAR appliances, resulting in estimated savings of 14,816 MWh of energy, 3.4 MW of peak demand savings, and 34,214 MMBtu of fuel savings. From the Program inception (1999) through year end 2012 the Program has saved 784,832 MWh, 149 MW, and 462,008 MMBtus. Over the three year evaluation period, the NYPP contributed slightly fewer than 2 % of cumulative energy savings while accounting for almost half of the incentives.[58]

The 2010-2012 program savings translates into slightly over 10% net attribution (10% of ENERGY STAR appliance sales being reported by the program retailers are attributed to the program). Though the savings and attribution appears to be very low, this is not necessarily a result of poor program implementation or design. Rather, based on the historical performance and indicators of the program, the evaluation team believes the NYPP has helped transform the ENERGY STAR market.

[58] It should be noted that up through 2007 the NYPP included CFL lighting savings, which represented approximately 50% of program savings.

Evaluation 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**: Considering the current program design (shifting focus from all ENERGY STAR products to Most Efficient products) and the findings contained in this report, NYSERDA should carefully consider the viability and continued support of consumer appliances. It is critical to track market share very closely and monitor potential program impacts, but the current form of the program is not able to track Most Efficient products. There are significant risks and constraints associated with the future cost effectiveness and evaluability of the program, including: the uncertainty surrounding estimating baseline sales, the availability and sharing of partner sales data, potentially higher incremental costs, lower savings due to new standards, and a limited range of Most Efficient models. If early indicators show lackluster market lift, NYSERDA should seriously reconsider continuation of this program.
    - **Response to Recommendation 1:** As part of NYSERDA's strategic planning efforts staff is looking at new upstream approaches to animate and transform the market and increase the penetration of high energy impact and innovative products and technologies. Efforts will include elements such as sales staff training, and point-of-purchase educational materials and activities. Staff will be working with NYSERDA's Performance Management and Evaluation Systems staff (PMES) to identify best practices for measuring program impact. It is expected that these changes would be implemented in Q1 2015.
- **Recommendation 2**: Focus of recruitment efforts should be to engage with retailers that are not receiving support through the national ENERGY STAR program to help them sell more efficient products. Furthermore, reconsider the extensive use of manufacturer buydown incentives since they drastically increased while the program showed minimal evidence of market lift.
    - **Response to Recommendation 2:** By working more with upstream and midstream partners through educational initiatives and incentives, eliminating buydowns and working with PMES to evaluate program impact by means other than collecting sales data, which has been problematic for many retailers, it is anticipated that NYSERDA will be more strategic and opportunistic in recruiting partners, addressing barriers and motivating the market. These changes will be implemented at the same time as those identified in Recommendation 1 (Q1 2015).
- **Recommendation 3**: Change can be unsettling, especially when the focus of a program shifts from what people know and expect to the "unknown." The challenge is convincing the partners that the change is forward looking and based on findings from credible evaluations. The program needs to continue to make an effort to communicate the necessity of changes to the various partners so that it is clear why the changes are happening, the issues being addressed, and the expected benefits.
    - **Response to Recommendation 3:** To the greatest extent possible, staff will work with the NYPP Implementation Contractor to inform partners about the significant changes that are expected to be implemented in Q1 2015.
- **Recommendation 4**: Take steps to educate both the public and pool pump manufacturers/retailers about the NYPP. Specifically, NYSERDA can reach out to company headquarters, industry associations, pool pump distributors, hold educational classes/informational sessions about high-efficiency pool pumps, and engage in general awareness campaigns to increase product demand.

- **Response to Recommendation 4:** Through increased outreach efforts, the NYPP has experienced a significant increase in the participation of pool pump manufacturer/distributors in 2014. There are currently 14 promotions underway and one is with a pool pump manufacturer. This manufacturer is one of the "big three", producing the majority of pool pumps in the country. It is anticipated that these efforts with pool pump manufacturers and distributors will continue through2015 with staff working with these stakeholders to increase awareness and educate customers on the benefits of ENERGY STAR certified pool pumps.

