New York State Energy Research and Development Authority

NYSERDA Technology and Market Development Program

Semiannual Report Through December 31, 2013

Final Report
March 2014

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 and technology, transforming New York's economy, 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 Technology and Market Development Program

Semiannual Report Through December 31, 2013

March 3, 2014

NYSERDA Record of Revision

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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.

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

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.

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 SBC3 funds that were uncommitted as of December 31, 2011 with the option to submit a proposal for use of those funds, as well as SBC3 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 SBC3 funds as directed in the October 24, 2011 Order. On March 30, 2012, NYSERDA submitted a petition proposing ways to allocate those uncommitted SBC3 funds among three primary activities:

- Develop and implement programs to reduce solar photovoltaic (PV) balance-of-system (BOS) costs and support priority 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)).

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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/Energy-Data-and-Prices-Planning-and-Policy/Program-Planning/-/media/Files/General/System-Benefits-Charge/TMD-OP.pdf.

- 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 also requested to apply $1.75 million in uncommitted SBC3 funds to New York State Cost Recovery Fee assessments applicable to SBC3. In addition, NYSERDA requested approval to allocate uncommitted SBC3 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.

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 SBC3 funds.[5] PSC approved the reallocation of SBC3 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 SBC3 funds to New York State Cost Recovery fee assessments. The PSC did not approve NYSERDA's request to reallocate uncommitted SBC3 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.

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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 Petiton to transfer $7.5 million in uncommitted SBC3 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.

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 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.

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 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

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[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.

[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.

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 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 SBC3 programs (e.g., Smart Grid, Advanced Clean Power, Clean Energy Business Development, Environmental Monitoring, Evaluation and Protection) continue to accrue and are reported in more detail in the SBC3 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

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 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 2013 annual report and as directed by DPS Staff.

2.1.2 Solicitations Released

In the past six months of the T&MD Program[9], 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 July 1, 2013 were included in prior semiannual reports and are omitted from Table 2-1.

[9] Solicitations released during the first six months of 2013 were listed in the semiannual report filed in August 2013.

Table 2-1. Solicitations Released from July 1, 2013 through December 31, 2013

Solicitation Number	Solicitation Name	Solicitation Release Date	Solicitation Closing Date
PON 2781	Advanced Transportation Technologies	7/3/2013	9/18/2013
RFP 2485	Implementation Contractor for NYSERDA Motor Systems	7/9/2013	8/28/2013
PON 2762	Workforce Training for Energy Efficiency	7/11/2013	9/10/2013
RFI 2568	CHP Acceleration Program	7/20/2013	11/16/2016
RFP 2693	NY State Energy Code Training	8/13/2013	10/16/2013
PON 2755	Electric Vehicle-Enabling Technology Demonstration	8/21/2013	10/22/2013
PON 2725	Multifamily Emerging Technologies & Accelerated Commercialization Demonstration Program	10/8/2013	11/21/2013
PON 2752	Emerging Technologies and Accelerated Commercialization-Residential Program Solid State Lighting	11/4/13	12/19/13
RFP 2573	Cleantech Commercialization Toolkit	12/17/2013	1/23/2014

Notes: 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.

* These solicitations are open until closing date indicated or until available funds are committed.

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, demonstration and pilot projects; signed 10 contracts for research studies on technologies, market barriers and policies related to increased smart grid implementation in New York State and is supporting 19 clean energy companies. Approximately $10 million has been leveraged to support smart grid infrastructure.
- As part of the Advanced Clean Power Initiative, 12 clean power technology projects are under contract and 12 clean energy companies are receiving support through the Clean Power Technology Innovation Program. In addition, two projects have been contracted and two discussions with stakeholders have been held to support the Resource Development component of the program.
- The CHP Aggregation and Acceleration Program pre-qualified 64 pre-packaged CHP systems for its catalog and has committed 14 CHP Aggregation sites for an estimated 2.2 MW in peak load electric generation, 13,695 MWh in annual electric generation and 17,803 MMBtu of annual primary energy savings. The CHP Performance Program has committed funding on seven projects for an estimated

29 MW in peak load electric generation, 240,000 MWh in annual electric generation and 310,000 MMBtu of annual primary energy savings.

- As part of the Advanced Buildings Program, 23 advanced building technology projects have been contracted and 16 clean energy companies are receiving program support. Approximately $5.4 million has been leveraged to support advanced building technologies. In addition, the Advanced Buildings Enabling Demand Response (DR) and Load Management Program has supported interval meter and enabling technology installations representing approximately 57 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.
- As part of the Market Development Program, six Market Research studies have been completed with an additional seven studies underway. In addition, 15 new retail partners and 35 new manufacturer partners have signed onto the New York Products Program and approximately 171 special promotions have been approved in product buy-downs since January 2012. The Business Partners Program has recruited 67 new commercial lighting partners and 80 new HVAC partners. In addition, the program has provided lighting business partners with continuing education credits through 13 webinars and six lighting expos while HVAC partners have been provided 39 trainings across the State. The Education/Behavior Change component of the program has sponsored and supported one LIFE conference and 510 community partnerships have been supported.
- As part of the Direct Support for Business Acceleration component of the Clean Energy Business Development (CEBD) Program, 19 companies have received Entrepreneurs-in-Residence support. As part of the Innovative/Entrepreneurial Capacity component of CEBD, 74 clients have been supported in incubators or Proof-of-Concept Centers. This component has also helped clean energy businesses leverage $7.4 million in funds.
- The Workforce Development Program has trained more than 1,400 individuals on renewable and emerging technologies and has held 40 on-the-job and hands-on renewable energy/advanced technology trainings. In addition, two community colleges/training organizations have been added to the program's Renewable Energy and Advanced Technology training network.
- EMEP has contracted 27 new research projects and conducted 13 workshops and briefings. Approximately $3.2 million has been leveraged to support projects and sponsored research. In addition, eight 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 two years of program operation. Performance milestone tables (included for each initiative in Section 3 of this report) show progress through December 31, 2013 against the Operating Plan's expected benefits in the 2012-2013 timeframe. Benefits achieved in the first two years of the T&MD Program should be viewed with two important points of context:

- All programs are competitively bid, requiring time to develop and issue solicitations, select winning bidders and negotiate contracts. Several solicitations were issued in 2012 and 2013.
- 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.

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 2014 through 2016 or later and have not yet begun reporting savings. The only program reporting savings at this point is the Market Development Program.

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

	2012 - 2016	Out Years	Total	Through December 31, 2013
On-site Electricity Savings from Energy Efficiency Projects, Technologies, Replications, and Codes & Standards (Cumulative Annual[b] MWh)	541,600 MWh	647,700 MWh	1,189,300[c] MWh	59,261[d] MWh
MWh Savings from Funded Project and Technology Installations	*171,600*	*900*	*172,500*	*59,261[d]*
MWh Savings from Anticipated Replications not Directly Funded by Program		*29,800*	*29,800*	*NR*
MWh Savings from Codes & Standards Activities supported by the Program	*370,000*	*617,000*	*987,000*	*NR*
On-site Fossil Fuel Savings from Energy Efficiency Projects, Technologies, Replications, and Codes & Standards (Cumulative Annual[b] MMBtu)	3,323,200 MMBtu	2,802,600 MMBtu	6,125,800[e] MMBtu	118,803[f] MMBtu
MMBtu Savings from Funded Project and Technology Installations	*965,200*	*7,800*	*973,000*	*118,803*
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 MW	242.4 MW	375.4 MW	57 MW
Demand Reduction from Funded Project and Technology Installations	*43*	*5.3*	*48.3*	*57*
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*	*207*	*297*	*NR*

Table 2-2 continued

	2012 - 2016	Out Years	Total	Through December 31, 2013
On-site Generating Capacity Installed from CHP Projects, Technologies, and Replications (Cumulative MW)	18	29.5	47.5	31.2 MW[g]
MWs Installed from Funded Project and Technology Installations	*18*	*19.5*	*37.5*	*31.2 MW[g]*
MWs Installed from Anticipated Replications not Directly Funded by Program	*0*	*10*	*10*	*NR*
On-site Electricity Generated from CHP Projects, Technologies, and Replications (Cumulative Annual MWh)[h]	121,000	216,250	337,250	253,695 MWh[g]
MWhs Generated from Funded CHP Project and Technology Installations	121,000	155,250	276,250	253,695 MWh[g]
MWhs Generated from Anticipated Replications not Directly Funded by Program	0	61,000	61,000	NR
Primary Energy Savings from CHP Installations (Cumulative Annual MMBtus)[h]	157,300	281,125	438,425	327,803 MMBtu[g]
MMBtu Consumed from Funded Project and Technology Installations	157,300	201,825	359,125	*327,803 MMBtu[g]*
MMBtu Consumed from Anticipated Replications not Directly Funded by Program	0	79,300	79,300	NR
System-wide CO_2 Emission Reductions – On-site and Central Station (Annual Tons)	418, 512 Tons	432,209 Tons	850,721 Tons	25,469 Tons
Advanced Technologies Reaching Commercial Availability	47 Technologies	42 Technologies	89 Technologies	7 (Previous SBC-funded projects resulted in 98 technologies reaching commercial availability)
Improved Technologies Adopted by the Market or Further Supported by Deployment Programs	10 Technologies	9 Technologies	19 Technologies	NR (Progress with prior funding captured in SBC3 report)

Table 2-2 continued

	2012 - 2016	Out Years	Total	Through December 31, 2013
Commercial Sales of New and Improved Supported Technologies	$26.5 million	$157.7 million	$184.2 million	NR (Progress with prior funding captured in SBC3 report) [i]
Funding Leveraged (co-funding and outside investment) by NYSERDA's Investment	$696.5 million	$103 million	$799.5 million	$174.3 million
Clean Energy Businesses Graduating from Incubators	90 Businesses	72 Businesses	162 Businesses	4 (Previous SBC-funded projects have graduated 39 businesses from incubators)
Clean Energy Companies Receiving Support	525 Companies	200 Companies	725 Companies	66 Companies
Retail and Supply Chain Businesses Partnering with NYSERDA to Increase Market Share of Energy Efficient Products	1,750 Partners		1,750 Partners	1,607 Partners
Clean Energy Training for Practitioners[j]	39,056 Trainees	9 Trainees	39,065 Trainees	1,502 Trainees
Supply Chain Training to Facilitate Adoption of Energy Efficient Products	1,525 Partner Employees		1,525 Partner Employees	708 Partner Employees
Adoption of Clean Energy Business Models, Practices or Strategies	Record will be maintained and reported			Outcomes to be determined through program tracking and evaluation

Table 2-2 continued

	2012 - 2016	Out Years	Total	Through December 31, 2013
Policy Development and Decisions Supported by NYSERDA studies, assessments and data[k]	Record will be maintained and reported			Outcomes to be determined through program tracking and evaluation
Net Additional Jobs as a Result of NYSERDA Investment[k]	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[k]				

[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] Shows a reduction from the June 30, 2013 report to account for the removal of EEPS CFL savings inadvertently included in Market Development Products Program savings estimates.

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

[f] Shows a reduction from the June 30, 2013 report to account for an error in how MMBtu savings were calculated for the Market Development Products Program.

[g] 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.

[h] 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.

[i] These metrics were reported in the 2012 year-end report as commercialization metrics generally require at least two years to be realized. Progress with prior SBC3 funding was also captured in the SBC3 annual report; an update to this report, showing SBC3 progress through 2013 is under development and will be available soon.

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

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

2.1.4 Budget and Spending Status

Table 2-3 shows the T&MD program budget and financial status through December 31, 2013. Committed and spent funds are also shown as a percent of the total 2012-2016 budget. As of December 31, 2013, two years of T&MD activity has been completed of the five-year program (i.e., 40%); thus, as shown in Table 2-3, NYSERDA's funding commitment level is on target at a portfolio level.

Table 2-3. Budget and Financial Status for T&MD Programs through December 31, 2013

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	**$188,053,344**	**$4,602,561**	**2.4%**	**$75,573,391**	**40.2%**
Smart Grid/Electric Vehicle	$61,281,382	$584,195	1.0%	$25,776,649	42.1%
Advanced Clean Power	$51,771,962	$3,169,600	6.1%	$19,068,710	36.8%
Combined Heat and Power[c]	$75,000,000	$848,765	1.1%	$30,728,032	41.0%
Building Systems	**$92,015,954**	**$1,970,847**	**2.1%**	**$53,806,311**	**58.5%**
Advanced Buildings	$75,336,160	$1,627,777	2.2%	$44,568,613	59.2%
Advanced Energy Codes & Standards	$16,679,794	$343,070	2.1%	$9,237,698	55.4%
Clean Energy Infrastructure	**$169,691,375**	**$15,295,288**	**9.0%**	**$66,518,803**	**39.2%**
Market Development	$70,380,281	$12,584,437	17.9%	$22,937,485	32.6%
Clean Energy Business Development	$41,761,046	$1,258,692	3.0%	$21,770,136	52.1%
Environmental Monitoring, Evaluation and Protection (EMEP)	$18,550,048	$894,348	4.8%	$4,881,130	26.3%

Table 2-3 continued

Workforce Development[c]	$39,000,000	$557,810	1.4%	$16,930,052	43.4%
Total Program	**$449,760,673**	**$21,868,694**	**4.9%**	**$195,898,505**	**43.6%**
Administration (8%)	**$39,765,533**	**$13,731,697**	**34.5%**	**$13,740,740**	**34.6%**
NYS Cost Recovery Fee (1.7%)	**$7,585,944**	**$1,002,008**	**13.2%**	**$1,002,008**	**13.2%**
Evaluation (5%)	**$26,363,458**	**$822,805**	**3.1%**	**$8,914,495**	**33.8%**
Grand Total	**$523,475,608**	**$37,425,204**	**7.1%**	**$219,555,747**	**41.9%**

[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 two years of the five-year funding period. As noted in Section 2, benefits achieved in the first two years of the T&MD program should be viewed with two important points of context:

1. All programs are competitively bid, requiring time to develop and issue solicitations, select winning bidders and negotiate contracts. Several solicitations were issued in 2012 and 2013.
2. 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.

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 December 31, 2013. 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, 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, in a briefing to the administration late last year on the results of NYSERDA's pending benefit/cost assessment, analysis of policy options and on NYSERDA's research and outreach plans for Off-Shore Wind (OSW), NYSERDA was asked to first engage in a study of cost reduction opportunities for 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.

