

New York State Energy Research and Development Authority

New York's Regional Greenhouse Gas Initiative Investment Plan (2014 Operating Plan)

Final Report

December 2014

NYSERDA's Promise to New Yorkers:

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

Mission Statement:

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

Vision Statement:

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

Core Values:

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

Portfolios

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

Energy Efficiency and Renewable Energy Deployment

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

Energy Technology Innovation and Business Development

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

Energy Education and Workforce Development

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

Energy and the Environment

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

Energy Data, Planning, and Policy

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

**New York's Regional Greenhouse Gas Initiative
Investment Plan
(2014 Operating Plan)**

Final Report

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Table of Contents

- NYSERDA Record of Revision i**
- List of Tables.....vi**
- Summary of Benefits S-1**
- 1 Introduction..... 1**
 - 1.1 Background 1
 - 1.2 Regulatory Context 3
 - 1.3 Program Goals 4
 - 1.4 Program Focus and Geographic Scope..... 4
 - 1.5 Portfolio Development Criteria 5
- 2 Overview of Program Funding..... 6**
 - 2.1 Assumptions about Auction Proceeds for Operating Plan..... 6
 - 2.2 Remaining Program Funds 7
 - 2.2.1 Funds Available for Program Implementation 7
 - 2.2.2 Repayment of SBC Funds 11
 - 2.2.3 Ongoing New York Share of RGGI, Inc. Costs 11
 - 2.2.4 State Cost Recovery Fee 12
 - 2.2.5 Other Budget Components 12
 - 2.2.6 Program Evaluation and Administration..... 13
 - 2.3 Summary of Proceeds Investment by Program 13
 - 2.3.1 Program Funding Expansion Plan and Additional Funds 14
- 3 Renewable Heat NY15**
 - 3.1 Program Description 15
 - 3.2 Benefits 15
- 4 NY-Sun.....16**
 - 4.1 Program Description 16
 - 4.1.1 Community Solar/K-Solar..... 16
 - 4.1.2 Long Island Incentives 16
 - 4.1.3 NYPA Customer Incentives..... 16
 - 4.2 Benefits 17

5	LIPA PV/Efficiency Program	18
5.1	Program Description	18
5.2	Benefits	18
6	Residential Efficiency Services Program	19
6.1	Program Description	19
6.1.1	Multifamily Performance Program	20
6.1.2	EmPower New York	20
6.1.3	Home Performance with ENERGY STAR®	21
6.1.4	Solar Thermal Program	21
6.1.5	Low-rise Residential New Construction Program (LRNCP)	21
6.2	Benefits	22
7	Industrial Innovations	24
7.1	Program Description	24
7.2	Benefits	24
8	Climate Research and Analysis	26
8.1	Program Description	26
8.2	Benefits	26
9	Clean Energy Business Development	28
9.1	Program Description	28
9.2	Benefits	28
10	Charge NY	30
10.1	Program Description	30
10.2	Benefits	30
11	Transportation Research	31
11.1	Program Description	31
11.2	Benefits	31
12	Competitive Greenhouse Gas Reduction (CGGR) Pilot	33
12.1	Program Description	33
12.2	Benefits	33
13	Cleaner, Greener Communities	34
13.1	Program Description	34
13.2	Benefits	35
14	Green Jobs - Green New York	37
14.1	Program Description	37

14.2	Benefits	37
15	NYS Generation Attribute Tracking System (NYGATS)	39
15.1	Program Description	39
15.2	Benefits	39
16	NY Green Bank	40
16.1	Program Description	40
16.2	Benefits	41
17	Program Evaluation and Reporting.....	42
17.1	Evaluation Budget	42
17.2	Evaluation Approach	42
17.2.1	Impact Evaluation.....	43
17.2.2	Process Evaluation and Market Characterization/Assessment	45
17.2.3	Baseline Studies.....	46
17.2.4	Use of Evaluation Results	46
17.3	Evaluation Implementation.....	46
17.3.1	Staff and Contractor Resources.....	46
17.4	Reporting.....	47
18	Administration.....	49
18.1	Guiding Principles	49
18.2	Procurement Policies and Procedures.....	49
18.3	Financial Tracking Systems	50
18.4	Administration Budget	50
Appendix A: Methods and Assumptions.....		A-1

List of Tables

Table 1. Current Actual and Estimated Future Funding	7
Table 2. Summary of Actual and Anticipated Funding Commitments From Revenues Collected Through Fiscal Year 2015-16	10
Table 3. NY Sun Expected Lifetime Benefits	17
Table 4. LIPA PV/Efficiency Expected Lifetime Benefits	18
Table 5. Residential Efficiency Services Program Expected Lifetime Benefits	23
Table 6. Industrial Innovations Program Expected Lifetime Benefits	25
Table 7. Climate Research and Analysis Program – Anticipated Benefits	27
Table 8. Clean Energy Business Development Program – Anticipated Benefits	29
Table 9. Charge NY - Anticipated Benefits	30
Table 10. Transportation Research - Anticipated Benefits	32
Table 11. Cleaner, Greener Communities Program Benefits	35
Table 12. Benefits of Community-Scale Sustainability Projects	36
Table 13. Green Jobs - Green New York Program - Expected Lifetime Benefits	38

Summary of Benefits

The Regional Greenhouse Gas Initiative (RGGI) portfolio of programs reduces and avoids (GHG) gas and co-pollutant emissions, demonstrates New York State's commitment to its environmental goals, and supports the movement toward a national, multisector GHG reduction program.

Specifically, the near-term program investments¹ listed in this annual update of the Operating Plan totaling \$354.4 million are anticipated to result in CO₂e² emission reductions, energy savings, bill savings, and job creation as presented in the remainder of the plan.³ Green Jobs-Green New York, Residential Energy Services, Long Island Power Authority (LIPA) PV/Efficiency, NY-Sun initiative, and Industrial Innovations are the deployment program areas that are expected to realize savings during this current Operating Plan timeframe. These programs represent approximately 48 percent (\$171 million) of the near-term program investments described in this plan. Additionally, with the initiation of new program activities, NYSERDA is continually examining other metrics for measuring and assessing the benefits of the investment of RGGI proceeds.

Estimated benefits related to the Cleaner, Greener Communities program, the Competitive Greenhouse Gas Reduction Pilot, NY Green Bank, or other research and development (R&D) initiatives are not included due to the uncertainty of project activities and associated savings. Nevertheless, some benefits can be anticipated from these program areas including long- and short-term job creation, economic development benefits, efficiency improvements, increased use of renewable energy, pollution prevention, abatement of fuel use, annual electric savings, and associated CO₂ emissions reductions. To the extent they are available, these benefits are described in greater detail in the program description sections of this Plan.

This Summary of Benefits provides a quantitative estimate of the benefits associated with these deployment programs.

¹ "Near-term program investments" reflect the combined total of remaining program funds plus estimated auction proceeds for fiscal years 2014-15 and 2015-16.

² Equivalent carbon dioxide measures the global warming potential of each of the greenhouse gasses by relating it to the functionally equivalent amount of carbon dioxide.

³ Due to the nature of some projects, there can be lag time between initial investment in projects and realization of the associated savings. The values represented here may not be realized in the same year in which the funds are expended. Nevertheless, NYSERDA anticipates that the ratio of savings to dollars reflects the benefits which are likely to accrue as a result of projects funded through this program. Metrics and goals presented in this document (e.g., dollars per ton) are subject to modification in the event that changes are made to the discounting rate, discounting approach, evaluation methods, or emissions factors.

S.1 Emissions Reductions⁴, Energy Savings,⁵ and Energy Bill Savings

Investments of RGGI proceeds into the programs listed in this Operating Plan are anticipated to result in approximately 2.2 million tons of emission reductions over the expected lifetime of the measures and practices; the equivalent of removing approximately 22,500 cars off the road each year. Specifically, the expected lifetime emission reductions would total approximately 0.7 million tons of CO₂ from electricity savings/generation and 1.5 million tons of CO₂ from fuel savings. These expected lifetime emission reductions are associated with the displacement of approximately 2.6 million barrels of crude oil.⁶ Further reductions are possible if the Competitive Greenhouse Gas Reduction Pilot provides emission reductions that cost \$18 per expected lifetime ton of CO₂ and achieves mostly fossil-fuel savings. In this case, the expected lifetime reductions from fuel savings associated with the overall portfolio of programs would be approximately 3.0 million tons of CO₂.

Approximately 19.1 million MMBtu of expected lifetime energy savings across all fuel types (excluding electricity) are anticipated to result from the investment of RGGI proceeds into the programs listed in this Operating Plan. Additionally, electricity savings from energy efficiency would account for approximately 350,000 megawatt-hours (MWh) of additional expected lifetime savings and electricity generation from renewable projects would account for approximately 1.9 million MWh of expected lifetime generation.