- **Recommendation 5**: An opportunity exists for NYSERDA to educate both the public and storefront retailers about the benefits of advanced power strips. As only half of purchasers go to the store specifically for an advanced power strip, in-store materials and salesperson knowledge are likely to heavily impact consumer purchases.
  - **Response to Recommendation 5:** Q1 2015 plans include continuing the promotion of advanced power strips, but these efforts will be integrated with initiatives to promote home automation and controls. It is anticipated that the focus will be related to promoting the house as a system instead of on individual plug loads. This approach to power management should resonate better with consumer and partners.

Evaluation Methods and Sampling

The research approach used to conduct the evaluation of the NYPP consisted of the following activities:

Table C-1. Evaluation Activities for NYPP

Evaluation activity	Methodology	Research Topics
Tracking Database and Secondary Information Review	Summarize available data	▪ Establish high impact measures to focus evaluation efforts
NYSERDA (N=2) and Lockheed Martin (N=3) Staff Interviews	Telephone In-Depth Interview	▪ Understand the experiences and lessons learned in working with retailers and manufacturers ▪ Review previous and current internal research ▪ Document planned program revisions
Development of a comparison region	Review of Available Data and Telephone Surveys	▪ Establish a market baseline; comparing sales in the NYSERDA area to the control region
End-Use Customer (N=681) Surveys New York State	Telephone Survey	▪ Equipment saturations (surveys represent 840 appliances) ▪ Purchase patterns by distribution channel ▪ Awareness/influence of ARRA rebates ▪ Efficient product market share
End-Use Customer Surveys (N=651) Comparison Area	Telephone Survey	▪ Equipment saturations (surveys represent 804 appliances) ▪ Purchase patterns by distribution channel ▪ Awareness/influence of ARRA rebates ▪ Efficient product market share ▪ Establish baseline sales for attribution analysis

Table C-1 continued

Evaluation activity	Methodology	Research Topics
Participating Appliance Retailer (N=71) Surveys (Storefront)	Telephone Survey	▪ Influence of NYPP ▪ Trends in consumer purchasing behavior ▪ Storefront stocking behavior ▪ NYPP satisfaction ▪ Impacts of ARRA ▪ Sales of APS units
Participating Appliance Manufacturer (N=2) Interviews	Telephone Interview	▪ Influence of the program on business practices ▪ Changes in the market ▪ Perceived sustainability of program impacts ▪ NYPP Satisfaction
Participating Appliance Retailer (N=4) Interviews (Corporate)	Telephone Interview	▪ Influence of NYSERDA program efforts on sales of ENERGY STAR and other high-efficiency products in NY and other areas of the United States ▪ Changes in awareness, availability, pricing, and marketing efforts that may have resulted from the NYPP ▪ Perceived sustainability of program impacts ▪ NYPP Satisfaction
Non-participating Appliance Retailer (N=1) Interviews (Corporate)	Telephone Interview	▪ Perceptions regarding the program ▪ Perceived market effects due to the program
Nonparticipating and participating pool pump manufacturers, retailers and contractors (N=20)	Telephone Interview	▪ Market share for high-efficiency pool pumps ▪ Market barriers/drivers for high-efficiency pool pumps ▪ How the program might better team with manufacturers and retailers to more closely to promote high-efficiency pool pumps
DOE (N=1)/EPA (N=1)/ASAP (N=1) Interviews	Telephone Interview	▪ Influence of NYSERDA program efforts on sales of ENERGY STAR and other high-efficiency products in NY and other areas of the United States (focus on comparison areas)
Analyze pricing and incremental cost of ENERGY STAR vs. standard efficiency products	Simple Averages & Multivariate Regression models	▪ This process was done to control for product features

