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NYSERDA Technology and Market Development Program

Semiannual Report through December 31, 2014

Final Report

May 2015

NYSERDA's Promise to New Yorkers:

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

Mission Statement:

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

Vision Statement:

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

NYSERDA Record of Revision

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NYSERDA Technology and Market Development Program

Semiannual Report through December 31, 2014

Final Report

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Albany, NY

May 15, 2015

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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. The 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 the 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.

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

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

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

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

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

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

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

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, the PSC issued an Order and approved, with modifications, NYSERDA's requests in its petition regarding uncommitted SBC III funds.[5] The PSC approved the reallocation of SBC III funds into the T&MD portfolio to support T&MD solar electric activities ($10 million) and Advanced Buildings activities ($5.76 million) as well as NYSERDA's support of the BNL proposal and NY-BEST

[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.

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

The PSC issued an Order on December 17, 2012 and approved, with modifications, the requests described in the balance of NYSERDA's March 30, 2012 petitions.[7] In this Order, the PSC approved NYSERDA to reallocate $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] NYSERDA submitted a revised T&MD Operating Plan on February 15, 2013, aligning the report with the December 17, 2012 Order. On June 16, 2014, NYSERDA

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

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

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.

submitted a petition to the PSC to add $7.5 million to the CHP initiative. This petition was withdrawn on November 14, 2014[9] with the recommendation that the uncommitted funds be considered within the overall context of the Clean Energy Fund (CEF).

The CEF proceeding was initiated by the PSC in a May 8, 2014 Order Commencing Proceeding.[10] The Commission noted in the Order that NYSERDA's CEF proposal "should refocus on market and technology transformative strategies designed to provide temporary intervention and support to overcome specific barriers and produce self-sustaining results." In response, NYSERDA filed its CEF Proposal on September 23, 2014 (Proposal).[11] In its Proposal, NYSERDA provided information regarding the four portfolios of activity that would constitute the CEF: market development; business and technology innovation; NY Green Bank; and the NY-Sun program. Also in that filing, NYSERDA advanced both budget and benefit information regarding the proposed market development and business and technology innovation portfolios, among other issues. NYSERDA is currently preparing supplemental information to assist the stakeholder comment process and to provide more detailed information for PSC deliberation; that supplement is due to be filed on June 8, 2015.

Going forward, NYSERDA's proposed CEF would comprise both the market development and technology and business innovation activities and is intended to supersede the final year (calendar 2016) of the current T&MD portfolio. A PSC Order on this request is anticipated in late 2015.

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9 Case 10-M-0457, *In the Matter of the System Benefits Charge IV*, Withdrawal of Petition for Allocation of Uncommitted T&MD Funds, November 14, 2014.

10 Case 14-M-0094 – *Proceeding on Motion of the Commission to Consider a Clean Energy Fund*, Order Commencing Proceeding. Issued and effective May 8, 2014.

11 Case 14-M-0094 – *Proceeding on Motion of the Commission to Consider a Clean Energy Fund*, Clean Energy Fund Proposal, September 23, 2014.

1.2 T&MD Program Mission and Objectives

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

Specifically, objectives designed to support this mission include:

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

The nine initiatives that comprise the T&MD portfolio (detailed in Section 3) will be assessed based on their ability to support these objectives. Future evaluation reports will present these findings as programs are assessed.

Achievement of T&MD portfolio goals is dependent on long-term or multi-phase investments and for this reason, several of the T&MD initiatives build on the experience and success of programs funded by previous rounds of the SBC Program or other funding sources. Although this desired and necessary continuity of effort makes it difficult to attribute performance results and outcomes to a specific phase of funding, NYSERDA recognizes the importance of attempting to clearly delineate progress made in the T&MD portfolio from earlier or alternate funding sources. Toward this end, NYSERDA intends to count outputs and outcomes supported at least in part by T&MD funds toward T&MD performance milestones and results. Where prior SBC or other funded activities are foundational to the success of the T&MD program and illustrative of potential future expectations for the T&MD portfolio, they are highlighted to help convey a more complete picture of possible program benefits, but these achievements will not be tallied toward the T&MD goals unless they have received T&MD funds.

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

1.3 Organization of the Report

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

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

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

2 Portfolio-Level Reporting

2.1 Portfolio Level Progress

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

2.1.1 Solicitations Released

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

Table 2-1. Solicitations Released from July 1, 2014 through December 31, 2014

Some of the solicitations listed in this table may have split funding sources, and some solicitations may have been revised since their initial release date.

Solicitation Number	Solicitation Name	Solicitation Release Date	Solicitation Closing Date
RFQ 2928	NYS Strategic Gasoline Reserve Prequalified Purchaser Program (Downstate Region)	7/8/2014	5/27/2015
PON 2656	Behavioral Demonstration Program	7/16/2014	9/15/2014
RFP 2985	RPS Program Purchase of Renewable Energy Attributes	7/28/2014	8/25/2014
RFP 2960	Greening the Bronx: Urban Heat Island Mitigation Project	7/31/2014	9/16/2014
PON 3010	Renewable Heat NY Biomass Boiler Program	7/31/2014	12/31/2018
RFP 2986	Consulting Services for PeopleSoft 9.2 Upgrade	8/1/2014	8/28/2014
PON 2844	Emerging Technologies & Accelerated Commercialization (ETAC-CI)	8/4/2014	1/28/2015
PON 2957	Advanced Transportation Technologies	8/14/2014	10/23/2014
RFP 2768	Anaerobic Digestion Assistance Initiative	8/14/2014	9/25/2014
RFI 2980	Incubator Investment Fund	9/8/2014	10/28/2014
PON 2942	Advanced Clean Power Technologies	9/11/2014	5/5/2015
PON 2981	Energy-Related Air Quality and Health Effects Research	9/19/2014	12/2/2014
RFP 3007	Bond Counsel Services	10/14/2014	11/12/2014
RFP 2930	Technical and Logistic Support for CHP Acceleration Program	10/14/2014	11/13/2014
RFP 2852	Energy Code Training and Support Website	11/4/2014	12/16/2014
RFP 3002	Radiation Protection Program Support Services (West Valley Management Program)	11/6/2014	1/6/2015
PON 3027	Energy and Environmental Performance of Biomass-Fired Heating Equipment	11/10/2014	1/13/2015
PON 2941	Climate Change Adaptation Research & Strategies	11/16/2014	12/9/2014
PON 3011	Community Solar NY	12/4/2014	1/30/2015
PON 3026	Electric Power Transmission and Distribution Smart Grid Program	12/12/2014	2/18/2015
PON 3016	Plug-in Electric Vehicle Enabling Technology Demonstration Program	12/15/2014	2/10/2015
RFP 2857	Greenhouse Gas Reduction Pilot Program	12/30/2014	3/5/2015

2.1.2 Implementation of T&MD Initiatives

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 three years of program operation. Performance milestone tables (included for each initiative in Section 3 of this report) show progress through December 31, 2014 against the Operating Plan's expected benefits in the 2012-2015 timeframe. Benefits achieved in the first three years of the T&MD Program should be viewed with two important points of context:

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

An Output/Leading Indicator describes the anticipated immediate results associated with initiative activities. An Outcome/Impact describes expected achievements in the near, intermediate, and longer term. Consistent with the Operating Plan for Technology and Market Development Programs (2012-2016), where a target is a range, the range's minimum value is shown in the tables. Please refer to Appendix D for the details on the target ranges

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 expected contributors to the overall savings goals in NYSERDA's T&MD Operating Plan, the Advanced Codes & Standards and Advanced Buildings programs, anticipated most of their savings to be achieved in late 2014 through 2016 or later. The energy savings reported in this table for all programs except Market Pathways Products Partners are program-reported; market impact evaluation activities have not yet been conducted on these other programs yet. Future reports will present findings from those studies once they are finalized. The energy savings for the Market Pathways Products Partners are adjusted for the evaluation findings from a market/impact evaluation that was completed in 2014.[12]

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

Electricity, fossil fuel and demand savings/generation targets and progress refer to the cumulative savings that are achieved through a particular time period from all measures installed; e.g., T&MD savings for 2012 - 2014 are the energy savings achieved in 2014, as a result of energy efficiency measures installed from January 2012 through December 2014.

The progress for the 2012-2013 time period has been restated after the underlying data, that is now in a centralized data warehouse, went through a quality and reconciliation process resulting in corrections across the program. By restating the results for the previous reporting report, NYSERDA is following financial reporting practices and meeting the validation and verification criteria for all reporting.

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.

Other noteworthy program implementation and progress milestones are each described in greater detail in Section 3.

Table 2-2. Summary of Anticipated Cumulative T&MD Benefits through 12/31/2014 (at full implementation)[13]

Table 2.2 Energy Efficiency Projects

Benefit Description	2012-2016	Out Years	Total	Thru Dec 31, 2014
On-site Electricity Savings from Energy Efficiency Projects, Technologies, Replications, and Codes & Standards (Cumulative Annual MWh)	541.60	647.70	1,189.30	16.70
GWh Savings from Funded Project and Technology Installations	171.60	0.90	172.50	16.70
GWh Savings from Anticipated Replications not Directly Funded by Program		29.80	29.80	0.00
GWh Savings from Codes & Standards Activities supported by the Program	370.00	617.00	987.00	0.00
On-site Fossil Fuel Savings from Energy Efficiency Projects, Technologies, Replications, and Codes & Standards (Cumulative Annual MMBtu)	3,323,200	2,802,600	6,125,800	70,363
MMBtu Savings from Funded Project and Technology Installations	965,200	7,800	973,000	70,363
MMBtu Savings from Anticipated Replications not Directly Funded by Program		231,800	231,800	0
MMBtu Savings from Codes & Standards Activities supported by the Program	2,358,000	2,563,000	4,921,000	0
On-site Demand Reduction from Energy Efficiency Projects, Technologies, Replications, and Codes & Standards (Cumulative Annual MW)	133.00	242.40	375.40	105.80
Demand Reduction from Funded Project and Technology Installations	43.00	5.30	48.30	105.80
Demand Reduction from Anticipated Replications not Directly Funded by Program		30.10	30.10	0.00
Demand Reduction from Codes & Standards Activities supported by the Program	90.00	207.00	297.00	0.00

Table 2.2 CHP Projects

Benefit Description	2012-2016	Out Years	Total	Thru Dec 31, 2014
On-site Electricity Generated from CHP Projects, Technologies, and Replications (Cumulative Annual MW)	18.00	29.50	47.50	74.01
MWs Installed from Funded Project and Technology Installations	18.00	19.50	37.50	74.01
MWs Installed from Anticipated Recplications not Directly Funded by the Program		10.00	10.00	0.00
On-site Electricity Generated from CHP Projects, Technologies, and Replications (Cumulative Annual GWh)	121.00	216.25	337.25	572.43
GWhs Generated from Funded CHP Project and Technology Installations	121.00	155.25	276.25	572.43
GWhs Generated from Anticipated Replications not Directly Program Funded by Program		61.00	61.00	0.00
Primary Energy Savings from CHP Installations (Cumulative Annual MMBtus)	157,300	281,125	438,425	744,160
MMBtu Consumed from Funded Project and Technology Installations	157,300	201,825	359,125	744,160
MMBtu Consumed from Anticipated Replications not Directly Funded by Program		79,300	79,300	0

[13] The target and progress for the System-wide CO2 Emission Reductions, Energy Efficiency - Onsite and Central Station (Annual Tons) have been recalculated using an updated emission factor of 625 lbs CO2e/MWh for the electricity grid (from 826 lbs CO2e/MWh). An average emission factor of 625 pounds of CO2e/MWh is used to estimate emission reductions associated with electricity use reductions for all sectors. This value includes emissions from in-state electricity generation as well as emissions associated with net imports of electricity. The emission factor for electricity is based on data from Patterns & Trends - New York State Energy Profiles: 1997 – 2011 (NYSERDA 2013) and methodology from the GHG Inventory and Forecast prepared for the 2014 Draft New York State Energy Plan (April 2014).

Individuals may participate in more than one training course for the Clean Energy Training for Practitioners benefit.

Table 2.2 Other TMD Benefits

Benefit Description	2012-2016	Out Years	Total	Thru Dec 31, 2014
System-wide CO2 Emission Reductions, Energy Efficiency - On-site and Central Station (Annual Tons)	363,890	366,555	730,444	9,348
Advanced Technologies Reaching Commercial Availability	46	42	88	13
Improved Technologies Deployment Programs Adopted by the Market or Further Supported by Deployment Programs	10	9	19	0
Commercial Sales of New and Improved Supported Technologies (millions)	$26.5	$157.7	$184.2	$1.6
Funding Leveraged (co-funding and outside investment) by Investment (millions)	$696.5	$103.0	$799.5	$287.3
Clean Energy Businesses Graduating from Incubators	90	72	162	11
Clean Energy Companies Receiving Support	525	200	725	269
Retail and Supply Chain Businesses Partnering with NYSERDA to increase Market Share of Energy Efficient Products	1,750		1,750	1,280
Clean Energy Training for Practitioners (Trainees)	39,056	9	39,065	5,908
Supply Chain Training to Facilitate Adoption of Energy Efficient Products (Partner Employees)	1,525		1,525	2,125

2.1.3 Budget and Spending Status

Table 2-3 shows the T&MD program budget and financial status through December 31, 2014. Committed and spent funds are also shown as a percent of the total 2012-2016 budget. As of December 31, 2014, three years of T&MD activity has been completed of the five-year program (i.e., 60%); 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 12/31/2014

Totals may not sum exactly due to rounding.

