



NYSERDA

New York State's Regional Greenhouse Gas Initiative- Funded Programs Status Report

Quarter Ending March 31, 2017

Final Report

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

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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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**New York State's Regional Greenhouse Gas Initiative-
Funded Programs Annual Status Report
Quarter Ending March 31, 2017**

Final Report

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New York State Energy Research and Development Authority

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Acronyms and Abbreviations

Btu	British thermal units
DEC	NYS Department of Environmental Conservation
CBO	constituency-based organizations
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalents
EEPS	Energy Efficiency Portfolio Standard
EPA	U.S. Environmental Protection Agency
ERP	Energy Reduction Plan
GHG	greenhouse gas
GJGNY	Green Jobs - Green New York
HPwES	Home Performance with ENERGY STAR®
kW	kilowatt
kWh	kilowatt-hour
LIPA	Long Island Power Authority
MMBtu	million British thermal units
MPP	Multifamily Performance Program
MW	megawatt
MWh	megawatt-hour
NYS or State	New York State
NYSERDA	New York State Energy Research and Development Authority
OBR	On-Bill Recovery Financing Program
PEV	plug-in electric vehicle
PON	Program Opportunity Notice
PSEGLI	Public Service Electric and Gas Long Island
RFP	request for proposals
RGGI	Regional Greenhouse Gas Initiative
RPS	Renewable Portfolio Standard
SBC	System Benefits Charge
WFD	Workforce Training and Development

1 Introduction

In New York State, the Regional Greenhouse Gas Initiative (RGGI) program has been implemented through two complementary regulations: The New York State Department of Environmental Conservation (DEC) established the State's Carbon Dioxide (CO₂) Budget Trading Program (6 NYCRR Part 242, 6 NYCRR Part 200, General Provisions), and the New York State Energy Research and Development Authority (NYSERDA) established the CO₂ Allowance Auction Program (21 NYCRR Part 507). This report is prepared pursuant to the State's RGGI Investment Plan (2015 Operating Plan) and provides an update on the progress of programs through the quarter ending March 31, 2017. It contains an accounting of program spending; an estimate of program benefits; and a summary description of program activities, implementation, and evaluation. NYSERDA's Board adopted an amendment to the Operating Plan on January 24, 2017. The amendment provides updated program descriptions and funding level which will be integrated into the 2017 version of the Operating Plan.

The State invests RGGI proceeds to support comprehensive strategies that best achieve the RGGI CO₂ emission reduction goals. These strategies aim to reduce global climate change and pollution through energy efficiency, renewable energy, and carbon abatement technology. Deploying commercially available renewable energy and energy efficiency technologies helps to reduce greenhouse gas (GHG) emissions from both electricity and other energy sources in the short term. To move the State toward a more sustainable future, RGGI funds are used to empower communities to make decisions that prompt the use of cleaner and more energy-efficient technologies that lead to lower carbon emissions as well as economic and societal co-benefits. RGGI helps to build capacity for long-term carbon reduction by training workers and partnering with industry. Using innovative financing, RGGI supports the pursuit of cleaner, more efficient energy systems and encourages investment to stimulate entrepreneurial growth of clean energy companies. Collectively, these activities use funds in ways that accelerate the uptake of low-to-zero emitting technologies.

2 Summary of Portfolio and Program Benefits

This section provides an overview of the expected quantifiable benefits with expended and encumbered funds through this quarter related to carbon dioxide equivalent (CO₂e) reductions, energy savings, and participant, energy-bill savings.¹ For more information on the methodology used to calculate CO₂e reductions and energy-bill savings, see Appendix A. For a list of former program names, reference Appendix B. Appendix C shows the detailed benefit results.

The estimated cumulative annualized and expected lifetime benefits as of March 31, 2017, at the portfolio and program levels, are shown in Table 1 and Table 2, respectively.² Investment benefits are further compared by fuel type in Figure 1. NYSERDA begins tracking program benefits once project installation is complete and provides estimated benefits for projects under contract that are not yet operational (pipeline benefits). The metrics presented in this section are estimates and are not evaluated unless otherwise noted on Table 2. Future Evaluation and Status Reports will present the evaluation results as they are available. Financial reporting may lag behind the reporting of program benefits. At this time, the program benefits include some projects that are jointly supported by other non-RGGI funding sources administered by NYSERDA.

Figure 1 shows energy savings, emission reductions, and participant, energy-bill savings realized through RGGI-funded projects by project fuel type as of March 31, 2017.

Key observations during this quarter:

- Electric energy efficiency comprised 49 percent of energy savings, 44 percent of emission reductions, and 43 percent of participant bill savings.
- Renewable electric generation comprised 25 percent of energy savings, 23 percent of emission reductions, and 24 percent of participant bill savings.

¹ These metrics represent the benefits that can be discretely counted at this time, and that are typically associated with traditional deployment programs. These programs include Green Jobs - Green New York, Residential Efficiency Services, NY-Sun, Renewable Heat NY, and LIPA Efficiency and Renewable Energy. These metrics do not reflect emission reductions, participant bill savings, and other possible benefits resulting from nondeployment programs such as Transportation Research and Cleaner, Greener Communities. Therefore, the benefits associated with the overall RGGI portfolio are anticipated to be greater than the subset of programs represented here.

² Cumulative annual benefits are reflective of the annual impacts from all currently operational projects installed, projects under a signed contract, and projects with an application received that are not yet operational since program inception. Expected lifetime benefits are reflective of the total impacts over the entire effective useful lifetime of the measures associated with all currently operational projects installed, projects under a signed contract and projects with an application received that are not yet operational since program inception. Please see Table A-4 in Appendix A for the measure-life assumptions.

- Energy savings from electric energy efficiency and renewable electric generation are a larger percentage than the emissions reductions and participant bill savings from electric energy efficiency and renewable electric generation because the emission factor and bill savings for the State's electric grid is cleaner and cheaper than other energy types such as distillate #2 oil.
- Distillate #2 oil comprised 14 percent of energy savings, 17 percent of emission reductions, and 18 percent of participant bill savings. Distillate #2 oil achieves a larger share of the emission reductions and participant bill savings than other fuel types because distillate #2 oil is dirtier and more expensive than other energy types such as electricity.
- Residual #6 oil comprised 14 percent of energy savings, 18 percent of emission reductions, and 13 percent of participant bill savings. Residual #6 oil achieves a larger share of the emission reductions and a smaller share of participant bill savings than other fuel types because residual #6 oil is dirtier, but less expensive than other energy types such as electricity.
- Due to fuel switching, natural gas use comprised negative three percent of energy savings, negative two percent of emission reductions, and one percent of participant bill savings. Fuel switching projects that save the dirtier and more expensive distillate or residual oil by consuming more of the cleaner and less expensive natural gas.
- Other fuels (including propane, steam, wood, kerosene, and coal) comprised less than one percent of energy savings, emission reductions, and participant bill savings.

To highlight the diversity and effectiveness of the RGGI portfolio, this report includes success stories of projects that are advancing the previously stated strategies.

Table 1. Summary of Expected Cumulative Portfolio Benefits through March 31, 2017

Benefits through March 31, 2017 ^a	Net Greenhouse Gas Emission Savings ^b (Tons CO ₂ e ^c)	Total Net Fuel Savings (MMBtu)	Net Efficiency Electricity Savings (MWh)	Net Renewable Energy Generation (MWh)	Total Net Electricity Savings/Generation (MWh)	Energy Bill Savings to Participating Customers (\$ Million)
Cumulative Annualized Installed Savings^d	756,278	2,841,408	537,096	278,367	815,462	\$207.3
Cumulative Annualized Pipeline Savings^e	60,500	302,649	26,260	38,419	64,680	\$15.2
Cumulative Annualized Committed Savings^f	816,778	3,144,057	563,356	316,786	880,142	\$222.5
Expected Lifetime Total Savings^g	15,126,899	60,448,813	9,353,672	7,065,060	16,418,732	\$4,337.9

- ^a Cross-program overlap for projects that received any combination of a Green Jobs - Green New York (GJGNY) assessment, a GJGNY loan, or a RGGI-funded incentive through the Home Performance with ENERGY STAR[®] Program, NY-Sun Program or Renewable Heat NY Program has been removed.
- ^b These emission reductions are associated with both electric and fossil-fuel saving measures. Under a cap-and-trade system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions going into the atmosphere. However, electric efficiency projects will reduce end-users' responsibility or footprint associated with emissions from electricity production.
- ^c CO₂e stands for carbon dioxide equivalent and describes the amount of CO₂ that would have the same global warming potential as a given mixture of gases based on factors published by the Intergovernmental Panel on Climate Change.
- ^d Inclusive of savings from all currently operational projects installed since program inception.
- ^e Inclusive of savings from all projects under a signed contract and projects with an application received that are not yet operational.
- ^f The sum of Installed Savings and Pipeline Savings.
- ^g The expected benefits over the lifetime of all operational projects, projects under a signed contract, and projects with an application received that are not yet operational. See Table A-4 in Appendix A for the measure-life assumptions.

Table 2. Summary of Expected Cumulative Annualized Program Benefits through March 31, 2017

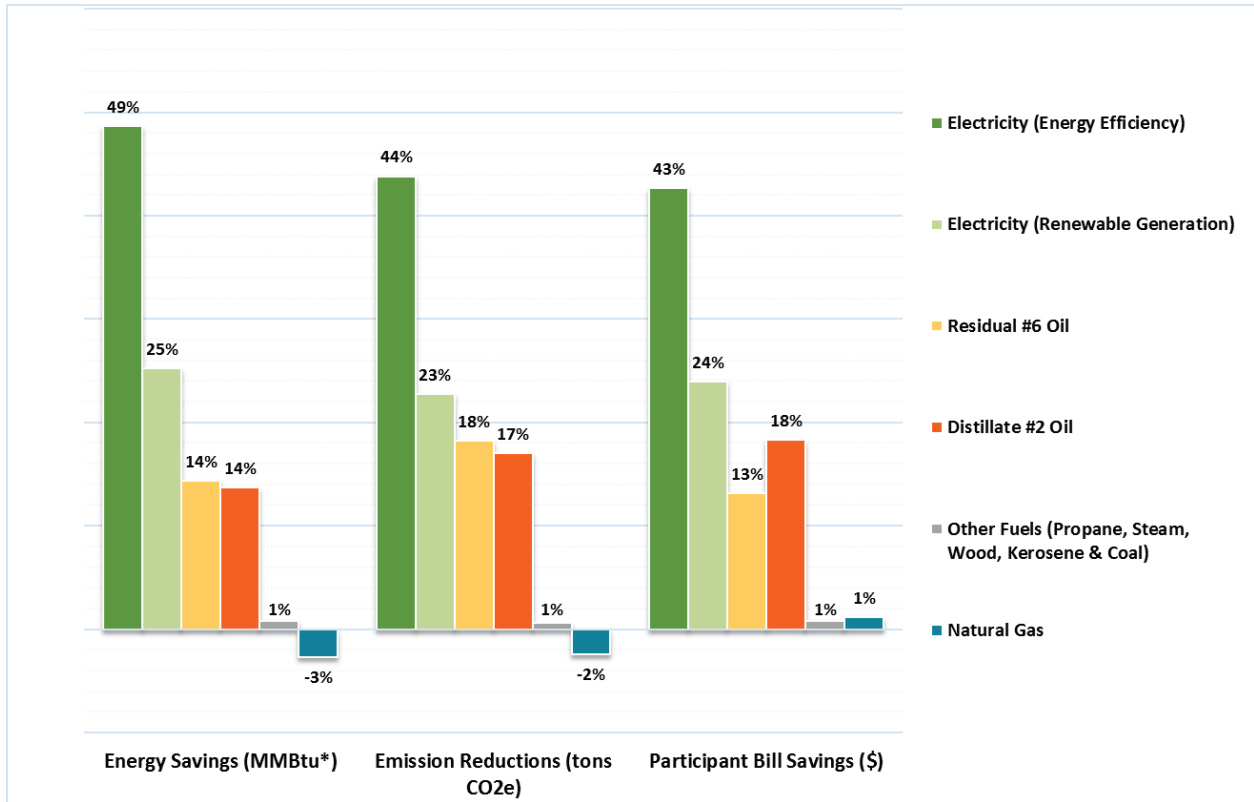
Program	Costs (millions of dollars)		Net Energy Savings (Annualized MMBtu)			Cost Benefit Ratio (\$/MMBtu)		Net Electricity Savings or Renewable Energy Generation (Annualized MWh)			Cost Benefit Ratio (\$/MWh)		Net Greenhouse Gas Emission Savings ^a (Annualized Tons CO ₂ e ^b)			Cost Benefit Ratio (\$/Ton CO ₂ e)	
	Total Incentives ^c	Total Associated Costs ^d	Installed Savings ^e	Pipeline Savings ^f	Total Committed Savings ^g	\$/MMBtu Savings ^h	\$/MMBtu EXPECTED LIFETIME Savings ⁱ	Installed Savings ^o	Pipeline Savings ^p	Total Committed Savings ^q	\$/MWh Savings ^r	\$/MWh EXPECTED LIFETIME Savings ^s	Installed Savings ^o	Pipeline Savings ^p	Total Committed Savings ^q	\$/Ton CO ₂ e Savings ^h	\$/CO ₂ e EXPECTED LIFETIME Savings ⁱ
Green Jobs - Green New York																	
One- to Four-Family Residential Buildings Program Assessments ^l	\$25.9	\$1.0	983,079	27,353	1,010,432	27	1	12,471	377	12,848	2,096	116	77,964	2,135	80,099	336	14
One-to Four-Family Residential Buildings Program Financing ^l	\$110.4	\$15.2	610,122	30,661	640,783	196	9	75,061	3,772	78,833	1,593	84	87,808	4,413	92,221	1,362	65
Multifamily Performance Program Assessments ^l	\$3.3	\$1.4	767,488	70,762	838,250	6	0.4	61,151	1,645	62,796	75	6	84,707	5,379	90,087	52	4
Small Commercial Energy Efficiency Program Financing ^l	\$1.5	\$0.3	9,461	-	9,461	181	9	722	-	722	2,367	182	998	-	998	1,714	97
Energy Efficiency																	
LIPA Energy Efficiency and Renewable Energy Initiative	\$123.1	-	-	-	-	-	-	345,517	-	345,517	356	19	200,400	-	200,400	614	33
Multifamily Performance Program ^k	\$15.1	\$2.0	446,577	163,283	609,860	28	2	19,202	7,021	26,223	653	50	43,313	15,837	59,150	289	19
Multifamily Carbon Emissions Reduction Program ^{l,m}	\$5.7	\$0.2	-	-	-	-	-	-	-	-	-	-	45,151	-	45,151	129	10
EmPower New York	\$25.3	\$1.7	150,727	1,550	152,277	177	7	-	-	-	-	-	11,108	121	11,228	2,406	100
Home Performance with ENERGY STAR ⁿ	\$21.1	\$2.4	324,072	4,996	329,068	71	3	1,775	22	1,796	13,088	727	26,982	403	27,386	859	36
Green Residential Building Program	\$2.5	\$0.3	36,548	-	36,548	75	3	1,573	-	1,573	1,744	97	3,084	-	3,084	890	40
Solar Hot Water (Thermal) Program	\$4.2	\$0.1	13,679	875	14,555	297	15	22	1	23	-	9,410	1,025	66	1,091	3,957	198
Low-Rise Residential New Construction Program ^o	\$0.8	-	8,874	2,320	11,193	75	3	-	-	-	-	-	604	158	762	1,108	46
Renewable Energy																	
Renewable Heat New York	\$0.8	\$1.14	2,919	416	3,335	577	29	396	24	420	4,585	229	1,431	108	1,539	1,251	63
NY-Sun Initiative	\$52.1	\$0.71	-	-	-	-	-	165,926	38,863	204,790	258	10	96,237	22,541	118,778	445	18
NYSERDA Solar Electric	\$5.2	\$0.1	-	-	-	-	-	2,040	-	2,040	2,607	104	1,183	-	1,183	4,495	180
Community Clean Energy																	
Regional Economic Development & GHG Reduction ^o	\$0.8	\$8.5	-82,448	5,502	-76,946	-122	-7	-	3,735	3,735	2,512	140	35,140	2,490	37,630	249	14
Clean Energy Communities	\$8.9	-	375,790	-	375,790	24	2	167,181	-	167,181	53	4	120,472	-	120,472	74	5
Clean Energy Fund																	
Clean Energy Fund ^p	\$4.2	\$0.74	18,331	52,049	70,381	70	4	889	14,457	15,346	320	19	1,621	14,028	15,649	314	19
Cross-Program Overlap ^q	N/A	N/A	-823,812	-57,118	-880,930	N/A	N/A	-38,465	-5,238	-43,704	N/A	N/A	-82,952	-7,178	-90,130	N/A	N/A
TOTAL Annualized Cumulative Benefits^r	\$410.8	\$35.8	2,841,408	302,649	3,144,057	142	N/A	815,462	64,680	880,142	507	N/A	756,278	60,500	816,778	547	N/A
TOTAL Expected Lifetime Cumulative Benefits^s	\$410.8	\$35.8	55,395,482	5,053,330	60,448,813	N/A	7	15,065,997	1,352,735	16,418,732	N/A	27	13,957,953	1,168,946	15,126,899	N/A	30

Table notes are on the next page

Table 2 continued

- a These emission reductions are associated with both electric and fossil-fuel saving measures. Under a cap-and-trade system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions going into the atmosphere. However, electric efficiency projects will reduce end users' responsibility or footprint associated with emissions from electricity production.
- b CO₂e stands for carbon dioxide equivalent and describes the amount of CO₂ that would have the same global warming potential as a given mixture of gases based on factors published by the Intergovernmental Panel on Climate Change.
- c Inclusive of incentive dollars for expenditures, encumbrances, and contract pre-encumbrances.
- d Inclusive of all non-incentive expenditures.
- e Inclusive of savings from all currently operational projects installed since program inception.
- f Inclusive of savings from all projects under a signed contract and projects with an application received that are not yet operational.
- g The sum of Installed Savings and Pipeline Savings.
- h The sum of Total Incentives and Total Associated Costs divided by Total Committed Savings.
- i The sum of Total Incentives and Total Associated Costs divided by the Expected Lifetime Total Committed Savings. Inclusive of cross-program overlap.
- j The benefits for this program include some projects that have also been supported by other non-RGGI NYSERDA funding sources. The decrease in installed megawatt-hours this quarter is due to a change in methodology from reporting the savings from measures as a result of an energy audit to only reporting the measures actually installed.
- k The benefits for this program have been evaluated and will be adjusted in future reports.
- l The Multifamily Carbon Emissions Reduction Program is a fuel-switching program and does not claim any energy or bill savings.
- m The benefits presented for this program have been adjusted based on results of an impact evaluation completed in October 2015. For additional information, see the "Program Evaluation" Section (4.7), in this report.
- n The electricity savings for the Low-Rise Residential New Construction Program (LRNC) are supported with non-RGGI funding sources. Prior RGGI Status Reports erroneously included the electricity savings from the LRNC program as a RGGI-funded benefit.
- o The Regional Economic Development and GHG Reduction program consists of 15 unique projects. The costs for all 15 projects are included in this table although only a subset of these projects actually report quantifiable energy benefits. The negative million British thermal unit (MMBtu) savings are due to a manufacturing project that switched from burning #6 residual oil to natural gas and a transportation project that switched from burning diesel fuel to compressed natural gas (CNG). CNG is slightly less efficient than diesel from an energy perspective but results in carbon emission reductions.
- p These figures represent a proportional allocation of benefits relative to the percent of RGGI contributions to the total approved Clean Energy Fund budget.
- q Cross-program overlap accounts for projects that received any combination of a GJGNY assessment, a GJGNY loan, or a RGGI-funded incentive through the Home Performance with ENERGY STAR® Program, NY-Sun Program, or Renewable Heat NY Program.
- r Totals may not sum exactly due to rounding.