Table C-1 continued

Evaluation activity	Methodology	Research Topics
Data Analysis	Various Methods	▪ Program Tracking database review – to assess whether there were key measures that accounted for the majority of program savings (known as high impact measures, or HIM) ▪ Process analysis – how the program is working and how it can be improved ▪ Market characterization analysis – understanding market qualities of the key targeted products (size, distribution channels, purchasing decisions, ENERGY STAR market penetration, market share) ▪ Market Assessment Analysis – overall program effectiveness (awareness, perceived value, availability, cost, behavior changes) ▪ Attribution and program savings – understand impacts due to market transformation programs ▪ Program Tracking database review – to assess whether there were key measures that accounted for the majority of program savings (known as high impact measures, or HIM)

A comprehensive approach examined a variety of primary and secondary data sources to generate information on a number of topics, including the size of the residential market for qualifying appliances; identifying the high impact appliances that would serve as the focus of the evaluation – ultimately identified as clothes washers, refrigerators, dishwashers, and room air conditions; the type and quantity of efficiency measures installed as a result of the Program; changes in awareness and understanding of energy efficiency; and the estimated influence and attribution of energy savings to the NYPP.

R&D Demonstration Survey Round II Evaluation Summary

Lead Investigator: Industrial Economics, Inc. (IEC), March 2014

Program Summary

The New York State Energy Research and Development Authority's (NYSERDA) Research & Development (R&D) Program employs a variety of approaches designed to advance the development and market acceptance of innovative, efficient, and clean energy technologies. R&D demonstration projects are one of NYSERDA's best-established strategies for promoting these goals. Demonstration projects are designed to showcase the value and effectiveness of a new technology or process, or application of an existing technology in a commercial setting.

Demonstration projects cover a wide variety of technology areas and project types, including advanced materials, air and waste remediation, building systems, electric power delivery, energy storage, industrial products, heating and cooling, transportation, waste management, wastewater treatment, and others. The types of impacts associated with these projects are equally far-reaching.

While demonstration projects often generate impacts in their own right, these projects are designed to achieve additional impacts through successful replications. Replication projects involve an additional installation or scaling up of the technology or process demonstrated under the NYSERDA-funded project, or additional sales of the technology that was used in the demonstration. Replications may be carried out at the same site or different site as the original demonstration project, as well as by the same firm or different firm.

Evaluation Objectives and Approach

This evaluation, completed by Industrial Economics in March 2014, assesses the impacts of NYSERDA's R&D demonstration portfolio based on projects completed in 2008 – 2010.[59] The evaluation has the following objectives:

- Estimate the resource savings (e.g., kW, MWh, etc.), revenues, cost savings, and other impacts resulting from NYSERDA-funded demonstrations and replication projects.
- Characterize the number, scale, and type of replication projects.
- Determine the factors that helped or hindered replication.
- Assess the cost-effectiveness of NYSERDA's R&D demonstration portfolio.
- Evaluate participant satisfaction with NYSERDA's R&D Program.

This evaluation explored the impacts of NYSERDA's R&D demonstration projects and replication projects. Since the primary goal of the evaluation was to identify replications, projects were subjected to two screening criteria: (1) The project demonstrated a technology or process that could conceivably be replicated (i.e., it was not basic research, and the project was not terminated prior to implementation); and (2) the project was completed at least two years ago, giving sufficient lead time for replications.

The primary data source for this evaluation was a survey of R&D participants who completed demonstration projects between 2008 and 2010. The evaluators aimed to survey the individual that was most knowledgeable about each project, which included site owners, vendors or integrators. In addition to the survey, the evaluation team also drew on NYSERDA's R&D Metrics Database, Project Reports, and Research Project Updates as information sources.

Detailed Evaluation Findings, Conclusions and Recommendations

Impact and Cost Effectiveness Findings

Combined benefits from both demonstration and replication projects are shown in Table C-2. Energy savings from demonstration and replication projects are 38,542 MWh per year and 88,184 therms per year. Cost savings from demonstration and replication projects amount to nearly $65.7 million and total revenue from demonstration and replication projects adds another $1.1 billion.