	2012-2016 Budget	Spent Funds	Percent of 2012-2016 Budget Spent	Committed Funds[a,b]	Percent of 2012-2016 Budget Committed
Power Supply and Delivery					
Smart Grid/Electric Vehicle	$61,281,382	$5,967,855	9.74%	$39,783,429	64.92%
Advanced Clean Power	$51,771,962	$6,945,160	13.41%	$33,003,762	63.75%
Combined Heat and Power[c]	$75,500,000	$2,055,217	2.72%	$50,012,120	66.24%
Total Power Supply & Delivery	*$188,553,344*	*$14,968,232*	*7.94%*	*$122,799,311*	*65.13%*
Building Systems					
Advanced Buildings	$75,336,160	$6,272,211	8.33%	$50,358,465	66.85%
Advanced Energy Codes & Standards	$16,679,794	$825,656	4.95%	$9,256,803	55.50%
Total Building Systems	*$92,015,954*	*$7,097,867*	*7.71%*	*$59,615,268*	*64.79%*
Clean Energy Infrastructure					
Market Development	$70,380,281	$27,629,307	39.26%	$36,994,684	52.56%
Clean Energy Business Development	$41,761,046	$6,993,941	16.75%	$23,897,187	57.22%
Environmental Monitoring, Evaluation and Protection (EMEP)	$18,550,048	$2,471,754	13.32%	$12,655,578	68.22%
Workforce Development[c]	$39,000,000	$4,535,724	11.63%	$15,959,112	40.92%
Total Clean Energy Infrastructure	*$169,691,375*	*$41,630,726*	*24.53%*	*$89,506,561*	*52.75%*
Total of All Program Areas	***$450,260,673***	***$63,696,825***	***14.15%***	***$271,921,140***	***60.39%***
Administration (8%)	$39,765,533	$21,746,890	54.69%	$21,759,249	54.72%
NYS Cost Recovery Fee (1.7%)	$7,585,944	$2,123,747	28.00%	$2,123,747	28.00%
Evaluation (5%)	$26,363,458	$2,649,653	10.05%	$9,422,523	35.74%
Grand Total - Portfolio	***$523,975,608***	***$90,217,115***	***17.22%***	***$305,226,660***	***58.25%***

[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 nine T&MD initiatives, including budget status and highlights of early achievements during the first three years of the five-year funding period. As noted in Section 2, benefits achieved in the first three years of the T&MD program should be viewed with two important points of context:

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

An Output/Leading Indicator describes the anticipated immediate results associated with initiative activities. An Outcome/Impact describes expected achievements in the near, intermediate, and longer term.

3.1 Power Supply and Delivery Initiatives

Table 3-1 shows committed and spent funds for this initiative 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 two program areas appears to be lower than might be expected at this point in time. Reasons are as follows:

- NYSERDA's program activities for Resource Development are not constant over time but instead vary with changes in state policy and energy priorities, which lead to differences in expenditures from year to year.
- Interest in the CHP market has increased as a result of the program's new catalog sales approach (predefined units make selection easier and cheaper for customer) and aggressive marketing program (regular CHP Expos event). Industry participants have reported customer sales cycles have been reduced to almost three months (as opposed to 12-15 months) and are attributing this reduction to the change in practices. There are currently 14 approved vendors and 148 approved CHP systems.

Table 3-1. Power, Supply, and Delivery Budget and Financial Status through 12/31/2014

Totals may not sum exactly due to rounding.

	2012-2016 Budget	Spent Funds	Percent of 2012-2016 Budget Spent	Committed Funds[a,b]	Percent of 2012-2016 Budget Committed
Smart Grid/Electric Vehicle					
Smart Grid	$47,284,415	$5,152,961	10.90%	$30,788,306	65.11%
Electric Vehicle	$13,996,967	$814,894	5.82%	$8,995,123	64.26%
Total Smart Grid/Electric Vehicle	*$61,281,382*	*$5,967,855*	*9.74%*	*$39,783,429*	*64.92%*
Advanced Clean Power					
Technology Innovation	$27,826,749	$5,820,287	20.92%	$27,175,524	97.66%
Resource Development	$13,945,213	$477,293	3.42%	$504,781	3.62%
Solar Cost Reduction	$10,000,000	$647,580	6.48%	$5,323,457	53.23%
Total Advanced Clean Power	*$51,771,962*	*$6,945,160*	*13.41%*	*$33,003,762*	*63.75%*
Combined Heat & Power[c]					
CHP Aggregation & Acceleration	$25,500,000	$937,688	3.68%	$5,395,686	21.16%
CHP Performance	$50,000,000	$1,117,529	2.24%	$44,616,434	89.23%
Total Combined Heat & Power	*$75,500,000*	*$2,055,217*	*2.72%*	*$50,012,120*	*66.24%*
Grand Total - Power, Supply, & Delivery Initiatives	***$188,553,344***	***$14,968,232***	***7.94%***	***$122,799,311***	***65.13%***

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

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

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

3.1.1 Smart Grid and Electric Vehicle Infrastructure

3.1.1.1 Smart Grid

The Smart Grid Program is designed to promote product development and demonstrations targeted at ensuring high levels of security, quality, reliability and availability of electric power; improving economic productivity; and minimizing environmental impacts while maximizing safety and sustainability. A smarter grid will be characterized by the widespread application of advanced sensing, communication and control devices, and other uniform diagnostic systems to support real-time visualization of electric grid operating conditions. This smarter grid is expected to reduce energy losses, extend equipment life, reduce

operating costs, increase system resiliency to disruptions, support quicker restoration after disruptions, support the integration of distributed energy resources, and increase the throughput or transfer of electric energy between regions of the State. A smarter grid will also be essential to accelerating adoption of grid-powered electric vehicles (GPV) and associated infrastructure. Projects funded through program activity must demonstrate significant statewide public benefit and quantify all energy, environmental, and economic impacts. Technology demonstrations, product development, research studies, and engineering studies are all eligible for funding support through periodic program solicitations.

The following key program activities and accomplishments have been performed during this reporting period:

- The annual Smart Grid Stakeholder's Meeting was held on October 8, 2014 at Orange and Rockland Utilities' facility in Blooming Grove, NY. Representatives from each investor-owned utility, New York Power Authority (NYPA), Long Island Power Authority (LIPA), Brookhaven National Labs, an electric cooperative utility, and academia were present. This year, members of the NYS Department of Public Service were invited to participate in the meeting to inform the gathered stakeholders on the Reforming the Energy Vision (REV) initiative. The meeting is held annually to share results of NYSERDA-funded smart grid projects, gather feedback on the NYSERDA smart grid program, and provide a venue for discussion amongst stakeholders on industry related activity.
- The Electric Power Transmission and Distribution (EPTD) Smart Grid Program solicitation (PON 3026) was released December 12, 2014. This third solicitation under the T&MD plan made $10 million available over two rounds with due dates of February 18, 2015 and August 5, 2015.
- New York State Legislature directed NYSERDA, the DPS, and the Division of Homeland Security and Emergency Services (DHSES) to assess the practical feasibility of establishing microgrids to enhance the resiliency of facilities that provide critical public safety, health and security support upon loss of the electric grid for an extended period (more than 72 hours) due to natural or manmade disasters. The interagency team lead by NYSERDA published a final report, "Microgrids for Critical Facility Resiliency in New York State" in December 2014. The report, along with previous research on microgrids conducted by NYSERDA, provides information on the challenges facing microgrid development in today's utility environment. Specifically, it examined five case studies and took a focused look at the use of microgrids to support mission critical functionality - generally at facilities that already had backup generation installed. It is expected that the report will complement two statewide initiatives currently underway: NY Prize (a community grid competition), and the New York State Public Service Commission's proceeding to reform New York State's energy industry and regulatory practices entitled REV. In particular, the Benefit-Cost Analysis (BCA) tool developed under this project is providing a foundation for assessing the benefits of more broadly defined community grids that serve all classes of consumers – both public and private.

Table 3-2 shows performance milestones and results for the Smart Grid Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Signed contracts and completed projects are for technology development, demonstration and pilot projects including several large flagship projects. Signed contracts and completed projects for research studies include studies on technologies, market barriers and policies related to increased smart grid implementation in New York State.

Table 3-2. Smart Grid Performance Milestones and Results through 12/31/2014

Smart Grid
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
Technology, development, demonstration or pilot projects	Signed Contracts - Target	7	10	12		29
	Signed Contracts - Progress	10	2			12
	Completed Projects - Target		5	9	15	29
	Completed Projects - Progress	0	0			0
Research Studies	Signed Contracts - Target	2	3	3		8
	Signed Contracts - Progress	12	12			24
	Completed Projects - Target		2	3	3	8
	Completed Projects - Progress	0	0			0
All Projects	Supported Companies - Target	8	12	14		34
	Supported Companies - Progress	21	17			38

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$18.0	$42.0	$52.0		$112.0
	Leveraged Funds Amount (millions) - Progress	$13.4	$6.1			$19.5
	Products and Technologies Commercialized - Target			1	2	3
	Products and Technologies Commercialized - Progress	0	0			0
	Product Revenue Amount (millions) - Target				$6.0	$6.0
	Product Revenue Amount (millions) - Progress	$0.0	$0.0			$0.0
	Market Adoption - Target			2	4	6
	Market Adoption - Progress	0	0			0

3.1.1.2 Electric Vehicle Infrastructure

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

The following key program activities and accomplishments have been performed during this reporting period:

- NYSERDA received a record 69 proposals for the Advanced Transportation Technology solicitation. These proposals were to develop new products and included more than 30 proposals that would expand and improve transportation electrification.
- Contractor Clean Power Research received additional funding from the State of California to expand the development of the EV Cost Calculator that NYSERDA is supporting through its Electric Vehicle Infrastructure program.
- Contractor Energetics, Inc. released updated reports on the use of NYSERDA-supported EV charging stations installed through NYSERDA's EV Charging Station Demonstration Program. The report shows quarterly use of the stations broken down by geographic region, type of location, and business model.
- Projects focused on detailing the grid impacts of EVs and identifying policy- and technology-based solutions met with stakeholders including utilities, the New York Independent System Operator (NYISO), DPS, EV charging station suppliers, and electric grid experts.
- NYSERDA met periodically with stakeholders, including auto manufacturers, environmental groups, EV infrastructure providers, site owners, and installers to solicit input for the design of new EV-related programs.

Table 3-3 shows performance milestones and results for Electric Vehicle Infrastructure Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Research studies focus on technologies, market barriers and policies related to increased grid powered vehicle implementation in New York State. Leveraged funds include co-funding and outside investments for electric vehicle infrastructure.

Table 3-3. Electric Vehicle Infrastructure Performance Milestones and Results through 12/31/2014

Electric Vehicle
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
Technology, development, demonstration or pilot projects	Signed Contracts - Target	4	9	12		25
	Signed Contracts - Progress	1	9			10
	Completed Projects - Target		3	6	16	25
	Completed Projects - Progress	0	0			0
Research Studies	Signed Contracts - Target	4	2	2		8
	Signed Contracts - Progress	1	10			11
	Completed Projects - Target		4	2	2	8
	Completed Projects - Progress	0	0			0
All Projects	Supported Companies - Target	5	10	15		30
	Supported Companies - Progress	3	19			22

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$4.0	$14.0	$24.0		$42.0
	Leveraged Funds Amount (millions) - Progress	$7.9	$3.2			$11.1
	Products and Technologies Commercialized - Target		1	1	2	4
	Products and Technologies Commercialized - Progress	0	0			0
	Product Revenue Amount (millions) - Target				$9.0	$9.0
	Product Revenue Amount (millions) - Progress	$0.0	$0.0			$0.0
	Market Adoption - Target			1	2	3
	Market Adoption - Progress	0	0			0

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 and clean power, and storage technologies. Technologies eligible under this program include innovative renewable-electric and other advanced clean power technologies for grid-connected applications, storage technologies for sub-utility-scale stationary applications, or technologies that improve grid power quality and reliability. Subsystems and components of these technologies, as well as improved innovative manufacturing methods for these technologies are included. Examples of technologies include fuel cells, batteries, solar electric power, wind power, hydro power, power conditioning equipment, waste heat to electricity, biomass to electricity and innovative control or monitoring technologies.

The following key program activities and accomplishments have been performed during this reporting period:

- Sentient Corporation completed project 30365, adding capability and reducing the cost to its wind turbine sensor and life prediction model. By the end of the project, Sentient modeled 218 turbines (150 Clipper and 68 GE) and installed sensors on 57 turbines (54 clipper and 3 GE). Seventeen turbines (14 Clipper and 3 GE) were included in the field test. Sentient successfully identified one of these units as at risk for an imminent failure. Sentient added 9 New York employees, resulting in 11 New York employees by the end of the project.
- Twenty-three proposals for Round 1 of PON 2942 (Advanced Clean Power) were received by November 5, 2014. The proposals were reviewed and eleven proposals were recommended for funding.

Table 3-4 shows performance milestones and results for the Technology Innovation program through December 31, 2014. Commercialization metrics for projects that only received SBC III funding are not reported here; those metrics are reported in the SBC III annual report. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Leveraged funds include co-funding and outside investments for clean power technology projects.