The estimated participant bill savings related to the investment of RGGI proceeds into the programs listed in this Operating Plan are approximately \$808.4 million in total expected non-discounted lifetime savings.

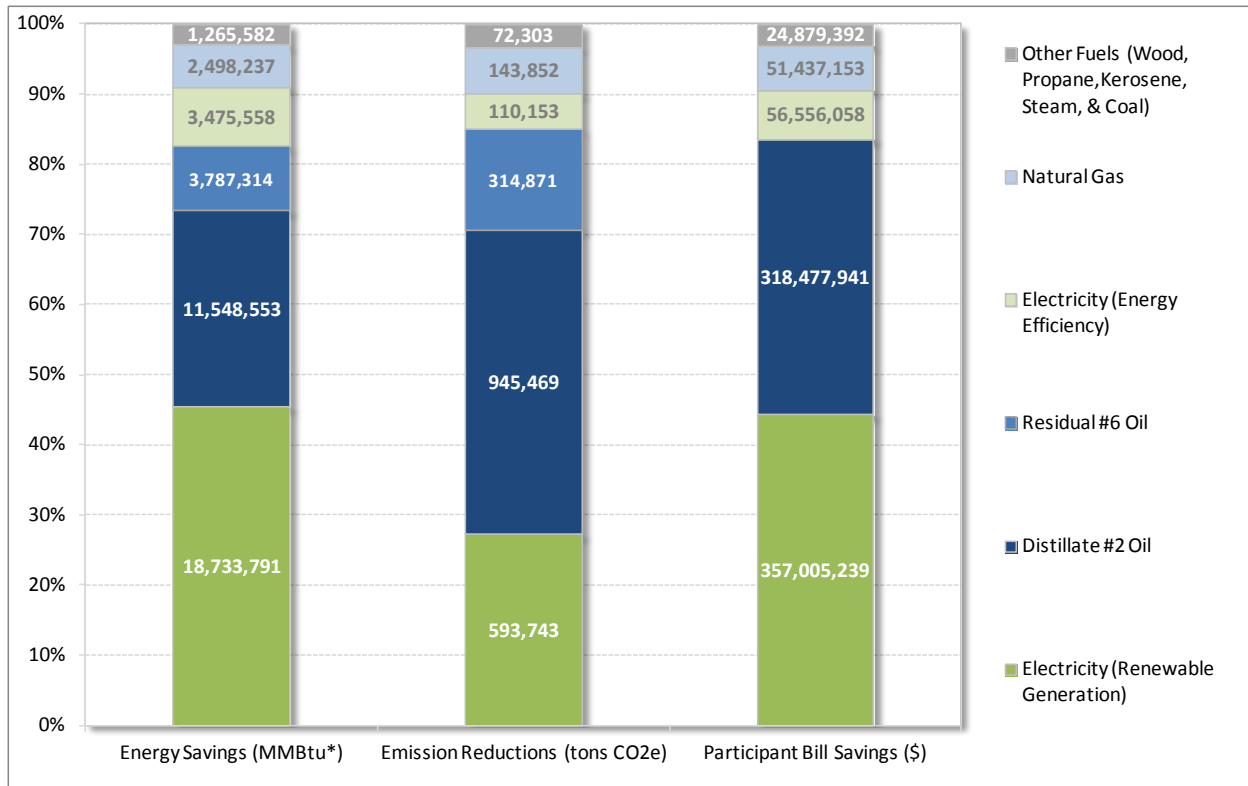
Figures S-1 and S-2 show the expected lifetime energy savings, emission reductions, and participant energy bill savings by fuel type. For comparison purposes, the electricity savings/generation were converted to source MMBtu. Benefit achievements are updated on a quarterly basis and can be found in New York's RGGI-Funded Programs Status Report, which is available at <http://www.nyserda.ny.gov/Energy-and-the-Environment/Regional-Greenhouse-Gas-Initiative/Evaluations-of-Funds.aspx>

⁴ The CO₂e reductions shown throughout this document include CO₂ reductions plus the co-benefits of other GHG reductions. In addition, Appendix A explains the methodologies used to calculate various metrics appearing in the Plan

⁵ The program areas are Green Jobs- Green New York, Residential Efficiency Services, NY Sun, LIPA PV/Efficiency, and Industrial Innovations.

⁶ This estimate does not account for the full lifecycle costs for producing and distributing crude oil and petroleum products.

Figure S-1. Benefits by Fuel Type for Expected Lifetime Energy Savings, Emission Reductions, and Bill Savings^a

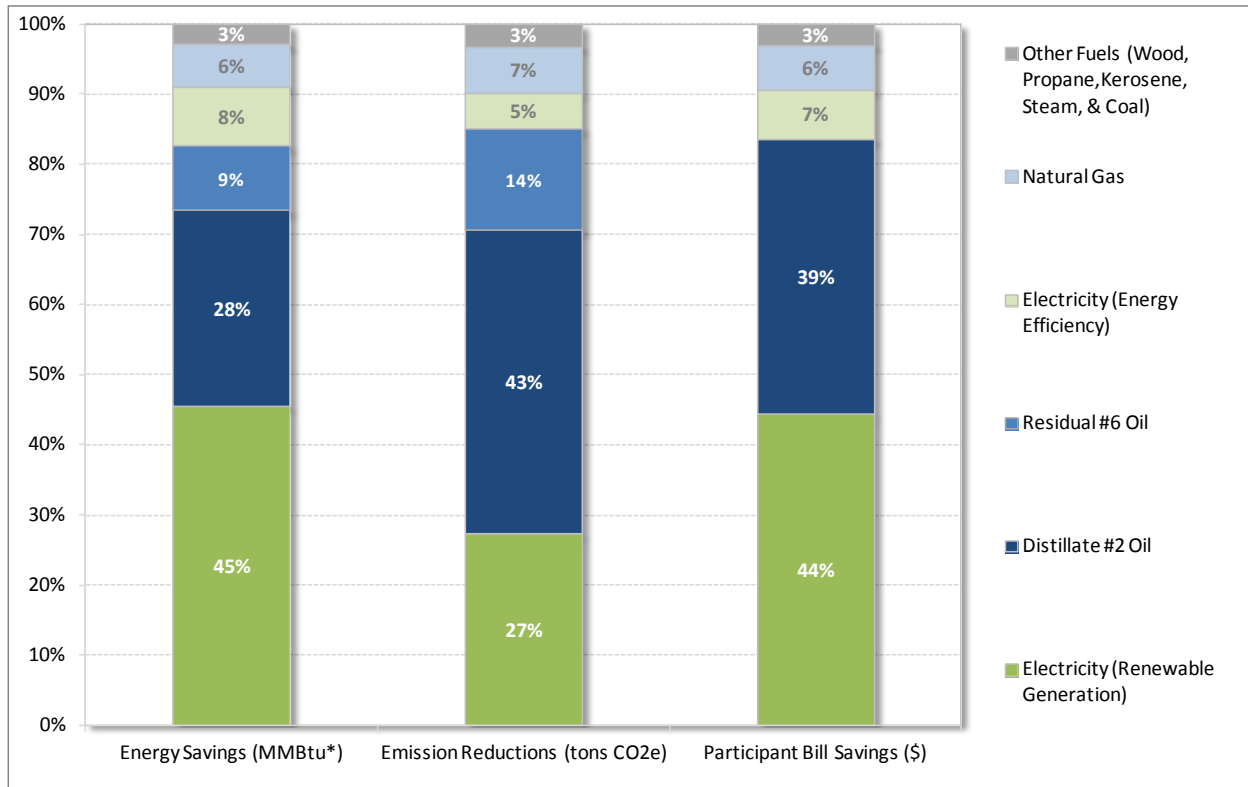


^a Benefits quantified for 56 percent of the portfolio. Balance will be quantified annually as scopes are refined.

* To convert to source MMBtu, the 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.

Under a cap-and-trade system, the total number of CO₂ allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, renewable energy projects may not decrease the overall amount of CO₂ being emitted into the atmosphere by New York entities. Still, renewable energy projects will reduce end users' carbon footprints as they will be responsible for a smaller percent of the emissions associated with electricity production.

Figure S-2. Percent Contribution by Fuel Type for Expected Lifetime Energy Savings, Emission Reductions, and Bill Savings^a



^a Benefits quantified for 56 percent of the portfolio. Balance will be quantified annually as scopes are refined.

* To convert to source MMBtu, the 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.

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S.4 Job Creation

Preliminary estimates for potential job creation associated with RGGI-funded programs have been calculated based upon historical data and modeling for deployment, technology development, and business development programs. This information is used as a preliminary estimate and actual job impacts are examined as part of the RGGI evaluation activities. Table S-1 shows how different job multiplier estimates are applied to the near-term program investments reflected in this Plan.