Figure 1. Percent Contribution by Fuel Type for Energy Savings, Emission Reductions, and Bill Savings through March 31, 2017³



* To convert to source MMBtu, the kilowatt-hour (kWh) savings, and generation for the electric measures were adjusted to account for savings at the source of generation. This approach enables an order of magnitude comparison between electric and fuel-energy savings/generation. The source factor used is 9,860 Btu/ kWh, which is based on a three-year rolling average (2009, 2010, and 2011) of the amount of fossil-fuel energy generated to produce electricity over the three-year period, and includes a line loss factor of 7.2 percent.

³ Columns may not sum exactly to 100 percent due to rounding.

3 Funds

3.1 Proceeds

As of March 31, 2017, NYS sold nearly 329 million CO₂ allowances and received more than \$1,014 million in auction proceeds. In addition, more than \$12.9 million in interest was earned on the RGGI portfolio and nearly \$2 million in interest was earned on the Green Jobs - Green New York (GJGNY) program. More than \$12 million in interest earnings were allocated on the RGGI portfolio and nearly \$1.8 million in interest earnings were allocated to the GJGNY program. The allocated interest earnings are reinvested for program implementation and distributed across various RGGI programs. Detailed auction proceeds and total funds for NYS RGGI are presented in Appendix D and Appendix E, respectively. Total NYS RGGI funds are listed in Table 3, and detailed auction proceeds for NYS RGGI are visually displayed in Figure 2.

Table 3. New York State's RGGI Auction Results and Funds through March 31, 2017^a

Source: RGGI, Inc. and NYSERDA

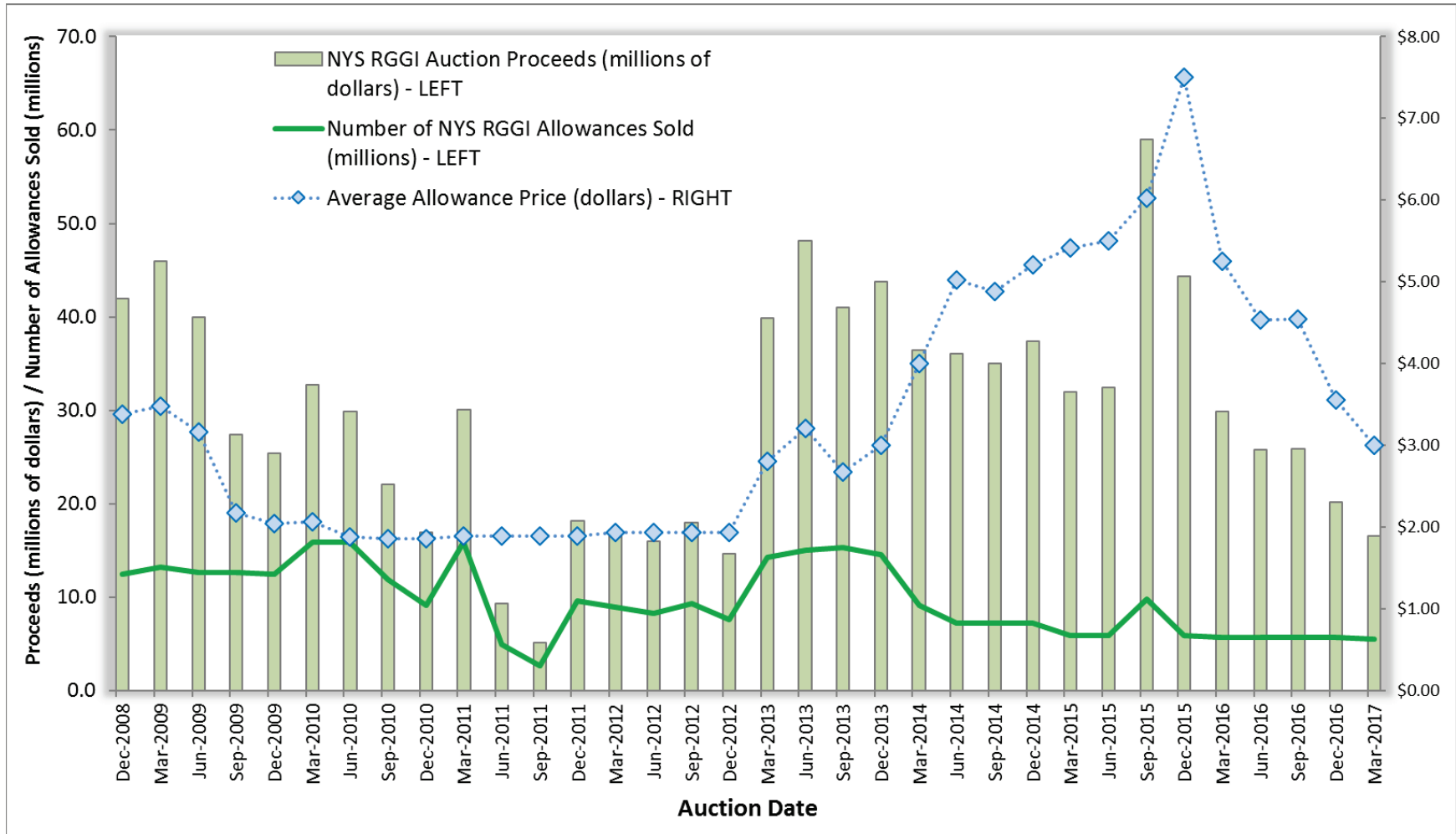
Fund Category	NYS Allowances Sold	Cumulative Funds
First Control Period Total	144,305,904	\$336,282,535
Second Control Period Total	128,764,643	\$391,950,232
Third Control Period Total	55,814,950	\$286,030,368
RGGI Auction Proceeds	328,885,497	\$1,014,263,135
RGGI Portfolio Interest Earnings		\$12,947,487
GJGNY Program Interest Earnings		\$1,963,338
Anticipated Auction Revenue		\$61,040,692
TOTAL Funds^b		\$1,090,214,651

^a The first control period for fossil-fuel-fired electric generators took effect on January 1, 2009 and concluded on December 31, 2011. The second control period took effect on January 1, 2012 and concluded on December 31, 2014. The third control period took effect on January 1, 2015 and extends through December 31, 2018.

^b RGGI program budgets have been increased based on anticipated auction revenues from the approved Fiscal Year 2016-2017 Operating Plan. These amounts have been allocated but not been received due to the timing of receipt of the proceeds.

Figure 2. New York State's RGGI Auction Results through March 31, 2017

Source: RGGI, Inc.



3.2 Budget

Financial data for the approved RGGI programs through March 31, 2017 are presented in Table 4 through Table 6. Table 4 presents the current expended, encumbered, and committed funds for each program and reflects how the more than \$1,090 million of approved funds are distributed across the six major program areas and other costs:

- Renewable Energy
- Energy Efficiency
- Innovation GHG Abatement Strategies
- Community Clean Energy
- GJGNY
- NY Green Bank

Table 5 and Table 6 present the financial data for the approved GJGNY program and NY Green Bank, respectively, through March 31, 2017.

Table 4. Available Funding and Financial Status through March 31, 2017 (millions of dollars)

Source: NYSERDA

	Budgeted Funds ^a	Expended Funds ^b	Open Encumbrances ^c	Pre-Encumbrances ^d	Committed Funds ^e	Remaining Balance ^f
Renewable Energy						
Renewable Heat NY	10.3	5.6	3.5	0.4	9.6	0.7
NY-Sun	89.0	41.8	11.0	0.4	53.2	35.8
NYSERDA Solar Electric Programs	5.3	5.3	0.03	-	5.3	-
NY Generation Attribute Tracking	0.8	0.05	0.73	-	0.8	-
Advanced Renewable Energy	2.9	2.8	-	-	2.8	0.02
Total Renewable Energy	108.3	55.7	15.3	0.8	71.7	36.6
Energy Efficiency						
LIPA Energy Efficiency and Renewable Energy	123.1	110.4	12.7	-	123.1	-
Residential Efficiency Services	83.8	75.8	5.0	1.0	81.7	2.0
Municipal Water and Wastewater	1.2	1.2	-	-	1.2	-
Clean Energy Workforce Opportunity	15.0	15.0	-	-	15.0	-
Total Energy Efficiency	223.1	202.4	17.6	1.0	221.0	2.0
Innovative GHG Abatement Strategies						
Industrial Innovations	13.0	8.3	4.4	0.3	13.0	-
Climate Research and Analysis	8.6	6.8	1.3	0.4	8.6	-
Clean Energy Business Development	23.2	14.9	3.2	2.6	20.7	2.5
Charge NY	10.0	0.4	0.7	0.03	1.1	8.9
Transportation Research	5.3	2.7	0.3	0.9	3.9	1.4
Carbon Capture and Sequestration	1.0	1.0	-	-	1.0	-
Advanced Buildings	1.6	1.2	0.4	-	1.5	0.1
Competitive Greenhouse Gas Reduction Pilot	1.0	0.5	0.5	-	1.0	-
Brookhaven National Laboratory Ion Collider	25.0	3.0	22.0	-	25.0	-
Total Innovative GHG Abatement Strategies	88.7	38.8	32.8	4.3	75.9	12.8
Community Clean Energy						
Climate Smart Communities	7.7	4.4	-	-	4.4	3.2
Economic Development Growth Extension	7.2	5.1	0.8	-	5.8	1.4
Cleaner, Greener Communities	99.1	30.2	54.0	13.1	97.3	1.8
Clean Energy Communities	4.5	-	-	-	-	4.5
Regional Economic Development and Greenhouse Gas Reductions	10.3	9.1	1.1	0.1	10.3	0.003
REV Campus Competition	3.0	0.1	1.9	1.0	3.0	-
Total Community Clean Energy	131.8	48.9	57.8	14.2	120.9	11.0
Other Costs^g						
Deficit Reduction Plan (DRP) Transfer ^h	90.0	90.0	-	-	90.0	-
Con Edison Smart Grid Program ⁱ	21.9	21.9	-	-	21.9	-
Program Administration ^j	26.6	24.5	0.05	-	24.5	2.1
Metrics and Evaluation	11.8	4.0	2.2	-	6.2	5.6
RGGI Inc. Costs ^k	8.0	7.6	0.2	-	7.9	0.1
New York State Cost Recovery Fee	9.6	9.6	-	-	9.6	-
Environmental Tax Credit	64.0	64.0	-	-	64.0	-
Electric Generation Facility Cessation Mitigation ^m	30.0	30.0	-	-	30.0	-
OTHER COSTS TOTAL	261.9	251.6	2.5	-	254.1	7.8
SUBTOTAL	813.7	597.3	126.0	20.3	743.6	70.2
Green Jobs - Green New York						
Green Jobs - Green New York	191.6	182.0	3.1	25.0	210.1	(-18.5) ^m
NY Green Bank						
NY Green Bank	52.9	51.3	0.6	-	51.9	1.0
Clean Energy Fund						
Clean Energy Fund	31.3	2.0	0.7	-	2.7	28.5
Clean Energy Standard						
Clean Energy Standard	0.7	-	-	-	-	0.7
TOTALⁿ	1,090.2	832.6	130.4	45.3	1,008.3	82.0

Table notes are on the next page

Table 4 continued

- ^a Includes auction proceeds and allocated interest on the RGGI and GJGNY portfolios. The allocation is consistent with the budget presented in the Operating Plan.
- ^b Invoices processed for payment by NYSERDA.
- ^c Remaining funding obligated under a contract, purchase order, or incentive award.
- ^d Planned funding for contracts awarded and under negotiation, as well as planned funding under active development through open solicitations with upcoming proposal due dates, adjusted so that the sum of the project commitments does not exceed Budgeted Funds. NYSERDA's annual audited financial statements may reflect project commitments in excess of Budgeted Funds. These commitments are expected to decrease over time due to project attrition and differences in estimated versus actual costs.
- ^e The sum of Expended, Encumbered, and Pre-Encumbered funds.
- ^f The difference between Budgeted Funds and Committed Funds.
- ^g The values for Program Administration, Metrics and Evaluation, and the NYS Cost Recovery Fee represent aggregate funds and commitments for RGGI-funded activities, NOT including GJGNY. For information on GJGNY finances, refer to Table 5.
- ^h On December 4, 2009, NYS enacted numerous deficit reduction measures that included the transfer of \$90 million in RGGI auction proceeds to the General Fund following the global financial crisis.
- ⁱ On December 22, 2009, NYSERDA's Board approved a proposed consent decree that resolves the legal challenge to the State's RGGI program. In October 2010, State Supreme Court Judge Thomas J. McNamara signed a Stipulation and Order of Discontinuance signed by all the parties, thereby formally ending the litigation. The parties to the consent decree presently estimate that the total commensurate benefit for the calendar years 2009–2017 is \$20.8 million and agreed to dedicate such funds for the development of smart grid technologies in the Con Edison territory. The budget reflects allocations that are intended to fund NYSERDA's estimated liability for each calendar year control period consistent with the timing of estimated cash payments due to Con Edison. NYSERDA is also responsible for certain additional costs that may be incurred through 2017. NYSERDA's annual audited financial statements show an amount expended of \$18 million to reflect these additional estimated costs that were required to be recorded.
- ^j Includes NYSERDA's upfront administrative expenses related to the development and implementation of the CO₂ Budget Trading Program, the CO₂ Allowance Auction program, and the Operating Plan.
- ^k The first-year budget includes RGGI Inc. start-up costs and the State's share of ongoing RGGI Inc. expenses. RGGI Inc. is a nonprofit corporation created to support development and implementation of the CO₂ Budget Trading Program.
- ^l The Electric Generation Facility Cessation Mitigation Program was enacted in the 2015-2016 New York State Budget, and is designed to support communities that are transitioning local economies that have been reliant on fossil-fuel power plants as a source of financial support. For more information see the Final 2016 RGGI Operating Plan Amendment at: <https://www.nyserda.ny.gov/Researchers-and-Policymakers/Regional-Greenhouse-Gas-Initiative/Useful-Documents>
- ^m The Residential Financing figures include certain loans issued, but where proceeds from bonds to finance the pledged loans is received subsequently. The Residential Financing figures also includes pre-encumbrances for approved loans not yet issued, which will be funded from additional funds to be transferred to GJGNY and not yet reflected in the Budgeted funds shown in this table.
- ⁿ Totals may not sum exactly due to rounding.

Table 5. Green Jobs - Green New York Available Funding and Financial Status through March 31, 2017 (millions of dollars)

	Budgeted Funds ^a	Expended Funds ^b	Open Encumbrances ^c	Pre-Encumbrances ^d	Committed Funds ^e	Remaining Balance ^f
Workforce Development, Outreach and Marketing						
Workforce Development	7.3	6.6	0.1	0.1	6.8	0.5
Outreach and Marketing	15.9	15.3	0.5	-	15.9	0.0
Total Workforce Development, Outreach and Marketing	23.2	22.0	0.7	0.1	22.7	0.5
Residential						
Energy Assessment Incentive	26.9	25.7	-	0.2	25.9	0.9
Implementation Costs	1.0	1.0	-	-	1.0	0.00
Financing: Loans	99.7	238.0	-	24.0	262.0	
Financing: Loan Repayments	-	(15.9)	-	-	(15.9)	
Financing: Implementation Costs	-	12.0	0.4	0.1	12.5	
Financing: Bond Proceeds	-	(106.1)	-	-	(106.1)	
Financing: Bond Issue Costs	-	3.6	0.2	-	3.7	
Financing: Short Term Note	-	(30.0)	-	-	(30.0)	
Total Financing	99.7	101.6	0.6	24.0	126.2	(-26.5)^g
Total Residential	127.6	128.3	0.6	24.2	153.1	(-25.5)^g
Multifamily						
Energy Assessments	3.3	3.1	0.2	0.002	3.3	0.0
Implementation Costs	1.4	1.4	-	-	1.4	0.0
Financing: Loans	3.5	3.9	-	-	3.9	
Financing: Loan Repayments	-	(2.4)	-	-	(2.4)	
Financing: Implementation Costs	0.3	0.2	0.2	-	0.3	
Total Financing	3.8	1.6	0.2	-	1.8	2.0
Total Multifamily	8.5	6.1	0.3	0.0	6.5	2.1
Small Commercial						
Energy Assessments	8.6	7.0	-	-	7.0	1.6
Implementation Costs	1.0	0.9	0.01	-	0.9	0.2
Financing: Loans	3.8	1.9	-	-	1.9	
Financing: Loan Repayments	-	(0.4)	-	-	(0.4)	
Financing: Implementation Costs	0.3	0.3	0.3	0.7	1.2	
Total Financing	4.1	1.7	0.3	0.7	2.7	1.4
Total Small Commercial	13.7	9.6	0.3	0.7	10.6	3.1
SUBTOTAL	173.1	166.0	1.9	25.0	192.9	(-19.8)^g
Other Costs						
Program Administration	10.5	10.4	0.01	-	10.4	0.1
Program Evaluation	5.6	3.3	1.3	-	4.6	1.0
New York State Cost Recovery Fee	2.2	2.2	-	-	2.2	0.0
Unallocated Interest Earnings	0.2	-	-	-	-	0.2
OTHER COSTS TOTAL	18.5	16.0	1.3	-	17.2	1.3
TOTAL^h	191.6	182.0	3.1	25.0	210.1	(-18.5)^g

^a Includes auction proceeds and allocated interest on the GJGNY funds.

The allocation is consistent with the budget presented in the RGGI Operating Plan.

^b Invoices processed for payment by NYSERDA.

^c Remaining funding obligated under a contract, purchase order, or incentive award.

^d Planned funding for contracts awarded and under negotiation as well as planned funding under active development through open solicitations with upcoming proposal due dates, adjusted so that the sum of the project commitments does not exceed Budgeted Funds. NYSERDA's annual audited financial statements may reflect project commitments in excess of Budgeted Funds. These commitments are expected to decrease over time due to project attrition and differences in estimated versus actual costs.

^e The sum of Expended, Encumbered, and Pre-Encumbered funds.

^f The difference between Budgeted Funds and Committed Funds.

^g The Residential Financing figures include certain loans issued, but where proceeds from bonds to finance the pledged loans is received subsequently. The Residential Financing figures also includes pre-encumbrances for approved loans not yet issued, which will be funded from additional funds to be transferred to GJGNY and not yet reflected in the Budgeted funds shown in this table.

^h Totals may not sum exactly due to rounding.