Table 3-4. Technology Innovation Performance Milestones and Results through 12/31/2014

Clean Power Technology Innovation
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Signed Contracts - Target	15	26	10		51
	Signed Contracts - Progress	12	11			23
	Completed Projects - Target		10	15	26	51
	Completed Projects - Progress	0	0			0
	Supported Companies - Target	19	32	13		64
	Supported Companies - Progress	12	13			25

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$20.0	$32.0	$13.0		$65.0
	Leveraged Funds Amount (millions) - Progress	$20.2	$15.0			$35.1
	Products and Technologies Commercialized - Target		1	2	5	8
	Products and Technologies Commercialized - Progress	2	1			3
	Product Revenue Amount (millions) - Target	$1.0	$1.0	$3.0	$50.0	$55.0
	Product Revenue Amount (millions) - Progress	$0.6	$0.2			$0.8

Table 3–4 continued

Energy Storage Commercialization Center
Performance Milestones and Results

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$2.0	$2.0	$1.0	$2.0	$7.0
	Leveraged Funds Amount (millions) - Progress	$0.5				$0.5
	Products and Technologies Commercialized - Target	1	4	4	16	25
	Products and Technologies Commercialized - Progress	0	0			0
	Revenue Amount (millions) - Target	$0.2	$2.2	$1.4	$6.3	$10.1
	Revenue Amount (millions) - Progress	$0.0	$0.7			$0.7
	Product Development Tests - Target	2	8	6	25	41
	Product Development Tests - Progress	0	4			4

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

The following key program activities and accomplishments have been performed during this reporting period:

- NYSERDA completed some economic and technical analysis of Offshore Wind. This work included modeling of a large-scale build out and looked at infrastructure, transmission and O&M issues associated with off-shore wind.
- University of Delaware Offshore Wind Cost Reduction Assessment—This study from the University of Delaware looks to identify cost reduction strategies for offshore wind. Offshore wind is capital intensive and remains within the early stages of development in the U.S. A thorough examination of cost reduction levers available to the state is thus a critical step in establishing plans for its development. The specific objectives of this study are to:
    - Identify areas of cost reduction for offshore wind that are expected to take place in world markets, primarily Europe.
    - Identify cost reduction pathways that apply to offshore wind in U.S. waters.

- Identify specific cost reduction factors that would reduce cost impacts of offshore wind to New York State and describe activities that New York State could undertake to achieve a meaningful reduction in the cost of offshore wind.
- Provide a roadmap of cost reduction strategies for consideration by New York State, including their sequencing.
- The results of this study will be used by NYSERDA to inform its decision making on if, when, and how to pursue an offshore wind program as a part of the State's energy plan for the second half of this decade.

- Offshore Wind Research Plan Development—NYSERDA Program staff is collaborating with the New York Department of State (DOS) and other stakeholders to address barriers to off-shore wind development. Issues under study include strategies for project cost reductions, suitable areas for development, and appropriate marine spatial planning initiatives and other research that should be conducted to promote responsible development. One form of stakeholder engagement process, a joint NYSERDA and DOS formal request for information (RFI), may be used to identify research areas of critical importance to New York State and the industry at large. The release of such an RFI is pending assessment of the Benefit-Cost, Policy Options, and Cost Reduction Assessments.
- Bureau of Ocean Energy Management (BOEM) NYS Offshore Wind Task Force--NYSERDA is a member of this task force led by DOS. BOEM organizes this task force to prov ide 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 and provide technical support to the DOS Coastal Resources program as it develops screening criteria for establishing a revised coastal zone planning process related to offshore wind energy. The DOS Atlantic Ocean Study maps physical and biological information to aid in the study of areas off the coasts where wind development may be suitable for State and federal consideration under the U.S. Department of Interior's Smart from the Start Initiative aimed at accelerating the federal process for leasing offshore tracts for wind energy.
- Northeast Wind Resource Center—NYSERDA is an active supporter of the NREL-funded Northeast Wind Resource Center (NWRC). The NWRC's purpose is to provide credible information, targeted outreach, and direct engagement with stakeholders and decision makers about offshore wind energy. The NWRC plans to support the development of a viable offshore wind industry by:
  - Collecting and disseminating web-based information by creating an NWRC-specific website and by maintaining websites for the U.S. Offshore Wind Hub, the Offshore Wind Accelerator Project, and the Maine Ocean and Wind Industry Initiative.
  - Developing strategies to increase opportunities for multistate collaboration.
  - Sponsoring regular webinars, workshops, and meetings.
  - Coordinating with other regions (e.g., Southeast Coastal Wind Coalition).

Table 3-5 shows performance milestones and results for the Resource Development Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Signed contracts and completed projects include studies, surveys and plans. Stakeholder engagements include engagements with stakeholder organizations and consortia in support of developing a research/program agenda. Leveraged funds include co-funding and outside investment.

Table 3-5. Resource Development Performance Milestones and Results through 12/31/2014

Resource Development
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Signed Contracts - Target	3	2	1		6
	Signed Contracts - Progress	4	0			4
	Completed Projects - Target	1	1	2	2	6
	Completed Projects - Progress	0	0			0
	Stakeholder Engagements - Target	2	1			3
	Stakeholder Engagements - Progress	2	1			3

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target		$1.0	$1.5		$2.5
	Leveraged Funds Amount (millions) - Progress	$0.0	$0.0			$0.0
	Site Development Potential (MW) - Target				1,000.00	1,000.00
	Site Development Potential (MW) - Progress	0.00	0.00			0.00

3.1.2.3 Solar Cost Reduction[14]

This program will help achieve the goals of the NY-Sun initiative[15] through activities that reduce the balance-of-system (BOS) costs of solar electric installations and that support priority solar electric technology development in New York State. BOS costs include non-module hardware, labor, design, permitting and interconnection, and can amount to approximately one-half of the installed cost of a solar electric system. A dialogue with representatives of the industry, permitting authorities and various stakeholders will be conducted through workshops and other means to develop a thorough understanding of the solar electric project development process and the elements that constitute BOS cost components.

The following key program activities and accomplishments have been performed during this reporting period:

- The NY-Sun PV Trainers Network is continuously providing trainings in localities across the State along with informational webinars, podcasts, and customized assistance for local officials.
- The NY-Sun PV Trainers Network website was launched and is operational. Interested localities can register for trainings, access resources, and obtain one-on-one technical assistance for solar electric projects in their communities.
- On October 14, 2014, Central New York Regional Planning and Development Board (RPDB) held a Central NY Solar Summit. About 160 participants attended (not including speakers and RPDB staff. Attendees were comprised of about 40% municipal stakeholders, 25% solar industry, architects and engineers, 10% higher education and the remaining 25% representing State, nongovernmental organization, community, labor, and other stakeholders.
- On September 4, 2014, Energy Improvement Corporation (EIC) held a Solarize Westchester kick-off meeting for interested municipalities. EIC and its partners introduced the upcoming Solarize campaigns and introduced Solarize Westchester's solar-friendly permitting and zoning. Later in the fall, EIC completed its RFI to attract and select communities to participate in the Solarize programs.

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

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

Table 3-6 shows performance milestones and results for the Solar Cost Reduction program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Signed contracts and completed projects for develop tools, practices, studies, surveys, and engagements are projects that reduce solar electricity costs. Signed contracts and completed projects for technology, development, demonstration or pilot projects are for balance-of-system (BOS) projects. The meetings, workshops and conferences are a result of BOS projects. The training sessions focus on aspects of solar electricity for authorities having jurisdiction, local officials and trainers. Leverage funds include co-funding and outside investment for BOS projects.

Table 3-6. Solar Cost Reduction through 12/31/2014

Solar Cost Reduction
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
Technology, development, demonstration or pilot projects	Signed Contracts - Target	7	3			10
	Signed Contracts - Progress	0	1			1
	Completed Projects - Target		2	5	3	10
	Completed Projects - Progress	0	0			0
Develop tools, practices, studies, surveys, engagements	Signed Contracts - Target	7	2	1		10
	Signed Contracts - Progress	0	5			5
	Completed Projects - Target		5	3	2	10
	Completed Projects - Progress	0	0			0
All Projects	Supported Companies - Target	6	2	1		9
	Supported Companies - Progress	0	11			11
	Solar (PV) Trainees - Target	1,800	200			2,000
	Solar (PV) Trainees - Progress	0	653			653
	Training Sessions - Target	180	20			200
	Training Sessions - Progress	0	25			25
	Meetings, Workshops, Conferences - Target	1	4	3	2	10
	Meetings, Workshops, Conferences - Progress	0	0			0

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$5.5	$5.0	$2.6		$13.1
	Leveraged Funds Amount (millions) - Progress	$2.0	$1.1			$3.1
	Products and Technologies Commercialized - Target				1	1
	Products and Technologies Commercialized - Progress	0	0			0
	Product Revenue Amount (millions) - Target				$7.2	$7.2
	Product Revenue Amount (millions) - Progress	$0.0	$0.0			$0.0
	Market Adoption - Target		3	2	2	7
	Market Adoption - Progress	0	0			0

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

The following key program activities and accomplishments have been performed during this reporting period:

- Conducted five CHP Expos which provided opportunities for prospective customer to meet the approved CHP vendors.
- Conducted six CHP Power Breakfast/Lunch and Learn events, which combine a presentation of CHP technology and the CHP Acceleration Program with a tour of a CHP system.
- Made presentations at 13 conferences and three webinars.
- Participated in 28 stakeholder meetings.
- Received the 2014 State Leadership in Clean Energy award from the Clean Energy States Alliance.
- Issued RFP 2930 Technical and Logistic Support for the CHP Acceleration Program, which received 17 proposals.

Table 3-7 shows performance milestones and results for the CHP Aggregation and Acceleration Program through December 31, 2014. 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. Project count, peak load demand, electric generation, and primary energy savings targets are established for projects installed through a particular time period. Progress or project count, peak load demand, electric generation, and primary energy savings refers to the cumulative savings that are installed, contracted or accepted through a particular time period; e.g., T&MD savings for 2012 - 2013 are the energy and demand savings/generation achieved or expected as of December 31, 2013 as a result of activity from January 2012 through December 2013. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period.

Table 3-7. CHP Aggregation and Acceleration Performance Milestones and Results through 12/31/2014

CHP Aggregation and Acceleration
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2012-15	2012-16	2012-20
All Projects	Projects - Target	3	21	30	37
	Applications Accepted but not yet Contracted - Progress	0	6		
	Projects Under Contract but not yet Installed - Progress	4	25		
	Projects Installed - Progress	0	3		
	Total Progress	4	34		
All Projects	Peak Load Electric Generation (MW) - Target	1.00	7.00	10.00	12.50
	Peak Load Electric Generation Applications Accepted but not yet Contracted (MW) - Progress	0.00	0.69		
	Peak Load Electric Generation Under Contract but not yet Installed (MW) - Progress	0.02	0.88		
	Peak Load Electric Generation Installed (MW) - Progress	0.00	0.10		
	Total Progress	0.02	1.67		
All Projects	Electric Generation (GWh) - Target	6.10	42.70	61.00	76.25
	Electric Generation Applications Accepted but not yet Contracted (GWh) - Progress	0.00	4.18		
	Electric Generation Under Contract but not yet Installed (GWh) - Progress	0.09	5.39		
	Electric Generation Installed (GWh) - Progress	0.00	0.61		
	Total Progress	0.09	10.18		
All Projects	Primary Energy Savings (MMBtu) - Target	7,930	55,510	79,300	99,125
	Primary Energy Savings Applications Accepted but not yet Contracted (MMBtu) - Progress	0	5,432		
	Primary Energy Savings Under Contract but not yet Installed (MMBtu) - Progress	119	7,006		
	Primary Energy Savings Installed (MMBtu) - Progress	0	793		
	Total Progress	119	13,231		

		2012-13	2014-15	2016	2017-20	Total
All Projects	Pre-Packaged Systems - Target	10	8	2		20
	Pre-Packaged Systems - Progress	64	77			141
	Knowledge/Technology Transfer Activities - Target	4	4	2		10
	Knowledge/Technology Transfer Activities - Progress	19	55			74

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$20.0	$20.0	$10.0		$50.0
	Leveraged Funds Amount (millions) - Progress	$3.4	$13.6			$17.0
	Leveraged Funds Replicated (millions) - Target				$40.0	$40.0
	Leveraged Funds Replicated (millions) - Progress	$0.0	$0.0			$0.0
	Peak Load Electric Generation Replicated (MW) - Target				10.00	10.00
	Peak Load Electric Generation Replicated (MW) - Progress	0.00	0.00			0.00
	Electric Generation Replicated (GWh) - Target				61.00	61.00
	Electric Generation Replicated (GWh) - Progress	0.00	0.00			0.00
	Primary Energy Savings Replicated (MMBtu) - Target				79,300	79,300
	Primary Energy Savings Replicated (MMBtu) - Progress	0	0			0

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 pounds/MWh of NO_x emissions.[16] 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.

The following key program activities and accomplishments have been performed during this reporting period:

- The Program exceeded its five-year Outputs/Leading Indicator targets two years early.
- The first project installation was completed. The facility at which the project is located will now generate their own power, reduce electric grid demand, improve reliability, lower costs, and reduce greenhouse gas emissions.
- College and universities have applied to the program for CHP projects that will provide energy and demand savings and campus resiliency for buildings of shelter, laboratories with sensitive equipment, and other needs.
- An innovative manufacturing site has contracted to integrate CHP into their process in a project that also leverages activity with the New York City Industrial Development Agency and the New York City Energy Efficiency Corporation.

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

Table 3-8 shows performance milestones and results for the CHP Performance Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. 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. Project count, peak load demand, electric generation, and primary energy savings targets are established for projects installed through a particular time period. Progress for project count, peak load demand, electric generation, and primary energy savings refers to the cumulative savings that are installed, contracted or accepted through a particular time period; e.g., T&MD savings for 2012 - 2013 are the energy and demand savings/generation achieved or expected as of December 31, 2013 as a result of activity from January 2012 through December 2013. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period.