- For CHP Aggregation and Acceleration, the lag is due to program start up, including development of the product catalog (which establishes the list of eligible measures, and now consists of ten pre-approved vendors with 64 pre-approved systems, five of such vendors have already submitted applications to the program showing the beginnings of program uptake). Additionally, recent rollout of "customer acquisition" support through Expos has not yet had its expected impact, and a series of speaking engagements at customer-focused events will soon occur, in early 2014, in Manhattan.

Table 3-1. Power Supply & Delivery and Combined Heat and Power Budget and Financial Status as of December 31, 2013

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 2012-2016 Budget Committed
Smart Grid/Electric Vehicle	**$61,281,382**	**$584,195**	**1.0%**	**$25,776,649**	**42.1%**
Smart Grid	$47,284,415	$583,084	1.2%	$22,172,008	46.9%
Electric Vehicle	$13,996,967	$1,111	0.0%	$3,604,641	25.8%
Advanced Clean Power	**$51,771,962**	**$3,169,600**	**6.1%**	**$19,068,710**	**36.8%**
Technology Innovation	$27,826,749	$2,788,013	10.0%	$10,281,588	36.9%
Resource Development	$13,945,213	$381,588	2.7%	$1,255,731	8.8%
Solar Cost Reduction	$10,000,000	-	0.0%	$7,561,391	75.6%
Combined Heat and Power[c]	**$75,000,000**	**$848,765**	**1.1%**	**$30,728,032**	**41.0%**
CHP Aggregation and Acceleration	$25,000,000	$452,399	1.8%	$4,297,421	17.2%
CHP Performance	$50,000,000	$396,365	0.8%	$26,430,611	52.9%
Power Supply & Delivery Total	**$188,053,344**	**$4,602,561**	**2.4%**	**$75,573,390**	**40.2%**

[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 the Commission'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 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 December 31, 2013 in an effort to meet the previously-stated milestones and anticipated results:

- NYSERDA meets 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 Electric Power Transmission and Distribution (EPTD) Smart Grid Program solicitation (PON 2474) released in April 2012 resulted in 70 proposals that requested more than $35 million in funding. Fifteen smart grid projects were selected to be funded that represent a commitment of $7.95 million of NYSERDA funding and are leveraged by an additional $10.88 million of private sector co-funding and investment.
- Three additional smart grid contracts were signed for the period representing $135,000 of NYSERDA funds and $50,000 in cost share. These projects included support for a Small Business Innovative Research project, sponsorship of an industry conference, and membership dues for the NYS Smart Grid Consortium.
- Projects stemming from PON 2474 include developing a product to optimize customer site supply voltage, demonstrating utility-scale transportable energy storage, a study of the feasibility of implementing a thermal energy storage system, and developing a utility distribution automation control system.
- Under PON 2474, 14 contracts have been signed utilizing the smart grid funding source; these contracts represent $6.9 million of NYSERDA funds and leverage $8.0 million in cost share.
- 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 Round 1 resulted in 41 proposals that requested more than $17 million in funding. Eleven smart grid projects were selected to be funded representing a commitment of $4.4 million of NYSERDA funding that is leveraged by an additional $2.2 million of private sector co-funding and investment.

NYSERDA has historically funded smart grid projects with SBC3 resources. Benefits from this SBC3 smart grid investment continue to accrue and were reported in the 2012 SBC3 annual report finalized in June 2013 (prior historical accomplishments can be found in the SBC3 annual report through December 31, 2011).[10]

A Program Theory and Logic Model Report was completed for the EPTD Program within the Smart Grid Initiative in December 2013. Appendix B provides the logic model diagram, and the full report is available on NYSERDA's website.[11]

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[10] The 2012 SBC3 report is available here: 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. The 2013 SBC report is under development and will be available soon.

[11] Electric Power Transmission and Distribution Smart Grid Program Theory and Logic Model. http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2013-Reports/-/media/Files/EDPPP/Program-Evaluation/2013ContractorReports/2013-PLM-EPTD-Smart-Grid-Program.pdf.

Program Evaluation Activities

Navigant (as a subcontractor to Research Into Action) is currently conducting an early stage process evaluation of the Electric Power Transmission and Distribution (EPTD) program within NYSERDA's Smart Grid initiative. The evaluation, which will be completed in March 2014, is comprised of the following components:

- Program and Stakeholder Review: Determine and document internal and external processes related to NYSERDA Smart Grid activities. Navigant documented the program design and objectives; explored the alignment of expectations across program staff; evaluated internal communication and collaboration pathways; and identified areas for internal program improvement. In addition, Navigant examined stakeholder awareness of program activities; explored alignment of the program with stakeholder objectives; identified issues for further investigation; and evaluated stakeholder perception of NYSERDA funding strategy.
- Benchmarking: Assess the breadth and depth of NYSERDA's Smart Grid program, which is more focused on grid-based (i.e., transmission and distribution (T&D)) modernization than on end-use applications (e.g., AMI, smart appliances). EPTD staff noted that a key driver of program activity is the desire to fill gaps along the Smart Grid continuum, particularly in the grid-based aspect of the continuum. Navigant used this context to focus its benchmarking efforts. In addition, Navigant augmented the benchmarking exercise by identifying key grid-level market trends in the Smart Grid domain by reviewing a limited number of relevant secondary sources.

For the Program and Stakeholder Review task, Navigant has conducted 18 planned in-depth interviews with a variety of stakeholders relevant to NYSERDA Smart Grid activities. Stakeholders were selected to represent broad categories of individuals and organizations affected by or in a position to affect NYSERDA Smart Grid programs. These categories included: NYSERDA Program Staff; Program Opportunity Notice (PON) awardees; the New York Independent System Operator; representatives of the New York State Smart Grid Consortium; the New York Power Authority; PSC; investor owned utilities; academic institutions; non-profit research institutions and experts in smart grid finance and investment. Given time constraints and limited availability of PON awardees for interviews, the sample represents only a small portion of PON awardee stakeholders. Navigant had intended to complete interviews with private T&D investors, but due to the sensitive nature of their investment insights, they declined to participate in the interview process.

For the Benchmarking task, Navigant conducted a comprehensive evaluation of EPTD's smart grid projects in order to understand the areas that are well supported by the program and to identify funding gaps. Navigant benchmarked EPTD's program against existing smart grid programs across North America, including ARRA investment in smart grid T&D programs. Navigant used this exercise to develop a gap analysis for NYSERDA's EPTD program compared to federal allocations.

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

Preliminary Evaluation Findings

Navigant has identified several initial findings as a result of the Program and Stakeholder Review and Benchmarking efforts completed to date. Given that nearly *all* stakeholder review and benchmarking research activities have been completed, these recommendations represent the most critical findings. The remaining research will likely reinforce the priority of each of the preliminary findings listed below:

1. **Communication Challenges:** Internal and external stakeholders noted that EPTD could do a better job of communicating with the stakeholders. Better communication of PON awards, the project updates, and project results would add value to these efforts and promote public awareness and involvement.
2. **Portfolio Investment Strategy is Prudent:** Given the scope of the T&D technology spectrum, the program's current strategy of small investments across multiple technologies is deemed to be the most sensible way to address the challenges facing EPTD. Furthermore, the investment dollars, which are distributed among research studies, engineering studies and demonstration projects, is proportionally aligned with the investment needs of each of these project types. Demonstration projects, for example, receive a higher proportion of investment dollars as compared to engineering or research studies. This strategy, which is aligned with the expectations and needs of the external stakeholders, reflects a rational distribution of R&D dollars, as demonstration projects tend to require a greater investment in both hardware and implementation costs. However, there appears to be a need to identify transitional funding for projects or technologies that have completed demonstration projects and are ready for expanding to a broader market.
3. **Strong Market Alignment:** A preliminary assessment of EPTD's technology investments shows a strong correlation with national trends in Smart Grid technology investments within the T&D domain. This correlation offers validation from a broader perspective that the areas in which the EPTD group has elected to focus its resources fill technology gaps identified by a larger stakeholder community. This, alignment in turn, holds the promise of broader economic development as a result of these investments.

Evaluation Recommendations

Based on the project activities completed to date, Navigant identified the following initial recommendations. Navigant will further develop these recommendations – including the possibility of adding to them or reprioritizing them - once the remaining evaluation tasks are completed.

- **Recommendation 1: Enhance External Communications & Project Information-sharing.** Navigant recommends enhancing the sharing of information regarding the EPTD program and the details of the specific projects within the program. Possibilities include case summaries of participating projects and corresponding lessons learned, improved access to project information, and scheduling engagements (such as webinars and stakeholder meetings) where project information may be shared. This effort will foster awareness of and enthusiasm for ETPD activities and projects among both stakeholders and private companies. In turn, these activities will strengthen existing relationships and tighten the feedback loop between stakeholders, project awardees and the program.
- **Recommendation 2: Explore Process for Tracking Metrics for Measuring Economic Impacts of EPTD Projects on the New York State Economy.** EPTD investments may lead to economic growth in the state. Navigant recommends that NYSERDA consider expanding their existing project review process by capturing three types of economic metrics at the conclusion of each project to serve as a baseline data collection guide for each project. The metrics categories are defined as benefits resulting from – either directly or indirectly – from NYSERDA's investment in a particular project. The metrics include: system benefits (electric distribution efficiency improvements, reliability, and efficiency, customer rate reduction resulting from system improvements, etc.), state economic benefits (including job creation and tax base increase) and business growth (including the revenue growth enjoyed by any companies that have received NYSERDA investment). Furthermore, NYSERDA could consider establishing processes for the ongoing tracking of their investments beyond the life cycle of the PON awards. This will offer NYSERDA a quantifiable assessment of EPTD investments over a broader time horizon.

3.1.1.2 Electric Vehicle Infrastructure

The Electric Vehicle (EV) Infrastructure efforts will include engineering studies, product development, demonstration projects and pilot programs to validate technology that minimizes negative grid impacts from GPV charging, develop GPV-to-grid communication technologies and control processes, and promote 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. 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.

Using the non–T&MD funding, NYSERDA's EV Charging Infrastructure solicitation (PON 2301) was administered with two proposal due dates. Twenty eight projects using unique and innovative business models for public access charging were selected for funding. The projects will install more than 900 charging ports at more than 350 locations throughout the State over the next year. Although the charging station hardware and installation costs were not SBC funded, SBC3 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. The second phase of work contracted under PON 2392 will be supported with T&MD funds and is anticipated to begin in the third quarter of 2013.

As previously noted above, NYSERDA has historically funded electric transportation projects with SBC3 resources. Benefits from this SBC3 investment continue to accrue and were reported in the 2012 SBC3 annual report finalized in June 2013 (prior historical accomplishments can be found in the SBC3 annual report through December 31, 2011).[12]

Table 3-2 shows the performance milestones and actual results for Smart Grid and Electric Vehicle Infrastructure Program through December 31, 2013. Table 3-2 includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

[12] The 2012 SBC3 report is available here: 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. The 2013 SBC report is under development and will be available soon.

Table 3-2. Smart Grid and Electric Vehicle Infrastructure Performance Milestones and Actual Results

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

		2012-2013 Anticipated	Through December 31, 2013
Outputs/Leading Indicators			
Smart Grid	Sign contracts for 29 technology development, demonstration and pilot projects, including several large flagship projects	7	9
	Sign contracts for 8 research studies on technologies, market barriers and policies related to increased smart grid implementation in New York State	2	10
	34 clean energy companies receiving support	8	19
	Facility operator agreement executed with 3rd party for Commercialization Center	Executed agreement	NR (Commercialization center funding approved in September 2012. Center is under development.)
Electric Vehicle Infrastructure	Sign contracts for 25 grid powered vehicle technology development, demonstration and pilot projects	4	NR (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 more than 900 charging ports at more than 350 sites.)
	Contract 8 research studies on technologies, market barriers and policies related to increased grid powered vehicle implementation in New York State	4	
	30 clean energy companies receiving support	5	

Table 3-2 continued

		2012-2013 Anticipated	Through December 31, 2013
Outcomes/Impacts			
Smart Grid	$112 million in leveraged funds (co-funding and outside investment) for smart grid infrastructure	$18 million	$10 million
	$7 million in leveraged funds (co-funding and outside investment) for the Commercialization Center	$2 million	NR (Commercialization center funding approved in September 2012. Center is under development.)
	$10M Revenue generated from facility use of the Commercialization Center	$150,000	
	41 Product development tests (technology readiness level (TRL) 7+) in the Commercialization Center	2	
	25 tested or prototyped products commercialized from the Commercialization Center	1	
Electric Vehicle Infrastructure	$42 million in leveraged funds (co-funding and outside investment) for electric vehicle infrastructure	$4M	NR (Non-T&MD funds are being used to support this effort in the near term and to further leverage limited T&MD funds. Metrics associated with T&MD funding will be included in future reports. $1 million in federal funding was leveraged.)

3.1.2 Advanced Clean Power

3.1.2.1 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 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 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 December 31, 2013.

On May 29, 2012, NYSERDA, together with the State University of New York (SUNY) at Albany and the New York Power Authority (NYPA), held a PV BOS cost reduction workshop. Nearly 50 selected key stakeholders representing all aspects of the industry including utilities, manufacturers, installers, and financing institutions attended the workshop.

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 solicitation designed to attract projects. The funds will 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. The solicitation had one proposal due date on July 30, 2013. Sixteen proposals were received and contracting with selected proposals will occur in early 2014. A second due date is scheduled for January 30, 2014. The solicitation will be a collaboration with NYPA that will provide an additional $10 million to be administered by NYSERDA.

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 response to Round 1 of Clean Power solicitation PON 2569. Eleven proposals totaling $6.9 million in NYSERDA funds were approved for funding. The 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, solid oxide fuel cells, hydrogen-bromine fuel cells, and a small wind turbine. Twenty-three proposals were received for the second round and requested a total of $8.7 million. Ten projects requesting $ 3.0 million of funding were recommended.

3.1.2.2 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 result in increased knowledge of coastal marine energy assets and their suitability for power development and better understanding of the capacity in New York State to manufacture construct and service new marine-based electrical generation projects and components.

Offshore Wind Cost-Benefit Study

NYSERDA is conducting a comprehensive cost-benefit 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 Atlantic coast states, discuss strengths and weaknesses, 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.

Offshore Wind Research Plan Development

Program staff is collaborating with New York Department of State (DOS) and other stakeholders to address various barriers to off-shore wind development. Issues under study include investigating strategies for project cost reductions, identifying areas of the ocean that might be most suitable for development and identifying 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.