**Table 6. NY Green Bank Available Funding and Financial Status through March 31, 2017
(thousands of dollars)**

	Budgeted Funds ^a	Deployed Funds ^b	Committed Capital ^c	Approved Investments ^d	Committed Funds ^e	Remaining Balance ^f
Program Costs						
NY Green Bank	47,567	47,567	-	-	47,567	-
SUBTOTAL	47,567	47,567	-	-	47,567	-
	Budgeted Funds	Expenses ^g	Open Encumbrances ^h	Pre-Encumbrances ⁱ	Committed Funds ^j	Remaining Balance ^f
Other Costs						
Operating Expenses (Program Administration)	4,234	3,670	564	-	4,234	-
Program Evaluation	969	10	-	-	10	959
New York State Cost Recovery Fee	156	74	-	-	74	82
OTHER COSTS TOTAL	5,359	3,754	564	-	4,318	1,041
	Budgeted Funds	Deployed Funds plus Expenses	Committed Capital plus Open Encumbrances	Approved Investments plus Pre-Encumbrances	Committed Funds	Remaining Balance
TOTAL^k	52,926	51,321	564	-	51,886	1,041

- ^a The allocation is consistent with the budget presented in the RGGI Operating Plan. NY Green Bank funding being reported here is only NY Green Bank funds that were transferred from RGGI. The actual NY Green Bank budget is higher.
- ^b Deployed Funds means, in any period, the aggregate funds that have been advanced by NY Green Bank subject to the terms of executed investment and financing agreements which remain in force during that period, expressed in dollars. Deployed Funds reflect only funds actually advanced. Many transactions involve provision of credit enhancements by NY Green Bank that, by their nature, are contingent obligations not generally intended to be fully drawn against or funded. In addition, many NY Green Bank investments are “delayed draw” in that funds are not deployed until project sponsors meet certain development milestones over a time period necessary to originate, develop and construct a large number of smaller, distributed, clean energy projects.
- ^c Committed Capital means, in any period, the aggregate funds to be provided by NY Green Bank pursuant to executed investment and financing agreements that remain in force during that period, without such funds having been deployed, expressed in dollars.
- ^d Approved Investments means proposed investments that have moved through NY Green Bank’s transaction process – from proposal submission, evaluation, structuring/diligence/negotiation, agreement in principle, to vetting by the IRC and approval by NYSERDA’s President and CEO after considering recommendations made by IRC members. Approved Investments represent an allocation of NY Green Bank’s capital in accordance with the terms of the IRC approval – an interim stage before “Committed Funds” or “Deployed Funds.” Once an Approved Investment has been fully negotiated and executed, it becomes “Committed” and/or “Deployed” and no longer represents a current Approved Investment. Equally, if an Approved Investment becomes dormant for any reason for a continuous period of one year prior to being fully negotiated and executed and at the end of that period the probability of that investment moving forward towards execution is regarded as low, it may also be removed from the category of Approved Investments. In that event, all capital amounts corresponding to that investment are released and available for other NY Green Bank investments.
- ^e The sum of Deployed Funds, Committed Capital, and Approved Investments.
- ^f The difference between Budgeted Funds and Committed Funds.
- ^g Invoices processed for payment by NYSERDA.
- ^h Remaining funding obligated under a contract, purchase order, or incentive award.
- ⁱ Planned funding for contracts awarded and under negotiation as well as planned funding under active development through open solicitations with upcoming proposal due dates, adjusted so that the sum of the project commitments does not exceed Budgeted Funds. NYSERDA’s annual audited financial statements may reflect transaction commitments in excess of Budgeted Funds. These commitments are expected to decrease over time due to project/transaction attrition and differences in estimated versus actual costs.
- ^j The sum of Expenses, Open Encumbrances, and Pre-Encumbrances.
- ^k Totals may not sum exactly due to rounding.

4 Program Descriptions and Accomplishments

4.1 Renewable Energy

4.1.1 Renewable Heat NY

The Renewable Heat NY initiative is a long-term commitment to help the high efficiency, low-emission biomass heating industry reach scale. The long-term market development strategy for Renewable Heat NY includes the following objectives:

- Raise consumer awareness.
- Develop large-scale anchor customers to expand the wood pellet bulk delivery market.
- Promote supply chain development including workforce training and support for product development, manufacturing, laboratory and field testing, and equipment certification.
- Leverage NYSERDA's issuance of the Biomass Heating Roadmap to accelerate the use of biomass for heating using the most efficient low-emission technologies.
- Provide financial incentives to consumers for advanced efficiency and low-emission technologies to reduce upfront costs in the early years, which will phase down as the market achieves scale and upfront costs decrease.
- Provide support so that sustainable forestry practices are available and followed by small and large landowners.

In many respects, developing this market will inherently require capturing the benefits of local scale. Installation and pellet supply economics will demonstrate an economic service radius effect; workforce development and customer awareness will show gains from local density. Consequently, this initiative seeks to develop and expand clusters of activity, thereby meeting the overarching goal of supporting the high-efficiency and low-emission biomass heating industry in NYS.

Renewable Heat NY is providing supply chain and service network development (i.e., workforce development, training, and research and development), along with consumer incentives and financing. These activities are not geared toward resource acquisition, but rather will position the market to be sustainable over the long term. There will be a reduction in investments of incentives and staff resources as the private market develops.

Key accomplishments as of this quarter:

- Twenty-three new research projects have been contracted as a result of proposals received from Program Opportunity Notice (PON) 3027: Energy and Environmental Performance of Biomass-Fired Heating Equipment. These projects are addressing needs identified through the Renewable Heat NY program and support the development and advancement of a high-efficiency, low-emissions biomass thermal industry in NYS.
- NYSERDA's training service provider conducted one in-person training session this quarter. Thirty-three individuals attended the training session. Enrollment of qualified installers is ongoing.
- The installation of 163 pellet stoves; more than 58 projects are in process. Two residential cordwood unit installations and three residential pellet boiler installations; five residential cordwood and nine residential pellet boiler installations are in process.
- Feasibility studies and reviews by technical consultants related to development of large commercial projects are ongoing, and three large commercial pellet boiler projects are in-process.

4.1.2 NY-Sun Initiative

The NY-Sun initiative is driving the growth of the solar industry and makes solar technology more affordable for all New Yorkers. The program provides declining incentives for the installation of systems and works to reduce solar electric balance-of-system costs through technology advancements, streamlined processes, and customer aggregation models. The goal is to achieve a sustainable solar industry that does not depend on incentives.

Community Solar NY, a component of the NY-Sun initiative, seeks to empower community projects across NYS through aggregation, group purchasing, and other existing and emerging strategies to make solar more accessible and affordable. The program will support projects organized by school districts, municipalities, nonprofit organizations, and other community institutions.

In August 2014, NY-Sun became a statewide program. RGGI funding enabled participation of customers of the Long Island Power Authority (LIPA), New York Power Authority, and municipal power companies. NY-Sun supports end-use solar installations for commercial, industrial, and residential customers as well as electric utility applications to improve the performance of distribution circuits and reduce peak electric load in critical load pockets. These projects assist NYS communities that empower clean energy, healthy communities, and economic development.

Key accomplishments as of this quarter:

- “Solarize” campaigns participating in Community Solar NY Round 2 officially closed out at the end of 2016. These campaigns resulted in approximately 850 solar installations across 24 counties, equaling approximately 6.17 megawatts (MW) of solar. This round of campaigns saved customers approximately 1.5 million dollars in project costs, totaling \$1,848 in cost savings per project. Round 3 of Community Solar NY kicked off in March 2017 with three communities moving forward. In 2017 there will be close to 15 active Solarize campaigns launching either from self-funded organizations, or through other NYSERDA funding channels.
- Uptake for the Affordable Solar program, which provides additional incentives for onsite residential projects for low- and moderate-income homeowners, increased for customers and contractors during the first quarter of 2017. Through Q1 2017, 146 installations were completed with 60 more in the pipeline. Over 40 NY-Sun contractors have completed Affordable Solar projects to date.
- Due to the continued growth of the Long Island residential solar market, the final residential MW Block for that region filled in April 2016 and the incentive program closed. There was a total of 18,138 solar electric systems installations through March 31, 2017 on Long Island through PON 2112 and the Solar Pioneer Programs.

4.1.2.1 NYSERDA Solar Electric Program

NYSERDA’s Solar Electric Program focuses on reducing GHG emissions in the long term by helping to establish a sustainable market for solar energy statewide that includes targeted financial incentives. These RGGI funds supplement and do not supplant Renewable Portfolio Standard (RPS) funds, supporting installation of systems in regions that do not pay into the RPS.

Key accomplishments as of this quarter:

- There was a total of 181 solar electric system installations outside of Long Island using RGGI funding through March 31, 2017.

4.1.3 New York Generation Attribute Tracking (NYGATS)

NYSERDA established the New York Generation Attribute Tracking System (NYGATS) to record electricity generation attribute information within NYS and to process generation attribute information from energy imported and consumed within the State, as a basis for creating tradable generation attribute certificates. Through NYGATS, entities are able to verify and substantiate ownership of renewable energy certificates (RECs) to either support regulatory compliance or to validate environmental attributes in trading markets. NYGATS also characterizes the attributes of electricity imports and exports and has

the capability to interface and exchange information with other certificate tracking systems. The system will serve to substantiate compliance for Clean Energy Standard (CES) requirements. As previously ordered by the Public Service Commission, this project is also supported with System Benefits Charge (SBC) environmental disclosure program funding.

Key accomplishments as of this quarter:

- NYGATS began creating CES Renewable Energy Standard (RES) Tier 1 RECs for eligible facilities in January 2017. These certificates will be used to demonstrate compliance with obligations under the CES.
- On March 9, 2017, the Public Service Commission issued the Value of Distributed Energy Resources (VDER) Order, which identified NYGATS certificates as the instrument to be received by the utilities in exchange for providing the environmental value component of the VDER Phase 1 Value Stack tariff. The VDER Order also changed the NYSERDA policy in regards to ownership of environmental attributes from NYSERDA-funded Customer Sited Tier projects, making it possible for project owners of Net Energy Metered projects to register in NYGATS and create certificates for use in substantiating voluntary claims.
- The RES Tier 1 facility certification process, as described in the approved CES Phase 1 Implementation Plan, was built in NYGATS and began accepting applications in March of 2017. Through this process, existing or proposed electric generation facilities can submit applications for a NYSERDA determination of eligibility to create RES Tier 1 RECs. Approval through the certification process is a pre-requisite to participate in the RES procurement scheduled to be released by NYSERDA in Q2 2017.
- NYSERDA offered a series of NYGATS user-training sessions in Q1 2017. Trainings were conducted for NYSERDA contractors that use NYGATS to fulfill their contractual obligations, for Load Serving Entities covered by the Clean Energy Standard, and for users of the RES Tier 1 certification process.
- Additional modifications to NYGATS required by the CES Order are currently in development and will be released throughout 2017.

4.1.4 Advanced Renewable Energy Program

The Advanced Renewable Energy Program supports projects that foster the market introduction of a broad range of promising new and advanced renewable energy technologies, including advanced biomass, tidal, and offshore wind technologies.

Key accomplishments as of this quarter:

- GridMarket, LLC has completed conducting a small research project to analyze the characteristics of building load profiles, using 15-minute interval meter data in the Con Edison distribution area. Their research also evaluated the potential benefits to customers and examined the grid when applying energy storage technologies to modify load and integrate with renewable generation. The draft of the final report has been received by NYSERDA and the review comments have been submitted to GridMarket, LLC. The final revision of the report is expected shortly.
- An Offshore Wind Cost Benefit Study was completed. It assessed the potential costs, ratepayer impacts, environmental benefits, economic benefits and impacts (job and other macroeconomic impacts) to New York State associated with plausible scenarios of future offshore wind energy deployment in the New York Bight through 2025.
- The Offshore Wind Master Plan, that is funded through the Clean Energy Fund, will include cost studies that build on the work completed for the Offshore Wind Cost Benefit Study.

4.2 Energy Efficiency

4.2.1 LIPA Energy Efficiency and Renewable Energy Initiative

The RGGI funds provided to LIPA ensure that businesses and consumers on Long Island have access to similar clean energy and energy efficiency opportunities that are available throughout the State and to help advance statewide efforts towards achieving the clean energy goals of the 2015 New York State Energy Plan. The funds provided to LIPA have traditionally supported solar incentive programs consistent with the statewide NY-Sun program but have more recently supported energy efficiency programs administered by Public Service Electric and Gas Long Island (PSEGLI). During 2016, LIPA, NYSERDA, and PSEGLI have collaborated to launch new approaches envisioned under Reforming the Energy Vision to support market transformation objectives, while also achieving greater carbon emissions reductions. Funding and reporting requirements are established through a Memorandum of Understanding (MOU) between NYSERDA and LIPA.

Following are the results from the first quarter of 2017.

Cumulative Q1 2017 rebate spending totaled \$8.65 million against total budgeted RGGI funds of \$34.6 million, resulting in 49,271 megawatt-hours (MWh) savings. The majority of the spending (\$5.1 million) consisted of payments to businesses through PSEGLI's Commercial Efficiency Program (CEP). Residential programs supported include PSEGLI's Cool Homes central air conditioner program and PSEGLI's Efficient Products program which includes support of LED light bulbs, pool pumps, and recycling refrigerators and room air conditioners.

Key accomplishments as of this quarter:

- In Q1 2017 over \$5.1 million in rebates were paid to Long Island businesses saving 20,159 MWh as part of PSEGLI's CEP as incentive for over 1,100 energy efficiency projects, installing measures such as lighting, HVAC systems, and efficient motors.
- PSEGLI residential customers were provided with incentives of over \$800,000 to install 730 energy efficient central air conditioning projects as part of PSEGLI's Cool Homes program, saving 622 MWh in Q1 2017.
- PSEGLI Residential Efficient Products program resulted in Q1 2017 savings of 28,053 MWh for total incentive payments of \$2.45 million, including rebates of \$2.1 million to PSEGLI residential customers for the purchase of over 1 million light bulbs. The remaining incentives paid for for efficient product measures such as LED light bulbs, pool pumps, and recycling refrigerators and room air conditioners.

4.2.2 Residential Efficiency Services

NYSERDA currently offers a suite of programs that provide comprehensive energy efficiency services for single and multifamily existing buildings and new construction, including low-income households. In addition to energy savings, these programs provide significant health and safety benefits through comprehensive testing and verification, improved air quality, and improved comfort. Previously, RGGI funds were used to fill gaps in residential energy efficiency services, offering incentives to implement energy efficiency measures related to petroleum fuel opportunities, or opportunities on Long Island and municipal electric districts, which were not supported through the Energy Efficiency Portfolio Standard (EEPS). However, the Clean Energy Fund initiatives are fuel neutral, and the LIPA now administers more comprehensive residential energy efficiency programs; therefore, RGGI funds are used to support petroleum fuel opportunities for customers of municipal electric utilities. Coordination of RGGI funds with programs offered by municipal electric utilities allows for efficiency contractors to provide comprehensive energy efficiency services to the home, expands the number of households served, and ensures that opportunities for carbon reduction measures are not lost.

4.2.2.1 Multifamily Performance Program

The Multifamily Performance Program (MPP) serves residential buildings with five or more units. Funds are targeted at efficiency measures that help to reduce on-site oil, non-firm natural gas, steam, and propane energy demand in multiunit residential buildings. All buildings receive program support for energy assessments to determine cost-effective measures, expected energy savings, and installation costs. Projects also receive implementation incentives to support the installation of measures identified by program supported assessments.

Key accomplishments as of this quarter:

- Through March 31, 2017, 146 energy efficiency projects were completed, representing efficiency upgrades to 33,227 housing units.

4.2.2.2 Multifamily Carbon Emission Reduction Program

This program is now closed. Refer to Appendix F: Closed RGGI-Funded Programs and Completed Evaluations for more information.

4.2.2.3 EmPower New York

NYSERDA's EmPower New York (EmPower) program offers no-cost energy efficiency services to low-income (i.e., HEAP-eligible) homeowners and renters. These services include electric reduction and home performance measures, such as appliance replacement, energy-efficient lighting, insulation, and air sealing. Historically, EmPower used RGGI funding to serve low-income applicants that heat with oil and propane and are ineligible for EEPS funding. Starting with the implementation of the Clean Energy Fund, which delivers energy efficiency in a fuel-neutral manner, RGGI funds were only used for customers served by PSEGLI or municipal utilities and are therefore not eligible for the Clean Energy Fund. Starting in 2017, PSEGLI will also begin to deliver services to households who heat with oil or propane and EmPower will no longer offer services in this territory. However, RGGI funds will continue to support petroleum fuel efficiency measures in households served by municipal electric utilities. These energy efficiency measures aid in the reduction of GHG emissions and provide long-term carbon reductions. On-site energy education offers customers additional strategies for managing their energy costs. Services are provided by participating contractors that are Building Performance Institute GoldStar Contractors. Currently, 159 EmPower contractors are assisting in RGGI-funded projects.

Key accomplishments as of this quarter:

- Across NYS, 192 households were served during this quarter, bringing the total to 6,854 households served under EmPower New York to date with RGGI funding through March 31, 2017.

4.2.2.4 Green Residential Buildings Program

This program is now closed. Refer to Appendix F: Closed RGGI-Funded Programs and Completed Evaluations for more information.

4.2.2.5 Home Performance with ENERGY STAR®

Home Performance with ENERGY STAR® (HPwES) is a comprehensive energy efficiency services program for existing one- to four-family homes and low-rise⁴ residential buildings. The program uses a network of Building Performance Institute (BPI) GoldStar contractors to perform diagnostic testing on the home, recommend improvements, determine the payback period for those improvements, and install improvements selected by the homeowner. As of March 31, 2017, 180 contractors are active in HPwES. The program uses RGGI funds for cost-effective oil and propane efficiency measures, such as replacing inefficient oil and propane heating equipment and other measures that have a direct impact on reducing GHG emissions from oil and propane consumption. Starting with the implementation of the Clean Energy Fund, which delivers energy efficiency in a fuel-neutral manner, RGGI funds were only used for customers served by PSEGLI or municipal utilities and are therefore not eligible for the Clean Energy Fund. Starting in January 2017, PSEGLI also began to deliver services to households who heat with oil or propane and HPwES will no longer offer services in that territory. However, RGGI funds will continue to support petroleum fuel efficiency measures in households served by municipal electric utilities. Income-qualified homeowners are eligible for incentives to make energy improvements. HPwES applicants may also qualify for GJGNY assessment and financing programs.

⁴ HPwES low-rise buildings encompass buildings with three stories or less, with eight units or less, and are constructed using building techniques common to one- to four-family homes. They must be served by residential-scale heating equipment with a maximum rating of 300,000 Btu. Taller residential buildings that fit these criteria are also eligible. Examples include brownstones, row housing, and other urban-style buildings.

Key accomplishments as of this quarter:

- During this quarter 172 energy efficiency projects were completed at a contracted value of \$1.79 million, bringing the total to 9,267 energy efficiency projects completed at a contracted value of \$90.49 million.
- Of these projects, 51 percent were Assisted Home Performance with ENERGY STAR[®], which serves homeowners with incomes between 60-80 percent of State or area median income, whichever is greater.
- In Q1 2017, 12 percent of all HPwES projects were RGGI funded.