Table 3-8. CHP Performance Program Performance Milestones and Results through 12/31/2014[17]

CHP Performance Program
Performance Milestones and Results

Outputs/Leading Indicators

			2012-13	2012-15	2012-16	2012-20
All Projects	Projects - Target			1	5	16
	Applications Accepted but not yet Contracted - Progress		4	13		
	Projects Under Contract but not yet Installed - Progress		0	2		
	Projects Installed - Progress		0	1		
		Total Progress	4	16		
All Projects	Peak Load Electric Generation (MW) - Target			2.00	8.00	25.00
	Peak Load Electric Generation Applications Accepted but not yet Contracted (MW) - Progress		24.27	61.08		
	Peak Load Electric Generation Under Contract but not yet Installed (MW) - Progress		0.00	4.16		
	Peak Load Electric Generation Installed (MW) - Progress		0.00	2.80		
		Total Progress	24.27	68.04		
All Projects	Electric Generation (GWh) - Target			10.00	60.00	200.00
	Electric Generation Applications Accepted but not yet Contracted (GWh) - Progress		187.22	438.19		
	Electric Generation Under Contract but not yet Installed (GWh) - Progress		0.00	73.06		
	Electric Generation Installed (GWh) - Progress		0.00	25.00		
		Total Progress	187.22	536.25		
All Projects	Primary Energy Savings (MMBtu) - Target			13,000	78,000	260,000
	Primary Energy Savings Applications Accepted but not yet Contracted (MMBtu) - Progress		243,389	569,644		
	Primary Energy Savings Under Contract but not yet Installed (MMBtu) - Progress		0	94,984		
	Primary Energy Savings Installed (MMBtu) - Progress		0	32,500		
		Total Progress	243,389	697,129		

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$30.0	$110.0	$110.0		$250.0
	Leveraged Funds Amount (millions) - Progress	$11.5	$23.1			$34.6

[17] For 2012-2015, one project was excluded from this table. This project brings the Applications Accepted but not yet Contracted - Progress to 14 and the Total Project Progress to 17, the Peak Load Electric Generation Applications Accepted but not yet Contracted - Progress (MW) to 65.38 MW and the Total MW Progress to 72.34 MW, the Electric Generation Applications Accepted but not yet Contracted - Progress to 464.19 MWh and the Total MWh Progress to 562.25 MWh, and the Primary Energy Savings Applications Accepted but not yet Contracted - Progress to 569,678 MMBtu and the Total MMBtu Progress to 697,163 MMBtu.

3.2 Building Systems Initiative

Table 3-9 shows the Building Systems budget and financial status through December 31, 2014. Committed and spent funds are also shown as a percentage of the total 2012-2016 budget. The following sections describe progress for each area of this initiative.

Table 3-9. Building Systems Budget and Financial Status through 12/31/2014

Totals may not sum exactly due to rounding.

	2012-2016 Budget	Spent Funds	Percent of 2012-2016 Budget Spent	Committed Funds[a,b]	Percent of 2012-2016 Budget Committed
Advanced Buildings					
Emerging Technology/Accelerated Commercialization	$32,446,214	$762,241	2.35%	$10,988,298	33.87%
Technology Development	$33,613,215	$3,452,102	10.27%	$34,249,890	101.89%
Demand Response	$9,276,731	$2,057,868	22.18%	$5,120,277	55.19%
Total Advanced Buildings	*$75,336,160*	*$6,272,211*	*8.33%*	*$50,358,465*	*66.85%*
Advanced Energy Codes & Standards	$16,679,794	$825,656	4.95%	$9,256,803	55.50%
Grand Total - Building Systems Initiatives	***$92,015,954***	***$7,097,867***	***7.71%***	***$59,615,268***	***64.79%***

[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 both as a feeder effort to support New York State clean energy programs and also to encourage market adoption without additional ratepayer support. This effort focuses on three market sectors: commercial/institutional, multifamily, and residential.

ETAC-Commercial/Institutional

NYSERDA's ETAC-CI program is 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 receive a NYSERDA-funded performance measurement and verification (M&V) study tailored to each project. Performance validation considers factors such as energy savings and other benefits, and pathways to overcome market challenges. Project results and validated performance information is shared through targeted, deliberate outreach to the market, other New York Program Administrators, and Department of Public Service staff. Support is offered through both competitive and open enrollment solicitations. The ETAC-CI open enrollment program, launched in May 2013, consists of two program tracks: Energy Performance Validation and Focused Demonstrations. Projects in the Focused Demonstration track receive NYSERDA funding to support installation and project costs, but must fall within one of NYSERDA's identified priority categories of technologies or approaches, and must also provide prior independently-verified performance data.

The following key program activities and accomplishments have been performed during this reporting period:

- Of nine contracted projects in the open enrollment program, two are Energy Performance Validation projects and seven are Focused Demonstration projects. All projects include at least two demonstration host sites. Technologies being demonstrated include advanced lighting and shading controls, remote energy analytics, HVAC packaged rooftop unit advanced controls, steam and hot water radiator controls, window air conditioner controls, and a building information and energy management system. Visit nyserda.ny.gov/All-Programs/Programs/ETAC-CI/ETAC-CI-Resources for project descriptions.

- Ongoing open enrollment demonstration projects are beginning to show positive results. For example, Radiator Labs is a Brooklyn, NY start-up that has developed an innovative solution for the perennial problem of limited in-room controls and overheating in buildings with central boiler systems and radiators. Their "Cozy" is an insulated radiator enclosure with a thermostatically controlled fan, allowing occupants greater control and comfort. Based on positive interim results showing both energy savings and increased comfort, the project has now expanded from two sites to seven. The Cozy is now being demonstrated in college dormitories, multifamily buildings and offices, with final results expected in summer 2016.
- Over the reporting period, ETAC-CI staff met with approximately half a dozen technology developers regarding potential projects. Staff gave presentations on the ETAC program at three conferences, and held a pre-bid webinar after the release of PON 2844. An advisory group meeting was held in December. NYSERDA continues to participate in the Consortium for Energy Efficiency's Emerging Technology Collaborative to share information with other program administrators on emerging technologies and approaches.

ETAC-Multifamily

The goal of this Program is to identify commercially available energy-efficiency methodologies, technologies or strategies that are commercially available, but under-used in the multifamily (MF) market and to address the market barriers preventing their broader adoption. This goal will be accomplished through selected projects that will identify these barriers, develop and implement strategies that will attempt to address them, and measure the impact of those strategies on overcoming the barriers.

The following key program activities and accomplishments have been performed during this reporting period:

- The technology areas for the three multifamily executed contracts are 1) solid state lighting, 2) domestic hot water controls, and 3) steam system supply side orifice plates.
- The program is anticipating a second round of funding in the second quarter of 2015 to identify and enable additional projects meeting ETAC goals.

ETAC-Residential

ETAC-RES targets the low-rise residential market. ETAC-RES demonstration projects are intended to demonstrate improved energy efficiency performance under real-world conditions, and overcome current market barriers and accelerate market uptake of proven, but underutilized, energy-saving technologies. The three current demonstration projects are focused on LED lighting. Subsequent solicitations under ETAC-RES may be more broadly focused, on a suite of eligible energy-saving technologies.

The following key program activities and accomplishments have been performed during this reporting period:

- Demonstration site agreements were put in place for seven of the 18 building sites that were identified by proposers under PON 2752 – Solid State Lighting. At one of the sites, the home was completed, lighting systems installed, and monitoring/data collection equipment in place during this reporting period. It is likely that more buildings overall will be new construction, as recruiting existing (retrofit) sites has been challenging, than initially anticipated.

Table 3-10 shows performance milestones and results for the ETAC Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. 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. Project count, peak load demand, electric generation, and primary energy savings targets are established for projects installed through a particular time period. Progress for project count, peak load demand, electric generation, and primary energy savings refers to the cumulative savings that are installed, contracted or accepted through a particular time period; e.g., T&MD savings for 2012 - 2013 are the energy and demand savings/generation achieved or expected as of December 31, 2013 as a result of activity from January 2012 through December 2013. Blank cells indicate the lack of a target in a particular time period.

Table 3-10. Emerging Technology/Accelerated Commercialization Performance Milestones and Results through 12/31/2014

Emerging Technology/Accelerated Commercialization (ETAC)
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2012-15	2012-16	2012-20
All Projects	Projects - Target	1	6	12	17
	Applications Accepted but not yet Contracted - Progress	0	2		
	Projects Under Contract but not yet Installed - Progress	0	12		
	Projects Installed - Progress	1	3		
	Total Progress	1	17		
All Projects	Peak Load Reduction (MW) - Target	0.55	1.25	2.00	2.30
	Peak Load Reduction Applications Accepted but not yet Contracted (MW) - Progress	0.00	0.86		
	Peak Load Reduction Under Contract but not yet Installed (MW) - Progress	0.00	0.24		
	Peak Load Reduction Installed (MW) - Progress	0.00	0.25		
	Total Progress	0.00	1.34		
All Projects	Energy Savings (GWh) - Target	2.00	6.20	9.60	10.50
	Electric Savings Applications Accepted but not yet Contracted (GWh) - Progress	0.00	11.68		
	Electric Savings Under Contract but not yet Installed (GWh) - Progress	0.00	4.47		
	Electric Savings Installed (GWh) - Progress	0.00	0.55		
	Total Progress	0.00	16.70		
All Projects	Primary Energy Savings (MMBtu) - Target	5,000	36,200	70,200	78,000
	Primary Energy Savings Applications Accepted but not yet Contracted (MMBtu) - Progress	0	44,721		
	Primary Energy Savings Under Contract but not yet Installed (MMBtu) - Progress	0	24,029		
	Primary Energy Savings Installed (MMBtu) - Progress	1,053	1,614		
	Total Progress	1,053	70,363		

		2012-13	2014-15	2016	2017-20	Total
All Projects	Stakeholder Engagements - Target	7	5	1		13
	Stakeholder Engagements - Progress	20	4			24
	Knowledge/Technology Transfer Activities - Target	8	17	10	3	38
	Knowledge/Technology Transfer Activities - Progress	0	1			1

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$1.0	$3.5	$2.0		$6.5
	Leveraged Funds Amount (millions) - Progress	$0.1	$2.5			$2.5
	Leveraged Funds Replicated (millions) - Target				$21.0	$21.0
	Leveraged Funds Replicated (millions) - Progress	$0.0	$0.0			$0.0
	Peak Load Reduction Replicated (MW) - Target				7	7
	Peak Load Reduction Replicated (MW) - Progress	0	0			0
	Energy Savings Replicated (GWh) - Target				30	30
	Energy Savings Replicated (GWh) - Progress	0	0			0
	Primary Energy Savings Replicated (MMBtu) - Target				231,800	231,800
	Primary Energy Savings Replicated (MMBtu) - Progress	0	0			0
	Market Adoption - Target			4	3	7
	Market Adoption - Progress	0	0			0

3.2.1.2 Technology Development

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

The following key program activities and accomplishments have been performed during this reporting period:

- Completed Round 4 of PON 2606. Thirteen projects were recommended for funding totaling $2,688,940 and leverage $2,535,129 in external funding.
- On December 12, 2014, 39 proposals were received to Round 5 of PON 2606 seeking $6,654,894 of NYSERDA funding. Proposals are under review with awards to be announced in April 2015.
- To date, PON 2606 has received 279 proposals requesting $48.4 million in NYSERDA funds. Through Round 4 approximately $16 million has been committed of the $25 million PON 2606 Budget.
- NYSERDA is evaluating the potential impacts for supporting a consortium to advance technologies that operate building systems with a holistic approach that optimizes the whole building efficiency instead of discrete system efficiencies and maximizes the benefits from on-site energy resources.

<u>Behavior Research Program</u>

NYSERDA's Behavior Research Program works with Action Research, Inc. (Action Research), and clean energy programs in New York State to implement and evaluate behavior pilots to identify successful pilot interventions that use behavior principles of decision making to influence energy-related decisions. The research pilots have been documented in a series of case study reports. Funding to demonstrate successful pilot interventions at a larger scale will be available through NYSERDA's Behavior Demonstration Program.

The following key program activities and accomplishments have been performed during this reporting period:

- Presentation of NYSERDA's Behavior Program and project portfolio at the 2014 Behavior, Energy, and Climate Change (BECC) Conference in December 2014.
- Two day behavior workshop at Pace Energy & Climate Center. Workshop was developed and funded by NYSERDA and the American Academy of Arts and Science. Over 100 people attended the two day workshop in June 2014.
- Initiated the development of an RFP for behavior technical consulting services. RFP expected to be issued first quarter 2015 with awards contracted in second quarter 2015.

Table 3-11 shows performance milestones and results for the Technology Development Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Anticipated achievements and results are estimates based on savings per program dollar invested in projects. Blank cells indicate the lack of a target in a particular time period. Signed contracts and completed projects are for clean power technology projects. Supported companies are clean energy companies. Products and technologies commercialized are clean power technologies that have reached commercial availability. Product revenue includes commercial sales of supported clean power technologies. Leveraged funds include both co-funding and outside investment for clean power technology projects.

Table 3-11. Technology Development Performance Milestones and Results through 12/31/2014

Advanced Buildings Technology Development
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Signed Contracts - Target	23	18	5		46
	Signed Contracts - Progress	29	34			63
	Completed Projects - Target		23	18	5	46
	Completed Projects - Progress	0	12			12
	Supported Companies - Target	12	9	2		23
	Supported Companies - Progress	25	34			59

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$7.0	$5.0	$2.0		$14.0
	Leveraged Funds Amount (millions) - Progress	$34.1	$10.1			$44.2
	Products and Technologies Commercialized - Target		1	4	1	6
	Products and Technologies Commercialized - Progress	2	2			4
	Product Revenue Amount (millions) - Target			$8.0	$75.0	$83.0
	Product Revenue Amount (millions) - Progress	$0.7	$0.2			$0.9

3.2.1.3 Enabling Demand Response and Load Management

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

Existing Facilities Program (PON 1219) is the active solicitation offering open-enrollment incentives for DR projects across New York State. Enhanced incentives are currently offered in Con Edison territory via the Demand Management Program. Clean distributed generation projects are eligible in Con Edison territory exclusively and load curtailment projects and energy storage projects are eligible statewide. The incentives for DR are $100 or $800 per kW for Upstate or Downstate, respectively, and the incentives for energy storage are $300 per kW in Upstate or $2,600 or $2,100 per kW for Downstate thermal or battery storage, respectively. Demand Management Program DR projects are required to enroll in the NYISO ICAP/SCR program. The NYSERDA Existing Facilities Program also offers prequalified 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.

NYSERDA has historically funded DR projects with SBC III resources. Benefits from this SBC III DR investment continue to accrue and were reported in the 2014 SBC III annual report finalized in March 2015. (Prior historical accomplishments are in the SBC III annual report through December 2012).