Table S-1. Job Creation Estimates Related to Near-term Program Investments^a

Program Category	Program Name	Near-term Program Investments (\$ millions)	Near-term Program Investments with Admin & Evaluation (\$ millions) ^b	Estimated Job Creation Multiplier	Net Estimated Sustained Jobs Created or Retained ^c
Energy Efficiency & Other Deployment	NYSERDA Solar Electric	\$299.8	\$344.6	3.2	1102
	Renewable Heat				
	NY-Sun				
	Green Jobs-Green New York				
	Residential Energy Services				
	Cleaner Greener Communities Program				
	Competitive GHG Reduction Pilot				
	Regional Economic Development and Greenhouse Gas Reduction				
	NY Green Bank				
	LIPA PV / Efficiency				
Technology & Business Development	Transportation Research	\$48.0	\$55.2	9.5	524
	Charge NY				
	Advanced Buildings				
	Industrial Innovations				
	Clean Energy Business Development				
	Advanced Renewable Energy				
Research	Climate Research and Analysis	\$6.2	\$7.6	N/A	N/A
Other	NYS Generation Attribute Tracking System	\$0.4	\$0.4	N/A	N/A
	Total	\$354.4	\$407.8	N/A	1,626

Table notes on next page

Table S-1 continued

- ^a The Energy Efficiency & Other Deployment programs multiplier is based upon macroeconomic evaluation of the Energy SmartSM portfolio and the multiplier for Technology and Business Development multiplier is based upon macroeconomic analysis of the product development portion of NYSERDA's R&D portfolio.
- ^b This value represents the sum of anticipated commitments for the near-term program investments plus Program Administration (eight percent) and Program Evaluation (five percent) and State Cost Recovery Fee (1.7 percent). This Plan covers program funding based on estimated auction proceeds for FY 2014-15, and FY 2015-16 as well as funding from prior collections that have not yet been committed under contract. These percentages are subject to change beginning in 2016 in accordance with the NYSERDA Clean Energy Fund Proposal <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-m-0094&submit=Search+by+Case+Number>
- ^c These values represent estimates of the number of net sustained jobs created through the near-term program investment of funds presented in this Operating Plan. A different type of jobs analysis was recently completed for the Green Jobs-Green New York program. This program evaluation initiative estimated the gross number of engineering, remodeling and building-related jobs that are created/retained by GJGNY program activity. The analysis estimated that approximately 1,000 direct jobs were created through 2013 and that this number might grow to about 2,700 by 2015. These jobs are based on point-in-time estimates by survey respondents and job persistence may be dependent on the continued availability of future funding for these types of activities.

1 Introduction

1.1 Background

Through RGGI, New York and its partner states have pioneered the nation's first market-based cap-and-invest program to help control the carbon dioxide emissions that are contributing to global climate change. Just as the RGGI program serves as a model for a national GHG emissions reduction strategy, New York State is also creating a national model through this RGGI Operating Plan (Plan), demonstrating how strategic investments across disciplines and across the economy can support comprehensive strategies that best advance the State's CO₂ emission reduction goals.

New York State maintains a robust portfolio of clean energy programs, and proceeds from the sale of RGGI CO₂ allowances are used to supplement existing policies and programs. The Plan is structured to result in immediate emissions reductions, while building capacity for long-term carbon emissions mitigation action. In accordance with State regulations, this plan implements activities to reduce carbon emissions and pollution through energy efficiency, renewable energy, and support for innovative carbon abatement strategies.

Building from the October 2013 version of the RGGI Operating Plan, this annual update to the Plan incorporates feedback and direction received during a public stakeholder meeting in May 2014⁷ and subsequent written comments from stakeholders. The Plan was approved by NYSERDA's Board in June 2014. Overall, the Plan covers near-term program investments comprised of the following RGGI funds:

- Anticipated proceeds from auctions to be held during fiscal years 2014-15 and 2015-16.
- Remaining program funds from prior auction proceeds.

The scope and approach for allocating the anticipated proceeds was approved by NYSERDA's Board of Directors in June 2014, and the use of previously obtained proceeds that comprise remaining program funds was approved by the Board at earlier meetings.

The investment of RGGI auction proceeds is designed to complement existing programs, including the System Benefits Charge (SBC), Renewable Portfolio Standard (RPS), Weatherization Assistance Program, Energy Efficiency Portfolio Standard (EEPS), and various transportation programs funded by the federal Congestion Mitigation and Air Quality Improvement Program. RGGI-funded programs create synergies with existing efficiency and clean energy programs, and also advance the stated RGGI policies and intended outcomes. The statewide goals of reduced GHG emissions, reduced energy use, accelerated growth in the State's clean energy economy, increased

⁷ The participating stakeholders represent a broad array of energy and environmental interests to advise NYSERDA on how to efficiently make use of proceeds from the sale of allowances consistent with the directives in the regulations.

energy efficiency, increased fuel diversity (measured by the overall proportion of renewable electricity generation), reduced criteria pollution, and low-income weatherization are therefore enhanced by these complementary resources. As such, the Plan is not designed as a singular portfolio of program activities, nor are RGGI proceeds relied upon as a sole source to achieve the State's contribution toward national or global carbon mitigation goals. Rather, the Plan should be considered in context of the other policies and programs that help to reduce GHG emissions and has been designed to strengthen and enhance the comprehensive statewide energy policy to best leverage the State's collective resources to achieve the identified energy goals. On September 23, 2014, NYSERDA filed a Clean Energy Fund Proposal (CEF) with the Public Service Commission (PSC). The CEF describes a 10-year plan that would serve as a successor to existing ratepayer funded initiatives. RGGI will continue to complement NYSERDA's future program activities aimed at reducing greenhouse gas emissions in New York State.

Deep and persistent emissions reductions will require systemic changes in all energy using sectors of the economy, including buildings and industrial processes, transportation and power generation, and will require changes in the energy consumption patterns of businesses and individuals. Systemic changes will result from expanding partnerships with industries, education, and outreach campaigns to generate demand in clean energy from consumers, and government's creation of a sound policy framework to achieve clean energy and emissions reduction goals.

To realize both the immediate need for GHG emissions reductions, as well as create the needed platforms for long-term, self-sustaining changes in energy consumption patterns, the RGGI portfolio of programs will:

- Provide substantial benefits to consumers and the environment, resulting in GHG emissions reductions from both electricity and other energy sources. By deploying a range of energy efficiency and renewable energy technologies, New York State can realize GHG emissions reductions in the near-term and provide valuable information to consumers and supply chain participants for self-sustaining markets for these activities.
- Empower communities to make decisions about energy usage that lead to lower carbon emissions as well as economic and societal co-benefits. By supporting sustainability planning and implementation of those plans, communities and individuals can guide decision making that improves localities that simultaneously reduces statewide GHG emissions.
- Employ innovative approaches to increase the adoption of clean energy alternatives in New York State. By using new financing strategies or program approaches targeting specific uses, the portfolio creates an opportunity to increase penetration of existing programs and expand the reach of clean energy programs to communities that may not traditionally take advantage of these options.
- Stimulate new technology development and create a strong clean energy business environment. By supporting entrepreneurial growth, RGGI can advance new economic development strategies for New York that help to expand the economy and support innovative New York products and services that can be exported across the country or around the world.
- Build capacity for long-term carbon reduction. By training workers and partnering with industry, the RGGI program portfolio enables transformative activities through implementation of carbon-reducing projects.

1.2 Regulatory Context

RGGI is a nine-state cooperative effort to reduce GHG emissions from electric power plants by means of a cap-and-trade system.⁸ Under RGGI, the participating states initially designed cap-and-trade programs that cap CO₂ emissions from power plants through 2015 and then lower the cap by 10 percent by 2018. In January 2012, the RGGI states began a 2012 Program Review as called for in the Model Rule.⁹ The Program Review included a comprehensive evaluation of program success, program impacts, additional reductions, imports and emissions leakage, and offsets. The regional RGGI Program Review was completed in early 2013 and on February 7, 2013, the states participating in RGGI announced proposed program changes, including a more stringent CO₂ emission cap, and released an Updated Model Rule. Subsequently, the participating states began working to incorporate program changes into their respective regulations. The RGGI states have since implemented these changes, which took effect in each state on or about January 1, 2014.

Each state is implementing RGGI through individual CO₂ Budget Trading Programs that are linked through the regional cap-and-trade program. Additional background on the initiative can be found at <http://www.rggi.org>.

In New York State, the RGGI Program has been implemented through two complementary programs:

- The New York State Department of Environmental Conservation (DEC) has established New York's CO₂ Budget Trading Program (6 NYCRR Part 242, 6 NYCRR Part 200, General Provisions).
- The New York State Energy Research and Development Authority (NYSERDA) has established the CO₂ Allowance Auction Program (21 NYCRR Part 507).