4.2.2.6 Solar Thermal Incentive Program

NYSERDA's Solar Thermal Incentive Program incentivizes the installation of solar thermal technologies for the production of hot water to displace electric heated hot water systems. Approximately 100 contractors participate in this program. RGGI supports the Solar Thermal Incentive Program by providing funding for heating fuels other than electricity while relying on the RPS program to provide funding for electrically heated domestic hot water. GJGNY financing is also available for these projects.

The revised program, released on March 20, 2015, provides cash incentives for the installation of new solar thermal (hot water) systems by an eligible installer or contractor. Incentives are available on a first-come, first-served basis. Incentives are applied to the total project cost based on displaced kilowatts-hours. The program allows combination systems (systems that provide domestic hot water and space heating); however, incentives are only provided on the portion of the solar thermal system output that offsets hot water production.

Key accomplishments as of this quarter:

- Program funds are winding down; no new solar thermal, hot water system was installed during this quarter. Only five funded projects remain in the existing program, potentially adding 816 MMBtu's once installed.
- In total, 13,753 MMBtu's have been saved through 177 projects and their solar thermal contribution to domestic hot water.

4.2.2.7 Low-rise Residential New Construction Program

NYSERDA's Low-rise Residential New Construction Program⁵ includes the New York ENERGY STAR Certified Homes Program and the New York Energy Smart designation for certain low-rise, multiunit buildings and gut rehabilitation projects. Funded primarily through the EEPS, this program is designed and intended to encourage the construction of new single-family homes and low-rise residential dwelling units that operate more energy efficiently and reduce long-term GHG emissions, are more durable, and provide a healthier environment for their occupants. Starting in July 2013, RGGI funded the MMBtu-savings component of the Low-rise Residential New Construction Program incentive for projects using propane or oil as the primary heating fuel. Although more than 165 builders participate in this program statewide, 24 builders have constructed homes eligible for RGGI incentives so far. RGGI funds have been fully committed as of Q3, 2015.

Key accomplishments as of this quarter:

- One new dwelling unit was constructed, bringing the cumulative total of new dwelling units constructed to date to 262.
- Additional private sector funds amounting to \$5,214 were leveraged, bringing the program total to date to \$1,038,718.

4.2.3 Municipal Water and Wastewater Program

This program is now closed. Refer to Appendix F: Closed RGGI-Funded Programs and Completed Evaluations for more information.

4.3 Innovative GHG Abatement Strategies

4.3.1 Industrial Innovations Program

The Industrial Innovations program is a longer-term program that supports development and demonstration of technologies with substantial GHG reduction potential and technologies relevant to NYS manufacturing industries and building systems. Funded projects will focus mainly on innovations that reduce the use of fossil fuels, have high replication potential for the State's

⁵ Low-rise residential new construction is a dwelling unit(s) contained within residential buildings of not more than three stories in height. Additionally, residential buildings that are more than three stories in height and determined to be eligible to participate in the EPA's ENERGY STAR[®] Certified Homes program are considered for eligibility on a case-by-case basis. Dwelling units "gut-rehabbed" or fully rehabilitated are also considered by NYSERDA for eligibility on a case-by-case basis.

manufacturing base, and are likely to be cost-effective. Projects will focus on technical innovations, including thermal-efficiency improvements for fossil-fuel based processes and alternative processes that eliminate the use of fossil fuels directly and indirectly for technologies that bring about thermal destruction of by-products. Projects also may include changes in material input and development of advanced controls, provided they directly bring about GHG reduction.

In 2014, two Manufacturing Innovations solicitations were issued: PON 2858 (Ultraviolet Light and Electron Beam Process Innovation and Market Transformation [UV/EB]) and PON 2927 (Transformative Technologies for Energy-Efficient Manufacturing [TTEEM]). These solicitations sought to advance the materials, methods, and machine tools used to mass-produce cleantech products, and thus reduce the GHG footprint of factories producing cleantech products, as well as reduce the cost of goods.

Key accomplishments as of this quarter:

- Projects in progress from previous quarters continued to make advancements during this quarter.

4.3.2 Climate Research and Analysis Program

The Climate Research and Analysis Program supports research studies, demonstrations, policy research and analyses, and outreach and education efforts. Through these activities, the program addresses critical climate change related problems facing the State and the region, including the needs of environmental justice communities.

Key accomplishments as of this quarter:

- Work has continued with the climate change adaptation research projects. A number of new projects have begun, ranging from exploring the impacts of climate change on NYS's electric sector, to making buildings more resilient, to investigating the State's risk to tropical cyclones in the future.
- Through the Community Risk and Resiliency Act (CRRA) process, the DEC formally adopted the NYSERDA-supported ClimAID projections for NYS as the official sea level rise projections for the State. NYSERDA staff continued to participate in an interagency working group to coordinate efforts on the CRRA. NYSERDA will continue to engage with this group, offering suggestions and support when appropriate.

- The New York Climate Change Science Clearinghouse launched in early May 2016. This quarter, the Northeast States for Coordinated Air Use Management (NESCAUM) and the team have been working with neighboring states who are interested in building off the New York site, potentially using this as a mechanism to help sustain the site into the future.

4.3.3 Clean Energy Business Development

The Clean Energy Business Development program seeks to support emerging business opportunities in clean energy and environmental technologies, while maintaining the goal of carbon mitigation.

Key elements of the program include:

- Providing financial support to leverage private investment in early-stage and growth-stage clean energy companies in NYS and accelerate the market introduction of innovative energy efficiency, renewable energy, or carbon abatement technologies.
- Advancing the transition of clean energy technologies or technologies that improve the energy efficiency of industrial processes from the development/demonstration stage to the launch of commercial-scale manufacturing or application.
- Developing and supporting a portfolio of programs designed to translate clean energy technology research into commercially viable business enterprises.

As part of the effort to bring private investment to early-stage clean energy companies in NYS, NYSERDA is working with the impact investment group, Investors' Circle, to develop a local network in New York City, which has been branded as Investors' Circle New York (IC NY). The group held monthly meetings/events to bring together the impact/social investing community in the New York metropolitan area, introduce clean energy investment opportunities to IC NY members, and provide feedback to the clean energy companies on how to successfully pitch to the impact/social investing community. IC NY is working to form and grow an effective and sustainable local network that will foster early-stage and growth-stage impact/social investments in clean energy companies in NYS. Additionally, IC NY worked to create stronger ties to key segments of the impact/social investor community, including foundations, family offices, sovereign wealth funds, and high-net-worth individuals.

Energy storage is an enabling technology important to the market penetration and value of intermittent renewable energy resources such as solar and wind. Financial support for the New York Battery and Energy Storage Technology Consortium (NY-BEST) Test and Commercialization Center in Rochester is partially provided by RGGI. The Center is a wholly owned subsidiary of NY-BEST and operated by DNV GL. The lab's grand opening occurred on April 30, 2014 and conducted the first test on May 28, 2014. In addition, in March 2015, the BEST Test and Commercialization Center received American Association for Laboratory Accreditation for International Organization for Standardization (ISO) 17025 Lab Quality.

The initiative 76West is focused on clean energy business development in the Southern Tier. As outlined in the 2015 State of the State address, this \$20 million investment will catalyze a clean energy business cluster that builds on the local strengths and assets of the Southern Tier.

The Photovoltaic Manufacturing Consortium (PVMC) is a \$5 million effort with more than 40 industrial collaborators as members or affiliates. Its goal is to accelerate the development, commercialization, manufacturing, field testing, and deployment of next-generation solar electric and lightweight photovoltaic (also known as solar electric) systems.

Key accomplishments as of this quarter:

- Investors' Circle New York continued to hold monthly meetings for the impact/social investment community in New York City.
- The second round of the 76West Clean Energy Business Competition was launched on December 1, 2016 and applications were due on March 13, 2017. Looking ahead, the semifinals of the competition will be held on July 11, 2017 in Alfred, NY and the finals will be held on July 13, 2017 in Corning, NY.

4.3.4 Charge NY

Charge NY will pursue three main strategies to promote plug-in electric vehicle (PEV) adoption by consumers across New York State. First, NYSERDA will develop and implement a rebate program for PEVs starting in 2017, accelerating purchases of PEVs by reducing higher upfront costs. Second, NYSERDA will invest in marketing and awareness-building activities to build interest in PEVs among the general public. A focus on building greater public knowledge and awareness of the capabilities of PEVs is essential to spur more private investment in purchases and PEV charging stations. This work may also include other market development activities, such as policy and business model development studies that support new ways for critical stakeholders, such as utilities, local governments, and car

dealers, to get involved in the electric vehicle market. Third, NYSERDA will also support the installation of PEV charging stations at workplaces, municipal lots, and multifamily buildings— location types that have been seen to be effective for PEV adoption based on usage data reported from previous installations. Regions of the State that have seen faster PEV adoption will be identified for additional charging station support, which ensure that investments in infrastructure will support areas with the greatest potential for additional PEV drivers. Charge NY will also initiate the deployment of a network of direct current (DC) fast-charge stations across the State.

Key accomplishments as of this quarter:

- In March 2017, NYSERDA launched the Drive Clean Rebate program for electric vehicles, providing up to \$2,000 per vehicle for qualifying purchases.
- NYSERDA's charging station deployment program is under development, with a request for proposal (RFP) expected to be released in 2017.

Success Story 1: New York State supports electric vehicles

RGGI funds are supporting New York State's Drive Clean Rebate initiative to encourage growth of clean and non-polluting electric car use in New York State and to promote the reduction of carbon emissions in the transportation sector. The initiative provides rebates of up to \$2,000 to all New York residents who buy eligible cars through participating new car dealers for the purchase of a new plug-in hybrid electric, all-electric, or hydrogen fuel cell vehicle.

4.3.5 Transportation Research

The goal of the Transportation Research Program is to commercialize technologies, products, systems, and services that provide superior GHG reduction. Activities include product development, performance validation, field testing, policy development, and business assistance to help emerging technologies achieve successful commercialization.

Key accomplishments as of this quarter:

- Mobile Fleet, of Hauppauge, NY, is working with the Port Authority of New York and New Jersey (PANYNJ) to complete designs for its advanced idle reduction equipment and to collect baseline utilization data on PANYNJ vehicles.

- EV-Box has completed a functional design of charging system hardware components for its AC and DC electric vehicle charger with integrated battery storage. They are now designing the embedded control software system. In parallel, the team has also developed a questionnaire to ascertain customers' perspective through interviews targeting the New York, California, and European markets, and has started developing the cost models for customer types in these markets.
- EDO completed its project with NYSERDA in March 2017. A laboratory prototype of the pneumatic driveline was successfully demonstrated, which removes weight from the vehicle body and reduces fuel usage. The company has developed a relationship with a truck body manufacturer and is seeking funding to perform an in-vehicle demonstration.
- NYSERDA is negotiating with Volpe, the National Transportation Systems Center of the U.S. Department of Transportation, to prepare a synthesis of the state-of-the-practice in the area of Smart Mobility and to provide recommendations for NYSERDA Smart Mobility activities.

Projects that were part of the Locomotive Idle Reduction Program (partially RGGI funded)—which installed U.S. Environmental Protection Agency (EPA) SmartWay-verified idle reduction equipment on locomotives—remain in use and are reducing fuel use and emissions from these locomotives while saving the short line railroads money.

4.3.6 Carbon Capture, Recycling, and Sequestration

This program area aims to build the State's capacity for long-term GHG emissions reduction by researching strategies to prevent emissions from releasing into the atmosphere. The program focuses on:

- Assessing and demonstrating carbon capture, reuse, compression, and transport technologies.
- Characterizing and testing the State's geological sequestration potential.
- Supporting the development of carbon capture and sequestration demonstration projects in NYS.

Currently, the program's largest supported project is TriCarb, located in Rockland County, NY. TriCarb is leveraging NYSERDA funding with more than \$8 million of U.S. Department of Energy funds to investigate the potential for geological sequestration in the Newark Basin.

Key accomplishments as of this quarter:

- All lab work and analysis for the TriCarb project is complete. The project is continuing with the reporting phase.

4.3.7 Advanced Buildings

GHG emissions associated with electric and fossil fuel use for buildings are a major contributor of GHG emissions. The goal of the Advanced Buildings Program is to drive technology development and commercialization of innovative building technologies for existing buildings and new construction that offer greater energy efficiency, accelerate the integration of renewables into buildings, offer resiliency, and enable net zero energy building.

Key accomplishments as of this quarter:

- The final report for the Energiesprong/Transition Zero assessment has been completed. The report will be made public and used to drive interest in RetrofitNY.

4.3.8 Competitive Greenhouse Gas Reduction Pilot

This pilot program was initiated to support market-ready projects that reduce GHG emissions at electric generating facilities in the State. The projects selected were based on a combination of requested dollar-per-ton GHG emission reduction, expected level of GHG emission reduction, and the technical merit/replication of the project across the power plant fleet in NYS. It was anticipated that projects could include, but not be limited to, supply-side energy efficiency and advanced controls resulting in cost-effective GHG emissions reductions.

Key accomplishments as of this quarter:

- The Caithness Long Island Energy Center CGGR project completed its first full year of operation and resulted in an 143% improvement in emissions rate reduction post modification. The Con Ed East River Generating Station CGGR project continues to deliver emissions benefits in its second year of operation. In its first year of operation their project resulted in an 83% improvement in emissions rate reduction post modification.
- Due to historic poor participation in this pilot program, the program was terminated and no further requests for proposal will be sought. The two projects awarded under the first program RFP will continue to be managed to verify performance.

4.3.9 Brookhaven National Laboratory Ion Collider

Cornell University (CU) and the Brookhaven National Laboratory (BNL) are designing, building, and commissioning the Cornell-BNL ERL Test Accelerator (CBETA), a 4-pass, 150 MeV electron Energy Recovery Linac that is a prototype for advanced technology to be used in the future BNL eRHIC accelerator.

This pilot-scale facility is located at Cornell University where all field testing/validation will occur. The work is being conducted at Cornell to fully leverage an existing \$32 million facility located on Cornell's campus. This results in significant overall cost savings for the CBETAproject.

BNL will manage all aspects of the initiative and serve as the project contractor. The contract cost to NYSERDA is \$25 million and the project is expected to complete by April 2020.

Timely and successful testing/validation of the pilot-scale ERL will allow BNL to submit a competitive proposal to the Department of Energy to secure an award to build and operate an electron-ion collider (EIC) on BNL's campus that includes a full-scale ERL as a major sub-system component for the future eRHIC accelerator.

Key accomplishments as of this quarter:

- At BNL
 - Finalized designs for Fixed Field Alternating Gradient (FFAG) Magnets and Steel Corrector Frames.
 - Procurement, evaluation, and builds of permanent magnet blocks, FFAG magnet, girder, AFT power supplies, and steel corrector frames are all in process.
- At Cornell University
 - Designed, built, assembled and partially installed girders and beamline components for the 'merger' section of the DC electron source.
 - Finalized injector beam simulations, Main Linac Crymodule (MLC) cooldown process, and Merger beamline connection to the cryogenic system.
 - Planning, prep, safety systems, and controls are all in place for upcoming MLC beam test.

4.4 Community Clean Energy

4.4.1 Climate Smart Communities

Established in 2009, the Climate Smart Communities Program is comprised of a network of local governments across the State that have committed, by adopting the Climate Smart Communities Pledge, to reduce GHG emissions and better prepare for unavoidable changes in climate. In addition to NYSERDA, the Climate Smart Communities program works in partnership with five other State agencies: The DEC, the Department of State, the Public Service Commission, the Department of Transportation, and the Department of Health.

In March 2011, NYSERDA issued a competitive solicitation to select contractors for a three-year Climate Smart Communities Regional Coordinators Pilot Program. The goal of this pilot program is to create and implement a strategic plan for engaging local governments in the Climate Smart Communities program, producing measurable results for climate protection and adaptation within each region, and developing important elements of guidance for local governments. The main outreach and technical assistance components of the three-year pilot program ended in November 2015. NYSERDA will continue to offer similar outreach and technical assistance to communities through the new Clean Energy Communities program which launched in August of 2016. In the meantime, NYSERDA is working with utilities to ensure that communities have access to their aggregated energy use data for clean energy and sustainability planning purposes.

Key accomplishments as of this quarter:

- NYSERDA is continuing to work with the Joint Utilities to develop a path forward to building out the Utility Energy Registry, a statewide platform designed to collect aggregated energy use data for communities on an ongoing basis.

4.4.2 Economic Development Growth Extension Program

The Economic Development Growth Extension Program (EDGE) is now closed. Refer to Appendix F: Closed RGGI-Funded Programs and Completed Evaluations for more information.

4.4.3 Cleaner, Greener Communities

A process evaluation of NYSERDA's Cleaner, Greener Communities program was completed in two waves and finalized in the second quarter of 2016. Wave One of this evaluation research was completed revealing a number of opportunities for NYSERDA to help regions implement their Phase I plans and achieve their sustainability goals. Wave Two revealed opportunities for communities to overcome common barriers that prevent engagement in activities involved with efficiency and sustainability as well as to encourage further investment in sustainability across the State's diverse regions. The process evaluation encompassing the two research waves will be posted to NYSERDA's website in the fourth quarter of 2016.

Governor Cuomo announced the Cleaner, Greener Communities program in his 2011 State of the State address. In coordination with the Climate Smart Communities program, this program provides support for development and implementation of a variety of sustainability strategies to help ensure that the State's ongoing investments in infrastructure aid in moving communities, and NYS as a whole, toward a self-sustaining, more environmentally sound future. The program encourages communities to use public-private partnerships and develop regional sustainable growth strategies in areas such as energy efficiency, renewable energy, low-carbon transportation, and other carbon reductions. The program emphasizes activities associated with smart growth, creation of green jobs, building green infrastructure, investing in environmental justice communities, and strengthening environmental protection.

Key accomplishments as of this quarter:

- All Cleaner, Greener Communities Round 1 awarded projects have been executed for a total of 45 contracts, which include comprehensive planning activities and large-scale sustainability projects.
- NYSERDA executed one additional contract for Cleaner, Greener Communities Round 2 awarded projects for a total of 43 executed contracts, which include comprehensive planning activities and large-scale sustainability projects. Two contracts are still under negotiation.
- NYSERDA received 11 new applications for incentives to 11 municipalities for adoption of streamlined permitting processes for solar electric systems or electric vehicle supply equipment (EVSE).
- NYSERDA is negotiating contracts for the third round of funding (\$25 million) for Phase II of the Cleaner, Greener Communities program, which includes 17 projects. Eleven contracts have been executed.

4.4.4 Regional Economic Development and Greenhouse Gas Reduction Program

The Regional Economic Development and Greenhouse Gas Reduction (REDGHG) Program supports projects identified as priority initiatives consistent with Governor Cuomo's REDC initiative and are not otherwise provided financial support by other NYSERDA programs or initiatives. REDGHG provides cost-share funding for energy efficiency, clean and renewable energy, and/or innovative carbon abatement projects that address the regional priorities of the REDCs, result in strategic investments, and build the capacity within the region to participate in the State's clean energy economy. REDGHG focuses on several end uses, including transportation, manufacturing and industrial process, buildings, agriculture, municipal processes, renewable electric generation, and district energy.

Key accomplishments as of this quarter:

- A total of 15 projects received awards from program inception through March 31, 2017.