The following key program activities and accomplishments have been performed during this reporting period:

- NYSERDA via the active solicitation (PON1219) issued seven purchase orders for implementation of demand response enablement measures representing approximately $7.5 million in private investment.
- NYSERDA issued two purchase orders reserving incentive funding for performance-based clean generation projects that are planned to offset a combined project cost of approximately $1 million via PON1219.
- NYSERDA issued two purchase orders for battery projects encompassing multiple sites leveraging over $7 million in private investment via PON1219.

Table 3-12 shows performance milestones and results for the Demand Response Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Energy savings reported in this table are program-reported; evaluation activities have not yet been conducted on these programs. Future reports will present findings from those studies as they are finalized. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period.

Table 3-12. Demand Response Milestones and Results through 12/31/2014

Demand Response
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2012-15	2012-16	2012-20
All Projects	MW Registered - Target	9.00	23.00	41.00	46.00
	MW Registered Applications Accepted but not yet Contracted (MW) - Progress	2.05	2.80		
	MW Registered Under Contract but not yet Installed (MW) - Progress	4.44	10.68		
	MW Registered Installed (MW) - Progress	39.57	90.13		
	Total Progress	46.06	103.61		

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	MW Registered Evaluated - Target				23.00	23.00
	MW Registered Evaluated - Progress	0.00	0.00			0.00

3.2.1.4 Advanced Energy Codes and Standards

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

3.2.1.5 Annual Statewide Compliance Assessments

Statewide compliance assessment studies provide a means to track compliance trends associated with changing codes and standards. These assessment studies help identify where program intervention may be needed. Compliance assessments will occur as a phased effort.

The following key program activities and accomplishments have been performed during this reporting period:

- NYSERDA received the initial draft of a statewide compliance assessment of commercial building alteration projects, permitted under the Energy Conservation Construction Code of New York State – 2010 and completed between January 1, 2011 and December 31, 2012.

3.2.1.6 Development and Delivery of Advanced Training and Tools

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

The following key program activities and accomplishments have been performed during this reporting period:

- For two of four primary audience groups, NYSERDA received training curricula for two of five courses (one for code enforcement officials; one construction trades), including curriculum on the changes to and application of the commercial Energy Code, updated to International Energy Conservation Code (IECC) – 2012 model code in January 2015.

3.2.1.7 Technical Support, Studies, and Resources

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

The following key program activities and accomplishments have been performed during this reporting period:

- NYSERDA engaged in administrative support studies, for the NYS Department of State, in order to advance the adoption of the IECC-2015.

3.2.1.8 Pilots and Expanded Implementation Assistance

Pilots testing strategies for improved code compliance and enforcement strategies, and stretch and green planning efforts were developed for competitive selection. NYSERDA also will support the construction and code enforcement communities by strategically providing implementation assistance to increase compliance with new and advanced codes and standards.

The following key program activities and accomplishments have been performed during this reporting period:

- NYSERDA received a strong response to RFP 2694: Energy Code Support Service for Municipalities, and will proceed with projects designed to improve Energy Code compliance and enforcement focused on the State's anticipated adoption of IECC-2015. Projects include:
    - Municipal support for building plan review and onsite inspection support and education.
    - New York State Energy Code Conference.
    - Foundational work on a New York State Stretch Code.
    - Print and online publications on best practices for Energy Code enforcement and compliance for municipalities, designers and builders.
    - Gap Analysis and Action Plan for Implementing Third Party enforcement support to municipalities.
- NYSERDA received a strong response to RFP 2852: NYSERDA Energy Code Training and Support Website and will seek to expand on its online presence among the enforcement, design and construction communities specific to Energy Code education and information.

Table 3-13 shows performance milestones and results for the Advanced Energy Codes & Standards Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. 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. Blank cells indicate the lack of a target in a particular time period. The training sessions are for new or expanded code training modules. The program support solicitations will competitively hire consulting and market research firms to provide program support. The solicitation support solicitations are for pilots and program implementation assistance.

Table 3-13. Advanced Energy Codes & Standards Performance Milestones and Results through 12/31/2014

Advanced Energy Codes
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
Code compliance efforts	Annual Code Compliance Assessments - Target	2	2	1		5
	Annual Code Compliance Assessments - Progress	1				1
	Training Sessions - Target	6	6			12
	Training Sessions - Progress	0	0			0
	Code Requirement Trainees - Target	7,000	6,000	2,000		15,000
	Code Requirement Trainees - Progress	0	0			0
Equipment and appliance standards efforts	State/Federal Standards Conformance Assessments - Target	1	1	1		3
	State/Federal Standards Conformance Assessments - Progress	0	0			0
All Projects	Program Support Solicitations - Target	1	1			2
	Program Support Solicitations - Progress	0	0			0
	Implementation Support Solicitations - Target	1	1			2
	Implementation Support Solicitations - Progress	1	2			3

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
Code compliance efforts	Energy Savings Installed (GWh) - Target	84.00	140.00	90.00	317.00	631.00
	Energy Savings Installed (GWh) - Progress	0.00	0.00			0.00
	Energy Savings Installed (MMBtu) - Target	575,000	1,057,000	726,000	2,563,000	4,921,000
	Energy Savings Installed (MMBtu) - Progress	0	0			0
	Peak Load Reduction Installed (MW) - Target	18.00	28.00	19.00	64.00	129.00
	Peak Load Reduction Installed (MW) - Progress	0.00	0.00			0.00
Equipment and appliance standards efforts	Energy Savings Installed (GWh) - Target		5.00	51.00	300.00	356.00
	Energy Savings Installed (GWh) - Progress	0.00	0.00			0.00
	Peak Load Reduction Installed (MW) - Target		2.00	23.00	143.00	168.00
	Peak Load Reduction Installed (MW) - Progress	0.00	0.00			0.00

3.3 Clean Energy Infrastructure Initiatives

Table 3-14 shows the Clean Energy Infrastructure budget and financial status through December 31, 2014. Committed and spent funds are also shown as a percent of the total 2012-2016 budget. Later sections describe progress for each area of this initiative.

Table 3-14. Clean Energy Infrastructure Budget and Financial Status through 12/31/2014

Totals may not sum exactly due to rounding.

	2012-2016 Budget	Spent Funds	Percent of 2012-2016 Budget Spent	Committed Funds[a,b]	Percent of 2012-2016 Budget Committed
Market Development					
Market Research	$4,640,141	$3,196,055	68.88%	$3,599,787	77.58%
Market Pathways	$55,710,000	$20,975,645	37.65%	$27,240,723	48.90%
Education/Behavior	$10,030,140	$3,457,607	34.47%	$6,154,174	61.36%
Total Market Development	*$70,380,281*	*$27,629,307*	*39.26%*	*$36,994,684*	*52.56%*
Clean Energy Business Development					
Innovation Entrepreneurial Capacity	$36,761,046	$5,332,627	14.51%	$20,375,459	55.43%
Market Intelligence	$1,688,584	$570,990	33.81%	$883,978	52.35%
Direct Support for Business	$2,400,000	$570,041	23.75%	$2,050,975	85.46%
Marketing	$911,416	$520,283	57.09%	$586,775	64.38%
Total Clean Energy Business Development	*$41,761,046*	*$6,993,941*	*16.75%*	*$23,897,187*	*57.22%*
EMEP	$18,550,048	$2,471,754	13.32%	$12,655,578	68.22%
Workforce Development					
Renewable Energy/Advanced Technologies	$15,000,000	$1,792,878	11.95%	$5,863,108	39.09%
Energy Efficiency	$24,000,000	$2,742,846	11.43%	$10,096,004	42.07%
Total Workforce Development	*$39,000,000*	*$4,535,724*	*11.63%*	*$15,959,112*	*40.92%*
Grand Total - Clean Energy Infrastructure	***$169,691,375***	***$41,630,726***	***24.53%***	***$89,506,561***	***52.75%***

[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.

3.3.1 Market Development

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

3.3.1.1 Market Research

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

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

- A multi-organization supported research project conducted by the American Council for an Energy-Efficient Economy (ACEEE) reviewed next-generation energy efficiency program designs and approaches. The research was published[18] in a technical report and offers insight on how NYSERDA could broaden and deepen its energy efficiency programs.
- Three market research activities were conducted in support of the development of the NY Green Bank:[19]
    - A study that characterized the market demand for financing resiliency-related energy projects in the healthcare and large multifamily housing customer sectors located within counties affected by Superstorm Sandy.
    - A study that assessed and summarized solar electric financing for the residential, small/medium commercial, and large commercial segments of the New York State marketplace based on interviews with New York State solar electric installers and financiers.
    - A study building on previous financing market research that assessed market demand for clean energy financing products in New York. NYSERDA is using the results of this research to evaluate different products and outline a set of near-term and long-term activities for the newly created NY Green Bank.
- Market research on the NYSERDA Residential Point-of-Sale Lighting Program provided information on how resources could be used to market and deploy the program in the most efficient and effective way. The lighting market is in the midst of rapid change with the increased availability of halogen bulbs, the introduction of more affordable LEDs, federal standards that have essentially phased out the common incandescent bulb, and consumer confusion regarding the overwhelming choice of unfamiliar bulbs available. This effort also examined the New York Products Program and explored ways to continue to increase use of energy-efficient products.

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[18] 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

[19] 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

- As a follow-up to the National Renewable Energy Laboratory (NREL) 2011 Solar PV Balance of System (BOS) cost survey, NYSERDA collaborated with NREL on its updated national survey and developed a New York State-specific PV BOS cost survey to gather state-specific information to establish a New York State baseline for nonhardware solar electric costs.
- A multi-organization supported research project with ACEEE that explored the opportunities for scaling up savings from commercial and residential retrofits. The project included a review of comprehensive commercial retrofit efforts to date including efficiency program activity as well as State and local programs targeting the commercial sector. In addition, the project included a review of recent data on commercial retrofits to develop estimates of the savings potential of a shift to more comprehensive retrofits. This research and analysis resulted in recommended actions and best practices for program administrators to increase program participation and improve program outcomes. For the residential sector, the project reviewed existing deep retrofit programs and analyzed cost and savings data to better understand the most promising opportunities for savings in terms of technical and economic potential and consumer and builder acceptance.
- An effort in support of the NY-Sun Initiative related to the restructuring of NYSERDA's Standard Offer PV program. Analyses were performed and tools developed to investigate the value of transition to a megawatt block structure, wherein the incentive levels would be lowered on a regional basis in response to achieving a designated threshold amount of megawatts under contract.
- A Data Center Market Research Study was completed to estimate the size of the data center market in New York and project various scenarios for growth and energy consumption through 2020. The study examined the energy efficiency opportunity and potential of data centers in the commercial and industrial market in New York by quantifying the current data center energy use and savings potential through a modeled forecast, examining major market and industry trends affecting and driving data center demand, and assessing the implementation and potential of energy efficient technology and best practices.
- A Heat Pump Potential assessment[20] was completed to estimate the technical and economic potential for new air source and geothermal heat pump systems in New York. Leveraging the methodology from the *Energy Efficiency and Renewable Energy Potential Study of New York State* (April 2014),[21] the study estimated the technical and economic potential for energy savings from both fuel switching and non-fuel switching applications of heat pumps in the commercial and residential sectors. The study also provided a high level overview of a variety of heat pump technologies.

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20 NYSERDA. 2014. "Heat Pumps Potential for Energy Savings in New York State." NYSERDA Report .Prepared by Optimal Energy. http://www.nyserda.ny.gov/Cleantech-and-Innovation/EA-Reports-and-Studies/EERE-Potential-Studies

21 NYSERDA. 2014. "Energy Efficiency and Renewable Energy Potential Study of New York State." NYSERDA Report 14-19. Prepared by Optimal Energy, American Council for an Energy-Efficient Economy, and Vermont Energy Investment Corporation. http://www.nyserda.ny.gov/Cleantech-and-Innovation/EA-Reports-and-Studies/EERE-Potential-Studies

- A Corporate Strategy Assessment (CSA) was conducted to determine where NYSERDA could be most effective and influential in New York State's clean energy space. The CSA used an objective, market-oriented approach to identify preferred strategies to accelerate the cost-effective deployment of clean energy and to stimulate technology and business innovation in the clean energy economy.

The following key program activities and accomplishments have been performed during this reporting period:

- Filing of NYSERDA's Clean Energy Fund Proposal on September 23, 2014. Market research through NYSERDA's Corporate Strategy Assessment was leveraged to develop the key barriers, decisions points, and proposed strategies included in NYSERDA's proposal.
- As part of the Corporate Strategy Assessment, NYSERDA conducted extensive market research to identify high potential market segments, the potential for clean energy market applications within those segments, and economic studies related to those applications. NYSERDA also conducted individual interviews with over 200 market stakeholders, and commissioned a survey of over 2,000 residential, commercial, and industrial customers. NYSERDA used the market research to inform the Market Development Portfolio, key barriers and decision points, intervention concepts, and strategies to achieve greater impact. The Technology and Business Innovation Portfolio was also informed by the research, by identifying key points in technology commercialization life cycles, and formulating potential strategic priority areas. These results were advanced to participants in the proceeding at the January 14, 2015 CEF Forum.

Table 3-15 shows performance milestones and results for the Market Research Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period.

Table 3-15. Market Research Performance Milestones and Results through 12/31/2014

Market Research
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Completed Projects - Target	2	1	1		4
	Completed Projects - Progress	3	6			9

3.3.1.2 Market Pathways

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

New York Products Program

The New York Products Program (Products Program), formerly known as the Energy $mart[SM] Products Program, seeks to increase sales of residential energy-efficient appliances, lighting, and home electronics products. The Products Program works on the supply side with retailers and manufacturers and on the demand side by marketing to consumers. The overall goal of the Products Program is market transformation: to increase awareness of and demand for energy-efficient products, including ENERGY STAR® certified appliances, high-efficiency HVAC equipment, and home electronics. Program activities include incentives for cooperative advertising and special promotions, as well as marketing campaigns on both the supply and demand sides of the appliance and lighting markets. Other activities include the development and distribution of special point-of-purchase (POP) materials; development of educational materials, coordination with retailers in their outreach efforts that support the Program's objectives, and training sessions for retail sales staff and managers.