NYSERDA's CO₂ Allowance Auction Program has established the rules through which New York will sell most of its CO₂ allowances. The CO₂ Allowance Auction Program also creates the parameters for use of the proceeds from the sale of allowances, and that will be used to "promote and implement programs for energy efficiency, renewable or non-carbon emitting technologies, and innovative carbon emissions abatement technologies with significant carbon reduction potential" (at 21 NYCRR Part 507.4(d)). The Plan was created to be consistent with these regulatory requirements.

⁸ The RGGI-participating states are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.

⁹ The RGGI Model Rule is a set of proposed regulations that form the basis for each RGGI State's CO₂ Budget Trading Program.

1.3 Program Goals

New York State invests RGGI proceeds to support comprehensive strategies that best achieve the RGGI CO₂ emission reduction goals, which reduce global climate change and pollution through energy efficiency, renewable energy, and carbon abatement technology. Investments will be focused on a complementary mix of electricity related GHG reduction opportunities and technologies and strategies for reductions related to the use of petroleum and natural gas.

Deploying commercially available renewable energy and energy efficiency technologies helps to reduce GHG emissions in the short term. To move the State toward a more sustainable future, RGGI works to empower communities to make decisions about energy usage 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. All of these activities use funds in ways that accelerate the uptake of low-emitting technologies.

Funds will also be used to induce additional GHG reductions by establishing the commitments and capacity to curtail GHGs by municipal, institutional, and other public and private sector participants.

1.4 Program Focus and Geographic Scope

RGGI funds have historically been used to support programs ineligible for funding from other sources. For instance, RGGI program funding has been used to complement current investments in the New York Energy \$martSM program, which is part of New York's System Benefits Charge programs, the Renewable Portfolio Standard, and the Energy Efficiency Portfolio Standard and other agency programs that support the goals of the CO₂ Budget Trading Program. Going forward RGGI-funded activities will complement and enhance Clean Energy Fund policies and programs.¹⁰

Geographic equity of expenditures and benefits will be pursued across the portfolio of programs, not on a program-by-program basis. Certain programs may have a limited geographic focus; most will be statewide in scope. Outreach activities may be tailored to different regions. Program monitoring and evaluation may lead to adjustments in offerings, such as changes in incentive levels.

¹⁰ NYSERDA Clean Energy Fund Proposal, <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-m-0094&submit=Search+by+Case+Number>

1.5 Portfolio Development Criteria

The following criteria were considered in developing the portfolio of programs included in the Plan:

- Cost-effectiveness measured by quantity of carbon equivalents reduced per dollar invested.
- Long-range potential for the technology or investment to reduce GHG emissions in New York.
- Potential to reduce the costs of achieving the emissions reduction goals of the CO₂ Budget Trading Program.
- Other benefits for New York such as job creation, leveraging of capital investment to promote economic development, providing health and environmental benefits, and enhancing municipal capacity to further reduce GHG emissions.
- Opportunities to reduce the disproportionate cost burden and environmental impacts on low-income families and environmental justice communities.
- Need for funds based upon availability from other funding sources.

These criteria served as guidance for the development of the overall portfolio of programs. They are not weighted; rather the intention is to achieve a strong balance of programs. Furthermore, the minimum or “critical mass” funding level needed to run an effective program is also an important consideration. The diverse portfolio of initiatives presented in the Plan will balance the achievement of near-term results with the investment in long-term strategies that will provide sustained, ongoing reductions of GHGs.

Consistent with Part 242-10.3(d)(3), projects that receive funds under a program covered in the Plan are not eligible to pursue CO₂ Emissions Offset credits under the CO₂ Budget Trading Program. Nevertheless, agricultural methane projects that receive CO₂ Emissions Offset credits under the CO₂ Budget Trading Program may also receive public benefits funds under a program covered in the Plan. All entities, including compliance entities, may pursue projects under any of the proposed programs in the Plan.

2 Overview of Program Funding

This section provides an overview of program funding. Funds available for investment or commitment during the near term planning period described in this Plan are comprised of two components:

- Estimated future proceeds during fiscal years (FY) 2014-15 and 2015-16.
- Remaining program funds.

2.1 Assumptions about Auction Proceeds for Operating Plan

Estimated auction proceeds for fiscal years 2014-15 and 2015-16 are anticipated to be \$89.4 million and \$80.8 million, respectively, for a total of \$170.2 million in gross anticipated proceeds.

Moderate assumptions were used in order to avoid overestimating the level of estimated future proceeds available, and to be sensitive to potential programmatic changes which may have an unpredictable impact on the RGGI carbon markets. A moderate approach has been used to develop the funding assumptions presented in this Plan for several reasons. First, we do not want to speculate about how the marketplace will behave during this time of program transition.¹¹ Additionally, the marketplace currently holds a large quantity, or “bank,” of CO₂ allowances in excess of what is needed to cover current compliance obligations. Moreover, this approach seeks to avoid overestimating the level of funds available, and to avoid possible constriction in program activity should actual proceeds become insufficient to support Operating Plan programs.

For planning purposes, it is assumed that the average 2014 allowance price will be \$3.22 per allowance. This amount represents the average price from auctions 20 through 23. For planning purposes, values beyond 2014 are escalated by the real after tax weighted cost of capital (5.7%/year) used by ICF during the recent RGGI Program Review. This approach results in estimated proceeds of \$89.4 million for FY 2014-15 and \$80.8 million for FY 2015-16.

After netting out administration and evaluation expenses and fees, this translates to \$70.0 million in FY 2014-15 and \$64.1 million in FY 2015-16 available for program implementation.

¹¹ A comprehensive program review was recently undertaken resulting in programmatic changes including a reduced CO₂ emissions cap.

2.2 Remaining Program Funds

As described in Table 1, \$619.8 million in proceeds have been collected through March 31, 2014. Program funding, net of administration, evaluation and other fees through March 31, 2014 totaled \$444.2 million. This \$444.2 million is then allocated among programs, with \$97.4 million allocated to Green Jobs-Green New York, \$48.6 million allocated to NY Green Bank, and the remaining \$298.2 million allocated to the other programs areas described in Table 2. Of the total historical \$444.2 million for all programs, \$171.2 million is comprised of remaining program funds and will be applied to near-term program investments. Of these remaining program funds, \$164 million is committed to long-term priorities, including legislatively mandated programs.

2.2.1 Funds Available for Program Implementation

Combined, Estimated Future Proceeds, and remaining program funds together, result in \$354.3 million in net funds available for investment during the near-term program planning horizon described in this Plan.

Table 1 provides a snapshot of how auction revenues collected through March 31, 2014 were distributed among various initiatives, as well as to support administration, evaluation, State Cost Recovery Fees, support for RGGI, Inc., and other related expenses. Additionally, Table 1 presents a description of how anticipated/new proceeds from RGGI auctions in fiscal years 2014-15 and 2015-16 will be invested between programs. Additional information about the fees and expenses that are netted-out from total auction proceeds are also shown, and described in further detail in the remainder of the section.

Table 1. Current Actual and Estimated Future Funding^a

	Cumulative Allocation Through March 2014	FY 2014-15	FY 2015-16	Total
	(\$ millions)	(\$ millions)	(\$ millions)	(\$ millions)
Proceeds				
RGGI Auction Proceeds	619.8	89.4	80.8	790.0
Allocated Interest	4.4	0.0	0.0	4.4
Total Proceeds	624.2	89.4	80.8	794.4
Budget Transfer ^a	(90.0)	0.0	0.0	(90.0)
Subtotal	534.2	89.4	80.8	704.4

Table 1 continued

	Cumulative Allocation Through March 2014	FY 2014-15	FY 2015-16	Total
	(\$ millions)	(\$ millions)	(\$ millions)	(\$ millions)
Proceeds				
Transfer to Green Jobs – Green New York	(112.0)	0.0	0.0	(112.0)
Program Funds	97.4	0.0	0.0	97.4
Administration	7.8	0.0	0.0	97.8
Evaluation	5.6	0.0	0.0	5.6
State Cost Recovery Fee	1.9	0.0	0.0	1.9
Sub-total GJGNY ^b	112.8	0.0	0.0	112.8
NY Green Bank	(52.9)	0.0	0.0	(52.9)
Program Funds	48.6	0.0	0.0	48.6
Admin/Eval/ State Cost Recovery Fee (SCRF)	4.4	0.0	0.0	4.4
NY GATS	0.00	0.00	(0.40)	(0.40)
Program Funds	0.00	0.00	0.40	0.40
Administration/Evaluation/SCRF	0.00	0.00	0.00	0.00
Subtotal Proceeds Available	369.3	89.4	80.4	539.1
Administration and Evaluation Expenses and Fees				
Administration ^c	(28.2)	(7.2)	(6.4)	(41.8)
Program Evaluation	(14.3)	(4.5)	(4.0)	(22.8)
Litigation settlement ^d	(15.0)	(2.7)	(1.1)	(18.8)
RGGI, Inc startup SBC repayment	(1.6)	0.0	0.0	(1.6)
RGGI, Inc. pro-rata costs	(5.1)	(1.0)	(1.0)	(7.1)
State Cost Recovery	(6.9)	(4.0)	(3.6)	(14.5)
Subtotal Administration & Evaluation Expenses	(71.1)	(19.4)	(16.3)	(106.8)
Funds Available for Programs	298.2	70.0	64.3	432.5

Table notes on next page

Table 1 continued

Notes: Fiscal years begin on April 1 and end on March 31.