[59] It follows a previous study that assessed the results of demonstrations completed in 2004 – 2007. Please refer to NYSERDA's *R&D Demonstration Survey Report*, prepared by Megdal & Associates, September 2012.

Table C-2: Summary of NYSERDA Contribution to Demonstration and Replication Impacts

	Estimated Benefits by Project Type			
Benefits Type	Power Production	Process Improvement	Product Demonstration	**Total Benefits**
Demonstration Installed Capacity (kW)	3,988	75	538	4,601
Replication Installed Capacity (kW)	4,075	63	-	4,138
Total Installed Capacity (kW)	**8,063**	**138**	**538**	**8,739**
Demonstration Electricity Savings (MWh/year)	17,062	88	4,688	21,838
Replication Electricity Savings (MWh/year)	16,558	-	146	16,704
Total Electricity Savings (MWh/Year)	**33,620**	**88**	**4,834**	**38,542**
Demonstration Fuel Savings (Therms/Year)	0	44,137	13,729	57,866
Replication Fuel Savings (Therms/Year)	-	1,000	29,318	30,318
Total Fuel Savings (Therms/Year)	**0**	**45,137**	**43,047**	**88,184**
Demonstration Cost Savings	$11,748,933	$8,514,463	$3,545,264	$23,808,660
Replication Cost Savings	$36,160,752	$5,435,000	$274,719	$41,870,471
Total Cost Savings	**$47,909,685**	**$13,949,463**	**$3,819,983**	**$65,679,131**
Demonstration Revenue	$3,194,233	$1,050,180,000	$9,590,000	$1,062,964,233
Replication Revenue	$12,515,540	$202,500	$60,480,000	$73,198,040
Total Revenue	**$15,709,773**	**$1,050,382,500**	**$70,070,000**	**$1,136,162,273**

Table C-3 shows the cost-effectiveness figures for combined demonstration and replication benefits. Overall, through 2013, the demonstration and replication projects saved or generated more than $52 for every dollar that NYSERDA invested in its R&D demonstration portfolio. The revenue figure includes a single project that reported $1.2 billion in sales. Even after removing this project from the analysis, cost-effectiveness is still positive, with $6.69 in benefits for every dollar that NYSERDA spent.[60] These figures represent the total cost savings and revenues achieved through 2013; in some cases, these benefits will continue into the future. However, the analysis was not able to account for costs that NYSERDA incurred for some of the replication projects. If NYSERDA's replication costs were included, this would lower the cost-effectiveness figures.

Table C-3: Cost Effectiveness for Combined Demonstration and Replication Benefits

Benefit Type	**Cost Effectiveness**	**Cost Effectiveness Adjusted (Outlier Removed)**
Demonstration and Replication **Cost Savings** per NYSERDA $	$2.90	$2.90
Demonstration and Replication **Revenues** per NYSERDA $	$50.09	$3.80
Demonstration and Replication Dollars (**Revenues and Cost Savings**) per NYSERDA $	$52.98	$6.69

[60] NYSERDA spent $22.7 million on 124 R&D demonstration projects that closed in 2008-2010, including surveyed and non-surveyed projects.

Conclusions

NYSERDA's R&D demonstrations have mostly achieved their objectives while generating substantial impacts. Nine out of 10 survey respondents reported meeting "all" or "most" of their objectives, with over half of all projects meeting all of their objectives. Respondents cited a wide range of project impacts, including energy efficiency, demand reduction, power production, environmental quality improvement, marketability, knowledge creation, and many others.

Demonstrable savings and technical expertise are important factors for developing replication projects in New York. Technical expertise and demonstrable savings achieved from demonstrations were the most frequently mentioned factors that support the development of replication projects in New York. This finding is consistent with NYSERDA's rationale for conducting demonstration projects, which is to showcase the value and effectiveness of a new technology or process in a commercial setting.