Such an RFI will complement another NYSERDA effort to develop a research agenda for wildlife impacts of offshore wind.[13]

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

NYSERDA is a member of this task force led by NYS 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.

Table 3-3 shows the performance milestones and actual results for the Advanced Clean Power Program through December 31, 2013. Table 3-3 includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

[13] NYSERDA Environmental Research program has contracted with BRI to conduct a formal stakeholder process to develop a scope/guidance for environmental/wildlife research in the ocean.

Table 3-3. Advanced Clean Power Performance Milestones and Actual Results

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

		2012-2013 Anticipated	Through December 31, 2013
Outputs/ Leading Indicators			
Clean Power Technology Innovation	Contract 51 clean power technology projects	15	12
	64 clean energy companies receiving support	19	12
Resource Development	6 studies, surveys, and plans contracted	3	2
	6 studies, surveys, and plans completed	1	0
	3 engagements with stakeholder organizations and consortia in support of developing a research /program agenda	2	2
Solar Cost Reduction	200 training sessions on aspects of PV for authorities having jurisdiction, local officials and trainers	180	NR (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.)
	2,000 trainees attending training sessions on aspects of PV for authorities having jurisdiction, local officials and trainers	1,800	
	10 Projects to develop tools/practices, studies/surveys, or workshops/engagements, to reduce PV costs contracted	7	
	10 BOS technology development or demonstration projects contracted	7	
	9 clean energy companies receiving support	6	
	10 Workshops/engagements as a result of BOS projects	1	

Table 3-3 continued

		2012-2013 Anticipated	Through December 31, 2013
Outcomes/Impacts			
Clean Power Technology Innovation	$55 million in commercial sales of supported clean power technologies	$1 million	NR (Metric will be reported in the 2013 year-end report for projects that commenced in SBC2 or SBC3 and received phase two T&MD support, as available. Commercialization metrics for projects that only received SBC3 funding will be reported in the SBC3 annual report.)
	$65 million of leveraged funds (co-funding and outside investment)for clean power technology projects	$20 million	$8.3 million
Resource Development	$2.5-5.0 million of leveraged funds (co-funding and outside investment)	up to $0.5 million	0
Solar Cost Reduction	$13.2 million of leveraged funds (co-funding and outside investment) for BOS projects	$5.52 million	NR (In September 2012, PSC approved the transfer of $10 million of SBC3 funds to a PV BOS cost reduction effort. This metric will be tracked in future reports.)

3.1.3 Combined Heat and Power (CHP)

3.1.3.1 CHP Aggregation and Acceleration Program

The CHP Aggregation and Acceleration Program will develop and transform the marketplace for CHP systems in the size range of 50 kW to 1.3 MW, which is the size range covering the majority of NYSERDA's previous CHP projects. The Program will accomplish this 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 size needs of a given site. This focus on pre-packaged 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.

NYSERDA has historically funded CHP projects with SBC3 resources. Benefits from this SBC3 investment continue to accrue and were reported in the 2012 SBC3 annual report finalized in June 2013 (Prior historical accomplishments can be found in the SBC3 annual report through December 31, 2011.)[14]

[14] The 2012 SBC3 report is available here: 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. The 2013 SBC report is under development and will be available soon.

3.1.3.2 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.[15] 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 seven projects for an anticipated summer peak demand reduction of 29MW and 240,000 MWh of annual generation.

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

Table 3-4 shows the performance milestones and actual results of the Combined Heat and Power Program through December 31, 2013. Table 3-4 includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

[15] 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 3-4. Combined Heat and Power Performance Milestones and Anticipated Results[a]

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

Performance Milestones and Anticipated Results			
		2012-2013 Anticipated	**Through December 31, 2013**
Outputs/Leading Indicators			
CHP Aggregation & Acceleration Program	20 Pre-packaged CHP Systems "pre-qualified" for catalog	10	64
	37 CHP Aggregation Sites – Committed[b]	15	14
	37 CHP Aggregation Sites – Installed	3	0
	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	CHP performance data website (http://chp.nyserda.ny.gov) ongoing with T&MD funding. NYSERDA has presented information at 10 conferences and 2 webinars, reaching an audience of 3,370 stakeholders. NYSERDA also hosted a regional CHP Expo reaching a targeted audience of 215 stakeholders.
	12.5 MW peak load electric generation- Committed[b]	5 MW peak load	2.245 MW peak load
	76,250 MWh/yr peak load electric generation- Committed[b]	30,500 MWh	13,695 MWh
	99,125 MMBtu/yr primary energy savings - Committed[b]	39,650 MMBtu	17,803 MMBTu

Table 3-4 continued

Performance Milestones and Anticipated Results			
		2012-2013 Anticipated	**Through December 31, 2013**
CHP Performance	16 Projects Performance Based-Committed[b]	2	7
	25 MW peak load electric generation – Committed[b]	3 MW peak load	29 MW
	200,000 MWh/yr electric generation – Committed[b]	20,000 MWh	240,000 MWh
	260,000 MMBtu/yr primary energy savings - Committed[b]	26,000 MMBtu	310,000 MMBtu
Outcomes/Impacts			
CHP Aggregation & Acceleration Program	12.5 MW peak load electric generation- Installed	1 MW peak load	NR (Program solicitation released in Q1 2013. Future reports will show progress toward these metrics.)
	76,250 MWh/yr electric generation- Installed	6,100 MWh	
	99,125 MMBtu/yr primary energy savings - Installed	7,930 MMBtu	
	$50 million in leveraged funds (co-funding and outside investment) for installed CHP systems	$20 million	
CHP Performance	$250 million in leveraged funds (cofounding and outside investment)	$30 million	$140 million

[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] 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.

3.2 Building Systems Initiatives

Table 3-5 shows the Building Systems budget and financial status through December 31, 2013. 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 2, 2014, as a result of two PONs. The first PON closed in December 2013 and the second PON will occur in early 2014. 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. It is planned to have the first round of contracts executed by April 2014 with the first set of funding committed. The second round of the PON is planned to be on the street in Quarter 3 2014, with contracts executed in Quarter 4 2014.

Table 3-5. Building Systems Budget and Financial Status as of December 31, 2013

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 2012-2016 Budget Committed
Advanced Buildings	**$75,336,160**	**$1,627,777**	**2.2%**	**$44,568,613**	**59.2%**
Emerging Technology/Accelerated Commercialization	$32,446,214	$218,099	0.7%	$7,490,648	23.1%
Technology Development	$33,613,215	$557,813	1.7%	$32,714,617	97.3%
Demand Response	$9,276,731	$851,865	9.2%	$4,363,348	47.0%
Advanced Energy Codes & Standards	**$16,679,794**	**$343,070**	**2.1%**	**$9,237,698**	**55.4%**
Building Systems Total	**$92,015,954**	**$1,970,847**	**2.1%**	**$53,806,311**	**58.5%**

[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, as well as encouraging 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 as in this section.

ETAC-Commercial/Institutional

NYSERDA held advisory group meetings for the ETAC-Commercial/Institutional (C/I) Program in October 2012, April 2013, and December 2013. Advisory group members include representatives of the design community, commercial property owners, colleges and universities, utilities, national laboratories, environmental groups and national energy efficiency organizations. Input and feedback from the group has been applied to program design and identification of promising commercially-available yet underutilized technologies and approaches.

NYSERDA has conducted market research on C/I emerging technologies (ET), and since December 2012 has met with nearly two dozen technology developers to further explore the leading edge of C/I energy savings technologies and approaches. NYSERDA is a participant in the Consortium for Energy Efficiency's bi-national ET Collaboration between the United States and Canada, and is working with NYPA to coordinate and collaborate on NYPA's new Energy Efficiency Innovation Collaborative.

NYSERDA launched an open enrollment program in May 2013, consisting of two program tracks: Energy Performance Validation and Focused Demonstrations. Both program tracks are targeted to technology developers and owners of multiple buildings wishing 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 will receive a NYSERDA-funded performance measurement and verification (M&V) study tailored to each project. Projects in the Focused Demonstration track may receive up to $150,000 to support installation and project costs, but must fall within one of NYSERDA's identified "Targeted Categories", and must also provide prior independently-verified performance data.[16] Project results and validated performance information will be shared through targeted, deliberate outreach to the market, other New York Program Administrators, and Department of Public Service staff. Project developers have indicated strong interest in the open enrollment program.

By the end of 2013, four applications had been received, with three approved and one contracted. Of the four, three are Focused Demonstration projects and one is an Energy Performance Validation project. A competitive solicitation, targeted at larger-impact projects, is under development for release in spring 2014. As part of a larger solicitation (RFP 2621) released in May 2013, NYSERDA selected independent technical consultants to assist with performance validation and measurement and verification of energy savings in demonstration projects, as well as additional technical and program support.

[16] 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

The solicitation for the Multifamily Technology Demonstration Program was released in the third quarter of 2013 with a proposal due date of November 21, 2013. PON 2725, Multifamily Emerging Technology and Accelerated Commercialization (ETAC) Demonstration Program, received five proposals. A Technical Evaluation Panel will review the proposals in early January 2014. Those proposals found to have technical merit should receive an award notice in February 2014. Once awards have been made, the Multifamily ETAC team will make decisions regarding a possible second round of the solicitation.

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

NYSERDA kicked off the residential ETAC effort with stakeholder meetings on June 8, 2012 and August 7, 2012. Stakeholders from the residential energy field including contractors, builders, PV installers, products manufacturers, research and design firms, and utilities were present. Input and feedback from the stakeholders was used to develop the initiative and subsequent solicitations. A program website was created in 2012 and a clearinghouse for potential demonstration participants was developed in 2013. The clearinghouse currently lists 30 companies that are interested in participating in demonstration and technology transfer activities. Since its development, more than 300 unique users have visited the clearinghouse online. In addition, outreach to stakeholders began in 2013, with seven webinars attended by 125 companies.

PON 2752, ETAC- Residential Solid State Lighting (SSL) Demonstrations was released in November 2013 with the objective of increasing the market adoption of SSL for residential applications by showcasing the impact that SSL, lighting system design, and the integration of controls can have on reducing electric demand in New York State's homes. Demonstration projects will be required to incorporate specific technology transfer strategies and activities to communicate results and best practices to the various stakeholders in the residential energy field. The PON closed on December 19, 2013 and contract awards will be made in February 2014.

NYSERDA plans to release an additional solicitation in support of the residential ETAC initiative in spring 2014. This solicitation will have a broader focus with respect to eligible technologies.

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 of new or emerging products. As a complement to Technology Development, NYSERDA also 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 into New York State markets.

A proposed program design for Technology Development and the Advanced Building Consortium 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 ($22 million T&MD, and $3 million from R&D statutory funds) in November 2012. The solicitation was a broad solicitation with six rounds for building-related technology development and pilot demonstration projects. Rounds 1 and 2 of PON 2606 received 160 proposals for funding combined. The request for funding from the first two rounds totaled $25 million; under Round 1, 14 proposals were awarded $2.3 million and under Round 2, 20 proposals were awarded $4.9 million. Round 3 received 33 proposals for funding; in January 2014 they will be reviewed by a Technical Evaluation Panel. Awarded projects from Round 1 and 2 span across 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 concept and approach to soliciting for an Advanced Building Consortium were approved by senior NYSERDA management and a $7.5 million solicitation is expected to be released in winter of 2014 to establish and support one Advanced Buildings Consortium that will introduce new and integrated building products and services that will be adopted far 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.

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 are documented through a series of case study reports. Funding to demonstrate successful pilot interventions at a larger scale will be available through NYSERDA's separate 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.

Under the Behavior Research Program, NYSERDA released PON 2631 Behavior Research and Energy Decision Making in December 2012 and August 2013. Over these two rounds, 34 proposals requesting a total of $3.9 million were received. A total of 13 proposals were selected for funding, of which eight were T&MD funded.

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. Such outcomes can contribute to suppressed wholesale energy costs, reduced congestion costs, increased reliability, and 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.

PON 1219 Existing Facilities Program is the active solicitation offering open-enrollment incentives for DR projects across New York State. 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 $200 per kW for Upstate or Downstate, respectively, and the incentives for energy storage are $300 or $600 per kW for Upstate or Downstate, respectively. DR projects are required to enroll in a mandatory-participation DR program offered by the NYISO or local utility. 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 57 MW of demand response.

NYSERDA has historically funded DR projects with SBC3 resources. Benefits from this SBC3 DR investment continue to accrue and were reported in the 2012 SBC3 annual report finalized in June 2013 (Prior historical accomplishments are in the SBC3 annual report through December, 2011).[17]

Table 3-6 shows the performance milestones and actual results of Advanced Buildings Program through December 31, 2013. Table 3-6 includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

[17] The 2012 SBC3 report is available here: 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. The 2013 SBC report is under development and will be available soon.

Table 3-6. Advanced Buildings Performance Milestones and Actual Results

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

		2012-2013 Anticipated	Through December 31, 2013
Outputs/Indicators – Quantifiable Targets			
Emerging Technology/Accelerated Commercialization	13-22 stakeholder meetings on emerging and underused technologies and strategies	7-10	11
	38-70 knowledge/technology transfer activities across the commercial and residential sectors (webcasts, reference case studies, and other knowledge transfer mechanisms)	8-18	NR (Scoping meetings held. Solicitations issued for Multifamily, Commercial/Industrial (C/I) and Residential ETAC projects. One C/I project contracted.)
	17-36 contracted reference demonstration[a] projects across the commercial and residential sectors (including large-scale demonstrations)	3-6	
	17-36 completed reference demonstration projects across the commercial and residential sectors (including large-scale demonstrations)	1-2	
Technology Development	46-74 advanced building technology projects contracted (including some large-scale projects)[b]	23-36	23 (Contracts for 19 additional new projects in negotiations)
	23-37 clean energy companies receiving support	12-18	16 (14 additional clean energy companies going through negotiations)

Table 3-6 continued

		2012-2013 Anticipated	Through December 31, 2013
Outputs/Indicators – Quantifiable Targets			
	15-30 stakeholders engaged in the Advanced Buildings Consortium (ABC)	5-10	NR (Pre-ABC meetings held with 177 stakeholders to define scope. Following Superstorm Sandy, the ABC solicitation focus was expanded to include resiliency and sustainability. Program adjustments are underway.)
	16-35 ABC stakeholder meetings, advisory meetings, workshops, conferences, events, etc.	2-5	4
	10-15 clean energy companies receiving support through ABC	3-5	Solicitation for the ABC expected to be released 1st Quarter 2014
Demand Response	46 MW Registered	9 MW	57 MW

Table 3-6 continued

		2012-2013 Anticipated	Through December 31, 2013
Outcomes/Impacts – Quantifiable Targets[c]			
Emerging Technology/Accelerated Commercialization	$6.5 -13 million of leveraged funds (co-funding and outside investment) for demonstration projects	$1-3 million	NR (Scoping meetings held. Solicitations issued for Multifamily, Commercial/Industrial (C/I) and Residential ETAC projects. One C/I project contracted.)
	10,500 MWh of energy savings from supported demonstration projects[d]	2,000 MWh	
	78,000 MMBtus of energy savings from supported demonstration projects[d]	5,000 MMBtu	
	2,300 Peak kW reduction	550	
Technology Development	$14-23 million in leveraged funds (co-funding and outside investment) for advanced building technologies	$7-10 million	$5.4 million

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

[b] Using a stage-gate process, technology opportunities will be explored and only the most promising technologies (select few) will be advanced to large-scale projects.