The “Cumulative Allocation through March 2014” column covers auctions from December 2008 through March 2014.

- ^a This figure represents the sum total of a \$90M budget transfer to the General Fund, and a subsequent \$25M appropriation to, and transfer from the General Fund for the Cleaner Greener Communities Program. On December 4, 2009, New York State enacted numerous deficit reduction measures that included the transfer of \$90 million in RGGI auction proceeds to the General Fund. These actions were taken to improve New York’s long-term fiscal health. Pursuant to the State FY 2013-14 budget, NYSERDA was required to transfer \$25 million of RGGI funds to the General Fund, but received a \$25 million appropriation in the FY 2013-14 State capital budget for the Cleaner Greener Communities program.
- ^b Program totals may not sum exactly due to rounding. Additionally, GJGNY interest allocations are accounted for separately from RGGI program funding. For more detail refer to New York’s RGGI-Funded Programs Status Report.
- ^c Administration is based upon the program administration budget rate approved by the Public Service Commission for public benefit energy efficiency and technology and market development programs funded through the System Benefits Charge.
- ^d The litigation settlement values represent \$13,001,595 paid through April 1, 2014 and estimated obligations through FY 2015-16.

Table 2. Summary of Actual and Anticipated Funding Commitments From Revenues Collected Through Fiscal Year 2015-16

Program	Actual Cumulative Allocation through March 2014	Planned Near-term Program Investments			Estimated Total Funds Through FY 15/16
		Remaining Program Funds	Planned FY 14/15 Proceeds	Planned FY 15/16 Proceeds	
Renewable Energy Subtotal	\$ 17,551,868	\$ 9,454,911	\$ 24,139,123	\$ 35,258,631	\$ 76,949,622
Renewable Heat NY	\$ 1,708,014	\$ 1,708,014	\$ 2,253,082	\$ 8,955,830	\$ 12,916,926
NY Sun*	\$ 7,613,959	\$ 7,613,959	\$ 21,886,041	\$ 26,302,801	\$ 55,802,801
Community/K-Solar	\$ 7,613,959	\$ 7,613,959	\$ 1,886,041	\$ -	\$ 9,500,000
Long Island Incentives	\$ -	\$ -	\$ 10,000,000	\$ 16,302,801	\$ 26,302,801
NYPA Customer Incentives	\$ -	\$ -	\$ 10,000,000	\$ 10,000,000	\$ 20,000,000
NYSDERA PV	\$ 5,336,221	\$ 47,650	\$ -	\$ -	\$ 5,336,221
Advanced Renewable Energy	\$ 2,893,674	\$ 85,288	\$ -	\$ -	\$ 2,893,674
Energy Efficiency Subtotal	\$ 102,869,379	\$ 38,814,273	\$ 23,272,380	\$ 8,672,380	\$ 134,814,139
LIPA Efficiency and RE*	\$ 55,200,000	\$ 29,600,000	\$ 14,600,000	\$ -	\$ 69,800,000
Residential Energy Services	\$ 46,016,761	\$ 8,925,134	\$ 8,672,380	\$ 8,672,380	\$ 63,361,521
Multifamily Performance Program	\$ 14,295,856	\$ 3,123,191	\$ 2,427,696	\$ 2,427,696	\$ 19,151,248
EmPower NY	\$ 8,833,444	\$ 2,255,115	\$ 3,057,412	\$ 3,057,412	\$ 14,948,268
Home Performance with Energy Star	\$ 11,330,090	\$ 2,436,859	\$ 3,187,272	\$ 3,187,272	\$ 17,704,634
Multifamily Carbon Emissions Reduction	\$ 7,000,000	\$ 669,012	\$ -	\$ -	\$ 7,000,000
Solar Thermal	\$ 963,779	\$ -	\$ -	\$ -	\$ 963,779
Green Residential Buildings	\$ 2,759,141	\$ 19,383	\$ -	\$ -	\$ 2,759,141
Low-Rise Residential New Construction	\$ 834,451	\$ 421,574	\$ -	\$ -	\$ 834,451
Municipal Water/Wastewater	\$ 1,652,618	\$ 289,139	\$ -	\$ -	\$ 1,652,618
Innovative GHG Abatement Strategies Subtotal	\$ 63,026,354	\$ 40,242,319	\$ 14,737,539	\$ 13,737,540	\$ 91,501,433
Industrial Innovations	\$ 11,771,117	\$ 5,933,362	\$ 5,000,000	\$ 5,000,000	\$ 21,771,117
Climate Research	\$ 8,826,322	\$ 3,056,776	\$ 1,598,551	\$ 1,598,552	\$ 12,023,425
Clean Energy Business Development	\$ 19,540,341	\$ 11,361,976	\$ 2,638,988	\$ 2,638,988	\$ 24,818,317
Charge NY	\$ -	\$ -	\$ 4,000,000	\$ 3,000,000	\$ 7,000,000
Transportation Research	\$ 2,750,000	\$ 751,631	\$ 1,500,000	\$ 1,500,000	\$ 5,750,000
Carbon Capture and Sequestration	\$ 1,000,000	\$ -	\$ -	\$ -	\$ 1,000,000
Competitive Greenhouse Gas Initiative	\$ 14,500,000	\$ 14,500,000	\$ -	\$ -	\$ 14,500,000
Advanced Buildings	\$ 4,638,574	\$ 4,638,574	\$ -	\$ -	\$ 4,638,574
Community Clean Energy Subtotal	\$ 114,767,597	\$ 53,904,778	\$ 7,896,624	\$ 6,433,344	\$ 129,097,565
Climate Smart Communities	\$ 4,394,999	\$ 1,692,333	\$ 1,640,000	\$ 1,640,000	\$ 7,674,999
Economic Development Growth Extension	\$ 5,215,517	\$ 991,140	\$ 1,800,000	\$ 1,800,000	\$ 8,815,517
Cleaner Greener Communities*	\$ 94,757,081	\$ 51,114,673	\$ 4,456,624	\$ 2,993,344	\$ 102,207,049
Incentives	\$ 79,472,679	\$ 48,939,718	\$ 2,208,419	\$ 2,993,344	\$ 84,674,442
Implementation Contractor and Marketing	\$ 5,684,402	\$ 2,138,199	\$ 2,248,205	\$ -	\$ 7,932,607
Planning	\$ 9,600,000	\$ 36,756	\$ -	\$ -	\$ 9,600,000
Regional Economic Development and GHG Reduction	\$ 10,400,000	\$ 106,632	\$ -	\$ -	\$ 10,400,000
GJGNY Subtotal*	\$ 97,426,000	\$ 28,793,508	\$ -	\$ -	\$ 97,426,000
GJGNY Residential - Residential, One-to-Four Family	\$ 47,048,533	\$ 9,058,179	\$ -	\$ -	\$ 47,048,533
GJGNY Residential, Multifamily	\$ 12,692,550	\$ 4,951,496	\$ -	\$ -	\$ 12,692,550
GJGNY - Small Business	\$ 14,174,917	\$ 9,817,077	\$ -	\$ -	\$ 14,174,917
GJGNY Workforce	\$ 8,000,000	\$ 1,762,319	\$ -	\$ -	\$ 8,000,000
GJGNY - Marketing & Outreach	\$ 15,510,000	\$ 3,204,437	\$ -	\$ -	\$ 15,510,000
NY Green Bank	\$ 48,563,992	\$ 48,563,992	\$ -	\$ -	\$ 48,563,992
NY GATS	\$ -	\$ -	\$ -	\$ 408,252	\$ 408,252
Grand Total	\$ 444,205,190	\$ 219,773,781	\$ 70,045,666	\$ 64,510,147	\$ 578,761,003
			OP PLAN TOTAL	\$ 354,329,594	

* These programs represent long-term priorities, including legislatively mandated programs

Descriptions and estimated benefits of near-term program investments are discussed in Sections 3 through 16 of this Plan. For reference, the 2014 RGGI Operating Plan Amendment details how these funds will be distributed among the 15 programs. A copy of the 2014 Operating Plan Amendment is at <http://www.nyserdera.org/Energy-and-the-Environment/Regional-Greenhouse-Gas-Initiative/Auction-Proceeds.aspx>

Additional information about the specific fees and expenses that are netted-out from total auction proceed estimates to arrive at Funds Available for Program Implementation as shown in Table 2 is in the following subsections.