NYSERDA's R&D demonstration portfolio performs well across several measures of cost-effectiveness. The revenue benefits are quite high, particularly with one demonstration project that reported $1.2 billion in sales. This result exemplifies the nature of R&D investment, where a small number of very successful projects typically justify the cost of the whole portfolio. It is notable that even without this one project, the benefits still exceed NYSERDA's investment.

Participant satisfaction with NYSERDA's R&D Program appears very high. Ninety-two percent (92%) of survey respondents agreed or strongly agreed with the statement: "Overall, I am satisfied with my participation in NYSERDA's R&D Program." Respondents also gave very high ratings (greater than 80%) for communications with project participants and qualifications of program staff. Though generally satisfied, respondents offered several suggestions for ways in which NYSERDA could further promote demonstration and replication projects in New York. These suggestions include, among others: simplify the application process; post project reports online and offer an online database of project results; align projects with relevant policies; facilitate more knowledge sharing activities with peers; and enhance communications with end users.

Data limitations pose challenges for evaluating NYSERDA's R&D demonstration projects. Several projects were missing contact information or had outdated or incorrect information. In other cases, the company contact was correct, but the Principal Investigator had moved on and could not be located. In addition, many respondents had difficulty recalling the benefits of projects that ended two or more years ago.

Recommendations

Recommendation 1: Fully leverage information in the R&D Metrics Database and Final Project Reports. The R&D Metrics Database was created in 2009. It did not exist when the first survey was conducted, and it was not fully populated for the second (current) survey. Assuming these issues are addressed for future rounds, NYSERDA may be able to obtain benefits data for most or all projects before conducting the survey.

Recommendation 2: Interview all three types of participants for each demonstration project. Each NYSERDA demonstration project typically involves three categories of participants: 1) integrators who bring together market actors and "package" the project; 2) vendors who supply the technology, product, or process; and 3) site owners. Re-survey demonstration projects from prior rounds.

Recommendation 3: Re-survey demonstration projects from prior rounds. The first two surveys focused on two distinct populations: projects completed in 2004-2007, and projects completed in 2008-2010. NYSERDA could consider re-surveying projects from 2004-2010, to learn whether demonstration benefits persisted and whether there have been any additional installations or sales of the demonstrated technology.

Recommendation 4: Clarify the definition of replication and track NYSERDA's replication costs. The first two R&D surveys defined replication projects broadly, and included replications with and without NYSERDA funding. However, NYSERDA is considering whether NYSERDA-funded replication projects should be "counted" as market replications. Going forward, NYSERDA should make a determination as to whether NYSERDA-funded replications will or will not be "counted" for the survey. The first two surveys interviewed a single type of respondent for each demonstration site- e.g., integrator, vendor, or site owner. Depending on available time and resources, NYSERDA may be able to survey all three types of participants for every site in future rounds. This would provide more comprehensive information about the benefits of NYSERDA's demonstrations.

Recommendation 5: Survey the replication sites. The first two rounds only surveyed demonstration participants, and asked if they were aware of any replication projects. Some respondents were unsure about the number of replications; others were unsure what specific benefits the replications had produced. Using a "snowball" survey technique, NYSERDA could ask demonstration respondents for "leads" at replication sites and follow up directly with the replicators.

Recommendation 6: Explore the impacts of knowledge creation. Sixty-two percent (62%) of respondents in the current survey identified knowledge creation as a direct benefit of their project – more than any other benefit category. NYSERDA could further explore the tangible and intangible benefits of knowledge creation in future rounds of the survey.

The Workforce Development Initiative Evaluation Summary

Program Evaluation Activities

Research Into Action conducted an early stage process evaluation of the WFD Program that was completed in March 2014. As described in the T&MD Operating Plan, the process evaluation uses an adapted Kirkpatrick four-level framework for evaluating training programs.[61] The four levels of a training assessment are:

4. Reaction: response of the trainee.
5. Learning: degree intended knowledge, skills, and attitudes, are acquired.
6. Behavior: workplace performance attributable to training.
7. Results: effects of training on the workplace.