[c] Estimates based on savings per program dollar invested in projects.

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

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 toward State and national appliance and equipment standards and specification setting processes for various equipment types. Activities within the four major areas are described in the following sections.

3.2.1.5 Annual Statewide Compliance Assessments

Statewide compliance assessment studies, an important component of the Advanced Energy Codes and Standards Initiative, provide a means to track compliance (or non-compliance) trends associated with changing codes and standards. These assessment studies help to 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 renovation projects and establishing the overall framework for all assessments during the T&MD period. The current compliance assessment is in the data gathering phase and the results of the assessment are expected in July 2014. Future efforts, built upon this framework, will evaluate commercial new construction, and residential new construction and renovation, and will update the initial commercial renovation assessment study for the latter periods of the T&MD funding cycle. The final compliance assessment study will also 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 upon those developed using 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 concept 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, RFP 2693 New York State Energy Code Training, was released in August 2013 and proposals received in October 2013. Contractors to deliver energy code training through the end of 2016 were competitively selected and it is anticipated that training will commence in mid-2014.

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 of 2012. It is expected that amendments will take effect in late 2014 (commercial provisions) and early 2015 (residential provisions).

The T&MD Operating Plan also identifies that a solicitation will be issued specific to the following tasks related to Website hosting and support:

- Enhance mechanisms for public contact (e.g., hotline, forum, FAQ).
- Design website upgrade.
- Manage and host additional website content prepared by NYSERDA and others.

A solicitation specific to these website tasks is expected in mid 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 associated with codes and standards changes, to implement new strategies, and to conduct other activities supporting the codes and standards efforts, including assistance in providing proactive responses to federal standard proposals and national energy code changes.

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 following tasks related to studies and support (technical and administrative):

- Regulatory and administration studies (e.g., third party energy enforcement).
- Technical studies (e.g., Building Science, New Materials) in support of proposed code changes.

3.2.1.8 Pilots and Expanded Implementation Assistance

A solicitation focused on providing direct support to municipalities is anticipated for release in early 2014 and will include the following tasks related to municipal support:

- Direct support to municipalities (Plan Review, Specialized Training, Inspection Support).
- Publication of a Code Enforcement Manual.
- Development of guidelines for adoption of advanced (above-minimum) codes.
- 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. Appendix B provides the logic model diagram, and the full Program Theory and Logic Model report is available on NYSERDA's website.[18]

Table 3-7 shows the performance milestones and actual results of the Advanced Energy Codes Program through December 31, 2013. Table 3-7 includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

Table 3-7. Advanced Energy Codes Performance Milestones and Actual Results

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

		2012-2013 Anticipated	Through December 31, 2013
Outputs/ Leading Indicators			
Annual Statewide Compliance Assessments	Conduct 5 annual code compliance assessments	2	1 in progress
	Conduct 3 compliance efforts with appliance and equipment vendors to assess conformance to State and federal standards	1	NR
Development and Delivery of Advanced Training and Tools	Develop 12-16 new or expanded code training modules	6-8	NR (RFP 2693 closed, training expected mid-2014)
	Train 15,000 individuals on code requirements	7,000	NR
	Develop or update educational or other tools to help support code compliance and NYS appliance/equipment standards		NR (Code/Commentary to 2013 Commercial/2014 Residential ECCCNYS updates in progress; solicitation for Code Enforcement Manual expected for issue early 2014.)

[18] Advanced Codes and Standards Final Initiative Level Logic Model Report. http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2013-Reports/-/media/Files/EDPPP/Program-Evaluation/2013ContractorReports/2013-PLM-Advanced-Codes-Standards.pdf.

Table 3-7 continued

		2012-2013 Anticipated	Through December 31, 2013
Technical Support, Studies and Resources	Issue 2 competitive solicitations to hire consulting and market research firms to provide program support		NR (Solicitation expected for release late 2014. Advanced Codes and Standards staff have elected to pursue one solicitation.)
	Participation by NYSERDA and DOS in rulemaking, code development hearings and codes and standards development workshops		NR
Pilots and Expanded Implementation Assistance	Issue 2 competitive solicitations for pilots and program implementation assistance	1	Solicitation expected for release in early 2014.
Outcomes/Impacts			
Annual Statewide Compliance Assessments	Information from code compliance assessments and standards research supports policy decisions on future code/standard changes		Results of compliance assessment focusing on commercial renovation and alteration expected to be made available July 2014.
Development and Delivery of Advanced Training and Tools and Technical Support, Studies and Resources	Code compliance efforts lead to 631 GWh of cumulative annual electricity savings	84 GWh/yr	NR (Not yet measured. Compliance study underway.)
	Code compliance efforts lead to 129 MW of cumulative annual peak demand savings	18 MW/yr	
	Code compliance efforts lead to 4,921,000 MMBtu of cumulative annual fossil fuels savings	575,000 MMBtu/yr	

3.3 Clean Energy Infrastructure Initiatives

Table 3-8 shows the Clean Energy Infrastructure budget and financial status through December 31, 2013. 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.

The level of committed funding for the Environmental Monitoring, Evaluation and Protection (EMEP) program appears to be lower than might be expected at this point in time. However, contract pre-encumbrances, open enrollment opportunities currently on the street, and subsequent planned future commitments for 2014 are expected to account for approximately 65% of the budget.

Table 3-8. Clean Energy Infrastructure Budget and Financial Status as of December 31, 2013

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 2012-2016 Budget Committed
Market Development	**$70,380,281**	**$12,584,437**	**17.9%**	**$22,937,485**	**32.6%**
Market Research	$4,640,141	$1,269,720	27.4%	$1,760,888	37.9%
Market Pathways	$55,710,000	$9,164,257	16.4%	$16,779,530	30.1%
Education/Behavior	$10,030,140	$2,150,461	21.4%	$4,397,068	43.8%
Clean Energy Business Development	**$41,761,046[c]**	**$1,258,692[d]**	**3.0%**	**$21,770,136[e]**	**52.1%**
Innovation Entrepreneurial Capacity	$36,761,046	$428,500	1.2%	$18,861,459	51.3%
Market Intelligence	$1,688,584	$271,368	16.1%	$580,793	34.4%
Direct Support for Business	$2,400,000	$198,159	8.3%	$1,744,000	72.7%
EMEP	**$18,550,048**	**$894,348**	**4.8%**	**$4,881,130**	**26.3%**
Workforce Development[f]	**$39,000,000**	**$557,810**	**1.4%**	**$16,930,052**	**43.4%**

Table 3-8 continued

Workforce Development- Renewable Energy/ Advanced Technologies	$15,000,000	$386,436	2.6%	$7,530,939	50.2%
Workforce Development – Energy Efficiency	$24,000,000	$171,374	0.7%	$9,399,114	39.2%
Clean Energy Infrastructure Total	**$169,691,375**	**$15,295,287**	**9.0%**	**$66,518,803**	**39.2%**

[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] Dollars spent for CEBD initiatives do not sum to the total CEBD 2012-2016 budget because $911,416 in CEBD 2012-2016 budget marketing funds were added to the total.

[d] Dollars spent for CEBD initiatives do not sum to the total CEBD dollars spent because $360,664 in spent CEBD marketing funds were added to the total.

[e] Dollars committed for CEBD initiatives do not sum to the total CEBD dollars committed because $583,885 in committed CEBD marketing funds were added to the total.

[f] Funding was increased in the Commission'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 works to identify market and institutional barriers to technology and product adoption, obtain critical early stage information and insights to guide investment decisions, and further advance the reach of T&MD and EEPS programs and other public policy goals. The goal is to amass specific market intelligence and identify program opportunities that will increase program implementation efficiency and effectiveness.

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

- A multi-organization supported research project conducted by the American Council for an Energy-Efficient Economy (ACEEE) that reviewed next generation energy efficiency program designs and approaches. The research was published[19] in a technical report and offers insight on how NYSERDA's energy efficiency programs could be tailored to incorporate new strategies that would allow the programs to go broader and deeper.
- Three market research activities were conducted in support of the development of the NY Green Bank[20]:
    - A study that characterized the market demand for financing resiliency-related energy projects in the healthcare and large multifamily housing customer sectors located within the Superstorm Sandy affected counties.
    - A study that assessed and summarized the landscape for solar PV financing for the residential, small/medium commercial, and large commercial segments of the New York State marketplace, utilizing interviews with New York State solar PV installers and financiers.
    - A study building from the previous financing market research that assessed the existing market demand for clean energy financing products in New York. NYSERDA is using the results of this research to evaluate the benefits of different products and outline a set of near-term and long-term activities for the newly created Green Bank.
- Market research on the NYSERDA Residential Point-of-Sale Lighting Program provided information on how resources could be best used to market and deploy the program in the most efficient and effective way as the lighting market transforms under market forces and external regulations. This effort also examined the Products Program and exploring 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 help establish a New York State baseline for non-hardware PV costs.

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

- A multi-organization supported research project with ACEEE that is exploring the opportunities for scaling up savings from commercial and residential retrofits. The project includes 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 includes a review of recent data on commercial retrofits to develop estimates of the savings potential of a shift to more comprehensive retrofits. For the residential sector, the project will review existing deep retrofit programs, and analyze 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. Completion of this study is anticipated in early 2014.

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[19] 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

[20] 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.

- A data center market research study that is intended 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 will also assess energy use and savings potential, assess major market trends driving demand for information technology computing in New York State, and assess opportunities to implement energy efficient data center technology and best practices. Unlike previous work, this study will conduct primary research in the data center market across New York State looking from the server level up to free standing dedicated data center buildings. A contractor was selected for this effort in the third quarter of 2013 and a project kickoff is anticipated for early 2014 with work continuing through the end of the year.
- An assessment of growth opportunities for New York's Clean Energy Economy (CEE) that will characterize the unique strengths of New York's CEE, including regional clusters[21] and core competencies, and consider the national and international market potential of various CEE segments to identify high growth opportunities. This study is designed to help provide information to further advance the T&MD Clean Energy Business Development Initiative goal to catalyze an entrepreneurial environment for energy innovation, and will create a detailed geo-coded inventory of entities within various segments (e.g., wind, solar PV, bio-energy, smart grid) of New York's CEE. An advisory group has been convened and their input used to help further scope the study. The solicitation is anticipated to be released and a contractor selected in 2014.
- A NYSERDA/NREL collaboration that will survey homeowners with installed PV systems to determine economic and other decision making factors that drive PV installations, particularly for third party owned systems. Results from these survey efforts will inform program and policy design that serve to further develop the New York State solar PV market in support of the NY-Sun Initiative[22].
- 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[23].
- Two complementary efforts related to potential restructuring of NYSERDA's PV programs – one for the Standard Offer program, the other for the Competitive PV program – both in support of the NY-Sun Initiative. These efforts are performing analyses and providing tools to investigate the value of transitioning 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.

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21 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.

22 NY-Sun Initiative, http://ny-sun.ny.gov/

23 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

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. Progress in key areas is described in the following sections.

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 809 retail and 70 manufacturer partners. Since January 2012, 15 new retailer partners and 35 new manufacturer partners have signed onto the program. The new manufacturer partners include 27 lighting, three appliance, three HVAC and two consumer electronics manufacturers. Through the partner network, NYSERDA has approved approximately 171 Special Promotions for a total of $1,618,753 in product buy-downs. These promotions are expected to save more than 7.9 million kWh and 4,533 MMBtu annually.[24] 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. Appendix B provides the logic model diagram and the full Program Theory and Logic Model report is available on NYSERDA's website.[25]

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

[25] New York Products Program Final Revised Logic Model Report. http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2013-Reports/-/media/Files/EDPPP/Program-Evaluation/2013ContractorReports/2013-PLM-NY-Products-Program.pdf

NYSERDA has historically funded activities in this area with SBC3 resources under the Market and Community Support Program. Benefits from this SBC3 investment continue to accrue and were reported in the 2012 SBC3 annual report finalized in June 2013 (prior historical accomplishments can be found in the SBC3 annual report through December 31, 2011).[26]

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 energy efficiency options to their customers.

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

ICF Resources was selected as the implementation contractor for the Commercial Lighting Business Partners Program. The core elements of the previous lighting program focused 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.

DNV GL was selected as the implementation contractor for the HVAC Business Partners Program. The core elements of the previous HVAC Business Partners Program focused 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.

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[26] The 2012 SBC3 report is available here: 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. The 2013 SBC report is under development and will be available soon.

The contractor for the Motor Systems Business Partners Program was selected and will be under contract during the first quarter of 2014. 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.

From research performed while revising the solicitation for the Motors Program, staff recognized the opportunity to expand the Motors Program to one of Motor Systems that will include other motor-driven systems, applications, and best practice motor repair. The solicitation for the Motor Systems Business Partners Program Implementation Contractor was reissued in July 2013, and proposers were required to identify the motor-driven systems prevalent in New York State (e.g., distribution via application, electric load, building sector, etc.). Approaches to market interventions, scopes, services, and products were identified that, if adopted by the motors and motor systems and 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 and is in the process of adding the site lighting module and scheduling four 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.

Recruitment efforts have been on-going with the Commercial Lighting Business Partners Program, including recruiting 67 new Partner firms since January 2012 and re-signing 38 previous Business Partners during the fourth quarter of 2013. The HVAC Business Partners Program, with 80 new Partners, has exceeded its 2013 recruitment goal of 75 new Partner firms. Energy savings activity in the Commercial Lighting program has been 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 expects to see rapid increases in energy savings beginning in the first quarter of 2014. The HVAC Program has increased its energy savings to date to 1.53 GWh based on 1,227 QM projects.