2.2.2 Repayment of SBC Funds

The Public Service Commission issued an Order in Case 05-M-0090, dated August 27, 2007, authorizing up to \$3 million of interest earnings from unexpended SBC funds, be used to finance certain start-up costs of RGGI, Inc., subject to reimbursement of the SBC account. In October 2009, reimbursement of approximately \$1.6 million was made to the SBC account, which represented the amount of funds used to finance these start-up costs plus interest.

2.2.3 Ongoing New York Share of RGGI, Inc. Costs

RGGI, Inc. is a nonprofit corporation created to support development and implementation of CO₂ Budget Trading Programs in New York and other participating states.

NYSERDA has entered into an agreement for RGGI, Inc. to provide technical and support services for key elements of New York's CO₂ Budget Trading program, including:

- Developing and maintaining a system to report data from emissions sources subject to RGGI, and to track allowances.
- Implementing a platform to auction CO₂ allowances.
- Monitoring the market related to the auction and trading of CO₂ allowances.
- Providing technical assistance to the participating states in reviewing applications for emissions offset projects.
- Creating and implementing a market monitoring program.
- Providing technical assistance to the participating states to evaluate proposed changes to the states' RGGI programs.

New York's share of RGGI, Inc. costs was estimated to be approximately \$1,000,000 per year during the planning period. This estimate was approved by the RGGI, Inc. Board of Directors in their 2013 RGGI, Inc. budget.

2.2.4 State Cost Recovery Fee

NYSERDA is assessed an annual State Cost Recovery Fee (SCRF) pursuant to Section 2975 of the Public Authorities Law, to help support general governmental services provided to NYSERDA. The fee is assessed on all NYSERDA revenues, and NYSERDA allocates this obligation proportionately among all NYSERDA programs and funding sources. The RGGI budget includes an estimate based on the current annual assessment of the fee expected to be allocated to the RGGI-funded programs.

2.2.5 Other Budget Components

On December 4, 2009, New York State enacted numerous deficit reduction measures that included the transfer of \$90 million in RGGI auction proceeds to the General Fund. These actions were taken to improve New York's long-term fiscal health.

In addition, on January 29, 2009, a lawsuit was initiated in State Supreme Court against the Governor, NYSERDA, and other State entities that claimed the RGGI regulations are unlawful and discriminatory. The original parties to the lawsuit as well as others that were joined as parties, including Consolidated Edison (Con Edison), entered into a settlement agreement resolving the litigation that was approved on October 1, 2010 by the court. Under the terms of the settlement, NYSERDA will use proceeds from RGGI auctions to meet its obligations to pay Con Edison in accordance with a formula set forth in the settlement agreement. Con Edison, in turn, will use the monies provided by NYSERDA to fund energy efficiency and renewable energy programs with significant carbon reduction potential within its service territory. NYSERDA has paid Con Edison approximately \$14.9 million to date. As of March 31, 2014, NYSERDA's additional future obligations under the settlement agreement are estimated to total approximately \$3.9 million.

In June 2011, three individuals filed a new lawsuit in State Supreme court, seeking a ruling that RGGI has been unlawful from its outset. Governor Andrew M. Cuomo, DEC, and NYSERDA were named as defendants. The Attorney General's Office (OAG) subsequently filed a motion to dismiss the lawsuit. OAG argued that the plaintiffs did not have legal "standing" to bring the lawsuit because they were not suffering any injury from the program. OAG asserted that the lawsuit appears to have been brought at the behest of two groups – Americans for Prosperity (AFP) and the Competitive Enterprise Institute (CEI) – as part of a campaign to convince states to repeal their RGGI programs. OAG also claimed that because the plaintiffs unreasonably delayed in filing the lawsuit, their claims were time-barred under the applicable statute of limitations, and were further subject to dismissal on laches grounds due to the substantial prejudice to New York, other states, and businesses, if the lawsuit proceeded at that time, nearly

three years after the RGGI regulations went into effect. In June 2012, the court granted a motion to dismiss on the grounds that the plaintiffs (1) lacked legal standing and (2) waited too long to sue, and thus were barred by the doctrine of laches. The Supreme Court's dismissal was upheld on appeal by Plaintiffs to the Appellate Division, Third Department. In April of 2014, New York's highest-level court, the Court of Appeals, denied Plaintiffs' subsequent request for further review.

2.2.6 Program Evaluation and Administration

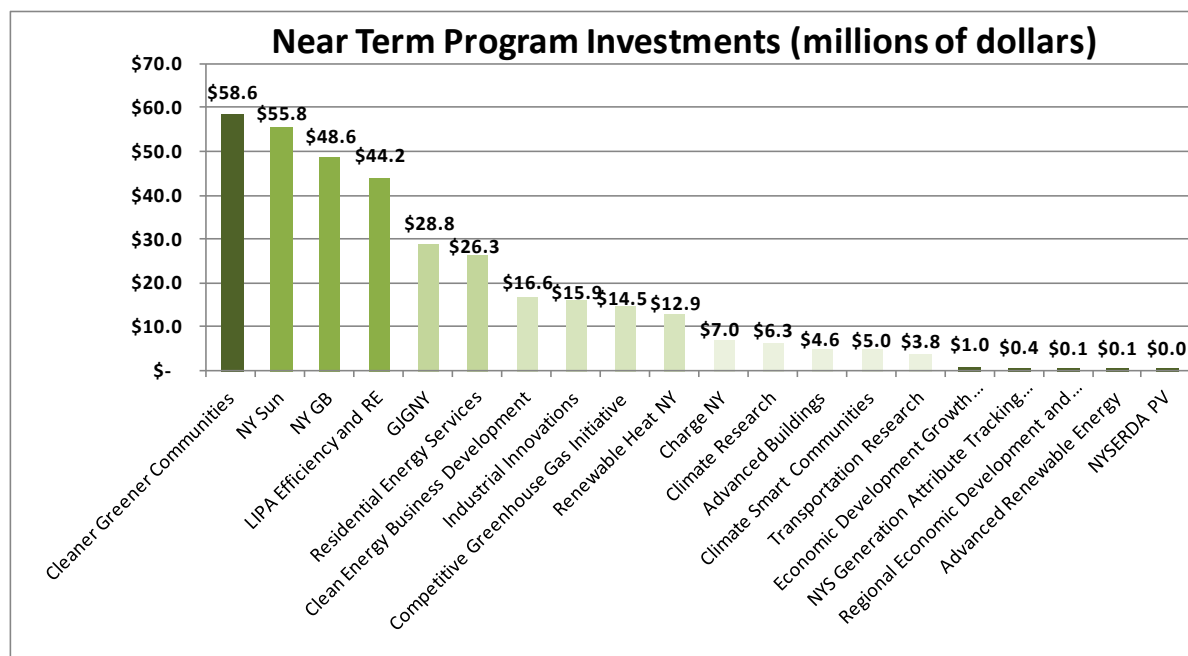
Program evaluation and administration costs have been budgeted for fiscal years 2014-15 and 2015-16 at 5 and 8 percent, respectively, of total revenues. These figures are consistent with the rates currently approved by the Public Service Commission for public benefit energy efficiency and technology and market development programs funded through the SBC.

2.3 Summary of Proceeds Investment by Program

Table 2 provides a summary of proceeds investment by program and shows how \$578.8 million of net program funds made available through RGGI auctions have been, or will be allocated among programs through fiscal year 2015-16. First, Table 2 describes how prior auction proceeds through March 2014 have been allocated among programs. Table 2 then reflects the balance of remaining program funds by program through March 31, 2014. Next, Table 2 shows the planned allocation of \$134.1 million anticipated from future auction proceeds for fiscal years 2014-15 and 2015-16 among programs. Finally, Table 2 summarizes how all auction proceeds through fiscal year 2015-16 have been, or will be allocated among programs. Funding allocations may be refined based upon the actual level of auction allowance proceeds that are received consistent with expectations outlined in the amendment.

Figure 1 shows a breakdown of the anticipated support commitments for the near-term program investments presented in this Plan. Near-term program investments presented in this Plan total approximately \$354.3 million.

Figure 1. Breakdown of \$354.3 Million in Near-term Program Investments Through FY 2015-2016



2.3.1 Program Funding Expansion Plan and Additional Funds

The RGGI Operating Plan Amendments address the potential for auction revenues to exceed the estimates being used to develop the Operating Plan for each year. If additional revenue is realized, such proceeds could be used to expand funding for the existing portfolio of RGGI programs including NY Green Bank as well as for climate resiliency and sustainability initiatives, to the extent consistent with Part 242. If applicable, this additional funding may potentially assist a program in expanding the types of fuel-neutral applications that it supports (e.g., solar thermal funding might potentially be used for commercial applications or for space heating and cooling). Changes in actual program funding as a result of fluctuating auction revenues are accounted for in the RGGI Quarterly Program Status Reports, available at <http://www.nyserda.org/Energy-and-the-Environment/Regional-Greenhouse-Gas-Initiative/Evaluations-of-Funds.aspx>

The ensuing program description sections of this Plan provide the following information for each program that is anticipated to have near-term program investments:¹²

- Program Description.
- Benefits resulting from near-term program investments (measures of program benefits).