This summary of findings addresses these four Kirkpatrick areas of assessment. It is worth noting that this process evaluation design was not able to assess fully the fourth Kirkpatrick level, as it only obtained opinions and not actual observations about training results.

The evaluation was comprised of the following components:

- Secondary data analysis of the pre- and post-training surveys of trainees administered by training partners. The evaluators constructed a database of completed training surveys and analyzed trends in the data on areas such as: satisfaction with training, interest in pursuing further training, and employment in, or interest in pursuing, green energy careers. Data were separated into two cohorts of trainees: the Career Pathways (CP) trainees, who generally received basic skills training in construction trades, and Technical Training (TT) trainees, who took more advanced training such as energy modeling and code compliance.
- Telephone interviews of CP and TT trainees, and of On the Job Training (OJT) employers and employees.
    - CP/TT post-training interviews: Interviews of 19 CP and 19 TT trainees, selected randomly from the Pre/Post survey database. (Goal was 12 to 18 for each group.)
    - On-the-Job Training (OJT) employer interviews: Interviews with 18 employers (goal was 15 to 20) from a variety of EE/RE/AT businesses working with NYSERDA's WFD OJT program.
    - OJT trainees interviews: interviews a sample of 26 trainees working for the interviewed OJT employers. (Goal was 25 to 30.)

Evaluation Findings

CP & TT Survey Secondary Data Analysis: Between summer 2012 and late 2013, 23 Training Partners submitted about 400 pre-training surveys and 400 post-training surveys from approximately 700 unique trainees, spanning 44 unique courses (22 CP and 22 TT). About 500 TT trainees and 200 CP trainees completed the surveys. The courses ranged from basic-skills training for Career Pathways trainees, such as Basic Construction, to advanced-skills training for Technical Training trainees, such as Energy Modeling and Code Compliance.

Reaction: The TT and CP trainees that completed pre- or post-training surveys were satisfied with their experiences of the training overall; their expectations of the training were met for almost half of the trainees, and exceeded for 45% of the trainees. Three-quarters of the CP and TT trainees described the training as appropriate for their level of knowledge, while the other 25% of trainees was split evenly in their experience that the training was either too hard or too easy. However, interview findings, discussed below, suggest a much lower rate of preparedness among CP trainees.

Learning: Nearly four-fifths (79%) of the TT trainees and 85% of the CP trainees reported that the training definitely or probably prepared them for a job in the energy efficiency field, while the other trainees were not sure how well the training prepared them. Further analysis to be conducted subsequently will include an exploration of the skill and experience level of the trainees prior to the training compared to how well prepared they felt after the training.

Behavior: Immediately after the training, 65% of the CP and TT trainees reported they planned to take additional energy efficiency or renewable energy training, while 5% of TT and 16% of CP trainees anticipated taking other training unrelated to energy efficiency or renewable energy; the remaining trainees did not plan to take any additional training. Over two-thirds (70%) of the TT trainees and 80% of the CP trainees reported they probably or definitely would either continue or pursue a job in the energy efficiency field. Subsequent analyses will include an exploration of the relationship between current employment status and jobs seeking or maintaining. Consistent with CP objectives, 70% of CP trainees reported they were unemployed or employed in areas other than energy efficiency at the start of the training; most CP trainees at the conclusion of the training reported they planned to pursue employment in an energy efficiency or renewable energy career. Consistent with TT objectives, 90% of TT trainees reported they were employed at the start of the training, and 75% had experience in the energy efficiency field; additionally 65% of the TT trainees reported that they were planning to pursue additional training in energy efficiency or renewable energy.

Career Pathways: Trainees' Assessment (Phone Interview)

Reaction: CP respondents reported mixed preparation to understand course content. Specifically, about half of CP respondents (9 of 17) reported having sufficient preparation to understand course content (rating 8 or higher on a 0 to 10 preparation scale), while the other half (8 of 17) reported having partial preparation (5, 6, or 7 on the same scale). Most CP respondents (15 of 19) reported more than half of course content was new.