4.4.5 Reforming the Energy Vision Campus Competition Program

Governor Cuomo’s Energy to Lead Competition is a competitive solicitation issued by NYSERDA that challenges colleges and student-led coalitions across the State to develop and implement plans to advance clean energy on their campuses or in their local communities in new ways. The three groups that propose the best solutions for an innovative clean energy project in energy efficiency, renewables, or GHG emission reduction will win \$1 million each to help implement their plans. The RFP for the Energy to Lead Competition was released January 22, 2016. Three informational webinars were held and NYSERDA posted answers to frequently asked questions on their website.

Teams are to submit plans for projects demonstrating innovations in one or more of the following:

- Business model: a new way of paying for a project, lowering costs, or creating new revenue streams.
- Community engagement: an approach to build on an on-campus project to advance clean energy in the surrounding community.
- Curriculum integration: a model for integrating project construction, implementation, or operations into student coursework, workforce training, or internships.

Proposals for the Energy to Lead Competition were due April 4, 2016. NYSERDA received 40 proposals from 33 institutions. The three winning institutions and their proposed projects were announced on May 16, 2016, and are as follows:

- Bard College’s “Micro Hydro for Macro Impact” project will use local dams to develop micro hydropower. The project is expected to avoid 335 metric tons of GHG emissions annually, equivalent to taking 70 cars off the road.
- The University at Buffalo will implement the “Localizing Buffalo’s Renewable Energy Future” project, which will install 100 MW of clean solar power throughout the city. The implementation involves partnership with the City of Buffalo and several not-for-profit and educational partners.
- Broome Community College’s “Geothermal Learning Laboratory” project includes installing a closed loop geothermal system that uses the heat energy stored in the earth; real-time, public data-sharing about the system’s operations; and development of hands-on, geothermal material for secondary schools.

Key accomplishments as of this quarter:

- No significant change in accomplishments this quarter.

4.4.6 Clean Energy Communities

In the Fall of 2015, NYSERDA, through the third and final round of the Cleaner, Greener Communities program, awarded three contracts for regionally-based outreach and technical assistance services to support NYSERDA's new Clean Energy Communities program. These services expand upon the efforts undertaken previously through Climate Smart Communities and Economic Development Growth Extension. In addition, communities that receive the Clean Energy Communities designation will be eligible to apply for grants to implement innovative clean energy projects.

The statewide Clean Energy Communities program, which is co-funded through the Clean Energy Fund, supports local governments with a common platform and the coaching, facilitation, technical assistance, and expertise for implementing the local-level policies and planning needed to drive future clean energy market activities. These local-level actions roll up and help to deliver the regional sustainable growth strategies encouraged by the Cleaner, Greener Communities program, consistent with the regional sustainability and economic development plans. The Clean Energy Communities program also complements the DEC's Climate Smart Communities Certification Program by providing assistance to communities working toward certification.

Key accomplishments as of this quarter:

- Clean Energy Communities Coordinators helped 135 communities complete and submit 316 High Impact Actions through the Clean Energy Communities program.
- Twenty-eight communities completed at least four High Impact Actions and became designated Clean Energy Communities.

4.4.7 Community Energy Engagement

This year NYSERDA plans to launch its Community Energy Engagement program, which is cofounded through the Clean Energy Fund, to build awareness and increase uptake of local renewable and energy efficiency solutions. The program will deploy trusted, local organizations to conduct energy awareness and education with residential, multifamily, and small business customers. The program will place an

emphasis on increasing the amount of funding and financing leveraged for the completion of clean energy projects. Additionally, the initiative will focus on improving energy affordability and increasing deployment of distributed energy resources for community members of all income levels, with a focus on low-to-moderate income (LMI) households and communities.

NYSERDA anticipates launching this initiative in summer 2017 with competitively selected organizations providing services in each of the 10 Economic Development Regions, as defined by Empire State Development. These organizations will deploy trusted, local Community Energy Advisers who engage with residents, small businesses, and multifamily building owners on how to reduce energy use and GHG emissions. By engaging directly with residents, small business, and multifamily building owners, Community Energy Advisers will help increase energy literacy and local understanding of the value of clean energy and reduced energy use. The face-to-face approach and focus on LMI residents and communities will ensure the Community Energy Engagement program makes the greatest impact.

Key accomplishments as of this quarter:

- NYSERDA's Community Energy Engagement Program is under development, with a RFP to competitively select organizations expected to be released in Q2 2017.

Success story 2: New York State launches Community Energy Engagement program

RGGI funds are being used for the State's Community Energy Engagement program, which will support organizations that can provide locally-based energy awareness and education services in communities across New York State. The organizations will work at the local level to develop ways of increasing the adoption rates for clean energy products and services for residential, multifamily, and small business customers, with an emphasis on LMI households and communities.

4.5 Green Jobs - Green New York

GJGNY provides funding for energy assessments, low-cost financing for energy upgrades, and technical and financial support to develop a clean energy workforce. GJGNY is a statewide effort to strengthen communities through energy efficiency and uses constituency-based organizations (CBOs) to support program outreach in underserved communities. GJGNY enables New Yorkers to make a significant

difference in homes, businesses, and neighborhoods—making them more comfortable, sustainable, and economically sound. GJGNY is administered by NYSERDA and made available by the Green Jobs - Green New York Act of 2009. The GJGNY 2016 Annual Report, issued in September 2016, presents financial data for the approved GJGNY programs through June 30, 2016.

The Act allocated \$112 million in funding from the State's share of the RGGI to support GJGNY. In consultation with the GJGNY Advisory Council, NYSERDA sub-allocated the funding, including interest earnings, across the various program components prescribed by the GJGNY Act. In addition to the RGGI funds, NYSERDA received a U.S. Department of Energy Better Buildings grant in the amount of \$40 million, of which \$18.6 million supports GJGNY financing or outreach. On occasion, NYSERDA also supplemented the GJGNY program funding with additional RGGI funds to ensure uninterrupted program services when needed.

By far the greatest demand for GJGNY funding generates from the residential revolving loan fund, with issued loans totaling its original allocation in less than three years. The residential revolving loan fund is now maintained primarily through a combination of short-term financing and proceeds from the sale of bonds. More details regarding the bond issuance process are in the Annual Report.

Even though NYSERDA has success using bonds to support the residential revolving loan fund, because of the subsidized interest rate offered on a rapidly growing number of GJGNY loans and the inability to include higher-risk loans in the portfolio of loans pledged for securities, the residential loan fund could not continue operating as it had previously. Reduced RGGI auction proceeds and the need to balance GJGNY program needs with other initiatives to achieve the State's goals for reduced GHG emissions limit NYSERDA's ability to fully mitigate loan fund losses, which have increased dramatically. The need to address the unsustainability of the residential loan fund became critical in 2015. Working with the Advisory Council, a plan was developed to implement higher interest rates for consumers with sufficient household incomes and meet traditional market-based underwriting criteria. The need for funding to support overcollateralization is by far the greatest for this sector, particularly for those obtaining loans for solar photovoltaic projects. The interest rates offered to these customers will reflect the actual cost of administering the loans, while continuing to offer discounted rates to consumers lacking access to alternative financing options. The interest rate changes, which were implemented on September 1, 2016, along with the occasional addition of a limited amount of RGGI funds are expected to adequately maintain the residential loan fund.

Funding allocated to individual components of GJGNY is nearly fully committed or expended. In order to maintain required elements of the Act, NYSERDA included GJGNY initiatives in the planning of the Clean Energy Fund.⁶ NYSERDA is working with stakeholders to incorporate lessons learned from GJGNY into Clean Energy Fund planning to ensure benefits from the GJGNY initiatives, particularly those benefitting the LMI sector, continue.

4.5.1 Assessments

4.5.1.1 One- to Four-Family Residential Buildings Program Assessments

HPwES is a comprehensive energy efficiency services program for existing one- to four-family homes. Participating Building Performance Institute GoldStar contractors conduct comprehensive home energy assessments and upgrades. Free and reduced-cost home energy assessments are available to homeowners in NYS through GJGNY funding, which drives increased participation in this program and cuts additional GHG emissions.

Effective for new applications submitted as of March 1, 2016, GJGNY funded audits in territories not covered by the Clean Energy Fund, specifically in PSEGLI and municipal electric territories. NYSERDA's Single Family Residential programs are using Clean Energy Funds for energy assessments in participating electric utility territories and are reported separately.

Key accomplishments as of this quarter:

- A total of 586 assessments were completed, bringing the total to 99,018 residential GJGNY assessments completed with RGGI funds; 92,003 (93 percent) were provided at no cost to the customer.
- Of the program, cumulative 32,056 completed residential units served through HPwES resulting from a GJGNY assessment and/or GJGNY financing, 11,062 (35 percent) units are associated with income-qualified Assisted HPwES customers.
- CBOs assisted with the completion of 2,618 units, or seven percent of all completed GJGNY residential retrofits.

⁶ The Clean Energy Fund, one of Reforming the Energy Vision's three strategic pillars, is designed to deliver on the State's commitment to reduce ratepayer collections, drive economic development, and accelerate the use of clean energy and energy innovation. It will reshape the State's energy efficiency, clean energy, and energy innovation programs. Visit <http://www.nysERDA.ny.gov/About/Clean-Energy-Fund> for more details regarding Clean Energy Fund planning.

4.5.1.2 Multifamily Performance Program Assessments

Through GJGNY, the MPP provides financing and co-funding for comprehensive energy assessments and the development of an Energy Reduction Plan, serving market-rate and LMI residential buildings with five or more units to increase adoption of clean energy in NYS. The needs of the multifamily sector are addressed by working with developers, building owners, and their representatives to improve the energy efficiency, health, safety, and security of multifamily residential buildings, targeting potential participants who are committed to the implementation of energy-related improvements. NYSERDA offers incentives to install eligible measures outlined within the Energy Reduction Plan. Each incentive is subject to funding availability from the EEPS or RGGI. Per-unit incentives are available for projects predicted to achieve the 15 percent energy reduction threshold. Additional performance payments apply to eligible projects that predict and achieve savings of more than 20 percent.

Key accomplishments as of this quarter:

- A total of 324 assessments was completed through March 31, 2017; of these, 56 percent are associated with affordable housing.
- Of the program's cumulative 37,587 residential units served with installed measures, 20,933 (56 percent) units are associated with affordable housing.

4.5.1.3 Small Commercial Energy Efficiency Program Assessments

The GJGNY Small Commercial Energy Efficiency Program stopped accepting applications on December 31, 2016 and will wrapped up all program activities within the first quarter of 2017. This program offered energy assessments and technical assistance to help small businesses and not-for-profit organizations improve their energy efficiency and reduce their energy costs to support the goal of increasing clean energy project adoption statewide. The program offered free energy assessments, along with technical assistance, to help identify economically viable improvements that may yield substantial annual energy savings. GJGNY offered energy assessments to small businesses and not-for-profits with an average electric demand of 100 or less and 10 employees or fewer. Regional firms were competitively selected by NYSERDA to provide assessments and technical assistance within this program opportunity.

Key accomplishments as of this quarter:

- A total of 119 new energy assessments was completed during this quarter, bringing the total number of completed assessments to 3,294.
- The 2015 Small Commercial Energy Efficiency Program Impact Evaluation reported 44 percent of the energy savings recommended through program audits were implemented, resulting in an estimated total of 1,823 completed projects through June 30, 2017.

4.5.2 Financing

4.5.2.1 One- to Four-Family Residential Buildings Program Financing

GJGNY financing is available to participants in HPwES to finance the installation of recommended energy efficiency improvements with the possibility of reimbursement through energy savings. Net-metered technologies, including solar electric systems, and solar thermal systems are also eligible for GJGNY financing. In addition, GJGNY Financing is available for participants in the Renewable Heat NY Program. The Smart Energy Loan and the innovative On-Bill Recovery Financing Program (OBR) Loan are the two low-interest rate financing options available through GJGNY, which enable more projects, resulting in greater reductions of GHG emissions.

Key accomplishments as of this quarter:

- A total of 19,827 loans has been issued totaling \$238.7 million.
- Assisted HPwES customers make up 33.6 percent of the Home Performance loans dispensed, representing 25.0 percent of the total loan funds.
- Through March 31, 2017, a total of 6,978 OBR Loans have closed, valued at approximately \$97.8 million.
- Through March 31, 2017, of the total 19,827 loans closed, 6,327 are solar electric loans valued at \$107.3 million.

4.5.2.2 Multifamily Performance Program Financing

Launched in 2011, financing through the MPP under GJGNY includes programs and incentives for owners, facility managers, developers, and condo/co-op boards of multifamily buildings with five or more units to support the goal of increased clean energy adoption statewide. These programs make it easier to assess, fund, implement, and measure energy efficiency upgrades that improve building performance and reduce costs. Participation loans are available through the program in which a participating lender issues a loan to a multifamily building owner for a qualifying energy efficiency project, with NYSERDA participating in the funding of 50 percent of the loan (up to a maximum of \$5,000 per unit or \$500,000 per building) at two percent interest, and the lender sets the interest rate on their share of the loan.

Key accomplishments as of this quarter:

- Through March 31, 2017, 23 loans closed totaling \$12.1 million. NYSERDA's share of the total loan value is \$3.9 million.

4.5.2.3 Small Commercial Energy Efficiency Program Financing

The GJGNY Small Commercial Energy Efficiency Program offers low-interest financing to help small businesses and not-for-profit organizations improve their energy efficiency and reduce their energy costs to support the goal of increased clean energy adoption statewide. In June 2011, NYSERDA launched the Participation Loan product to small business and not-for-profit customers. NYSERDA provides 50 percent of the loan principal, up to \$50,000, at two percent interest and the participating lender provides the remaining loan principal at its market interest rate. In June 2012, NYSERDA launched the OBR Loan for small business and not-for-profit customers, making a NYSERDA loan available for up to \$50,000 at 2.5 percent interest to finance recommended energy efficiency improvements. Customers can then repay their loan through a charge on their utility bill. Fourteen lenders have agreed to offer either Participation Loans or OBR loans.

Key accomplishments as of this quarter:

- A total of 34 OBR Loans has been closed with a total value of \$985,560, which represents 92 percent of the total financing value of \$1,071,159.
- A total of 27 Participation Loans has closed with a value of \$1,844,416. NYSERDA's share of the total value is \$868,998.

4.5.3 Workforce Development, Outreach, and Marketing

4.5.3.1 Workforce Development

The GJGNY Workforce Training and Development (WFD) initiative complements other NYSERDA and New York State Department of Labor programs targeted at preparing individuals for energy efficiency, solar thermal, and solar electric careers in NYS. WFD programs also help to build the State's capacity for long-term carbon reduction and facilitate energy education programs that will help build a clean energy future. Specifically, WFD efforts under GJGNY seek to expand energy-specific content in NYS Registered Apprenticeship and third-party accredited building trades programs. Expectations are to increase access to technical training workshops for skills enhancement and certification, and to bridge the gap between training and employment through on-the-job training incentives for businesses

seeking to hire and train new workers while reaching out to low-income communities to expand training opportunities. All of NYSERDA's GJGNY-funded training partnership agreements have concluded. From the program's inception through 2016, 3,846 New Yorkers were trained in courses including solar thermal installation, introductory solar electric training, advanced air sealing, pressure diagnostics, Building Performance Institute certification courses, and oil heat technology.

4.5.3.2 Outreach and Marketing

GJGNY provides for community-based outreach, enabling one-to-one assistance with the process of participating in the program to deliver services in underserved communities. GJGNY provides outreach services in targeted communities through CBOs, which locate residents, businesses, not-for-profits, multifamily building owners, and potential workforce candidates to participate in the program. The expectation for this community-based approach, combined with statewide marketing, is an increase the reach of the program, particularly among disadvantaged populations and those not traditionally participating in energy efficiency programs. Participating in the programs empowers communities in their transition toward sustainability while producing lower carbon emissions.

Key accomplishments as of this quarter:

- Finger Lakes region: PathStone Corporation continues to attend health and job fairs organized by other entities to reach rural markets that match their targeted demographic. It has taken the initial steps towards creating its own aggregation pilot in coordination with the City of Rochester. The CBO has agreed with the city to serve as the initial intake point for its rehabilitation and emergency repair grant program. In an effort to reach rural homeowners, the CBO has become a member of the Genesee Interagency Council, the Wyoming Interagency Council, and the Livingston County Interagency Council.
- El Puente hosted or attended a total of fifteen outreach events, to help promote NYSERDA's energy efficiency programs throughout several neighborhoods in Brooklyn. El Puente has also reported that it has begun to reach out to owners of commercial properties and multifamily buildings. In addition to conducting outreach at three separate community board meetings (CB 11, CB 14, and CB 16), the CBO has held its own homebuyer's course to promote energy efficiency as well.
- In Queens, Neighborhood Housing Services (NHS), Jamaica's networking opportunity, included conducting a door-knocking outreach campaign in the Elmhurst and Corona neighborhoods; the initiative targeted one to four family homeowners and resulted in approximately five dozen leads. A promotional mailing campaign was executed in February which reached approximately 520 households in Queens Village and South Jamaica.

- The Bronx was home to five events including three civic association events attended by representatives from Sustainable South Bronx (SSBx), netting more than three dozen potential referrals across several market sectors: homeowners, multifamily buildings owners, and businesses. They also held a homeowner’s resource fair with the NYC Housing Preservation and Development (HPD) agency to connect them to property owners.
- People United for Sustainable Housing (PUSH) Buffalo held thirteen outreach events throughout the greater Buffalo area, two of which piggybacked off Small Business Administration meetings and wellness fairs in Erie County. The CBO also engaged with several of its past clients, deemed program “ambassadors,” to recruit them to host future outreach events that encourage friends and neighbors to participate in NYSERDA’s energy efficiency offerings. In addition to conducting low-income outreach at a HEAP event at a local library, the CBO promoted small business efficiency at Buffalo State College while also planning general outreach for the Lackawanna Love Day.
- In Richmond County, Neighborhood Housing Services of Staten Island (NHSSI) reached out to clients that had been inactive for a year or more in an attempt to spur interest in homeowners that have since stalled in the HPwES and Assisted HPwES programs. After conducting a home maintenance training workshop in late February, nine clients received certificates of completion; the CBO was able to find seven new leads partly due to participants in this training session. The CBO has also made efforts to conduct outreach at its in-house homeowner orientation classes.
- Affordable Housing Partnership (AHP) of the Capital Region continues to gather leads through its homeownership informational website as well as its long-running homeowner workshops and presentations. The CBO also conducted several outreach events with municipalities (the City of Albany) as well as an informational session conducted for employees of the University at Albany and an outreach at the Albany Community Resource Fair on March 25.
- North Country region: Adirondack North Country Association (ANCA) has been performing outreach workshops at a regional junior high school that has resulted in nearly two dozen parents applying to NYSERDA energy efficiency programs. The CBO has also been working with *Northern New York Business Magazine* to identify twenty community leaders under forty years old; the goal is to work with the magazine’s editors to assemble a group for a workshop and for energy assessments. The CBO believes that these local leaders would eventually help convince other homeowners in the Adirondacks to take advantage of NYSERDA program offerings. ANCA is also reaching out to the hundreds of businesses that had received a NYSERDA Small Commercial Energy Audit.
- Mid-Hudson region: Rural Ulster Preservation Corp. (RUPCO) has relied on its strong relationships with the local utility (Hudson Gas & Electric), Energize NY, as well as various community-level Solarize programs operating in the territory. As a result of these partnerships, the CBO identified 69 homeowners who may be interested in HPwES or Assisted HPwES. RUPCO also made use of social media outreach, publishing nearly a dozen posts that were viewed by almost sixteen hundred constituents—undoubtedly contributing to the higher-than-average number of leads collected.