¹² The Statewide Solar Electric program and the Carbon Capture and Sequestration component of the Advanced Power Technology program are not described in this Plan because funds were encumbered prior to this Plan’s planning horizon. Descriptions may be found in the 2010 version of the Plan. Additionally, the Municipal Wastewater, Advance Power Technology, Regional Greenhouse Gas Reduction program, Solar Thermal, and Multifamily Carbon Emissions Reduction programs are not described in this plan since funds were either encumbered prior to the current planning horizon, or were diminimus for purposes of this Plan. Descriptions may be found in the 2012 version of the Plan.

3 Renewable Heat NY

3.1 Program Description

Renewable Heat NY was announced by Governor Cuomo in his 2014 State of the State address as “a long-term commitment to help the high-efficiency and low-emission biomass heating industry reach scale.” The Governor identified specific near-term actions to be taken as part of the initiative, including:

- Raise consumer awareness.
- Develop larger-scale anchor customers to expand the bulk delivery market for wood fuel.
- 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 Wood Heat for New York Roadmap to accelerate the use of biomass for heating using the most efficient, low-emission technologies.
- Identify high profile demonstration projects in state and municipal buildings that are ideally suited for biomass conversion.
- Provide financial support to consumers (including residential, commercial, not-for-profit, and government) to reduce upfront costs, which will be phased down as the market achieves scale and upfront costs decrease.
- Provide support so that sustainable forestry practices are available and followed by landowners.

In many key respects, developing this market will inherently require capturing the benefits of scale, and particularly of local sale. 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 will seek to develop clusters of activity, rather than spread support evenly across geography.

Renewable Heat NY will provide 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 become self-sustaining over the long term. As program success is continuously measured, investments in incentives and staff resources will be reduced as the private market develops.

3.2 Benefits

Renewable Heat NY will accomplish the mission of the RGGI selection criteria in the following ways: reduced GHG emissions, energy bill savings, and the creation or retention of jobs in New York State. The program will reduce New Yorkers’ energy bills while providing significant environmental benefits. Included among these benefits are GHG reductions that stem from the retirement and replacement of residential outdoor and indoor wood boilers with advanced cord wood boilers with full thermal storage and commercial pellet boilers. Renewable Heat NY will also create and retain jobs in New York’s biomass industry by providing needed training in hydronic biomass heating to qualify contractors and installers for the program.

4 NY-Sun

4.1 Program Description

The NY-Sun initiative, a dynamic public-private partnership, will drive growth in the solar industry and make solar technology more affordable for all New Yorkers. The program provides incentives for the installation of solar systems, promotes solar technology advancements, and works to reduce balance-of-system costs for solar electric (also known as photovoltaic or PV) installations. The NY-Sun initiative brings together and expands programs administered by NYSERDA, LIPA, and NYPA, to ensure a coordinated, well-funded statewide solar energy expansion plan, in an effort to drive growth in the solar electric industry and increase the affordability of solar electric technology. RGGI funds will be used to support multiple components of the NY-Sun program including New York Power Authority (NYPA) and LIPA customer incentives, and the NYSERDA administered Community Solar/K-Solar program described in this section. NYSERDA, LIPA, PSEG Long Island, and NYPA are collaborating to make the transition from previous successful solar programs and to add more than 3 gigawatts (GW) of installed solar capacity in New York State by 2023.

4.1.1 Community Solar/K-Solar

Community Solar NY seeks to empower community projects across New York State that will leverage 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 coordination with NYPA, K-Solar will offer targeted resources to help schools implement solar and act as hubs for community solar projects.

4.1.2 Long Island Incentives

NY-Sun provides solar electric system megawatt (MW) targets that vary by region and incentives that decline at a predictable rate over time. The program is managed by NYSERDA with local administration provided on Long Island by PSEG Long Island. Long Island Incentives aim to increase the number of solar electric systems across Long Island by stimulating the marketplace, so that costs associated with installing solar electric systems for residents and businesses are reduced.

4.1.3 NYPA Customer Incentives

Incentives are available for NYPA customers, which are mostly government buildings, municipalities, and schools across New York State.

4.2 Benefits

The benefits associated with NY-Sun include increasing solar adoption, decreasing solar costs, integrating solar with other distributed energy resources, and building a sustainable clean energy economy in New York with resulting GHG reductions.

The benefits provided by Community Solar NY will be evaluated the using the following metrics: increased solar deployment and soft cost reduction, associated deployment of non-solar distributed energy resources, and non-energy benefits, including economic development.

The expected benefits of the Long Island Incentive and NYPA Customer Incentive programs are presented in Table 3.

Table 3. NY Sun Expected Lifetime Benefits

Program	Planned Period Budget (\$ Million)	Number of Participants	Expected Lifetime Electricity Savings (MWh)	Expected Lifetime Natural Gas Savings (MMBtu)	Expected Lifetime # 2 Oil Savings (MMBtu)	Expected Lifetime #6 Oil Savings (MMBtu)	Expected Lifetime Other Fuel Savings (MMBtu) ^a	Expected Lifetime CO2 Reduction (Tons) ^b	Program Cost per Ton (Expected Lifetime) ^c
NYPA Customer Incentives	20.0	1,781	440,190	N/A	N/A	N/A	N/A	137,559	142
Long Island Incentives	26.3	2,342	526,056	N/A	N/A	N/A	N/A	164,393	155

^a Other fuel savings include savings from wood, propane, kerosene, steam, and coal.

^b Under a cap-and-trade system, the total number of CO₂ allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, renewable energy projects may not decrease the overall amount of CO₂ being emitted into the atmosphere by New York entities. Still, renewable energy projects will reduce end users' carbon-footprints as they will be responsible for a smaller percent of the emissions associated with electricity production.

^c Cost per ton is based on the present value of all program costs (including initial incentives, program administration, and performance-based incentives) divided by the estimated lifetime GHG emissions reductions. Future program costs are discounted using a five percent social discount rate.

5 LIPA PV/Efficiency Program

5.1 Program Description

The current LIPA PV/Efficiency Program allocation will be used to enhance the ability of the Long Island Power Authority (LIPA) to provide energy efficiency and renewable energy services to LIPA customers in accordance with the approved LIPA budget. As the LIPA Solar Pioneer and Solar Entrepreneur PV incentive programs transition to a statewide solar electric program through NY-Sun in 2014, these RGGI funds will be used for energy efficiency programs administered by PSEG Long Island that are consistent with PSEG-Long Island's clean energy programs and Reforming Energy Vision plan. These residential and commercial energy efficiency projects may include efficient lighting, air conditioning, and other ENERGY STAR® appliances in existing buildings as well as in new construction.

5.2 Benefits

Consistent with the RGGI program selection criteria, this program is designed to reduce customer electric bills while providing significant environmental benefits including reduction of GHGs (Table 4).

Table 4. LIPA PV/Efficiency Expected Lifetime Benefits

Program	Planned Period Budget (\$ Million)	Number of Participants	Expected Lifetime Electricity Savings (MWh)	Expected Lifetime Natural Gas Savings (MMBtu)	Expected Lifetime # 2 Oil Savings (MMBtu)	Expected Lifetime Other Fuel Savings (MMBtu) ^a	Expected Lifetime CO2 Reduction (Tons) ^b	Program Cost per Ton (Expected Lifetime) ^c
LIPA Efficiency and Renewable	44.2	3,936	933,271	N/A	N/A	N/A	291,647	152

^a Other fuel savings include savings from wood, propane, kerosene, steam and coal.

^b Under a cap-and-trade system, the total number of CO₂ allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, renewable energy projects may not decrease the overall amount of CO₂ being emitted into the atmosphere by New York entities. Still, renewable energy projects will reduce end-users' carbon-footprints as they will be responsible for a smaller percent of the emissions associated with electricity production.

^c Cost per ton is based on the present value of all program costs (including initial incentives, program administration, and performance-based incentives) divided by the estimated lifetime GHG emissions reductions. Future program costs are discounted using a five percent social discount rate.

6 Residential Efficiency Services Program

6.1 Program Description

NYSERDA currently offers a suite of programs providing 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. One important benefit of the program has been the discovery and mitigation of significant levels of carbon monoxide in households at all income levels throughout the State. EEPS-Electric funding for these programs is available for achieving electric savings, and EEPS-Gas funding for these programs provides the opportunity to address certain energy-efficiency measures, such as heating systems, for customers who heat with natural gas. Home heating accounts for 30 to 40 percent of household energy costs, and improvements to heating and building shell systems can provide four times the energy cost savings of electric measures that consist primarily of lighting and appliance replacements.