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 / 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.

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 can provide 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 December 31, 2013, EDGE Program ROCs have established 510 new partnerships that have led to 948 referrals. They have also participated in more than 334 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. Appendix B provides the logic diagram, and the full Program Theory and Logic Model report is available on NYSERDA's website.[27]

Behavioral Demonstrations

Behavioral Demonstrations, 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.

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[27] Economic Development Growth Extension (EDGE) Program Final Initiative Level Logic Model Report. http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2013-Reports/-/media/Files/EDPPP/Program-Evaluation/2013ContractorReports/2013-PLM-EDGE-Program.pdf.

The program design has received NYSERDA management approval and NYSERDA expects an early 2014 release date for the solicitation.

Based on the advisory group feedback from the meeting held July 2012, the draft solicitation emphasizes the following items:

1. Eligible projects must build upon tested, successful behavioral strategies. The goal of this program is demonstrate at a larger scale the efficacy of strategies applied at the research or pilot level.
2. Proposals must include strict implementation plans that detail the adoption of experimental groups, control groups, and baselines to statistically analyze the impact of the applied behavioral intervention.
3. Demonstrations will also be required to examine the persistence of the impact of the behavioral intervention up to one year 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. 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 presented eight webinars to 338 attendees and distributed 12 electronic newsletters to a network of more than 5,000 individuals.

Table 3-9 shows the performance milestones and actual results for Market Development Performance Program through December 31, 2013. ***Table 3-9*** includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

Table 3-9. Market Development Performance Milestones and Actual Results[a]

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

		2012-2013 Anticipated	Through December 31, 2013
Outputs/ Leading Indicators			
Market Pathways	Enlist 1,240 Energy $mart Products partners participants	940 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.	879 (809 retailers and 70 manufacturers)
	Enlist 510 Midstream Partner participants	430[b]	728 (of which 147 are new partners)
	Train 500 Product Partner employees on sales of high efficiency equipment	200	131
	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
	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 (On-Bill Recovery Launched in 2012. Future T&MD activities will be reported.)
	Facilitate 30-45 customers accessing innovative energy efficiency investment strategies	20-25 projects	
	Energy-aligned leasing (EAL) arrangements (10-15) and other approaches to split incentive issue	4-6 EAL evaluations; 4 seminars & webinars	1 EAL pilot
	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	Lighting: 13 webinars and 6 expos; HVAC: 2 fact sheets and 39 training seminars, 8 webinars

Table 3-9 continued

		2012-2013 Anticipated	Through December 31, 2013
Outputs/ Leading Indicators			
Education/Behavior Change	Sponsor and support 5 annual LIFE conferences[c]	2	1[d]
	Support 600 community partnerships	250	510
	Sponsor up to 8-12 behavioral pilots	5-8	NR (A solicitation to select behavioral demonstrations will be released in early 2014)
Outcomes/Impacts			
Market Research	Conduct 4-6 research studies	2-3	6 studies completed, 7 additional studies underway
Market Pathways	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 GWh	57 GWh[e]
	895,000 MMBtu saved through supporting emerging technologies and higher efficiency products with Energy $mart Partners	254,000 MMBtu	118,803 MMBtu[f]
	Increase market share of 3-6 technologies and higher efficiency products	1-3	NR (Program data and evaluation studies will be used to retrospectively examine change in market share.)

Table 3-9 continued

		2012-2013 Anticipated	Through December 31, 2013
Outputs/ Leading Indicators			
Market Pathways	37 GWh saved through Midstream Partner projects	15 GWh	2,261MWh
	Complete 20–35 customer projects that accessed innovative energy efficiency investment strategies	5-8 projects	NR (Evaluation research underway to assess attitudes towards financing. Future T&MD outcomes will be reported.)

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

[c] The LIFE program anticipates sponsoring, planning and supporting a total of 7 LIFE conferences and Regional meetings.

[d] In addition to 1 Statewide Conference, 6 Regional Meetings were also supported by the LIFE program.

[e] shows a reduction from the June 30, 2013 report to account for the removal of EEPS CFL savings inadvertently included in T&MD savings estimates.

[f] Shows a reduction from the June 30, 2013 report to account for an error in how MMBtu savings were calculated.

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.

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.

PON 2537 Proof –of-Concept Center Initiative was issued in May 2012 with a proposal due date of July 18, 2012. Following the Technical Evaluation Panel's recommendation, NYSERDA awarded a total of $15 million to Columbia University, the Polytechnic Institute of New York University and High Tech Rochester to create three POCCs dedicated to helping inventors and scientists turn their high-tech, clean energy ideas into successful businesses. NYSERDA is investing approximately $5 million in seed money at each center over a five-year period. The centers are expected to operate on their own after NYSERDA funding ends.

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.
- High Tech Rochester Inc., (HTR) a non-profit venture development organization based in the Rochester area, which will open the NYSERDA POCC to serve western and central New York. HTR will work 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.
- New York University (NYU-Poly), in partnership with the City University of New York (CUNY)

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 HTR program has been branded NEXUS-NY (New Energy Xcelerator for Upstate New York). Each of the programs were initiated in 2013 with applications submitted and reviewed by the last quarter of the year. A total of 111 applications were submitted to the programs. NEXUS-NY down-selected the 56 applications they received to 12 teams to enter the first phase of the program. The PowerBridge NY program received 55 applications that were down-selected to 15 teams that are in the process of preparing full proposals. Final decisions on the full proposals will be made in March 2014.

Emerging Clean Energy Business Development

The Clean Energy Business Incubator program was initiated in 2009 with funding from SBC3. 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, the program has been funded with SBC3 resources alone and benefits were reported in full in the 2012 SBC3 Annual Report finalized in June 2013. (Prior historical accomplishments can be found in the SBC3 annual report through December 31, 2011).[28] The program is currently transitioning to T&MD funding, and once that process is complete, benefits will be reported only in the T&MD semi-annual reports.

Clean Energy Cluster Development

This program will work to convene multi-disciplinary market participants to promote new networks of interrelated clean energy firms, or clusters that can accelerate the development of new products and services and create new business models. These clusters can drive productivity and innovation and serve as an important driver of regional competitiveness.

The first initiative under this program is the development of an Energy Infotech cluster in New York City. The objectives of this cluster development include the formation of more startup companies in energy infotech; attraction of venture capital to New York City-based companies in this sector; and development of a community to facilitate recruiting, marketing, and strategic partnering. Energy Infotech NYC (EITNYC) is a newly formed organization to promote this cluster. EITNYC will perform strategic planning, outreach to the energy infotech community, and event sponsorship. EITNYC sponsored a successful Cleanweb Hackathon in January 2012 and was the lead organizer of a follow-up event in September 2012. Although current cluster activities are funded with SBC3 funds, cluster development work will be used to inform future T&MD programs.

[28] The 2012 SBC3 report is available here: 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. The 2013 SBC report is under development and will be available soon.

3.3.2.2 Market Intelligence

New York State Clean Energy Innovation Metrics

Under RFP 2266, NYSERDA selected a contractor to define and promote New York State's environment conducive to innovation, entrepreneurship and technology-led growth.[29] Specifically targeted to the clean energy space, information and metrics have been gathered for business owners, entrepreneurs and investors who are deciding where and how to invest. The lack of such information was a barrier to business start up, expansion and attraction. These clean energy indicators can be used for policy purposes—to gauge progress and weaknesses in the development of the State's clean economy, and to identify policy gaps that need to be addressed. The first report and analysis was funded under SBC3. Future iterations of the report will be supported under T&MD funding and will be used to inform future T&MD programs.

3.3.2.3 Direct Support for Business Acceleration

The NYSERDA Entrepreneurs-in-Residence (EIR) program provides business mentoring to companies receiving NYSERDA R&D funding, NYSERDA incubator clients, and other select companies supported by NYSERDA. The mentors are selected for their senior executive or entrepreneurial experience and provide strategy level guidance. A pilot program was funded under SBC3.

PON 2419 NYSERDA Entrepreneurs-in-Residence, was issued in May 2012 with a proposal due date of June 20, 2012. High Tech Rochester Inc., the original contractor for the program, submitted the proposal that was selected for contract award.

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[29] New York State (NYS) Clean Energy Technologies Innovation Metrics Report. http://www.nyserda.ny.gov/Home/BusinessAreas/Energy%20Innovation%20and%20Business%20Development/Innovation%20and%20Business%20Development/Tracking%20Clean%20Tech%20Innovation%20for%20New%20York.aspx.

In the fourth quarter of 2012, NYSERDA issued a PON seeking proposals to develop a multi-year clean energy education program to educate experienced entrepreneurs interested in seeking opportunities in the clean technology (clean tech) and renewable energy industries. Increasing the knowledge and awareness of clean energy business operations for experienced and successful executives in New York State will likely increase the number of successful clean technology businesses and create the opportunity for increased hiring in the clean tech sector within the State. No contracts resulted from the proposals received under the solicitation. Stakeholder meetings were held in early 2013. The solicitation was re-issued soon after and, following the review of proposals, contracts have been awarded to Skidmore College and New York University. Both of the programs are in the design stage with the fist class of participants to begin by the third quarter of 2014.

In an effort to assist clean tech companies and their management in the development of the business capabilities necessary to commercialize and launch their innovations, a PON was released in the third quarter of 2013 for the development of a Cleantech Commercialization Toolkit. This toolkit will be publicly available and will guide businesses through the process for commercializing clean tech innovations. As such, the toolkit will include templates, references, and instructions for each stage of commercialization. The contractor selected to perform this development will also provide an up-to-date list of business mentorship and assistance resources available, and will provide guidance and feedback to the companies that choose to use the toolkit.

A Program Theory and Logic Model was completed for the CEBD program in 2013. Appendix B provides the logic model diagram, and the full Program Theory and Logic Model report can be found on NYSERDA's website.[30]

Table 3-10 shows the performance milestones and actual results for Clean Energy Business Development Program through December 31, 2013. Table 3-10 includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

[30] Clean Energy Business Development Final Initiative Level Logic Model Report. http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2013-Reports/-/media/Files/EDPPP/Program-Evaluation/2013ContractorReports/2013-PLM-Clean-Energy-Business-Development.pdf.

Table 3-10. Clean Energy Business Development Performance Milestones and Actual Results

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

		2012-2013 Anticipated	**Through December 31, 2013**
Outputs/ Leading Indicators			
Innovation/ Entrepreneurial Capacity	Support 405 clients in incubators or POCCs [a]	65	74[b] (Previous SBC funded projects have supported 73 clients. There are 12 teams in the first phase of the NEXUS-NY program and 15 teams preparing full proposals in the PowerBridge NY program.)
Market Intelligence	Create 5 annual "benchmark reports" on clean energy business and financial indicators for New York State	2	1
	Support dissemination of clean energy benchmark information through 500 website downloads	100	NR (Indicators being developed.)
Direct Support for Business Acceleration	Provide support for 150 companies with new and improved products serving New York State markets	59	Contractor to deliver EIR services has been selected and 19 companies received EIR support in 2013
Outcomes/Impacts			
Innovation/ Entrepreneurial Capacity	Help clean energy businesses attract $150 million in leveraged funds (co-funding and outside investment)	$40 million	$7,429,460[c] (Previous SBC funded projects have generated approximately $140 million in leveraging)

Table 3-10 continued

		2012-2013 Anticipated	**Through December 31, 2013**
Outcomes/Impacts			
	Graduate 162 businesses from incubators	36	4[c] (Previous SBC funded projects have graduated 39 businesses from incubators)
	40 advanced technologies reaching commercial availability	5	7[c] (Previous SBC funded projects have generated 98 new products offered by incubator clients for commercial sale)
	$20 million in commercial sales of new and improved supported technologies[d]	$2.5 million	NR (Metric to be established via a survey of businesses. Commercialization metrics for projects that only received SBC3 funding will be reported in the SBC3 annual report.)
	486 Incremental FTEs associated with incubator graduates	108	30[c] (Previous SBC funded projects have generated 301 FTEs associated with incubator graduates)

[a] 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.

[b] 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. This figure excludes clients that were supported at one time but have since dropped out.

[c] Represents outcomes from Q3 2013 through December 31, 2013 for three out of six incubators that began receiving T&MD funding in Q3 2013. Two out of six incubators have not reported their Q4 outcomes yet.

[d] 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.

Table 3-11 highlights business development progress from the pipeline of NYSERDA's pre-T&MD SBC investments. Over time, each of the companies listed has achieved substantial private/outside funding support to leverage the NYSERDA investment made. These highlights illustrate the time frame often required to achieve business development impacts of the type expected from the T&MD portfolio.

Table 3-11. SBC Funded Business Development – Pre-T&MD Achievements

Company	Product	Private/Outside Investment	NYSERDA SBC Funding
American Aerogel – Rochester, NY (Founded in 1995)	Aerogel-based materials for insulation used in shipping containers and energy systems.	In 2011, the company received $2.5 million in venture capital financing.	$400,000
Applied Nanoworks/Auterra – Malta, NY (Founded in 2003)	Technology removes oil contaminants and can reduce refining cost/energy by 30-50%.	Reported up to $10 million in venture funding received.	$503,000
Crystal IS – Green Island, NY (Founded in 1997)	Substrates for UV LEDs used in energy efficient water and air purification products.	Received several million dollar private investments and was acquired in 2012; still based in Green Island.	$399,000
Ener-g-Rotors – Rotterdam, NY (Founded in 2004)	Device to recapture industrial waste heat and convert it into electricity.	Several private investments including $1.5 million from Bright Capital in 2012.	$1.5 million in NYSERDA SBC funding plus Entrepreneur-in-Residence services.
Ephesus Technologies – Syracuse, NY (Founded in 2011)	First LED light both designed and manufactured in New York State.	Awarded a $50,000 technology development grant from Syracuse Center of Excellence and $1 million in NYS tax incentives.	$100,000 in NYSERDA SBC funding, plus business incubation services.
Honest Buildings – New York, NY	Online network of buildings and building professionals to promote energy efficiency measures.	$750,000 in seed and venture capital investment.	Business incubation and Entrepreneur-in-Residence services.
Ioxus – Oneonta, NY (Founded in 2007)	Advanced ultracapacitors used in wind turbines and hybrid vehicles.	Raised $21 million with its second round of investment.	$450,000 for product development and $1.5 million for manufacturing scale-up paid as product is produced.