- Southern Tier: During the first quarter, Public Policy and Education Fund – Southern Tier (PPEF) continued its efforts to target populations eligible for NYSERDA energy efficiency programs through newspaper ads, tabling events, and radio interviews. PPEF continues to use the media market in the Southern Tier region. For example, a number of informational articles have been published in various regional publications including the *Corning Leader* and the *Oneonta Star*, combined with online outreach conducted through social media sites such as Facebook, the CBO has attempted to expand outreach to seldom targeted areas of the region.

4.6 NY Green Bank

NY Green Bank, a division of NYSERDA, is a \$1 billion investment vehicle established to attract private sector capital to accelerate clean energy deployment in NYS. NY Green Bank works to increase the size, volume, and breadth of clean energy investment activity throughout the State, expand the base of investors focused on NYS clean energy, and increase clean energy participants' access to capital. To do so, NY Green Bank collaborates with the private sector to develop transaction structures and methodologies that overcome typical clean energy investment barriers. NY Green Bank focuses on opportunities that create attractive precedents, standardized practices, and roadmaps that capital providers can willingly replicate and scale. As funders “crowd in” to a particular area within the clean energy landscape, NY Green Bank moves on to other areas that have attracted less investor interest.

To solve client problems in real time and address capital provider needs, NY Green Bank operates comfortably within private sector time horizons and commercial norms. Visit www.greenbank.ny.gov for more information on NY Green Bank's growing portfolio and how industry participants and capital providers can do business with NY Green Bank.

Key accomplishments as of this quarter:

- Executed and closed six transactions totaling \$40.6 million contributing to NY Green Bank's overall investments to date of \$346.1 million across various technologies and financing arrangements.
- Continued to grow NY Green Bank revenues.
- Through ongoing business development activities, achieved an active pipeline of potential investments, which are progressing towards closing at \$591.7 million by end of the quarter.
- Filed quarterly Metrics Report with the Public Service Commission on February 15, 2017.

4.7 Program Evaluation

Several RGGI evaluation studies are underway or in the planning stages as of the first quarter of 2017. The study objectives and timing are discussed in the following sections. Other study plans are also in development and will be detailed in future quarterly reports. The following types of evaluation activities are being performed:

- **Impact Evaluation** measures the outcomes and benefits of a program, calculates the cost-effectiveness of the program, and compares the outcomes to the program goals.
- **Market Evaluation** develops an understanding of markets and market actors, provides information to support program design and delivery, and tracks changes in markets over time.
- **Process Evaluation** reviews oversight and operations, gauges customer satisfaction, and recommends process and efficiency improvements.
- **Logic Model Reports** inform evaluation work by documenting the relationships between program activities; activity outputs; and the short, medium, and long-term outcomes the program intends to induce.
- **Evaluation Readiness Reviews**⁷ help identify whether a program has various factors in place that will ensure an evaluation is justified, feasible, and likely to provide useful information.

In addition, two major baseline studies received support from RGGI evaluation funds and are described herein.

4.7.1 Evaluation of Energy Efficiency and Other Deployment Programs

Residential Non-Energy Impact Study: A study was conducted to identify and begin to quantify measurable non-energy effects from residential programs, including HPwES and the Green Residential Building Program. This study was jointly supported with RGGI and other NYSERDA funds. The study was finalized in Q1 2017 and will be posted to NYSERDA's website soon.

Wastewater Energy Efficiency Program: An impact evaluation of the Wastewater Efficiency Program was completed in Q1 2017. The Program provided objective and customized energy-related information and opportunities to customers that targeted the customer's specific energy and business needs. The impact evaluation confirmed the study-recommended savings that customers adopted. The study will be available on NYSERDA's website soon.

⁷ Formerly known as Evaluability Assessment.

4.7.2 Evaluation of Technology/Business Development and Research Programs

Advanced Transportation Research: A logic model for this program was completed in Q3 2015 and published on the NYSERDA website.⁸ A Market Characterization of the transportation market in NYS was initiated in Q1 2016 and is expected to be completed in Q2 2017.

Industrial Innovations: Evaluation plans for this program may be considered in the future.

Clean Energy Business Development (CEBD): A market characterization is nearing completion with the edits incorporated into the final report. This report is expected to be completed by the end of the Q2 2017.

Community Solar NY: Work is underway on the Solar Balance of System Baseline Cost Study with an expected completion date in Q2 2017.

Power Systems Program: An Impact Evaluation is underway for the Power Systems Program with an expected completion date in Q2 2017.

⁸ NYSERDA Transportation Program Logic Model Report, nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Transportation-LM-Report.pdf

4.7.3 Baseline Studies

NYSERDA has undertaken two major baseline studies to assess residential and commercial markets across a broad range of customer segments and energy measures. The goals of these studies are to 1) better understand building stock and associated energy use, including saturations of energy-consuming measures, penetrations of energy-efficient equipment, building characteristics and energy management practices and 2) use this information to estimate the technical, economic and achievable energy efficiency opportunities in NYS in the next three and five years. Although these large studies are supported by SBC funding, RGGI funds are supplementing the budget to allow for robust data collection on fuel measures.

The Residential Baseline study was completed in Q4 2014. The final report is available on NYSERDA's website and the data set is available on Open NY.⁹ The Commercial Baseline study is underway with an anticipated completion date of 2018.

⁹ Residential Statewide Baseline Study of New York State (nyserda.ny.gov/Residential-Statewide-Baseline-Study-of-New-York-State.aspx) and the associated data on Open NY (<https://data.ny.gov/en/browse?q=RSBS>).

Appendix A: Savings Calculations Methodology

This appendix describes the general methods and assumptions used to calculate the energy savings, emission reductions, bill savings, and cost-effectiveness metrics presented in this report.

A.1 Energy Savings

Annual energy savings values are based on the past performance of publicly funded energy efficiency programs and information obtained from various sources of technical literature.

A.2 CO₂ Reductions

Emissions factors translate the energy savings data into annual GHG emissions reduction values.

The GHGs evaluated in the report include carbon dioxide, methane, and nitrous oxide. Because each of these gases has a different global warming potential,¹⁰ emissions for gases other than carbon dioxide are converted into carbon dioxide equivalent units (CO₂e) through multiplication with their appropriate Intergovernmental Panel on Climate Change (IPCC) global warming potential value,¹¹ shown in Table A-1.

Table A-1. Global Warming Potentials

These values represent a 100-year time horizon.

Source: Intergovernmental Panel on Climate Change. 1995. Second Assessment: Climate Change.

Gas	Global Warming Potential
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous Oxide (N ₂ O)	310

¹⁰ A global warming potential is a measure that estimates how much a given mass of a GHG contributes to global warming. Calculations span over a specific time interval, which is 100 years for the IPCC Second Assessment Report values.

¹¹ Intergovernmental Panel on Climate Change. 1995. Second Assessment: Climate Change 1995. According to EPA guidance, this inventory uses potentials from the IPCC Second Assessment report, rather than values from the more current Third Assessment: Climate Change 2001 report. The DEC regulation Part 242 1.2 (49) uses the Third Assessment values. Reconciliation between these two methodologies will be investigated as part of the program implementation and evaluation process.

NYSERDA uses the emission factors shown in Table A-2 to calculate emissions from on-site fuel combustion derived from the EPA emission coefficients. The CO₂e values represent aggregate CO₂, CH₄, and N₂O emissions. If a program covers more than one sector, then the estimated reduction is based on a calculated average emission factor for the affected sectors.

Table A-2. Fuel Combustion Emission Factors by Sector¹²

	Transport (lb CO₂e/MMBtu)	Residential (lb CO₂e/MMBtu)	Commercial (lb CO₂e/MMBtu)	Industrial (lb CO₂e/MMBtu)
Coal	N/A	224.8	211.4	203.7
Natural Gas	117.2	117.2	117.2	114.5
#2 Oil/Distillate/Diesel	163.0	162.9	162.9	162.9
#6 Oil/Residual	N/A	N/A	166.0	166.0
Kerosene	N/A	161.2	161.2	161.2
Propane	136.1	136.1	136.1	136.1
Gasoline	158.0	N/A	N/A	N/A
Aviation Fuel	159.2	N/A	N/A	N/A
Wood	N/A	18.2	18.2	4.1
Steam	N/A	106.1	106.1	N/A

¹² Beginning with Q4 2016, NYSERDA updated emission factors for natural gas, #2 oil, #6 oil, kerosene, propane, wood, and steam to be consistent with emission factors used in the updated NYS Greenhouse Gas Inventory (<https://www.nyserdera.ny.gov/About/Publications/EA-Reports-and-Studies/Energy-Statistics>). These factors are derived from EPA’s February 2016 State Inventory Tool release (<https://www.epa.gov/statelocalclimate/state-inventory-and-projection-tool>). Steam emission factors have been updated to be consistent with New York City’s updated Greenhouse Gas Inventory (http://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/NYC_GHG_Inventory_2014.pdf).

A marginal emission factor of 1,160 pounds of CO₂e/MWh estimates emission reductions associated with electricity use reductions for all sectors.¹³ Although electricity savings may not lead to near-term emission reductions under the RGGI CO₂ cap, savings will potentially reduce imports of electricity to NYS; the demand for CO₂ allowances, leading to a possible future reduction in the cap; and the carbon-footprint of end-users, as they will be responsible for a smaller percent of the emissions associated with electricity production.

A.3 Bill Savings

Annual bill savings values for each program are estimated by multiplying the energy savings by sector-specific fuel price data.

Table A-3 shows fuel prices by sector. Electricity and natural gas prices represent average values for six service territories weighted by the percentage of RGGI projects located in each utility area, excluding basic service charges.

Table A-3. Fuel Prices by Sector^a

Sector	Electricity (\$/kWh)	Natural Gas (\$/MMBtu)	Fuel Oil / Distillate (\$/MMBtu)	Propane (\$/MMBtu)
Residential	0.18	8.57	25.59	34.21
Commercial	0.16	5.09	24.51	26.04
Industrial	0.12	5.09	23.39	30.32
Transportation	0.05	N/A	27.58	N/A
C&I	0.14	5.09	23.95	28.18

¹³ With the submittal of its Clean Energy Fund Investment Plan Budget Accounting and Benefits Chapter on February 22, 2016, NYSERDA adopted the NYS Public Service Commission's recommendation in its January 21, 2016 Order Establishing the Benefit Cost Analysis Framework that New York's GHG emissions factor methodology shift from an average grid emission profile to a marginal grid emission profile. Due to this shift, beginning in 2016, New York's factor to calculate GHG emissions reductions has changed from 625 pounds CO₂e/MWh to 1,160 pounds CO₂e/MWh. The emissions reductions calculated for this report reflect the new factor of 1,160 pounds CO₂e/MWh.

Table A-3 continued

Sector	Residual (\$/MMBtu)	Kerosene (\$/MMBtu)	Wood (\$/Cord)	Coal (\$/Ton)
Residential	N/A	28.13	7.83	N/A
Commercial	17.41	28.13	N/A	5.78
Industrial	17.41	24.56	N/A	4.74
Transportation	N/A	N/A	N/A	N/A
C&I	17.41	26.35	N/A	5.26

For electricity and natural gas, prices are an average of July 2012 and January 2013 prices as reported by the NYS Department of Public Service billing data
<http://www3.dps.ny.gov/W/PSCWeb.nsf/All/C56A606DB183531F852576A50069A75D?OpenDocument>
 For all other fuel types, prices reflect 2011 retail prices as reported in NYSERDA's *Patterns and Trends-NYS Energy Profiles: 1997-2011* (NYSERDA 2013).

Table A-4. Program Measure Life Assumptions

Average savings-weighted measure life, shown by program, is used to calculate expected lifetime benefits.

Program	Electricity Measure Life	Fuels Measure Life
GJGNY - Single-Family Residential Assessment Component	18	24
GJGNY - Single-Family Residential Loan Component	19	23
GJGNY - Multifamily Residential Assessment Component	13	15
GJGNY - Small Commercial Loan Component	13	21
RGGI - Multifamily Performance Program	13	15
RGGI - Multifamily Carbon Emissions Reduction Program	N/A	13
RGGI - EmPower New York	N/A	24
RGGI - Home Performance with ENERGY STAR®	18	24
RGGI - Green Residential Building Program	18	24
RGGI - Solar Thermal Incentive Program	N/A	20
RGGI - Low-rise Residential New Construction Program	18	24
RGGI - NYSERDA Solar Photovoltaic Initiative	25	N/A
RGGI - Cleaner, Greener Communities	15	15
RHNY - Boilers	20	20
RHNY - Pellet Stoves	20	20
LIPA Efficiency	18	NA
LIPA Photovoltaic and Efficiency Initiative	25	N/A
Regional Economic Development and GHG Reduction	18	18

Appendix B: Former Program Names

Table B-1. Former Program Names

Current Program Name	Formerly Known As
Residential Efficiency Services	Residential Space and Water Heating
Municipal Water and Wastewater	Water and Wastewater Efficiency; Water and Wastewater Energy Efficiency
Industrial Innovations	Industrial Process Improvements; Advanced Building Systems and Industrial Process Improvements
Transportation Research	Advanced Transportation Development
Clean Energy Business Development	Clean Technology and Industrial Development
Power Systems	Advanced Power Technology Program (APTP)

Appendix C: Summary of Portfolio Benefits

Table C-1. Summary of Portfolio Benefits

Quarter End Date	Quarter	Cumulative Annual Installed MMBtu	Cumulative Annual Installed MWh Saved	Cumulative Annual Installed MWh Generated	Cumulative Annual Tons of CO ₂ e Mitigated	Cumulative Annual Bill Savings Realized by Participating Customers (\$)
6/30/2010	Qrt 2	3,409	4,371	-	2,100	700,000
9/30/2010	Qrt 3	47,332	4,371	-	5,630	1,200,000
12/31/2010	Qrt 4	91,471	838	4,316	9,310	2,900,000
3/31/2011	Qrt 1	115,763	1,213	3,903	10,950	2,700,000
6/30/2011	Qrt 2	152,501	5,233	3,992	15,553	4,000,000
9/30/2011	Qrt 3	197,622	6,473	4,205	17,874	4,600,000
12/31/2011	Qrt 4	256,980	8,126	4,218	23,805	6,000,000
3/31/2012	Qrt 1	318,273	13,363	4,218	31,194	7,800,000
6/30/2012	Qrt 2	411,462	13,702	4,248	40,368	9,400,000
9/30/2012	Qrt 3	519,144	15,023	4,278	51,353	10,700,000
12/31/2012	Qrt 4	577,025	16,895	4,345	56,764	12,000,000
3/31/2013	Qrt 1	651,564	18,206	4,305	60,349	16,300,000
6/30/2013	Qrt 2	770,186	20,038	4,386	69,068	18,100,000
9/30/2013	Qrt 3	889,027	24,385	16,710	96,916	21,200,000
12/31/2013	Qrt 4	985,379	26,545	16,752	100,934	23,100,000
3/31/2014	Qrt 1	1,089,306	28,206	16,752	108,844	25,500,000
6/30/2014	Qrt 2	1,174,186	28,697	20,331	115,852	27,700,000
9/30/2014	Qrt 3	1,301,751	32,481	20,331	127,880	31,600,000
12/31/2014	Qrt 4	1,503,898	115,024	44,470	178,048	53,400,000
3/31/2015	Qrt 1	1,614,354	120,453	54,642	191,322	58,500,000
6/30/2015	Qrt 2	1,726,165	165,092	78,093	216,657	75,105,825
9/30/2015	Qrt 3	1,894,278	207,154	97,314	245,176	89,706,416
12/31/2015	Qrt 4	2,025,159	236,298	120,506	277,276	102,222,096
3/31/2016	Qrt 1	2,079,825	237,147	178,908	488,278	117,000,474
6/30/2016	Qrt 2	2,131,898	252,067	183,534	490,159	140,543,911
9/30/2016	Qrt 3	2,197,233	251,124 ¹⁴	198,807	502,987	144,247,847
12/31/2016	Qrt 4	2,378,290	383,344	234,123	617,467	170,237,928
3/31/2017	Qrt 1	2,841,408	537,096	278,367	756,278	207,316,180

¹⁴ The decrease in Cumulative Annual Installed MWh Saved is due to a change in methodology for the GJGNY MPP, from reporting the savings from measures as a result of an energy audit to only reporting the measures actually installed.