Learning: About half of CP respondents (8 of 15) reported the training provided good preparation (rating 8 or higher on a 0 to 10 preparation scale) for their current work or advancement in their field, while two-fifths of CP respondents reported the course provided partial preparation (5, 6, or 7 on the same scale). Over two-thirds (11 of 16) respondents noted the training was relevant or helpful to their work.

Behavior: Four of the five respondents reported using skills learned from their training; two stated they use skills learned during their training on a daily basis. The one CP respondent who did not report using skills learned during training noted taking this course as a refresher. Most (12 of 17) CP respondents reported they were eligible to pursue certifications after receiving training, and three-quarters (9 of 12) pursued these certifications.

Results: About half of CP respondents (8 of 17) are currently employed, a higher percentage than the number employed during training (6 of 19). One CP respondent reported the training helped him obtain a promotion.

Technical Training: Trainees' Assessment (Phone Interview)

Reaction: TT respondents reacted positively to the WFD training. Most TT respondents (16 of 19) had sufficient preparation to understand course content. Additionally, most TT respondents (16 of 19) mentioned the information presented during their course was new.

Learning: Providing evidence that TT respondents learned from their training, almost two-thirds of respondents (12 of 19) reported the training provided good preparation (rating 8 or higher on a 0 to 10 preparation scale) for their current work or advancement in their field. Over three-quarters of TT respondents (15 of 19) noted the training was relevant or helpful to their work, and three respondents said they have or will advance in their career because of the training they received.

Behavior: Most TT respondents (16 of 18) reported regularly using skills learned via their training. Three of these respondents noted using skills on a daily basis. All interviewed TT trainees reported they were eligible to pursue certifications after receiving their training and all respondents pursued these certifications.

Results: All TT respondents are currently employed; two respondents were unemployed at the time of the training. Three TT respondents reported the training either had, or would, assist them in obtaining a promotion.

OJT Employers: Employers' Assessment (Phone Interview): NYSERDA engaged 52 employers in the fields of energy efficiency and renewable energy in providing on-the-job training to 250 employees.

Reaction: The employers had universally positive reactions to the program. All interviewed employers were willing to recommend the program to other companies in the clean energy field. Employers stated that they would recommend the program because it produced more potential employees (4 of 18), it helped them financially (3), and it reduced risk (2).

Learning: Employers observed that OJT trainees had developed skills and had become more adept at assigned tasks. Half of the employers had defined the OJT program objectives on their own and the other half of the employers identified objectives in conjunction with the DOL. Employers delivered training primarily using several different methods including: shadowing other employees (9 of 18), on-the-job training (8), and third-party training (8). Some also provided lessons through one-on-one training (5) or in a classroom setting (3). Most employers reported that trainees were meeting (10) or exceeding (6) expectations for performing the new tasks they were learning.

Behavior: Employers observed positive improvements in the behavior of the OJT trainees as the program progressed. All employers regularly assigned tasks to trainees within six months or less of being trained on a task. One employer reported that it took longer than six months to assign work to auditors whereas the other trainees were regularly working on their tasks sooner. Employers reported that over the course of training, the quality of work increased in most cases with the following exceptions: Two employers had a trainee fail to meet expectations in improvement on the job and two trainees quit before the employer could make an assessment. Otherwise, work quality either met or exceeded expectations for all other trainees.

Results: Employers observed that the program successfully prepared trainees to work in the field, including direct hires. Most employers reported that the training prepared the trainees for work in the clean energy field, indicated by a median rating of 8 on a preparedness scale of 0 to 10. Employers reported it was unlikely that they would have hired the trainees without the training (median score of 1.5 likelihood of hiring on a scale of 0 to 10). Employers are hiring the individuals in the OJT training, with more than half of the employers (10 of 18) having already hired trainees or in the process of hiring trainees; another five employees reported that it is "very likely" they will hire from the program.