The following key program activities and accomplishments have been performed during this reporting period:

- U.S. Environmental Protection Agency (EPA) ENERGY STAR® Most Efficient Campaign: The New York Products Program was selected by the EPA as one of only two programs nationwide to hold a spot market campaign for ENERGY STAR Most Efficient products. For the campaign, in-store promotional events were scheduled at selected Albany region retailer partner stores to focus consumer attention on ENERGY STAR Most Efficient products. At each location, identified as eligible to participate due to the store’s product selection, a program Account Representative met with store personnel to label product, set-up campaign point-of-purchase (POP) material and provide education about the campaign. The campaign and selected partners were also promoted on ENERGY STAR’s website.

- A redesigned Products Partner Portal was launched in August and is designed to help retail partners take full advantage of all that the Products Program has to offer and increase sales of program-qualified products. Partners are afforded easy Web access to the portal using a single, unique username and password via Energy Information System (EIS) data tracking system for the Products Program. The Partner Portal currently features two main categories of content. (1) Sales Training for Active Retailers (STAR) - a virtual learning environment that offers training courses on a variety of topics, including selling tips on program-qualified products, information on the Products Program, NYSERDA, and ENERGY STAR, and insights on how to get the most out of program marketing materials; and (2) Partner Resources - a convenient document repository of program material.
- For the last six months of 2014, 3,358 of newly created POP pieces that promote program-qualified products were distributed to 175 partner locations. Additionally during this time approximately $2.97 million in incentives was paid out to program partners while 151 STAR Trainings were completed by partners online.

Business Partners Programs

The Business Partners Programs are designed to accelerate the adoption of energy efficiency products and services within the commercial sector. Activities help service providers (contractors, vendors, installers, distributors, designers) in the commercial midmarket supply chain develop business models to address the primary factors affecting their customers' operations and energy decisions. New market opportunities are identified and the supply chain is informed of technological innovations and provided the technical tools, resources, and training necessary to promote profitable energy efficiency options to their customers.

Technical and sales training is provided for the network of service providers (Business Partners) focusing on quality and efficient design practices, and maintenance, repair and replacement services for energy products in commercial and industrial buildings. Tools and resources are made available that Business Partners can use to design projects, demonstrate cost-benefit information, and help customers develop a nd implement energy efficiency plans. These tools and resources enable Business Partners to differentiate their business models within the marketplace, make it easier to demonstrate the value of clean energy solutions, increase customer confidence in project benefits, improve project performance, streamline the procurement of energy services, and help integrate energy efficiency information into the decision making processes for buyers and sellers. Incentives are provided to help Business Partners overcome risk, understand new technologies, and encourage the expansion of new clean energy solutions for their customers.

Business Partner programs have focused on commercial lighting design, roof-top HVAC service and maintenance, and motor inventories. ICF Resources is the implementation contractor for the Commercial Lighting Business Partners Program. The core elements of the lighting program provide educational and technical support and resources 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 is the implementation contractor for the HVAC Business Partners Program that provides HVAC Business Partners (primarily commercial HVAC firms and refrigeration firms) with quality maintenance strategies and tools in accordance with ASHRAE/ACCA Quality Maintenance Standard 180. Partners learn to evaluate and upgrade commercial roof top units (RTU) beyond what is typically offered as standard practice. The 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 following key program activities and accomplishments have been performed during this reporting period:

- Groups of stakeholders representing the HVAC and Lighting technology sectors were convened to discuss program experience and key value propositions to be incorporated in future program evolution. Partner profiles, successful Partner attributes and market segmentation activities were initiated during this reporting period.
- Business Partners engaged several commercial retail accounts during this reporting period, resulting in the first portfolio scale pilot projects in both HVAC and Lighting Business Partners. CVS, Lowe's, Advanced Auto, and 7-11 participated in HVAC projects at 331 locations across New York State (46% of 722 total sites statewide). TOPS Friendly Markets implemented "the Right Light" lighting design at two warehouse locations operating 8,760 hours annually in Rochester, NY.
- Three key Motor Systems Market Study deliverables were completed: a NYS Motor Systems Market Analysis; Motor Systems Tool Assessment Report; and Motor Systems Program Implementation Report. These reports will be used to assess future intervention strategies for the motor systems market.
- External consultants and NYSERDA Program Staff expanded the HVAC Business Partners Program tool platform to include the iManifold Diagnostic Tool, a wireless digital HVAC diagnostic tool, bringing the total diagnostic technology offerings to three.

- An Outdoor Site Lighting module was completed that expands lighting program criteria to include projects outside a building shell.
- An economizer module to expand the HVAC Business Partner Program to include economizer retrofit/repair was completed along with the Strategic Energy Planning Platform that can be used for end user capital planning and portfolio planning purposes.

Innovative Strategies

Innovative Strategies is designed to support the identification and demonstration of sector-specific approaches, tools, and strategies for demonstrating and verifying energy savings and to broadcast the energy efficiency message to building owners, operators, and the financial sector. Opportunities to standardize efforts will be identified where appropriate, and credibility will be provided to approaches that reduce the barriers to financing energy efficiency projects that are not addressed by EEPS programs. The goals of the Commercial/Industrial Emerging Technologies and Advanced Commercialization (ETAC-CI) initiative are to identify, demonstrate, and accelerate adoption of newer, under-used energy-saving technologies and strategies in the State.

The following key program activities and accomplishments have been performed during this reporting period:

- A matrix was completed that provides energy efficiency and renewable energy financing options for both the private and public sectors. The matrix is expected to be a Web-based tool, and will be reviewed and modified as needed for placement on the NYSERDA website.

Table 3-16 shows performance milestones and results for the Market Pathways Program through December 31, 2014. Energy savings reported for the Business Partners program in this table are program-reported; evaluation activities have not yet been conducted on these programs. The recently completed evaluation factors for the efficiency products with Energy $mart Partners have been applied to the energy savings reported for the Product Partners program. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period.

Table 3-16. Market Pathways Performance Milestones and Results through 12/31/2014

Market Pathways
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
Product Partners	Energy Smart Product Partner Participants - Target	940	200	100		1,240
	Energy Smart Product Partner Participants - Progress	610	281			891
	Product Partner Trainees - Target	200	200	100		500
	Product Partner Trainees - Progress	130	339			469
Business Partners	Midstream Partner Participants - Target	430	55	25		510
	Midstream Partner Participants - Progress	95	282			377
	Midstream Partner Trainees - Target	375	375	275		1,025
	Midstream Partner Trainees - Progress	1,103	553			1,656
	Factsheets - Target	4	4	1		9
	Factsheets - Progress	0	0			0
	Seminars/Webinars - Target	4	4	1		9
	Seminars/Webinars - Progress	12	8			20
Innovative Strategies	Innovative Energy Efficiency Investment Strategy Participants - Target	20	5	5		30
	Innovative Energy Efficiency Investment Strategy Participants - Progress	12	2			14
	EAL Evaluations - Target	4	4	2		10
	EAL Evaluations - Progress	0	0			0
	EAL Seminars/Webinars - Target	4	4	2		10
	EAL Seminars/Webinars - Progress	48	0			48
	Factsheets - Target	3	2	1		6
	Factsheets - Progress	0	0			0
	Seminars/Webinars - Target	4	4	2		10
	Seminars/Webinars - Progress	0	0			0

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
Product Partners	Energy Savings Installed (GWh) - Target	50.00	50.00	25.00		125.00
	Energy Savings Installed (GWh) - Progress	5.91	3.87			9.78
	Energy Savings Installed (MMBtu) - Target	254,000	419,000	222,000		895,000
	Energy Savings Installed (MMBtu) - Progress	142,610	82,136			224,747
Business Partners	Energy Savings Installed (GWh) - Target	15.00	15.00	7.00		37.00
	Energy Savings Installed (GWh) - Progress	4.64	44.21			48.84
	Market Adoption - Target	1	1	1		3
	Market Adoption - Progress	0	0			0
Innovative Strategies	Completed Projects - Target	5	10	3	2	20
	Completed Projects - Progress	0	0			0

3.3.1.3 Education to Change Behavior and Influence Choices Component

Economic Development Growth Extension Program

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

The following key program activities and accomplishments have been performed during this reporting period:

- EDGE Program ROCs have established new partnerships that have led to referrals from these new relationships.
- ROCs have also participated in public outreach events including the Consolidated Funding Application Workshops held across the state to support the efforts of the Regional Economic Development Council initiative.

Behavioral Demonstrations

The Behavioral Demonstrations program 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 targeted behavioral and messaging strategies and no financial incentives.

The following key program activities and accomplishments have been performed during this reporting period:

- Seventeen proposals were received in response to PON 2646
- NYSERDA is currently in the process of contracting with the five organizations selected for funding by the Technical Evaluation Panel

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, contractors, and community-based organizations, the program undertakes several initiatives to increase awareness of low-income energy issues.

The following key program activities and accomplishments have been performed during this reporting period:

- LIFE produced and distributed six electronic newsletters that include feature articles of interest to low-income energy stakeholders along with hyperlinked resources for readers to connect with further information. Each newsletter arrives in over 3,600 inboxes.
- LIFE hosted six webinars on various topics including program updates, best practices, and consumer protections. On average, the webinars were attended by 37 individuals representing 25 organizations.
- The LIFE Steering Committee met three times (July 10, September 18, and December 16) to plan for LIFE initiatives, share program information, and discuss opportunities for collaboration.
- LIFE increased its number of followers on Twitter by 20 percent.

Table 3-17 shows performance milestones and results for the Education/Behavior Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Signed contracts are the sponsorship on behavioral pilots. The meetings, workshops and conferences are the sponsorship of annual LIFE conferences. The LIFE program anticipates sponsoring, planning and supporting a total of seven LIFE conferences and Regional meetings. Completed projects include completing and evaluating behavioral pilots.

Table 3-17. Education/Behavior Performance Milestones and Results through 12/31/2014

Education/Behavior
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Signed Contracts - Target	5	3			8
	Signed Contracts - Progress	0	0			0
	Meetings, Workshops, Conferences - Target	2	2	1		5
	Meetings, Workshops, Conferences - Progress	1	1			2
	Community Partnership Participants - Target	250	250	75		575
	Community Partnership Participants - Progress	465	393			858

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Completed Projects - Target		4	6	2	12
	Completed Projects - Progress	0	0			0

3.3.2 Clean Energy Business Development

3.3.2.1 Innovation/Entrepreneurial Capacity Building

There are three Proof-of-Concept Centers (POCC): New York University, in partnership with the City University of New York, and Columbia University, in partnership with SUNY Stony Brook, Cornell NYC Tech, Brookhaven National Laboratory, are co-branding the two programs as PowerBridgeNY. Another POCC is run through High Tech Rochester as NEXUS-NY. The mission of the POCCs is to accelerate the translation of research into marketable products. This translation is primarily accomplished by fostering successful pre-startup companies. Generally, the next step for these companies is to participate in a business mentoring or incubation program. NYSERDA is investing approximately $5 million in seed money at each center over a five-year period. The centers are expected to operate independently after NYSERDA funding ends.

The objectives of the POCC initiative are to:

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

The following key program activities and accomplishments have been performed during this reporting period:

- For all of the programs, the Cycle 2 teams have been selected and are actively engaged in customer discovery and market validation. Cycle 1 teams are finishing up the development of a minimally viable prototype and looking to start building a business.

Emerging Clean Energy Business Development

The Clean Energy Business Incubator program was initiated in 2009 with funding from SBC III. The purpose of these incubators is to foster the viability and growth of seed-stage and early-stage clean energy companies, most of which are still in the process of commercializing technologies and have yet to earn revenue from commercial operation and product sales. The incubators assist companies by providing ready access to investors, development partners, mentors, and service providers.

The following key program activities and accomplishments have been performed during this reporting period:

- New York University's New York City Accelerator for a Clean and Resilient Economy (NY-ACRE) assisted Honest Buildings, a New York City-based startup that has developed a platform to connect professionals in the real estate construction and design space, raise $11.5 million from leading venture capitalists.
- Additionally, Rochester Institute of Technology's Venture Creations incubator assisted Sweetwater Energy, a Rochester-based startup that has develop technology to extract sugars from biomass to help meet the world's bioenergy and biochemical needs, raise almost $18 million from investors.

Table 3-18 shows performance milestones and results for the Innovation/Entrepreneurial Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Leverage funds include co-funding and outside investments to help clean energy businesses. Product revenue includes commercial sales of new and improved supported technologies. The following key program metrics and accomplishments have been tracked and achieved by companies working with the NYSERDA-sponsored incubators during this reporting period: Private capital raised, non-NYSERDA grants awarded, new commercial products developed, revenue generated, jobs created and retained, strategic partnerships formed, and mergers and acquisitions completed.

Table 3-18. Innovation/Entrepreneurial Milestones and Results through 12/31/2014

Innovation/Entrepreneurial Capacity
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Incubators or POCCS Participants - Target	65	90	50	200	405
	Incubators or POCCS Participants - Progress	29	10			39

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$40.0	$45.0	$25.0	$40.0	$150.0
	Leveraged Funds Amount (millions) - Progress	$40.2	$26.1			$66.2
	Products and Technologies Commercialized - Target	5	10	10	15	40
	Products and Technologies Commercialized - Progress	1	4			5
	Product Revenue Amount (millions) - Target	$2.5	$5.0	$5.0	$7.5	$20.0
	Product Revenue Amount (millions) - Progress	$0.0	$0.0			$0.0
	Businesses Graduated from Incubators - Target	36	36	18	72	162
	Businesses Graduated from Incubators - Progress	9	2			11
	FTEs Associated with Incubator Graduates - Target	108	108	54	216	486
	FTEs Associated with Incubator Graduates - Progress	185	62			247

3.3.2.2 Market Intelligence

New York State Clean Energy Innovation Metrics

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

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

- 1st overall in wind patenting.
- 2nd in overall cleantech patenting.
- 2nd in electric and gas energy efficiency investment.
- 3rd in state energy efficiency policies.
- 3rd in university research expenditures.