Table C-2. Summary of Fuel Savings by Type

Quarter End Date	Quarter	Fuel Type	Cumulative Annual (MMBtu)	Cumulative Annualized Pipeline (MMBtu)^a
6/30/2010	Qrt 2	Diesel	-	
6/30/2010	Qrt 2	Gasoline	-	
6/30/2010	Qrt 2	Natural Gas	-	
6/30/2010	Qrt 2	Oil	3,409	
6/30/2010	Qrt 2	Propane	-	
9/30/2010	Qrt 3	Diesel	-	
9/30/2010	Qrt 3	Gasoline	-	
9/30/2010	Qrt 3	Natural Gas	-	
9/30/2010	Qrt 3	Oil	47,332	
9/30/2010	Qrt 3	Propane	-	
12/31/2010	Qrt 4	Diesel	-	
12/31/2010	Qrt 4	Gasoline	-	
12/31/2010	Qrt 4	Natural Gas	3,926	
12/31/2010	Qrt 4	Oil	74,691	
12/31/2010	Qrt 4	Propane	301	
12/31/2010	Qrt 4	Steam	12,553	
3/31/2011	Qrt 1	Diesel	-	
3/31/2011	Qrt 1	Gasoline	-	
3/31/2011	Qrt 1	Natural Gas	18,206	
3/31/2011	Qrt 1	Oil	85,998	
3/31/2011	Qrt 1	Propane	1,280	
3/31/2011	Qrt 1	Steam	10157	
3/31/2011	Qrt 1	Wood	122	
6/30/2011	Qrt 2	Diesel	-	
6/30/2011	Qrt 2	Gasoline	-	
6/30/2011	Qrt 2	Kerosene	27	
6/30/2011	Qrt 2	Natural Gas	20481	
6/30/2011	Qrt 2	Oil	118,963	
6/30/2011	Qrt 2	Propane	2,272	
6/30/2011	Qrt 2	Steam	10,557	
6/30/2011	Qrt 2	Wood	201	
9/30/2011	Qrt 3	Diesel	-	
9/30/2011	Qrt 3	Gasoline	-	
9/30/2011	Qrt 3	Kerosene	208	
9/30/2011	Qrt 3	Natural Gas	40,683	
9/30/2011	Qrt 3	Oil	140,917	
9/30/2011	Qrt 3	Propane	4,818	

Quarter End Date	Quarter	Fuel Type	Cumulative Annual (MMBtu)	Cumulative Annualized Pipeline (MMBtu)^a
9/30/2011	Qrt 3	Steam	10,557	
9/30/2011	Qrt 3	Wood	439	
12/31/2011	Qrt 4	Diesel	-	
12/31/2011	Qrt 4	Gasoline	-	
12/31/2011	Qrt 4	Kerosene	285	
12/31/2011	Qrt 4	Natural Gas	88,439	
12/31/2011	Qrt 4	Oil	150,163	
12/31/2011	Qrt 4	Propane	7,344	
12/31/2011	Qrt 4	Steam	10,157	
12/31/2011	Qrt 4	Wood	592	
3/31/2012	Qrt 1	Diesel	-	
3/31/2012	Qrt 1	Gasoline	-	
3/31/2012	Qrt 1	Kerosene	285	
3/31/2012	Qrt 1	Natural Gas	108635	
3/31/2012	Qrt 1	Oil	186,637	
3/31/2012	Qrt 1	Propane	11,810	
3/31/2012	Qrt 1	Steam	10,157	
3/31/2012	Qrt 1	Wood	749	
6/30/2012	Qrt 2	Diesel	-	
6/30/2012	Qrt 2	Gasoline	-	
6/30/2012	Qrt 2	Kerosene	285	
6/30/2012	Qrt 2	Natural Gas	140,597	
6/30/2012	Qrt 2	Oil	246,477	
6/30/2012	Qrt 2	Propane	12,798	
6/30/2012	Qrt 2	Steam	10,157	
6/30/2012	Qrt 2	Wood	1,000	
6/30/2012	Qrt 2	Residual Oil	144	
9/30/2012	Qrt 3	Diesel	-	
9/30/2012	Qrt 3	Gasoline	-	
9/30/2012	Qrt 3	Kerosene	285	
9/30/2012	Qrt 3	Natural Gas	183,379	
9/30/2012	Qrt 3	Oil	303,649	
9/30/2012	Qrt 3	Propane	14,187	
9/30/2012	Qrt 3	Residual Oil	144	
9/30/2012	Qrt 3	Steam	15,901	
9/30/2012	Qrt 3	Wood	1,599	
12/31/2012	Qrt 4	Diesel	-	
12/31/2012	Qrt 4	Gasoline	-	
12/31/2012	Qrt 4	Kerosene	1,026	

Quarter End Date	Quarter	Fuel Type	Cumulative Annual (MMBtu)	Cumulative Annualized Pipeline (MMBtu)^a
12/31/2012	Qrt 4	Natural Gas	203,118	
12/31/2012	Qrt 4	Oil	337,096	
12/31/2012	Qrt 4	Propane	16,593	
12/31/2012	Qrt 4	Residual Oil	144	
12/31/2012	Qrt 4	Steam	15,969	
12/31/2012	Qrt 4	Wood	3,079	
3/31/2013	Qrt 1	Diesel	-	-
3/31/2013	Qrt 1	Gasoline	-	-
3/31/2013	Qrt 1	Kerosene	1,359	353
3/31/2013	Qrt 1	Natural Gas	231,225	90,488
3/31/2013	Qrt 1	Oil	378,533	317,149
3/31/2013	Qrt 1	Propane	18,848	7,747
3/31/2013	Qrt 1	Steam	15,969	37,123
3/31/2013	Qrt 1	Wood	5,129	1,338
3/31/2013	Qrt 1	Residual Oil	144	27
3/31/2013	Qrt 1	Coal	357	-
6/30/2013	Qrt 2	Diesel	-	-
6/30/2013	Qrt 2	Gasoline	-	-
6/30/2013	Qrt 2	Kerosene	1,270	138
6/30/2013	Qrt 2	Natural Gas	313,287	76,148
6/30/2013	Qrt 2	Oil	411,518	262,809
6/30/2013	Qrt 2	Propane	21,051	7,341
6/30/2013	Qrt 2	Steam	15,969	30,232
6/30/2013	Qrt 2	Wood	6,550	935
6/30/2013	Qrt 2	Residual Oil	144	20
6/30/2013	Qrt 2	Coal	397	-
9/30/2013	Qrt 3	Diesel	-	-
9/30/2013	Qrt 3	Gasoline	-	-
9/30/2013	Qrt 3	Kerosene	1,365	356
9/30/2013	Qrt 3	Natural Gas	415,512	182,146
9/30/2013	Qrt 3	Oil	424,549	239,750
9/30/2013	Qrt 3	Propane	23,656	24,099
9/30/2013	Qrt 3	Steam	15,969	13,112
9/30/2013	Qrt 3	Wood	7,497	2,203
9/30/2013	Qrt 3	Residual Oil	144	-
9/30/2013	Qrt 3	Coal	335	-
12/31/2013	Qrt 4	Diesel	-	-
12/31/2013	Qrt 4	Gasoline	-	-
12/31/2013	Qrt 4	Kerosene	1,490	203

Quarter End Date	Quarter	Fuel Type	Cumulative Annual (MMBtu)	Cumulative Annualized Pipeline (MMBtu) ^a
12/31/2013	Qrt 4	Natural Gas	466,754	128,549
12/31/2013	Qrt 4	Oil	466,125	236,933
12/31/2013	Qrt 4	Propane	25,403	5,491
12/31/2013	Qrt 4	Steam	15,969	15,977
12/31/2013	Qrt 4	Wood	8,981	1,111
12/31/2013	Qrt 4	Residual Oil	144	-
12/31/2013	Qrt 1	Coal	514	-
3/31/2014	Qrt 1	Diesel	-	-
3/31/2014	Qrt 1	Gasoline	-	-
3/31/2014	Qrt 1	Kerosene	1,594	80
3/31/2014	Qrt 1	Natural Gas	509,205	130,012
3/31/2014	Qrt 1	Oil	523,876	228,057
3/31/2014	Qrt 1	Propane	27,788	5,869
3/31/2014	Qrt 1	Steam	15,969	14,733
3/31/2014	Qrt 1	Wood	10,270	580
3/31/2014	Qrt 1	Residual Oil	144	-
3/31/2014	Qrt 1	Coal	458	-
6/30/2014	Qrt 2	Diesel	-	-
6/30/2014	Qrt 2	Gasoline	-	-
6/30/2014	Qrt 2	Kerosene	1,715	56
6/30/2014	Qrt 2	Natural Gas	545,195	126,749
6/30/2014	Qrt 2	Oil	569,438	225,510
6/30/2014	Qrt 2	Propane	28,521	4,969
6/30/2014	Qrt 2	Steam	15,969	14,733
6/30/2014	Qrt 2	Wood	12,322	654
6/30/2014	Qrt 2	Residual Oil	144	-
6/30/2014	Qrt 2	Coal	882	-
9/30/2014	Qrt 3	Diesel	-	-
9/30/2014	Qrt 3	Gasoline	-	-
9/30/2014	Qrt 3	Kerosene	2,494	706
9/30/2014	Qrt 3	Natural Gas	526,170	184,391
9/30/2014	Qrt 3	Oil	723,190	381,324
9/30/2014	Qrt 3	Propane	17,860	28,153
9/30/2014	Qrt 3	Steam	15,969	18,269
9/30/2014	Qrt 3	Wood	14,952	4,079
9/30/2014	Qrt 3	Residual Oil	-	-
9/30/2014	Qrt 3	Coal	1,115	86
12/31/2014	Qrt 4	Diesel	-	-
12/31/2014	Qrt 4	Gasoline	-	-

Quarter End Date	Quarter	Fuel Type	Cumulative Annual (MMBtu)	Cumulative Annualized Pipeline (MMBtu)^a
12/31/2014	Qrt 4	Kerosene	2,602	669
12/31/2014	Qrt 4	Natural Gas	644,280	219,296
12/31/2014	Qrt 4	Oil	804,029	433,001
12/31/2014	Qrt 4	Propane	17,967	8,699
12/31/2014	Qrt 4	Steam	15,969	18,269
12/31/2014	Qrt 4	Wood	17,801	4,351
12/31/2014	Qrt 4	Residual Oil	-	-
12/31/2014	Qrt 4	Coal	1,249	313
3/31/2015	Qrt 1	Diesel	-	-
3/31/2015	Qrt 1	Gasoline	-	-
3/31/2015	Qrt 1	Kerosene	3,104	792
3/31/2015	Qrt 1	Natural Gas	671,315	301,729
3/31/2015	Qrt 1	Oil	885,524	498,536
3/31/2015	Qrt 1	Propane	19,357	17,177
3/31/2015	Qrt 1	Steam	15,969	19,056
3/31/2015	Qrt 1	Wood	17,781	4,380
3/31/2015	Qrt 1	Residual Oil	-	-
3/31/2015	Qrt 1	Coal	1,305	315
6/30/2015	Qrt 2	Diesel	-	-
6/30/2015	Qrt 2	Gasoline	-	-
6/30/2015	Qrt 2	Kerosene	3,763	770
6/30/2015	Qrt 2	Natural Gas	694,322	220,988
6/30/2015	Qrt 2	Oil	955,804	501,564
6/30/2015	Qrt 2	Propane	22,091	67,535
6/30/2015	Qrt 2	Steam	15,969	16,372
6/30/2015	Qrt 2	Wood	20,558	20,411
6/30/2015	Qrt 2	Residual Oil	-	-
6/30/2015	Qrt 2	Coal	1,442	285
9/30/2015	Qrt 3	Diesel	-	-
9/30/2015	Qrt 3	Gasoline	-	-
9/30/2015	Qrt 3	Kerosene	4,063	875
9/30/2015	Qrt 3	Natural Gas	786,147	224,883
9/30/2015	Qrt 3	Oil	1,019,266	404,798
9/30/2015	Qrt 3	Propane	24,464	51,936
9/30/2015	Qrt 3	Steam	15,969	11,899
9/30/2015	Qrt 3	Wood	23,371	21,323
9/30/2015	Qrt 3	Residual Oil	-	-
9/30/2015	Qrt 3	Coal	1,627	326
12/31/2015	Qrt 4	Diesel	-	-

Quarter End Date	Quarter	Fuel Type	Cumulative Annual (MMBtu)	Cumulative Annualized Pipeline (MMBtu)^a
12/31/2015	Qrt 4	Gasoline	-	-
12/31/2015	Qrt 4	Kerosene	4,581	783
12/31/2015	Qrt 4	Natural Gas	829,928	202,156
12/31/2015	Qrt 4	Oil	1,116,994	376,191
12/31/2015	Qrt 4	Propane	28,612	10,054
12/31/2015	Qrt 4	Steam	15,969	12,272
12/31/2015	Qrt 4	Wood	26,889	4,736
12/31/2015	Qrt 4	Residual Oil	-	-
12/31/2015	Qrt 4	Coal	2,186	319
3/31/2016	Qrt 1	Diesel	-	-
3/31/2016	Qrt 1	Gasoline	-	-
3/31/2016	Qrt 1	Kerosene	5,172	866
3/31/2016	Qrt 1	Natural Gas	692,629	193,265
3/31/2016	Qrt 1	Oil	1,297,717	291,552
3/31/2016	Qrt 1	Propane	28,921	9,236
3/31/2016	Qrt 1	Steam	23,849	12,023
3/31/2016	Qrt 1	Wood	29,115	4,429
3/31/2016	Qrt 1	Residual Oil	-	-
3/31/2016	Qrt 1	Coal	2,422	326
6/30/2016	Qrt 2	Diesel	-	-
6/30/2016	Qrt 2	Gasoline	-	-
6/30/2016	Qrt 2	Kerosene	5,530	673
6/30/2016	Qrt 2	Natural Gas	(803,957)	181,393
6/30/2016	Qrt 2	Oil	1,343,608	265,944
6/30/2016	Qrt 2	Propane	30,397	5,654
6/30/2016	Qrt 2	Steam	23,849	13,273
6/30/2016	Qrt 2	Wood	29,946	3,406
6/30/2016	Qrt 2	Residual Oil	1,500,062	-
6/30/2016	Qrt 2	Coal	2,462	250
9/30/2016	Qrt 3	Diesel	-	-
9/30/2016	Qrt 3	Gasoline	-	-
9/30/2016	Qrt 3	Kerosene	5,863	302
9/30/2016	Qrt 3	Natural Gas	(767,716)	199,946
9/30/2016	Qrt 3	Oil	1,373,947	254,114
9/30/2016	Qrt 3	Propane	30,903	10,000
9/30/2016	Qrt 3	Steam	21,663	9,325
9/30/2016	Qrt 3	Wood	30,049	3,377
9/30/2016	Qrt 3	Residual Oil	1,500,062	-
9/30/2016	Qrt 3	Coal	2,462	116

Quarter End Date	Quarter	Fuel Type	Cumulative Annual (MMBtu)	Cumulative Annualized Pipeline (MMBtu)^a
12/31/2016	Qrt 4	Diesel	-	-
12/31/2016	Qrt 4	Gasoline	1,190	-
12/31/2016	Qrt 4	Kerosene	6,611	421
12/31/2016	Qrt 4	Natural Gas	(626,814)	152,521
12/31/2016	Qrt 4	Oil	1,415,357	184,861
12/31/2016	Qrt 4	Propane	32,516	3,724
12/31/2016	Qrt 4	Steam	21,663	7,978
12/31/2016	Qrt 4	Wood	25,089	893
12/31/2016	Qrt 4	Residual Oil	1,500,062	-
12/31/2016	Qrt 4	Coal	2,616	127
3/31/2017	Qrt 1	Diesel	-	-
3/31/2017	Qrt 1	Gasoline	986	-
3/31/2017	Qrt 1	Kerosene	7,595	243
3/31/2017	Qrt 1	Natural Gas	(239,961)	127,311
3/31/2017	Qrt 1	Oil	1,486,761	116,157
3/31/2017	Qrt 1	Propane	34,141	5,575
3/31/2017	Qrt 1	Steam	21,663	6,255
3/31/2017	Qrt 1	Wood	18,271	(215)
3/31/2017	Qrt 1	Residual Oil	1,563,332	-
3/31/2017	Qrt 1	Coal	2,619	47,323

^a Tracked beginning first quarter of 2013

Appendix D: NYS RGGI Auction Proceeds

Table D-1. NYS RGGI Auction Proceeds^a

Auction Date	Control Period	Clearing Price	New York State Allowances Sold	New York State Auction Proceeds
12/17/2008	First	\$3.38	12,422,161	\$41,986,904
3/18/2009	First	\$3.51	12,422,161	\$43,601,785
3/18/2009	Second	\$3.05	776,385	\$2,367,974
6/17/2009	First	\$3.23	11,861,849	\$38,313,772
6/17/2009	Second	\$2.06	776,385	\$1,599,353
9/9/2009	First	\$2.19	11,861,849	\$25,977,449
9/9/2009	Second	\$1.87	776,385	\$1,451,840
12/2/2009	First	\$2.05	11,861,850	\$24,316,793
12/2/2009	Second	\$1.86	571,423	\$1,062,847
3/10/2010	First	\$2.07	15,136,022	\$31,331,566
3/10/2010	Second	\$1.86	740,167	\$1,376,711
6/9/2010	First	\$1.88	15,136,022	\$28,455,721
6/9/2010	Second	\$1.86	756,801	\$1,407,650
9/8/2010	First	\$1.86	11,421,736	\$21,244,429
9/8/2010	Second	\$1.86	464,418	\$863,817
12/1/2010	First	\$1.86	8,678,724	\$16,142,427
12/1/2010	Second	\$1.86	41,863	\$771,645
3/9/2011	First	\$1.89	15,153,524	\$28,640,160
3/9/2011	Second	\$1.89	757,676	\$1,432,008
6/8/2011	First	\$1.89	4,519,648	\$8,542,135
6/8/2011	Second	\$1.89	383,114	\$724,085
9/7/2011	First	\$1.89	2,689,151	\$5,082,495
12/7/2011	First	\$1.89	9,621,954	\$18,185,493
3/14/2012	Second	\$1.93	8,895,733	\$17,168,765
6/6/2012	Second	\$1.93	8,265,426	\$15,952,272
9/5/2012	Second	\$1.93	9,315,659	\$17,979,222
12/5/2012	Second	\$1.93	7,568,550	\$14,607,302
3/13/2013	Second	\$2.80	14,252,818	\$39,907,890
6/5/2013	First	\$3.21	750,000	\$2,407,500
6/5/2013	Second	\$3.20	14,252,818	\$45,751,546
9/4/2013	First	\$3.21	769,253	\$2,053,906
9/4/2013	Second	\$3.20	14,578,296	\$38,924,050
12/4/2013	Second	\$3.00	14,578,295	\$43,734,885
3/5/2014	Second	\$4.00	9,119,837	\$36,479,348
6/4/2014	Second	\$5.02	7,173,198	\$36,009,454
9/3/2014	Second	\$4.88	7,173,198	\$35,005,206
12/3/2014	Second	\$5.21	7,173,198	\$37,372,362
3/11/2015	Third	\$5.41	5,906,447	\$31,953,878

Table D-1 continued

Auction Date	Control Period	Clearing Price	New York State Allowances Sold	New York State Auction Proceeds
6/3/2015	Third	\$5.50	5,906,446	\$32,485,453
9/9/2015	Third	\$6.02	9,799,723	\$58,994,332
12/2/2015	Third	\$7.50	5,906,446	\$44,298,345
3/9/2016	Third	\$5.25	5,691,771	\$29,881,798
6/1/2016	Third	\$4.53	5,691,771	\$25,783,723
9/7/2016	Third	\$4.54	5,691,771	\$25,840,640
12/7/2016	Third	\$3.55	5,691,770	\$20,205,784
3/8/2017	Third	\$3.00	5,528,805	\$16,586,415
First Control Period Total			144,305,904	\$336,282,535
Second Control Period Total			128,764,643	\$391,950,232
Third Control Period Total			55,814,950	\$286,030,368
TOTAL			328,885,497	\$1,014,263,135

- a NYS did not offer allowances for sale in the RGGI auction held on December 25, 2008, where the clearing price for 2009 vintage allowances was \$3.07. The first control period for fossil-fuel-fired electric generators took effect on January 1, 2009 and concluded on December 31, 2011. The second control period took effect on January 1, 2012 and concluded on December 31, 2014. The third control period took effect on January 1, 2015 and extends through December 31, 2018.