OJT Employees: Trainees' Assessment (Phone Interview)

Reaction: OJT trainees are highly satisfied with their OJT experience; the great majority indicated the OJT was an excellent fit for them (24 of 26 rated this item as 9 or 10 on a 0-10 satisfaction scale) and that they would recommend OJT to others interested in working the energy efficiency field (25 of 26). Similarly, most (22 of 26) trainees indicated no improvements were needed when asked what could be done to better serve trainees. Two trainees with suggestions for improvement indicated they would have liked some classroom training in tandem with the OJT, as they needed some additional time to go over the material before going into the field.

Learning: OJT trainees reported learning and acquiring a wide variety of new skills during the OJT. Most commonly, trainees indicated they began their training by shadowing and assisting a team of experienced direct installers (11 of 26). Others spent the beginning of their OJT learning and practicing auditing skills (7 of 26) or company procedures (such as computer systems and paperwork, 5 of 26). Seven other respondents offered vague descriptions of their initial responsibilities, such as "shadowing the crew on various tasks." In all, OJT trainees commonly reported learning about conducting audits (9 of 26) and retrofits (insulation, weatherization, and lighting; 10 of 26), general energy efficiency industry and building science principles (7 of 26), and basic job skills (organizational and communication skills, completing paperwork, basic computer skills, and management skills; 7 of 26). OJT trainees reported they acquired their new skills and knowledge via shadowing and assisting experienced crewmembers.

Behavior: OJT provides trainees with the skills they need to succeed in their new energy efficiency career; the majority reported they now work independently (without supervision) and some noted they now manage crews or projects. Most trainees reported that they were able to apply their training to a job site within a month or less from the start of their training, with eight indicating this hands-on experience was supplemented with classroom type training.

Results: Most interviewed trainees also report that the training prepared them to work in the energy efficiency field. Most trainees felt it was very unlikely they would have been working in a similar job (23 of the 24 that offered a response) or the energy efficiency field in general without the OJT program (21 of 26 rated this item as a 0-3 on a 0-10 likelihood scale). Trainees not making this assessment already had some exposure to the field. About half (14 of 26) of the sample reported plans to take additional training on energy efficiency or renewables in the next year, more than half (9 of 14) of which report their employer will pay for some or all of the training.

Evaluation Recommendations

Recommendation 1: Encourage training partners to incorporate into CP registration information a six or ten item checklist of the basic educational skills (reading and math) needed for understanding course content. Either provide examples or structure the items as a simple quiz that prospective applicants can take to see if the course is appropriate for them.

Response to Recommendation 1: NYSERDA requires CP training providers to document their screening procedures to ensure that enrollees have attained appropriate mathematics and literacy skills before enrolling in a technical training program. For most programs, the Test of Adult Basic Education (TABE) test is employed.

Recommendation 2: Encourage OJT employers to plan for their trainees to attend at least one TT course, to augment their hands-on learning with formal education that will provide a broader and deeper context for their work activities.

Response to Recommendation 2: NYSERDA disseminates information about technical training programs with a network of contractors. However, even with reduced tuition costs, the financial burden can be a barrier. Efforts continue to be made to communicate training opportunities to this audience with more regularity.

Recommendation 3: After an OJT employer has received an initial funding award, stipulate that subsequent OJT funding must be applied to employees with tenure at the firm of less than six months, to encourage new hires.

Response to Recommendation 3: NYSERDA no longer allows any OJT funding for incumbent workers; therefore all incentives are limited to new hires. In June 2014, NYSERDA eliminated the per business funding cap (previously set at $150,000) so that companies would not be hindered in their ability to hire and train new workers as necessitated by demand for services

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and funding 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.

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New York State Energy Research and Development Authority

17 Columbia Circle
Albany, NY 12203-6399

toll free: 866-NYSERDA
local: 518-862-1090
fax: 518-862-1091

info@nyserda.ny.gov
nyserda.ny.gov

NYSERDA Technology and Market Development Program

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State of New York
Andrew M. Cuomo, Governor

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