Table 3-11 continued

Company	Product	Private/Outside Investment	NYSERDA SBC Funding
OptiCool Technologies – Rochester, NY	Energy-efficient refrigerant based data center cooling system.	More than $4 million in private investment.	Business incubation services.
Paper Battery Company – Troy, NY (Founded in 2009)	Flexible, thin batteries with potential applications including computer servers and electronics.	Raised over $1 million in angel investments.	$1.5 million in NYSERDA SBC funding, plus business incubation services.
ThinkEco – New York, NY	Plug-load management devices and cloud-based systems for low cost energy management and demand response.	More than $11 million in private investment.	$350,000 in NYSERDA SBC funding, plus business incubation services.
United Environment and Energy – Horseheads, NY (Founded in 2003)	Environmentally friendly, energy efficient, renewable/recycled materials used in roof coatings, energy-efficient windows, bioasphault, and renewable energy.	$1 million Federal Small Business Innovation Research (SBIR) grants to continue technology development.	$568,000

3.3.3 The Workforce Development Initiative

New York's ambitious energy and environmental goals will 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 activities focus directly on practitioners who are a critical link to ensuring quality installations, services and maintenance for these technologies. The program is designed to address the on-going 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, addressing identified needs, and to integrate new technology education into existing programs.

Through December 31, 2013, 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 December 31 2013, NYSERDA has executed on-the-job (OJT) agreements with 27 businesses seeking to hire new employees or advance incumbent workers. To date, 84 people have been hired from NYSDOL's New York State Career Centers Lists and 20 incumbent employees were approved for off-site training. Approximately $689,320 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 Interstate Renewable Energy Council (IREC) Institute for Sustainable Power Quality (ISPQ) accreditation, company accreditation and individual certifications.
- PON 2762 Workforce Training for Energy Efficiency: This PON, 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 17 contracts have been awarded or are under negotiation.
- PON 2774 Career Pathways Training Partnerships for Energy Efficiency & Renewable Energy: This PON, 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 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 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. Fourteen proposals were received, and five contracts were awarded.
- 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 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 PV system or who might encounter a 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 PV systems. Six proposals were received, one contract is under negotiation.

A Program Theory and Logic Model was completed for the WFD Program in December 2013. Appendix B provides the logic model diagram, and the full Program Theory and Logic Model report is available on NYSERDA's website.[31]

[31] Workforce Development Final Program Theory and Logic Model Report. http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2013-Reports/-/media/Files/EDPPP/Program-Evaluation/2013ContractorReports/2013-PLM-Workforce-Development.pdf.

Program Evaluation Activities

Research Into Action is currently conducting an early stage process evaluation of the WFD Program that is anticipated to be 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.[32] The four levels of a training assessment are:

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

The research is complete; the reporting is underway. 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.)

3.3.3.1 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.

3.3.3.2 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.

3.3.3.3 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.

3.3.3.4 OJT Employers: Employers' Assessment (Phone Interview)

As of the end of 2013, NYSERDA had 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.

3.3.3.5 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.

3.3.3.6 Evaluation Recommendations

The evaluation report will be available by the end of first quarter 2014, at which time NYSERDA will develop its response to the following recommendations and begin tracking progress on action items.

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.

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.

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.

Table Table 3-12 shows the performance milestones and actual results for the Workforce Development Program through December 31, 2013. Table 3-12 includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

Table 3-12. Workforce Development Performance Milestones and Anticipated Results

Performance Milestones and Anticipated Results			
		2012-2013 Anticipated	**Through December 31, 2013**
Outputs/Leading Indicators			
Renewable Energy & Advanced Technology	Technical training on RE/AT for 2,000 incumbent workers and high school students preparing for technical careers	500	1,462
	Support 480 disadvantaged, unemployed or underemployed individuals seeking entry-level employment	90	NR (RE/AT Disadvantaged workers will be served through several new training partnerships that will be executed in Q1 2014 and training is slated to begin in Q2 2014.)
	OJT and Hands-on RE/AT Training for 680 individuals	150	40
	Develop advanced courses to be integrated components of college certificate and degree programs & trades trainings	2	NR (Four new contracts have been executed and training will begin in early 2014. Another round of the PON will close in Q1 2014 and additional new contracts will be executed in Q4 2014.)
	Additional Community Colleges and training organizations added to training network	2	2

Table 3-12 continued

Performance Milestones and Anticipated Results			
		2012-2013 Anticipated	**Through December 31, 2013**
Outputs/Leading Indicators			
Energy Efficiency	Technical training on EE for 13,793 incumbent workers and high school students preparing for technical careers	3,448	Activities for the EE component began in 2013. Contracts are being negotiated and training metrics will rapidly ramp up throughout 2014-2015.
	Support 3,200 disadvantaged, unemployed, or underemployed individuals seeking entry-level employment	800	
	OJT and Hands-on EE Training for 1,867 individuals	467	
	Community Colleges and other training organizations added to training network[a]	2	

[a] 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. Six meetings 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, and Climate Change Adaptation and Climate Change Mitigation (Note that: although the climate change research is eligible for T&MD funding, to date the majority

has been funded through RGGI). Meetings targeting Wind Energy Impacts and possibly High-Volume Hydraulic Fracturing for Natural Gas Extraction are yet to be conducted. A comprehensive assessment of ecosystem monitoring activities in New York State, funded with SBC3 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, 14 new research projects with a focus on acid deposition and mercury monitoring have been contracted, the first life-cycle analysis project has begun, and 13 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 policy makers 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 SBC3 resources and benefits were reported in the 2012 SBC3 annual report finalized in June 2013. Prior historical accomplishments can be found in the SBC3 annual report through December 31, 2011.[33]

Table 3-13 shows the performance milestones and actual results of EMEP through December 31, 2013. Table 3-13 includes only those performance milestones with anticipated achievements during the first two years (2012-2013) of the five-year program; the rightmost column indicates the actual achievement to date.

[33] The 2012 SBC3 report is available here: 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. The 2013 SBC report is under development and will be available soon.

Table 3-13. Environmental Monitoring Evaluation and Protection Performance Milestones and Actual Results

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

		2012-2013 Anticipated	Through December 31, 2013
Outputs/ Leading Indicators			
Environmental Monitoring Evaluation and Protection	Update multi-year EMEP research plan with input from policymakers, scientists, and stakeholders		EMEP has initiated an update of the multi-year environmental research plan with input from policymakers, scientists and stakeholders. Six meetings have been conducted to date. Additional meetings covering other topics are being planned.
	Sign 60 contracts for research studies, including several large flagship projects	23	27
	Hold 5 Program Advisory Group meetings	2	2
	Hold 5 Science Advisory Committee meetings	2	2
	Sponsor 14 workshops, conferences or seminars	5	4

Table 3-13 continued

		2012-2013 Anticipated	Through December 31, 2013
	Complete 65 research studies	5	NR
	Convene 30 briefings on research projects with policy- makers or other stakeholders	12	13
Outcomes/Impacts			
	$11 M in leveraged funds (co-funding and outside investment) to support projects and sponsored research	$3.5 million	$3.2 million
	Publish 119 peer-reviewed scientific journal articles based on program-supported research	10	8

3.3.4.1 EMEP Evaluation: Citation Analysis

The primary mission of NYSERDA's EMEP program is to increase the understanding and awareness of the environmental impacts of energy choices and emerging energy options, and to provide a scientific technical foundation for formulating effective, equitable, energy-related environmental policies and resource management practices. EMEP seeks to identify information needs and research gaps related to electricity-related environmental issues relevant to New York State.

EMEP's information products and outreach efforts target diverse audiences and meet the needs of each of these audiences. High-level policymakers and political staff members require succinct summaries of scientific information placed in a policy context. Government employees that write and defend environmental regulations require more detailed discussions of research projects and the limitations of these projects. Reaching the academic and scientific community requires that projects be referenced in peer-reviewed journals—the most credible information source for these stakeholders. It should also be noted that over the last couple of years the EMEP program has been encouraging its funded researchers to publish in "open source" journals, which assists in increasing the distribution of project results. In some cases EMEP funds have also been used to make publicly available articles published in subscription-based journals.

NYSERDA's evaluation contractor, Research Into Action, conducted a citation analysis in late 2013 for EMEP. This analysis updated prior citation analyses conducted in 2006 and 2009 and was done using Thomson Reuters' (Thomson) Institutional Citation Report (ICR). Obtaining an ICR helps document if and how the research findings supported by EMEP are being used by other researchers. Using its Web of Science® bibliographic database, Thomson algorithmically matches the records of specific authors with articles, books, journals, proceedings, or patents. Thomson is not able to guarantee a 100% match rate; however, tracking match rate, citation volume and other key statistics can give an indication of the general trend in the proliferation of program-sponsored studies and associated information transfer over time, which is a key goal of EMEP.

3.3.4.2 Match Rate

In 2013, Thomson matched about two-thirds of all articles supported by EMEP to their Web of Science® database. This value is consistent with past citation analyses (Table 3-14).

Table 3-14. Citation Analysis Summaries 2006, 2009, and 2013

Analysis Year	Articles Supported By EMEP	Articles Matched to Web of Science®	Match Rate
2006	138	98	71%
2009	254	154	61%
2013a	374	245	66%

a This analysis excludes the 27 uncategorized articles supported by EMEP. Due to differences in Thomson Reuters methodology the uncategorized publications did not match to their database in 2013 whereas they did in match in 2009.

3.3.4.3 2013 ICR Citation Frequency and Diffusion

The 245 EMEP-funded and categorized papers matched in the Web of Science® Database search are referred to as ***source papers***. These ***source papers,*** attributed to 695 authors, were cited 5,833 times between 1999 and 2013. These 5,833 ***citing papers*** were in turn cited 76,384 times. The ICR also shows that the 245 source papers matched in 2013 appeared in 68 unique journals, an increase of almost 60% from the 2009 analysis, which identified 43 journals. In addition, although almost 60% of the source papers appear in 10 of the 68 journals (15%), the spread of the papers is becoming more diffuse compared to 2009 when two-thirds of the source papers appeared in nine of the 43 journals (20%). The academic field associated with the largest number of papers is "Environmental Sciences" followed by "Meteorology and Atmospheric Sciences."

3.3.4.4 Other Indicators of Reach or Success

An ICR results in several other measures of reach or success. The first measure is called a C-Index and it communicates the actual citations relative to expected citations. A value of 1.0 would indicate that the EMEP funded papers were cited at the same rate as other papers in the Web of Science® database. In 2009, the C-Index value was 1.7. The 2013 update of the ICR found that EMEP papers continue to be cited at a greater rate than other literature in the field with a value of 1.3. The lower C-index value in 2013 is likely due to differences in methodology at Thomson Reuters since the last EMEP citation analysis that reduced the match rate among uncategorized publications. As of 2013, more than 94% of EMEP funded papers have been cited at least once. The second measure of intellectual reach is an H-Index. An H-Index is a statistic that reflects the number of papers cited at least that many times. The 245 matched EMEP source papers in 2013 earned an H-Index of 39—meaning that 39 of the source papers were cited at least 39 times each.

3.3.4.5 Conclusion

Since the 2009 analysis, the average number of citations has increased, the H-index increased, and the percentage of all EMEP-funded papers cited increased. The median number of citations remained close to the same and only the C-index decreased; likely reflecting the fact that Thomson could not match most of the uncategorized papers in 2013. However, the C-index of 1.3 still shows that EMEP funded work is 30% more likely to be cited than the average work in its field.

In conclusion, EMEP funding supports research that is being widely disseminated in the academic literature. This analysis captures only part of the academic reach of EMEP and these results indicate that the research is being utilized by academics at a greater rate than other literature in the field.

4 T&MD Program Evaluation Activities

During the second half of 2013, NYSERDA significantly ramped up its T&MD evaluation efforts. As discussed in previous reports, early evaluation tasks have included development of program theory and logic models, and assessment of each major program to ensure readiness for future evaluation. By identifying and documenting inputs, activities, outputs, outcomes and external influences relevant to the program, theory and logic models are a good practice that will help to guide program implementation and program evaluation. Evaluability assessments will help ensure early on that the necessary program tracking or other data is being collected and recorded in a manner that will support examination, through a robust evaluation, of the ultimate outcomes and indicators identified for each program.

Through December 31, 2013, and working with an existing evaluation contractor, Research Into Action (RIA), program theory and logic modeling activities have been completed for the Advanced Codes and Standards, Clean Energy Business Development, Workforce Development, Economic Development Growth Extension, New York Products and Smart Grid programs. Program theory and program logic modeling activities are underway for the Commercial/Industrial component of the Market Development Initiative, Advanced Buildings: ETAC, Advanced Buildings: Technology Development, and CHP Aggregation and Acceleration programs. Evaluability assessments have been developed for Advanced Energy Codes and Standards and Clean Energy Business Development program. Additional evaluability assessments will be developed for programs upon completion of the theory and logic models.

In addition, RIA has conducted early process evaluation studies on the Smart Grid and Workforce Development programs and a citation analysis on EMEP. These three studies are summarized within their respective program narrative in Section 3 of this report.

During the second half of 2013, Industrial Economics, Inc. (IEc), was competitively selected as the new process, market and impact contractor for the T&MD portfolio. Attention was placed on hiring a contractor, or team of contractors, with expertise in evaluating technology and market development program impacts. The team held kick-off meetings in late October with NYSERDA evaluation staff, program staff and DPS. Program-specific kick-off meetings were also held to inform development of a comprehensive, multi-program evaluation plan that will be completed in early 2014 and will guide evaluation activities conducted by IEc. Upon completion of this plan, IEc will take over subsequent logic modeling and evaluability assessment activities as well as future process, market and impact evaluations. This work will be closely coordinated such that data is collected from market actors in the most efficient and least burdensome manner and findings from formative evaluations are incorporated into program implementation and subsequent evaluation studies.

In addition to the logic modeling and evaluability assessments already underway and planned, other key evaluation activities that will be conducted as part of the T&MD evaluation include process, market and impact evaluation. The 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 typically include an assessment of customer | and stakeholder satisfaction with programs. The goal of process evaluation is to inform real-time adjustments and maximize program efficiency and effectiveness through actionable recommendations. These studies will mainly be 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. IEc's process evaluation work will likely begin in early 2014.

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 impact and market 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. IEc is currently researching deemed savings estimates for technologies promoted under the Market Development Products initiative.