Appendix E: Total NYS RGGI Funds

Table E-1. NYS RGGI Funds

Quarter End Date	Quarter	Fund Category	Cumulative Funds (\$)
9/30/2010	Qrt 3	Interest Allocated to the RGGI Portfolio	\$940,276
9/30/2010	Qrt 3	RGGI Auction Proceeds	\$265,358,611
12/31/2010	Qrt 4	Interest Allocated to the RGGI Portfolio	\$940,276
12/31/2010	Qrt 4	RGGI Auction Proceeds	\$282,272,683
3/31/2011	Qrt 1	Interest Allocated to the RGGI Portfolio	\$940,276
3/31/2011	Qrt 1	RGGI Auction Proceeds	\$312,344,851
6/30/2011	Qrt 2	Interest Allocated to the RGGI Portfolio	\$1,034,063
6/30/2011	Qrt 2	RGGI Auction Proceeds	\$321,611,071
9/30/2011	Qrt 3	Interest Allocated to the RGGI Portfolio	\$1,034,063
9/30/2011	Qrt 3	RGGI Auction Proceeds	\$326,693,566
12/31/2011	Qrt 4	Interest Allocated to the RGGI Portfolio	\$1,034,063
12/31/2011	Qrt 4	RGGI Auction Proceeds	\$344,879,060
3/31/2012	Qrt 1	Interest Allocated to the RGGI Portfolio	\$1,998,557
3/31/2012	Qrt 1	RGGI Auction Proceeds	\$362,047,824
6/30/2012	Qrt 2	Interest Allocated to the RGGI Portfolio	\$1,998,557
6/30/2012	Qrt 2	RGGI Auction Proceeds	\$378,000,097
9/30/2012	Qrt 3	Interest Allocated to the RGGI Portfolio	\$1,998,557
9/30/2012	Qrt 3	RGGI Auction Proceeds	\$395,979,318
12/31/2012	Qrt 4	Interest Allocated to the RGGI Portfolio	\$3,026,525
12/31/2012	Qrt 4	Interest Allocated to the GJGNY Program	\$770,000
12/31/2012	Qrt 4	RGGI Auction Proceeds	\$410,586,620
3/31/2013	Qrt 1	Interest Allocated to the RGGI Portfolio	\$3,026,525
3/31/2013	Qrt 1	Interest Allocated to the GJGNY Program	\$770,000
3/31/2013	Qrt 1	RGGI Auction Proceeds	\$450,494,510
6/30/2013	Qrt 2	Interest Allocated to the RGGI Portfolio	\$3,026,525
6/30/2013	Qrt 2	Interest Allocated to the GJGNY Program	\$770,000
6/30/2013	Qrt 2	RGGI Auction Proceeds	\$498,653,556
9/30/2013	Qrt 3	Interest Allocated to the RGGI Portfolio	\$3,026,525
9/30/2013	Qrt 3	Interest Allocated to the GJGNY Program	\$770,000
9/30/2013	Qrt 3	RGGI Auction Proceeds	\$539,631,512
12/31/2013	Qrt 4	Interest Allocated to the RGGI Portfolio	\$3,026,525
12/31/2013	Qrt 4	Interest Allocated to the GJGNY Program	\$770,000
12/31/2013	Qrt 4	RGGI Auction Proceeds	\$587,162,922

Quarter End Date	Quarter	Fund Category	Cumulative Funds (\$)
3/31/2014	Qrt 1	Interest Allocated to the GJGNY Program	\$770,000
3/31/2014	Qrt 1	RGGI Auction Proceeds	\$619,845,745
6/30/2014	Qrt 2	Interest Allocated to the RGGI Portfolio	\$4,400,174
6/30/2014	Qrt 2	Interest Allocated to the GJGNY Program	\$770,000
6/30/2014	Qrt 2	RGGI Auction Proceeds	\$655,855,199
9/30/2014	Qrt 3	Interest Allocated to the RGGI Portfolio	\$4,400,174
9/30/2014	Qrt 3	Interest Allocated to the GJGNY Program	\$770,000
9/30/2014	Qrt 3	RGGI Auction Proceeds	\$690,860,405
12/31/2014	Qrt 4	Interest Allocated to the RGGI Portfolio	\$4,400,174
12/31/2014	Qrt 4	Interest Allocated to the GJGNY Program	\$770,000
12/31/2014	Qrt 4	RGGI Auction Proceeds	\$728,232,767
3/31/2015	Qrt 1	Interest Allocated to the RGGI Portfolio	\$5,900,174
3/31/2015	Qrt 1	Interest Allocated to the GJGNY Program	\$1,779,747
3/31/2015	Qrt 1	RGGI Auction Proceeds	\$760,186,645
6/30/2015	Qrt 2	Interest Allocated to the RGGI Portfolio	\$5,900,174
6/30/2015	Qrt 2	Interest Allocated to the GJGNY Program	\$1,779,747
6/30/2015	Qrt 2	RGGI Auction Proceeds	\$792,672,098
9/30/2015	Qrt 3	Interest Allocated to the RGGI Portfolio	\$5,900,174
9/30/2015	Qrt 3	Interest Allocated to the GJGNY Program	\$1,779,747
9/30/2015	Qrt 3	RGGI Auction Proceeds	\$851,666,430
12/31/2015	Qrt 4	Interest Allocated to the RGGI Portfolio	\$5,900,174
12/31/2015	Qrt 4	Interest Allocated to the GJGNY Program	\$1,779,747
12/31/2015	Qrt 4	RGGI Auction Proceeds	\$895,964,775
3/31/2016	Qrt 1	Interest Allocated to the RGGI Portfolio	\$9,067,174
3/31/2016	Qrt 1	Interest Allocated to the GJGNY Program	\$1,779,747
3/31/2016	Qrt 1	RGGI Auction Proceeds	\$925,846,573
6/30/2016	Qrt 2	Interest Allocated to the RGGI Portfolio	\$10,733,145
6/30/2016	Qrt 2	Interest Allocated to the GJGNY Program	\$1,879,665
6/30/2016	Qrt 2	RGGI Auction Proceeds	\$964,243,106
9/30/2016	Qrt 3	Interest Allocated to the RGGI Portfolio	\$12,388,468
9/30/2016	Qrt 3	Interest Allocated to the GJGNY Program	\$1,894,084
12/31/2016	Qrt 4	Interest Allocated to the RGGI Portfolio	\$12,752,158
12/31/2016	Qrt 4	Interest Allocated to the GJGNY Program	\$1,930,606
12/31/2016	Qrt 4	RGGI Auction Proceeds	\$997,676,720
3/31/2017	Qrt 4	Interest Allocated to the RGGI Portfolio	\$12,947,487
3/31/2017	Qrt 4	Interest Allocated to the GJGNY Program	\$1,963,338
3/31/2017	Qrt 4	RGGI Auction Proceeds	\$1,014,263,135

Appendix F: Closed RGGI-Funded Programs and Completed Evaluations

F.1 Closed Programs

F.1.1 Green Residential Buildings Program (GRBP)

The Green Residential Building Program (GRBP), established under Public Authorities Law 1872, was a market transformation initiative designed to change the building practices of the residential construction industry for single- and multifamily homes with up to 11 dwelling units. The GRBP offered incentives to owners who obtain a certification stating that their newly constructed residences meet or exceed Leadership in Energy and Environmental Design (LEED®) or National Green Building Standard guidelines, as well as other GRBP program-specific energy efficiency and health and safety requirements. Buildings meeting GRBP requirements will help reduce energy use and GHG emissions, save water and other natural resources, use sustainable building materials, reduce waste, and improve indoor air quality. Sixty-nine contractors participated in this program. Per the enabling law, the application deadline was October 31, 2013; therefore, the program is now closed to new applications. The following data represent only those projects where RGGI funded the incentive, which represents 82 percent of the program activity.

Key accomplishments were as follows:

- Four hundred forty RGGI-funded projects were completed.

F.1.2 Municipal Water and Wastewater Program

The Municipal Water and Wastewater Program provided a unique opportunity to coordinate RGGI climate change goals and funding with American Recovery and Reinvestment Act (ARRA) and the EPA goals and funding while installing infrastructure to improve the environment and keep NYS waters clean and healthy. This program was co-managed by the NYS Environmental Facilities Corporation and NYSERDA. The Environmental Facilities Corporation secured ARRA and Green Project Reserve Funds from the EPA to bolster efforts to finance wastewater infrastructure via the Clean Water State Revolving Fund Program. Wastewater plants installed through the program are energy-efficient, thus minimizing carbon emissions and improving their economic and environmental performance.

1 Introduction

In New York State, the Regional Greenhouse Gas Initiative (RGGI) program has been implemented through two complementary regulations: The New York State Department of Environmental Conservation (DEC) established the State's Carbon Dioxide (CO₂) Budget Trading Program (6 NYCRR Part 242, 6 NYCRR Part 200, General Provisions), and the New York State Energy Research and Development Authority (NYSERDA) established the CO₂ Allowance Auction Program (21 NYCRR Part 507). This report is prepared pursuant to the State's RGGI Investment Plan (2015 Operating Plan) and provides an update on the progress of programs through the quarter ending March 31, 2017. It contains an accounting of program spending; an estimate of program benefits; and a summary description of program activities, implementation, and evaluation. NYSERDA's Board adopted an amendment to the Operating Plan on January 24, 2017. The amendment provides updated program descriptions and funding level which will be integrated into the 2017 version of the Operating Plan.

The State invests RGGI proceeds to support comprehensive strategies that best achieve the RGGI CO₂ emission reduction goals. These strategies aim to reduce global climate change and pollution through energy efficiency, renewable energy, and carbon abatement technology. Deploying commercially available renewable energy and energy efficiency technologies helps to reduce greenhouse gas (GHG) emissions from both electricity and other energy sources in the short term. To move the State toward a more sustainable future, RGGI funds are used to empower communities to make decisions that prompt the use of cleaner and more energy-efficient technologies that lead to lower carbon emissions as well as economic and societal co-benefits. RGGI helps to build capacity for long-term carbon reduction by training workers and partnering with industry. Using innovative financing, RGGI supports the pursuit of cleaner, more efficient energy systems and encourages investment to stimulate entrepreneurial growth of clean energy companies. Collectively, these activities use funds in ways that accelerate the uptake of low-to-zero emitting technologies.

F.1.4 Economic Development Growth Extension Program

The Economic Development Growth Extension (EDGE) Program facilitated by Regional Outreach Contractors performs on-the-ground outreach, education, and marketing of NYSERDA program opportunities to residents, businesses, institutions, and local governments across the State to promote the value of energy efficiency, sustainable growth practices, clean energy technologies, and innovations using carefully constructed public-private partnerships. The program aligns with Governor Cuomo's Regional Economic Development Council (REDC) initiative and provides direct support to advance the strategic priorities and regionally significant projects identified in each region. NYSERDA is providing a greater level of education and adoption of energy efficiency and renewable energy practices at the community level.

The EDGE Program concluded April 30, 2016. NYSERDA is in final stages of rolling out a new Clean Energy Communities Program, which will build upon the successes of the EDGE Program. The Clean Energy Community Program will provide grants, direct technical support to communities, and recognition to local governments that demonstrate leadership in the area of clean energy.

Key accomplishments were as follows:

- Partnerships amounting to 1,102 were developed that may help to identify and assist in customer engagement.
- Events, presentations, or other speaking engagements were conducted totaling 1,489 public outreach activities.
- Projects that were referred to various NYSERDA programs came to 4,117.
- Project referrals received from partners came to 3,215.

F.1.5 Emerging Technology/Accelerated Commercialization Program

NYSERDA's Emerging Technology/Accelerated Commercialization (ETAC) initiative seeks to accelerate market uptake of commercially available, but underused building technologies and strategies, in the residential sector that will deliver significant and measurable energy savings and GHG emissions reductions. While NYSERDA recognizes the significant value in the ETAC program and its alignment with RGGI investment objectives, funds previously allocated to this program were repurposed for other initiatives. The ETAC program continues to seek to identify and overcome barriers to full-market adoption of new and/or underutilized technologies through other NYSERDA program resources.

F.2 Completed Evaluations

F.2.1. Green Jobs - Green New York Jobs Quantification Study

This study quantified the direct, indirect, and induced jobs created/retained from the GJGNY program, including those in disadvantaged communities. The study also examined changes in worker skill level and wages resulting from GJGNY. NYSERDA issued the final reports for both phases of the study in November 2013. Both Phase 1 and Phase 2 reports are posted on NYSERDA's website.¹⁵ An update to the 2013 study was completed in two phases in the fourth quarter of 2016. This update is available on NYSERDA's website.¹⁶

F.2.2. Multifamily Performance Program Process/Market Evaluation

A major Process/Market Evaluation of the SBC/EEPS-funded MPP was undertaken to assess the RGGI fuel efficiency incentive activity and GJGNY assessment/loan activity. This study was finalized in the third quarter of 2014 and published on the NYSERDA website.¹⁷

F.2.3. Multifamily Performance Program Impact Evaluation

A major Impact Evaluation of the SBC/EEPS-funded MPP assessed the effects of RGGI fuel efficiency incentives. The work included measurement and verification of energy savings, and attribution analysis of projects completed from 2009 through 2011. The finalized study is available on NYSERDA's website.¹⁸

¹⁵ The GJGNY jobs quantification studies, Phase 1 and Phase 2, are on NYSERDA's website: nyserdera.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/NYERDA-Evaluation-Contractor-Reports/2013-Reports/NMR-Group.aspx

¹⁶ Assessment of Job Impacts of the Green Jobs - Green New York Program (Phase 1), <https://www.nyserdera.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/GJGNY-Jobs-Analysis-Phase-I.pdf>. Economic Impacts of the Green Jobs-Green New York Program (Phase 2), <https://www.nyserdera.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/GJGNY-Jobs-Analysis-Phase-II.pdf>

¹⁷ MPP/Process Evaluation and Market Characterization, nyserdera.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-MPP-Process-Evaluation.pdf

¹⁸ MPP Impact Evaluation (2009–2011), nyserdera.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/Evaluation-Contractor-Reports/2015-Reports

F.2.4. Economic Development Growth Extension Process Evaluation

A Process Evaluation for this program was finalized in the third quarter of 2015 and published on the NYSERDA website.¹⁹

F.2.5. Multifamily Carbon Emission Reduction Program

An Impact Evaluation for this program measured and verified the energy and emission effects attributable to the program. This evaluation was completed in the fourth quarter of 2015. The final report is available on NYSERDA's website.²⁰

F.2.6. GJGNY Small Commercial Energy Efficiency Program

NYSERDA conducted an Impact Evaluation to quantify the measure adoption rate over time and the degree to which the audit program influenced participants' decision-making regarding recommended measures that they have installed. The study was finalized in December 2015 and reported 44 percent of the recommended energy savings were implemented. The final report is available NYSERDA's website.²¹

F.2.7. Cleaner Greener Communities Program

A process evaluation of NYSERDA's Cleaner, Greener Communities () program was completed in two waves and finalized in the second quarter of 2016. Wave One of this evaluation research was completed revealing a number of opportunities for NYSERDA to help regions implement their Phase I plans and achieve their sustainability goals. Wave Two revealed opportunities for communities to overcome common barriers to engaging in efficiency and sustainability activity and to encourage further investment in sustainability across the State's diverse regions. A summary of the findings from Waves One and Two are posted on NYSERDA's website.²²

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- ¹⁹ Economic Development Growth Extension Process Evaluation, [.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/economic-development-growth-extension-process-evaluation.pdf](http://www.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/economic-development-growth-extension-process-evaluation.pdf)
- ²⁰ RGGI Multifamily Carbon Emissions Reduction Program Impact Evaluation (2011–2012); http://www.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/MCERP_IMPT_RP_FINAL.pdf
- ²¹ GJGNY Small Commercial Energy Efficiency Program, <http://www.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Small-Comm-Impact-Evaluation-July-2010-December-2013.pdf>
- ²² Wave 1 Study: <https://www.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2016-Cleaner-Greener-Communities-Market-Evaluation-Wave1-Findings.pdf>.

F.2.8. GJGNY Constituency-Based Organization Program

The assessment of CBO-related activities is complete. This assessment was coordinated with HPwES process evaluation and includes surveys with CBO-affiliated HPwES participants, partial participants (GJGNY audit recipients), and contractors. This study was finalized in the fourth quarter of 2015 and is available on NYSERDA's website.²³

F.2.9. Home Performance with ENERGY STAR Program

A Process/Market Evaluation of the SBC/EEPS-funded HPwES was utilized to assess the RGGI fuel efficiency incentive activity and GJGNY assessment/loan activity. This Process/Market Evaluation study was completed in Q4 2015 and is available on NYSERDA's website.²⁴

HPwES Program: An Impact Evaluation was completed in the fourth quarter of 2016 of the GJGNY "assessment only" participants. This evaluation assessed the impacts of those who received a GJGNY-funded audit and installed measures on their own in the absence of incentives.²⁵

ave 2 Study: <https://www.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/2016-Cleane-Greener-Communities-Market-Evaluation-Wave2.pdf>

²³ GJGNY Constituency-Based Organization Program, <http://www.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/GJGNY-CBO-Outreach-Program-Process-Evaluation.pdf>

²⁴ HPwES Process Evaluation/Market Characterization Assessment Final Report (2012-2013), <https://www.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2012-2013-HPwES-Process-Evaluation-Market-Characterization-Assessment-FinalReport.pdf>

²⁵ HPwES Program Impact Evaluation Report, Green Jobs – Green New York Audit-Only Impact Evaluation (PY 2010-2013), <https://www.nyscrda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/HPwES-IE-Report-Vol4.pdf>

The impact evaluation of HPwES unregulated fuels²⁶ projects was finalized in the fourth quarter of 2016 and published on NYSERDA’s website.²⁷ The projects (completed in 2011 through 2013) encompassed cost-effective oil and propane efficiency measures, such as replacing inefficient oil and propane heating equipment and other measures that have a direct impact on reducing GHG emissions from oil and propane consumption.

F. 2.10. Green Jobs – Green New York Jobs Quantification Study

Green Jobs - Green New York Jobs Quantification Study: An update to the 2013 study on this topic was completed in the fourth quarter of 2016. This study quantified direct, indirect, and induced jobs created or retained from the GJGNY program, including those in disadvantaged communities. The study examined changes in worker skill level and wages resulting from GJGNY. The results of the two phases of this study are available on NYSERDA’s website.²⁸

²⁶ “Unregulated fuels” refer to fossil fuels (i.e., primarily fuel oil, propane, and kerosene) that are not provided by a regulated utility.

²⁷ Home Performance with ENERGY STAR: Unregulated Fuels Impact Evaluation (2011-2013), <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/HPwES-unregulated-fuels-impact-evaluation.pdf>

²⁸ Assessment of Job Impacts of the Green Jobs - Green New York Program (Phase 1), <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/GJGNY-Jobs-Analysis-Phase-I.pdf>. Economic Impacts of the Green Jobs-Green New York Program (Phase 2), <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/GJGNY-Jobs-Analysis-Phase-II.pdf>

F.2.11. Advanced Transportation Research Program

A logic model for this program was completed in Q3 2015 and published on the NYSERDA website.²⁹ Six impact/market impact case studies for a select group of program-supported technologies were completed in Q1 2017 and published on the NYSERDA website.^{30,31,32,33,34,35}

F.2.12. Community Solar NY Program

A logic model report for this program was finalized in Q3 2015 and published on the NYSERDA website.³⁶

²⁹ NYSERDA Transportation Program Logic Model Report, [nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Transportation-LM-Report.pdf](https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Transportation-LM-Report.pdf)

³⁰ <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/2016-Transportation-Case-Study-Buffalo-Niagara-Medical-Campus.pdf>

³¹ <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/2016-transportation-case-study-electric-refrigeration.pdf>

³² <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/Alstom-Transportation-cs.pdf>

³³ <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/Saab-Sensis-Advanced-Airport-Departure-Manager-Transportation-cs.PDF?la=en>

³⁴ <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/Adaptive-Control-Decision-Support-System-Traffic-Management-Transportation-cs.pdf>

³⁵ <https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/Transportation-Case-Study-Report-Leviton.pdf>

³⁶ Community Solar NY Program: Final Initiative-Level Logic Model Report, [nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Community-Solar-NY-Final-Initiative-Level-Logic-Model-Report.pdf](https://www.nysERDA.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Community-Solar-NY-Final-Initiative-Level-Logic-Model-Report.pdf)

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.

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