- Top three in science, technology, engineering, and mathematics (STEM) degrees awarded and venture capital investment.
- 4th in a number of cleantech companies and green goods and services employment.

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

The following key program activities and accomplishments have been performed during this reporting period:

- In second half of 2014, work began on the second issue of the NYS Clean Energy Technologies Innovation Metrics report with contractor SRI. Work will commence with a user survey to understand user usage and additional reporting needs. Based on advisor input, it was decided to update the report every two years. The next issue of the report is expected to be completed by June 2015.

Table 3-19 shows performance milestones and results for the Market Intelligence Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Signed contracts include creating annual benchmark reports on clean energy business and financial indicators for New York State. Website downloads support the dissemination of clean energy benchmark information.

Table 3-19. Market Intelligence Milestones and Results through 12/31/2014

Market Intelligence
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Signed Contracts - Target	2	2	1		5
	Signed Contracts - Progress	0	1			1
	Website Downloads - Target	100	200	200		500
	Website Downloads - Progress	0	66			66

3.3.2.3 Direct Support for Business Acceleration Program

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

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

The following key program activities and accomplishments have been performed during this reporting period:

- NY EXCEL kicked off with its first cohort in early August 2014 at Skidmore. The first week include visits to NYISO and NYSERDA and well as seminars by renewable experts, legal and regulatory entities. The course took 10 students around NYS for weekend classes, company visits and support centers in Syracuse (September), Saratoga (October) White Plains and NYC (November), and Rochester (December). This first class continued into January and completes with a capstone project in February 2015.
- The New York City Accelerator for a Clean Resilient Economy (NYC-ACRE) in collaboration with New York University is hosting a Clean Start Program for professionals with 5-10 years of experience who have targeted a transition into the clean energy sector. The Clean Start curriculum combines business and technology to create a hybrid platform for professionals to team up with leaders of New York's clean energy economy—from startups, industry members, and utilities. The 120-hour evening and weekend part-time curriculum is designed to attain a professional certificate from the NYU School of Continuing and Professional Studies Center for Global Affairs. Advisory board and the first cohort were chosen in fall of 2014. Classes at NYU will be held January to June of 2015.
- The Commercialization Toolkit program will be designed to provide a more standardized and accessible framework for guiding company development, an easy way to assess overall business readiness including commercial and technology factors, and a ready-made suite of resources tailored to the specific needs of clean economy entrepreneurs as they pursue successful commercialization of their offerings. NYSERDA and NECEC Institute reached a contract in December, the project will formally start in January 2015.

Table 3-20 shows performance milestones and results for the Direct Support for Business Acceleration Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Companies supported provides support for companies with new and improved products serving New York State markets. Business executives transitioned includes the transition of business executives to the clean energy technology industry.

Table 3-20. Direct Support for Business Acceleration Performance Milestones and Results through 12/31/2014

Direct Support for Business Acceleration
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Companies Supported - Target	59	59	32		150
	Companies Supported - Progress	41	24			65

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Business Executives Transitioned - Target		18	18	9	45
	Business Executives Transitioned - Progress	0	0			0

3.3.3 Workforce Development Initiative

New York State's ambitious energy and environmental goals require an adequate supply of trained workers with applied skills in energy efficiency, renewable energy, and advanced technologies. The Workforce Development (WFD) Initiative focuses directly on practitioners who ensure quality installations, services and maintenance for these technologies. The program is designed to address the ongoing need for workers with skills that will result in quality installs and thus energy efficiency and energy production.

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

The following key program activities and accomplishments have been performed during this reporting period:

- NYSERDA Workforce Development staff met with the New York State Education Department to discuss upcoming changes in the State's science requirements and the possibility for new education standards to include a clean energy component.

- PON 2841 allocated $4 million for two rounds, sought proposals in two categories for training that supports installation and operation of renewable energy (RE) systems and advanced or emerging technologies (AT) for up to $300,000 of NYSERDA funding per proposal. Proposers could apply for funding to develop and deliver curriculum at a reduced rate (Category A), or to deliver existing curriculum with reduced tuition for students (Category B). Eligible RE/AT technology areas included: customer-sited RE system design, installation and operation/maintenance; RE/AT equipment manufacturing; AT and strategies that can contribute to net zero energy buildings; smart grid and electric vehicle infrastructure; and, data monitoring. The PON specified that funds for training delivery are for the express purpose of directly reducing the costs of training for students. None of the three proposals received under Round 2 were recommended for funding.
- NYSERDA participated in the inaugural meeting of the Capital District Chapter of New York STEAM Girls Collaborative. The meeting brought together educators from around the region to discuss strategies to encourage more girls to pursue careers in science, technology, engineering, and mathematics.
- Under PON 2774 Clean Energy Career Pathways initiative, NYSERDA sponsors training partnerships in energy efficiency and renewable energy which lead to paid internship opportunities. Many of the interns placed under the program have gone on to full-time employment in the clean energy industry. For example, Questar III BOCES trained 12 individuals in its semester-long "Photovoltaic Installer Program." Five trainees were placed in paid internships with local solar installers and, at the conclusion of the four week internship program; four were hired as full time installers. Veteran Solar Systems of West Sand Lake hired both of the interns placed through the program. President Thom Besch had this to say about his experience: "The NYSERDA program has been beneficial by making it easier for me to train an employee new to the solar industry."
- LaGuardia Community College launched its "Solar Plus Pro" training program, an integrated solar electric training program that will take students on a progressively advancing path from math and electricity review to solar electric fundamentals to specialized training in either solar electric installation or sales.

Table 3-21 and Table 3-22 show performance milestones and results for the Workforce Development Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Community Colleges may offer renewable energy, advanced technology and energy efficiency courses.

Table 3-21. Workforce Development – Renewable Energy Performance Milestones and Results through 12/31/2014

Workforce Development Renewable Energy
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Renewable Energy Technical Trainees - Target	500	1,000	500		2,000
	Renewable Energy Technical Trainees - Progress	0	829			829
	Entry Level Trainees - Target	90	200	190		480
	Entry Level Trainees - Progress	0	20			20
	OJT, Hands-On Training - Target	150	380	150		680
	OJT, Hands-On Training - Progress	39	74			113
	Training Organizations - Target	2	3	1		6
	Training Organizations - Progress	0	0			0
	Certifications Developed - Target		2	1		3
	Certifications Developed - Progress	0	0			0
	Course Development - Target	2	4	2		8
	Course Development - Progress	0	2			2

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$0.8	$2.3	$1.3		$4.4
	Leveraged Funds Amount (millions) - Progress	$1.1	$1.4			$2.5

Table 3-22. Workforce Development – Energy Efficiency Performance Milestones and Results through 12/31/2014

Workforce Development Energy Efficiency
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Energy Efficiency Technical Trainees - Target	3,448	5,517	4,828		13,793
	Energy Efficiency Technical Trainees - Progress	96	3,744			3,840
	Entry Level Trainees - Target	800	1,280	1,120		3,200
	Entry Level Trainees - Progress	0	310			310
	OJT, Hands-On Training - Target	467	747	653		1,867
	OJT, Hands-On Training - Progress	48	95			143
	Training Organizations - Target	2	3	1		6
	Training Organizations - Progress	10	1			11
	Certifications Developed - Target		2	1		3
	Certifications Developed - Progress	0	0			0

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$1.3	$3.8	$2.0		$7.1
	Leveraged Funds Amount (millions) - Progress	$0.4	$5.2			$5.6

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 residents, 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.

The following key program activities and accomplishments have been performed during this reporting period:

- NYSERDA hosted a webinar presentation for the American Wind Energy Association Siting and Environmental Compliance Committee on the use of the New York State Wind Siting Mapping Tool developed by the Nature Conservancy and the New York Natural Heritage Program. The wind siting tool is an interactive spatial mapping tool that seeks to protect New York State's biodiversity heritage while still advancing statewide energy development and policy goals. The tool uses geographic information systems (GIS) to identify and map important ecological resources along with wind development resources. These maps can be used to visualize and overlay ecological and wind development resources. Fifty-four state and federal regulators, developers, consultants and environmental groups participated.
- NYSERDA hosted a workshop to develop a Research Plan for offshore wind energy and wildlife for New York State. The assembled group worked through 34 specific research needs and data gaps identified through a request for information released earlier in the year. Based on feedback from the group a draft research plan has been developed that will aid New York in identifying and prioritizing research needs to assist the orderly and efficient development of offshore renewable energy.
- Proposals were received as a result of two new solicitations issued during this period: PON 2912: Acid Deposition and Mercury Research in New York State, and PON 2981: Energy-Related Air Quality and Health Research in New York State.

Table 3-23 shows performance milestones and results for the EMEP Program through December 31, 2014. Outputs/Leading Indicators measure immediate results; Outcomes/Impacts measure achievements. Blank cells indicate the lack of a target in a particular time period. Signed contracts include several large flagship projects. The meetings, workshops and conferences are sponsored by NYSERDA. Briefings are on research projects convening with policy-makers or other stakeholders. Leverage funds include co-funding and outside investment to support projects and sponsored research.

Table 3-23. Environmental Monitoring Performance Milestones and Results through 12/31/2014

Environmental Monitoring, Evaluation and Protection (EMEP)
Performance Milestones and Results

Outputs/Leading Indicators

		2012-13	2014-15	2016	2017-20	Total
All Projects	Signed Contracts - Target	23	28	9		60
	Signed Contracts - Progress	20	14			34
	Completed Projects - Target	5	23	23	9	60
	Completed Projects - Progress	0	0			0
	Program Advisory Group Meetings - Target	2	2	1		5
	Program Advisory Group Meetings - Progress	3	0			3
	Science Advisory Committee Meetings - Target	2	2	1		5
	Science Advisory Committee Meetings - Progress	3	0			3
	Meetings, Workshops, Conferences - Target	5	6	3		14
	Meetings, Workshops, Conferences - Progress	7	7			14
	Briefings - Target	12	12	6		30
	Briefings - Progress	5	2			7

Outcomes/Impacts

		2012-13	2014-15	2016	2017-20	Total
All Projects	Leveraged Funds Amount (millions) - Target	$3.5	$4.5	$3.0		$11.0
	Leveraged Funds Amount (millions) - Progress	$2.5	$2.9			$5.4
	EMEP Research Citations - Target			3,000		3,000
	EMEP Research Citations - Progress	0	0			0
	Peer-reviewed Scientific Journal Articles - Target	10	35	45	29	119
	Peer-reviewed Scientific Journal Articles - Progress	15	1			16

4 T&MD Program Evaluation Activities

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

4.1 Program Theory and Logic Models

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

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

- Smart Grid[22]
- Advanced Codes and Standards[23]
- Economic Development Growth Extension[24]
- New York Products[25]
- Clean Energy Business Development[26]
- Workforce Development[27]
- CHP Aggregation and Acceleration[28]

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

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

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

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

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

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

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

- Advanced Buildings: ETAC[29]
- Advanced Buildings: Technology Development[30]

During this reporting period, PTLMs have been completed, reports posted on NYSERDA's website, and logic model diagrams included in Appendix B for the following programs/areas:

- NY-BEST[31]
- Solar Cost Reduction[32]
- Clean Power Technology Innovation[33]

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

- Transportation
- Community Solar
- Demand Response
- Market Development Initiative (Commercial/Industrial component)

Following the development of a PTLM, NYSERDA typically engages in an Evaluation Readiness Review[34] to help identify whether a program has various factors, or when such factors will be in place, to ensure an evaluation is justified, feasible, and likely to provide useful information. For example, programs must have appropriate data tracking to support evaluation. Evaluation Readiness Reviews have been completed for several programs to date and have helped identify areas to strengthen or solidify in order to lay the groundwork for the most productive evaluations.

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

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

31 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-NY-BEST-Logic-Model.pdf

32 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-SCR-logic-model.pdf

33 http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-CPTI-Logic-Model-Report.pdf

34 Formerly known as Evaluability Assessment.

4.2 Process Evaluation

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

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

- Smart Grid[35]
- Workforce Development[36]
- EMEP[37]

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

- Solar Cost Reduction (Q1 2015)
- NY-BEST (Q1 2015)
- Technology Development (Q3 2015)
- EDGE (Q3 2015)
- Advanced Codes and Standards (Q3 2016)[38]

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

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

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

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

4.3 Market and Impact Evaluation

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

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

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

Prior to July 2014, focused market evaluations were completed for the following T&MD programs:

- NY Products Program[39]

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

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

- ETAC/Technology Development Market Assessment (Q4 2015)
- Smart Grid Market Assessment (Q4 2015)
- NY-BEST (Q4 2015)
- Advanced Codes and Standards Impact Evaluation (two phases: Q4 2015 and Q4 2018)

4.4 Higher Level Studies

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

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

During the first half of 2014, the R&D demonstration project impact study was completed.[40] This study updated a prior similar evaluation and addressed R&D demonstration projects completed in 2008-2010. Some of the other studies are being scoped out or are underway.