In addition to traditional program level evaluations, IEc will undertake several portfolio level or cross-cutting evaluations. For example, IEc recently completed a survey of NYSERDA R&D Demonstration Projects to estimate project impacts including energy and environmental benefits, characteristics of potential replication projects, as well as process evaluation information including participant awareness, program communication, adequacy of assistance provided, and efficiency of the funding process. A final report detailing these findings is expected to be completed in the first quarter of 2014.

In addition to the impact, market and process evaluation activities previously described, NYSERDA has contracted with ICF Consulting (ICF) to conduct economic and environmental analyses on its program portfolios, including the T&MD portfolio. In particular, ICF will provide targeted analysis, as needed, to help assess the cost-effectiveness of NYSERDA's investment in its T&MD programs. A Task Work Order has been initiated under which ICF has conducted a literature review of current best practices for assessing the cost-effectiveness of programs similar to those offered under NYSERDA's T&MD portfolio. IFC's deliverable, expected in the first quarter of 2014, will include recommendations for NYSERDA to undertake to apply these practices in examining the cost-effectiveness of the T&MD portfolio in the future.

Appendix A NYSERDA T&MD Program Advisory Committee Members

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NREL Innovation and Entrepreneurship
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NYS Department of Public Service

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NYC Investment Fund

Jeff Harris
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Alliance to Save Energy

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New Buildings Institute

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Robert Simpson
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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
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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. Electric Power Transmission and Distribution (EPTD) Smart Grid Program Logic Diagram

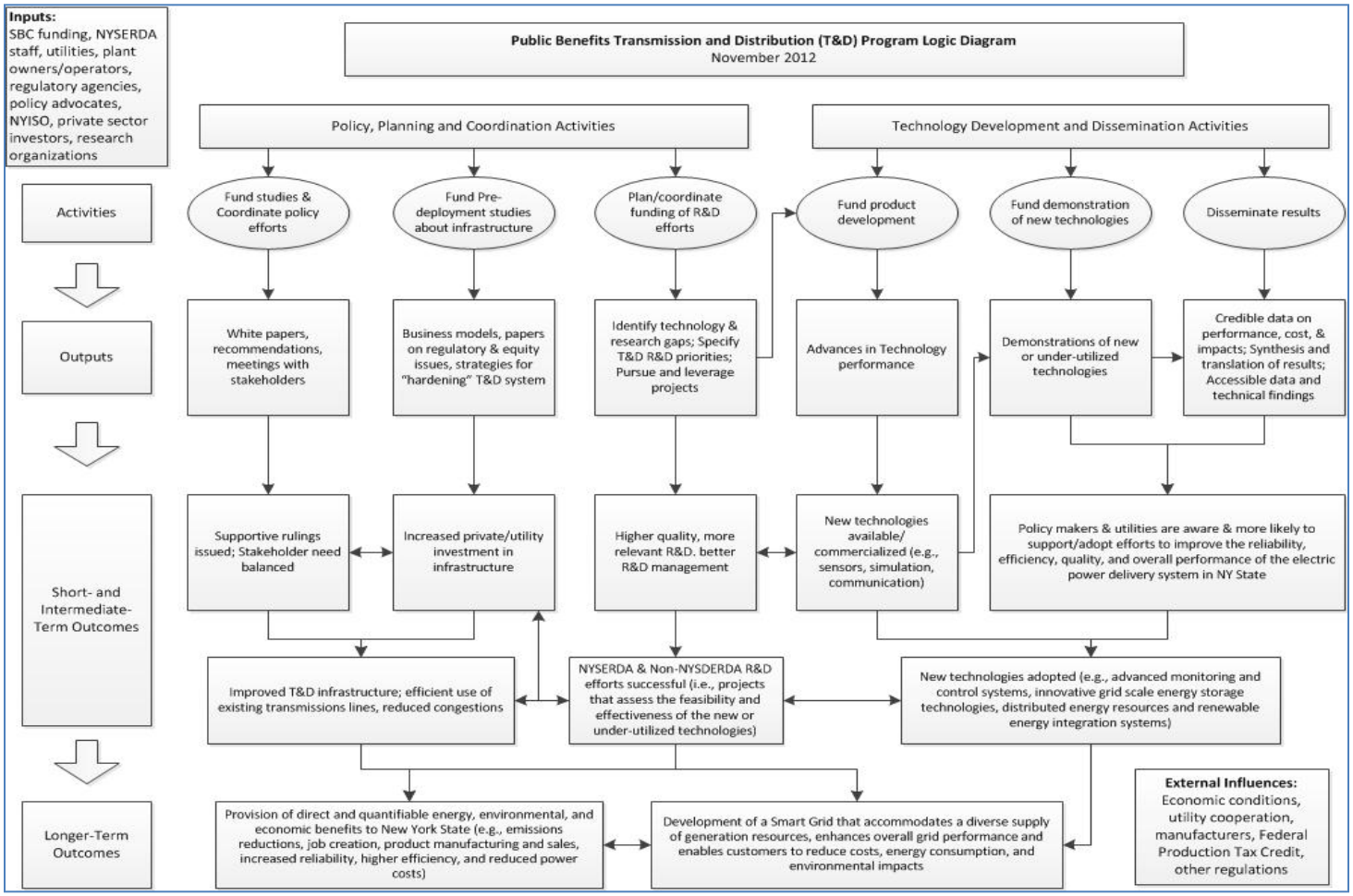


Figure B-2. Advanced Codes Logic Diagram

D/C: Design & Construction

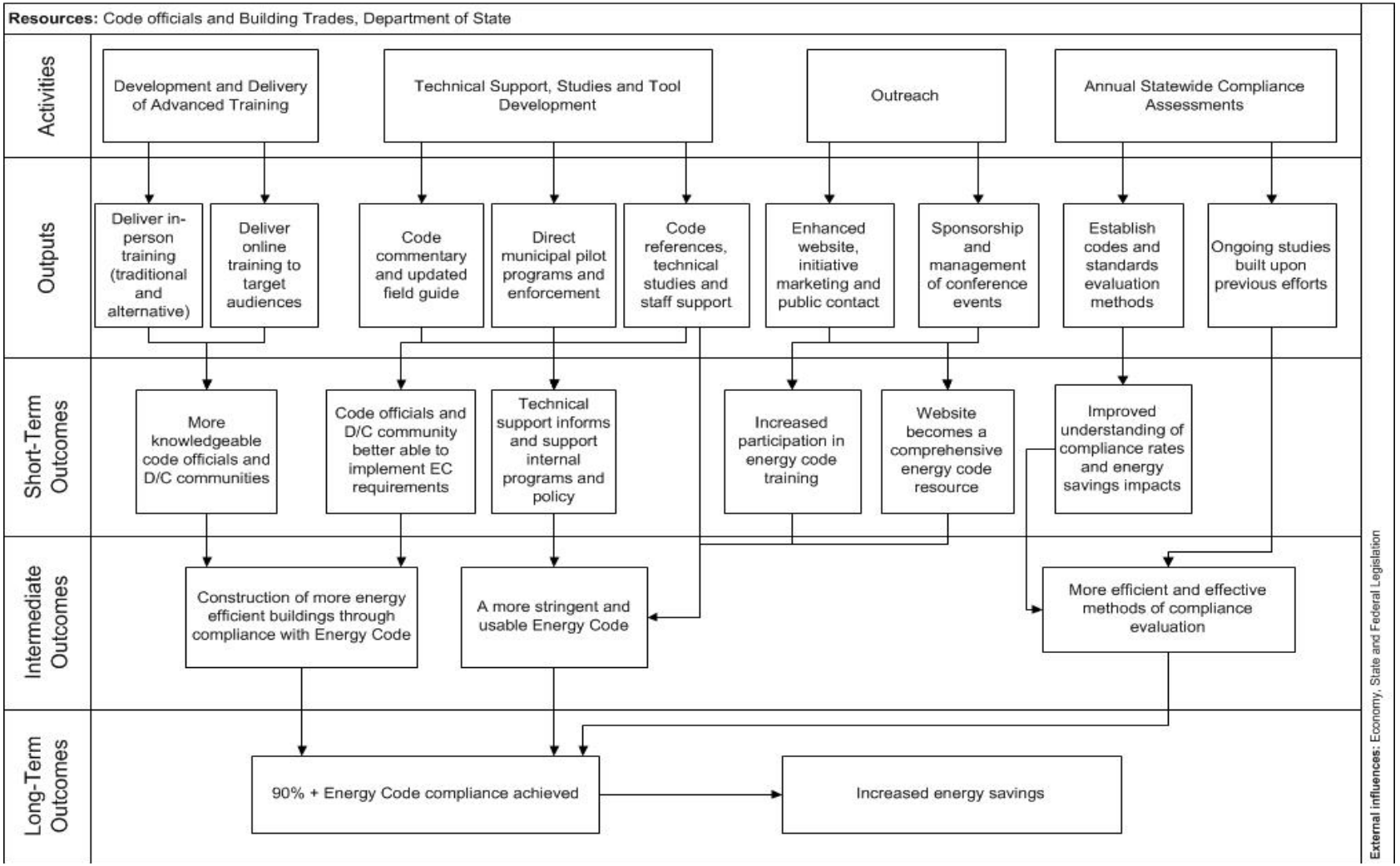


Figure B-3: Standards Logic Diagram

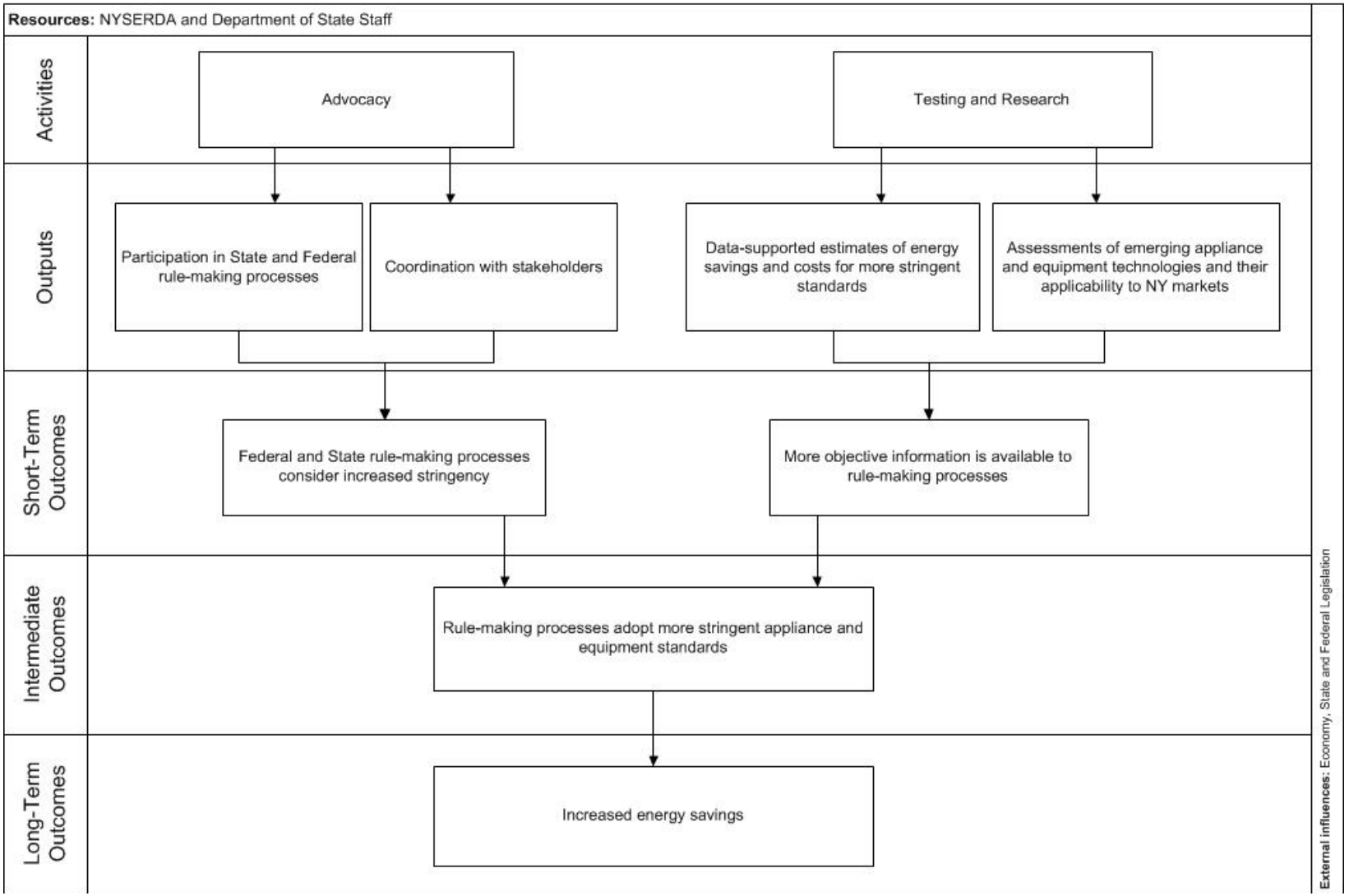


Figure B-4. New York Products Program Logic Model Diagram

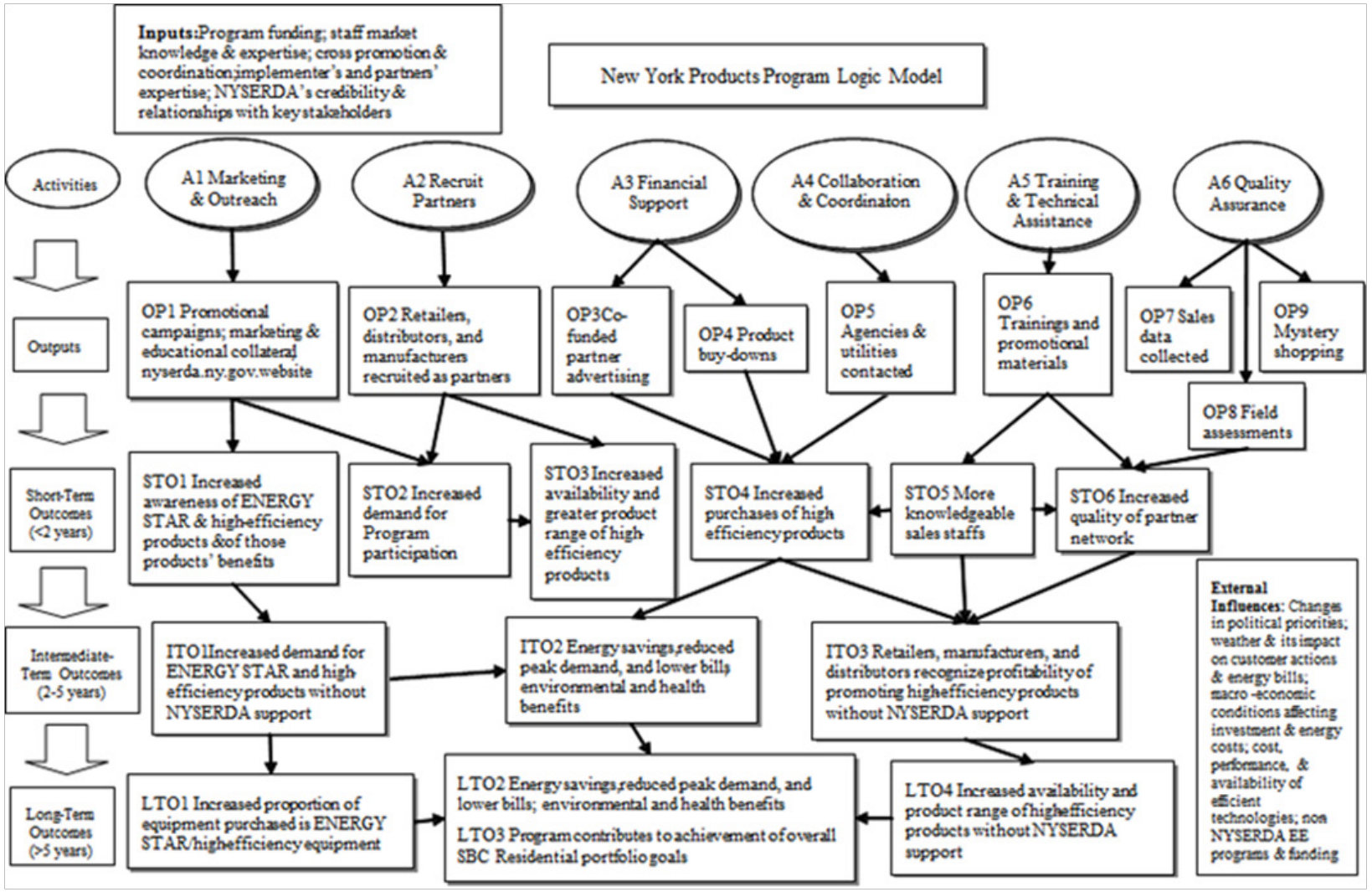


Figure B-5. Economic Development Growth Extension Program Logic Model Diagram

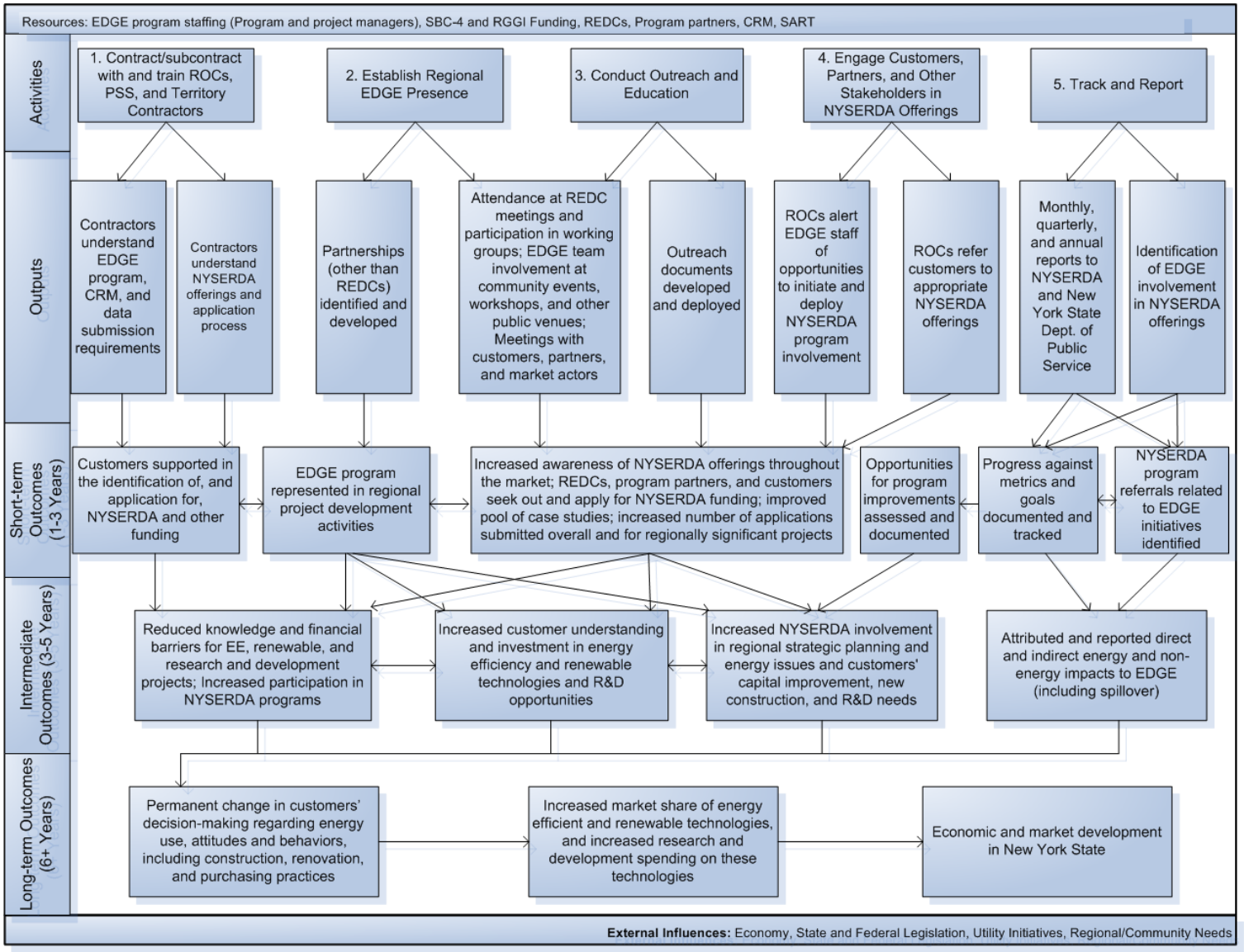


Figure B-6. Clean Energy Business Development Program Logic Model Diagram

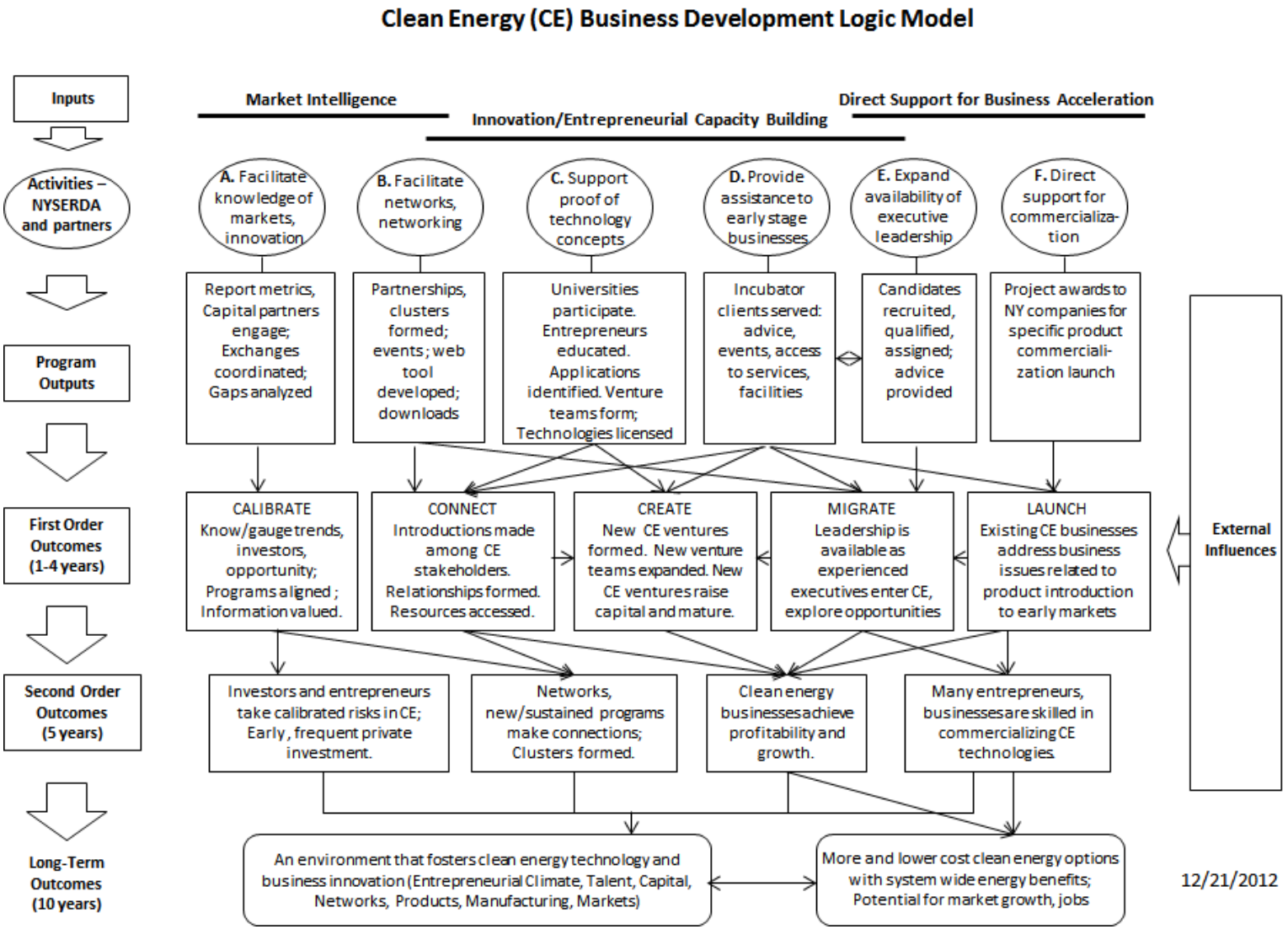
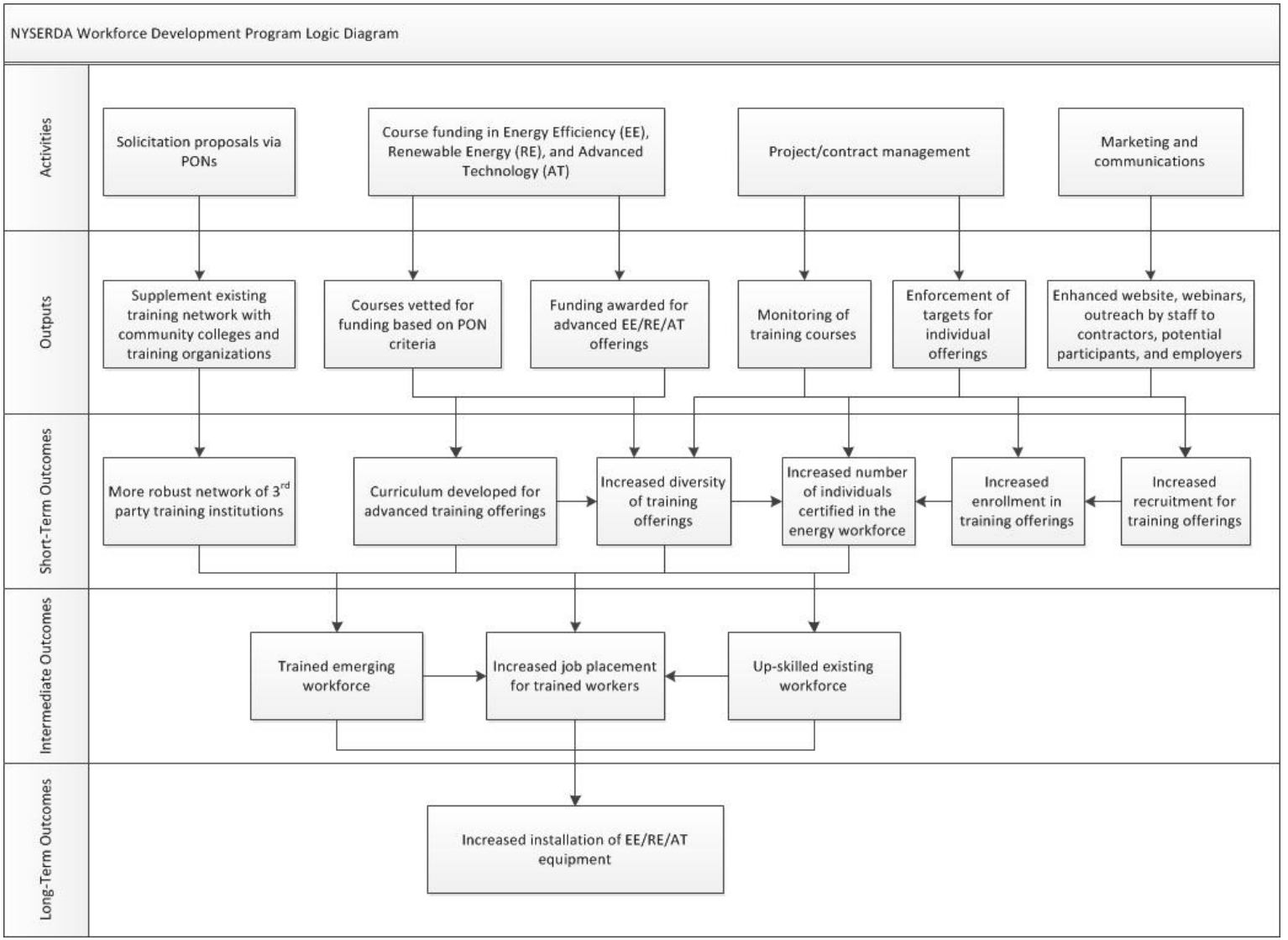


Figure B-7. Workforce Development Initiative Logic Model Diagram.



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.

To learn more about NYSERDA's programs and funding opportunities, visit nyserda.ny.gov or follow us on Twitter, Facebook, YouTube, or Instagram.

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NYSERDA Technology and Market Development Program

Semiannual Report through December 31, 2013

Final Report
March 2014

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