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

Appendix A: T&MD Program Advisory Committee Members

Richard Adams
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Anthony Collins
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Appendix B: T&MD Program Logic Models

Figure B-1. NY-BEST Program Logic Model Diagram

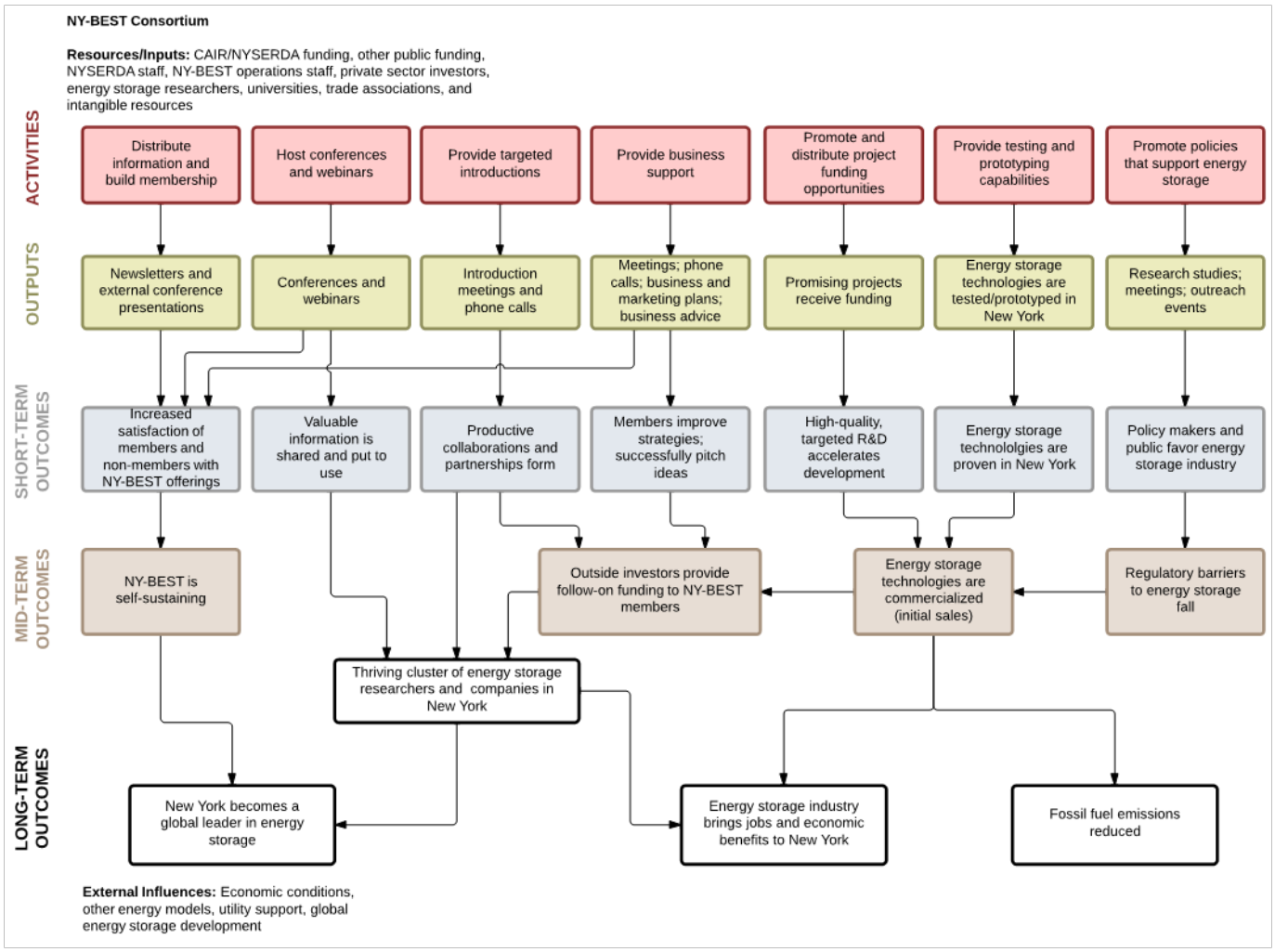


Figure B-2. Solar Cost Reduction Program Logic Model Diagram

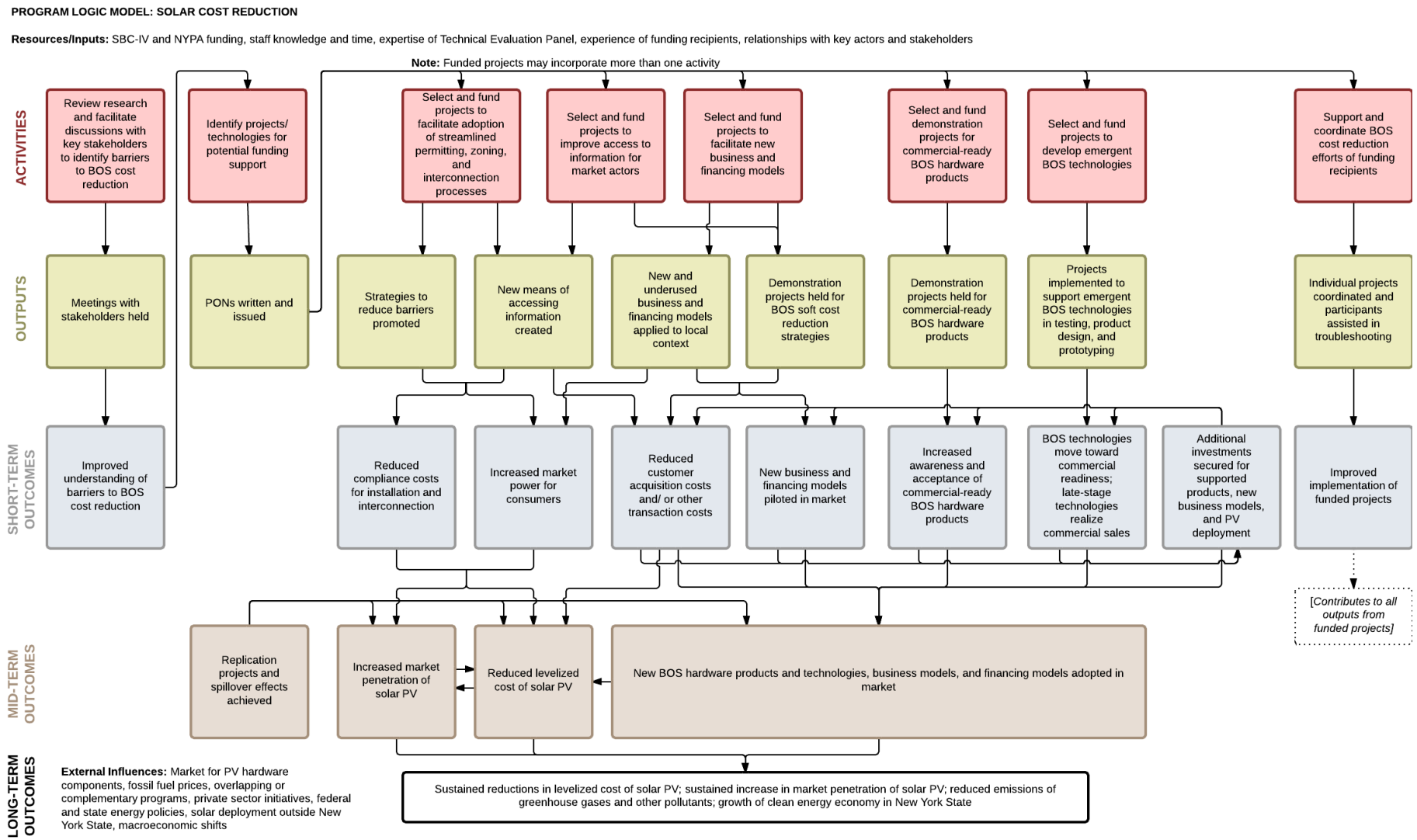
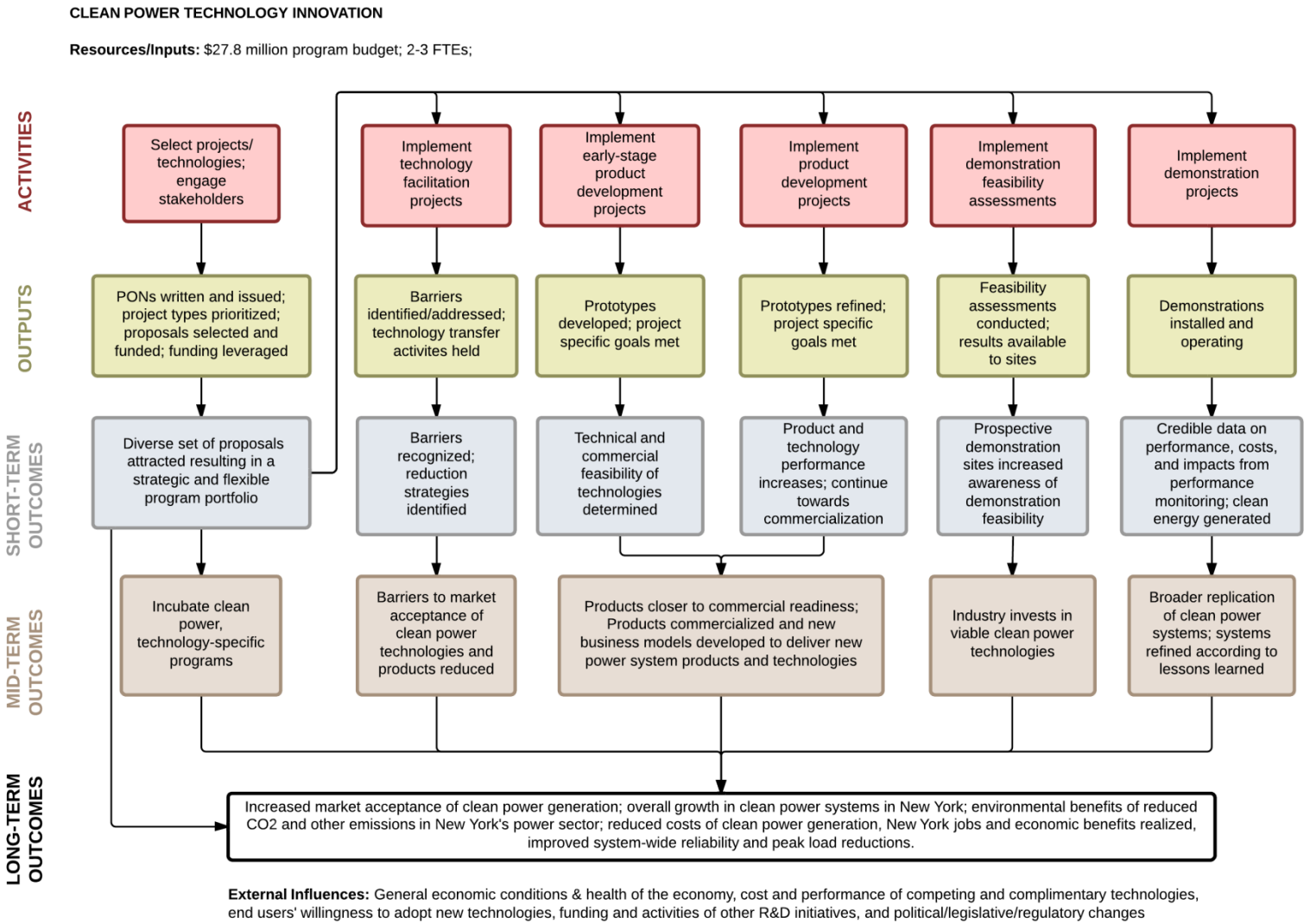


Figure B-3. Clean Power Technology Innovation Program Logic Model Diagram



Appendix C: Evaluation Report Summaries

No evaluation reports were completed during the reporting period from July 1, 2014 through December 31, 2014. Future reports will include evaluation summaries as they are available.

Appendix D: Target Ranges

Program	Reportable Item	2012-2013	2014-2015	2016	2017-2020	Total
Advanced Energy Codes	Code Training Modules	6-8	6-8			12-16
Education Behavior	Behavioral Pilots	5-8	3-4			8-12
ETAC	Knowledge/Tech Transfer Activities	8-18	17-26	10-18	3-8	38-70
ETAC	Projects Installed	1-2	5-14	6-12	5-8	17-36
ETAC	Stakeholder Meetings	7-10	5-9	1-3		13-22
Market Pathways	Completed Projects	5-8	10-15	3-7	2-5	20-35
Market Pathways	EAL Agreements	4-6	4-6	2-3		10-15
Market Pathways	Fact Sheets	3-4	2-3	1-2		6-9
Market Pathways	Fact Sheets	4-5	4-5	1-2		9-12
Market Pathways	Market Adoption	1-3	1-3	1		3-6
Market Pathways	Projects	20-25	5-10	5-10		30-45
Market Pathways	Seminars, Webinars	4-5	4-5	1-2		9-12
Market Research	Research Studies	2-3	1-2	1		4-6
Resource Development	Leveraged Funds	0 - .5M	1-1.5M	1.5-3.0M		2.5-5.0M
Technology Development	Projects Contracted		23-36	18-29	5-9	46-74
Technology Development	Commercial Sales			8-20M	75-100M	83-120M
Technology Development	Commercially Available Technologies		1-3	4-6	1-2	6-11
Technology Development	Leveraged Funds	7-10M	5-10M	2-3M		14-23M
Technology Development	Projects Installed		23-36	18-29	5-9	46-74
Technology Development	Stakeholder Meetings	2-5	8-20	6-10		16-35
Technology Development	Supported Companies	12-18	9-14	2-4		23-37
Technology Development ABC	Commercial Sales			1-2M	3-4M	4-6M
Technology Development ABC	Leveraged Funds		2-3M	2-3M		4-6M
Technology Development ABC	Products Demo'd ABC		1-2	1-2	1	3-5
Technology Development ABC	Projects Installed ABC		1-2	1-2	1	3-5
Technology Development ABC	Publications, Policy Research, etc.		5-9	6-10		11-19
Technology Development ABC	Stakeholders Engaged in ABC	5-10	10-15	0-5		15-30
Technology Development ABC	Supported Companies ABC	3-5	6-8	1-2		10-15

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

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

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