NYSERDA will use RGGI funds for fossil-fuel based measures and renewable energy measures not eligible for EEPS incentives. Coordination of these funding sources will expand the number of households served and ensure that opportunities for carbon reduction measures are not lost.

RGGI funds will also be used to provide fossil-fuel efficiency programs for those not currently served by NYSERDA's programs due to funding restrictions, such as LIPA and NYPA customers and electric service customers of municipal electric providers. In the event that natural gas funding is not available, NYSERDA will use RGGI funding to support natural gas efficiency measures.

The following programs are near-term, cost-effective programs that have significant technical potential for reducing GHGs in the residential sector. These programs will seek to address environmental justice issues by directly targeting outreach to environmental justice communities and working with community-based organizations that address environmental justice issues by referring them to appropriate programs.

6.1.1 Multifamily Performance Program

The Multifamily Performance Program (MPP) serves buildings with five or more units. Existing MPP consulting firms, known as Partners in the program, will use the program's benchmarking tools, templates, and various auditing software packages to determine what energy improvements are cost-effective, their expected energy savings, and the costs to install them. The energy audits that are developed, known as Energy Reduction Plans (ERPs) in the program, identify the upgrades needed to reduce energy use by at least 15 percent.

RGGI funding will be used to reduce non-firm gas, oil, and propane in multifamily buildings by providing incentives to repair and replace space and domestic water heating systems as well as installing insulation, air sealing, and other building shell energy efficiency measures. Electric reduction measures, including ENERGY STAR[®] lighting and refrigerators, will be provided using EEPS funding in buildings eligible for those services.

Electric customers of LIPA, NYPA, and municipal electric providers will receive services for oil efficiency, including heating and shell upgrades, if not provided by their utility. NYSERDA will consider providing gas efficiency services through RGGI funds once EEPS funding targeting gas upgrades has been exhausted. NYSERDA will coordinate closely with the Weatherization Assistance Program to ensure the most effective use of both funding sources.

Approximately one-third of the multifamily buildings in New York State are heated with fossil fuels. NYSERDA proposes to service an estimated 2,000 low-income units and about 13,200 market rate units over the three-year period, assuming EEPS funds are adequate to continue addressing the electric efficiency needs of those buildings.

6.1.2 EmPower New York

EmPower New York provides energy efficiency services for low-income New Yorkers. RGGI funds are primarily targeted to households heating with oil, propane, kerosene, wood or coal, but may also be applied to homes heating with natural gas, when EEPS-Gas funding is not available. RGGI funds energy efficiency measures that reduce carbon emissions, such as insulation, air sealing, and heating system upgrades.

The RGGI-funded services are available statewide. Households served with RGGI funding are also provided with energy efficiency upgrades through EEPS-Electric funding in the territories of utilities participating in the SBC. Households may apply directly to the program, or may be referred through utilities, Offices for the Aging, Departments of Social Services, and other community-based organizations; NYSERDA will continue to coordinate services with the Weatherization Assistance Program (WAP) whenever possible, to ensure effective use of both funding sources.

6.1.3 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. The program uses a network of service providers accredited by the Building Performance Institute (BPI) to perform diagnostic testing on homes, recommend improvements, determine the payback period for those improvements, and install improvements selected by the homeowner. RGGI funding will allow HPwES to target customers using oil and propane for space and domestic water heating purposes. The funds will offset part of the cost for consumers to replace inefficient oil and propane heating equipment and other measures that have a direct impact on reducing oil and propane consumption (e.g., insulation, air sealing). Income-eligible customers receive additional incentives, up to 50% of the cost of eligible upgrades, through Assisted HPwES.

Eligible electric measures for HPwES will be covered by EEPS funds within the SBC territory. NYSERDA is coordinating with LIPA, NYPA, and municipal electric service providers to offer these heating efficiency services to their customers. In the event gas funds are not available, NYSERDA may expand use of RGGI funds to heating equipment.

HPwES and Assisted HPwES are delivered in coordination with Green Jobs - Green New York, which is described later in this Plan.

6.1.4 Solar Thermal Program

RGGI funds will support incentives for the installation of solar thermal systems to replace fossil-fuel domestic hot water systems. RGGI funds may be used to support the installation of residential and nonresidential solar thermal systems through outreach efforts targeted at increasing the market and demand for solar thermal systems. Solar thermal funding may be used for commercial applications or for space heating and cooling.

6.1.5 Low-rise Residential New Construction Program (LRNCP)

Formerly known as: New York ENERGY STAR™ Certified Homes (NYESCH)

NYSERDA's Low-rise Residential New Construction Program (LRNCP) incorporates the New York ENERGY STAR® Certified Homes Program as well as the alternative New York Energy Smart designation for gut rehabilitation projects. These programs were designed and intended to encourage the construction of single-family homes and low-rise residential dwelling units that operate more energy efficiently, are more durable, more comfortable, and provide a healthier environment for their occupants than would otherwise be achieved. Technical assistance and financial incentives are offered to builders and developers, as well as to Residential Energy Services Network (RESNET) Home Energy Rating System (HERS) Providers and their Home Energy

Raters to encourage the adoption of progressive building practices among professional homebuilders and developers while stimulating permanent consumer demand for dwellings that are significantly more energy-efficient than code-built homes. Additional support is now available, with eligibility based on the achievement of increased levels of energy performance, up to and inclusive of homes that are designed to achieve net zero energy performance through on-site production of at least as much energy as will be used in a year.

LRNCP requires a minimum annual kilowatt-hour usage reduction, typically achieved through the installation of ENERGY STAR[®] qualified heating and cooling equipment, appliances, lighting, and electronically commutated motors in HVAC equipment. LRNCP also require combustion appliance safety testing, and additionally mandates minimum building shell tightness standards, properly sized heating and cooling systems, proper ventilation to ensure indoor air quality, ENERGY STAR[®]-qualified appliances, and high-efficacy lighting. The installation of a solar electric system, sized to offset the use of grid produced energy at the site, is required on homes that are applying for the highest incentive levels offered by LRNCP, intended to support net zero energy performance. RGGI funds are used, in combination with EEPS-Electric funding, when oil or propane will be used as the primary heating fuel. This allocation primarily occurs in geographic areas that do not have access to natural gas utility service.

6.2 Benefits

Consistent with the program selection criteria, the Residential Efficiency Services initiatives support:

- The cost-effective reduction of GHGs.
- Other benefits to New York State by leveraging RGGI funds with existing electric reduction programs funded through SBC and other sources, participates will realize more annual energy bill savings than when only electric measures are installed.
- Opportunities to reduce the disproportionate cost burden and environmental impacts on low-income families and environmental justice communities.

Table 5 presents anticipated fuel savings, CO₂ reductions, and program cost per CO₂ ton reduced over the lifetime of the installed upgrade.

Table 5. Residential Efficiency Services Program Expected Lifetime Benefits

Program	Planned Period Budget (\$ Million)	Number of Participants^a	Expected Lifetime Electricity Savings (MWh)	Expected Lifetime Natural Gas Savings (MMBtu)^b	Expected Lifetime # 2 Oil Savings (MMBtu)^b	Expected Lifetime #6 Oil Savings (MMBtu)	Expected Lifetime Other Fuel Savings (MMBtu)^{b,c}	Expected Lifetime CO2 Reduction (Tons)^d	Program Cost per Ton (Expected Lifetime)^e
Multifamily Performance Program	8.0	12,760	69,064	191,245	3,780,760	N/A	267,791	361,048	22
MPP Market Rate	5.1	8,166	44,201	122,397	2,419,686	N/A	171,386	231,071	22
MPP Low Income	2.9	4,594	24,863	68,848	1,361,074	N/A	96,405	129,977	22
Multifamily Carbon Emission Reduction Program ^f	0.7	2,481	N/A	(3,597,949)	(189,366)	3,787,314	N/A	88,636	8
EmPower New York	8.4	2,052	N/A	147,312	1,076,601	N/A	281,600	116,074	71
Home Performance with ENERGY STAR	8.8	1,676	17,500	29,900	4,185,115	N/A	(12,812)	340,222	25
HP Market Rate	4.1	771	8,050	13,754	1,925,153	N/A	(5,894)	156,502	25
HP Low Income	4.8	905	9,450	16,146	2,259,962	N/A	(6,919)	183,720	25
Low-rise Residential New Construction Program	0.4	206	6,517	N/A	N/A	N/A	140,544	11,660	35
Total	26.3	19,175.1	93,082	(3,229,491)	8,853,110	3,787,314	677,123	917,640	\$ 29

^a The number of participants in the multifamily residential sector represents individual units rather than buildings.

^b Some programs experience an increase in fuel usage due to fuel switching projects and interactive effects from certain measures. Interactive effects may include increased demand for heating fuel as a result of switching lighting technology; for example, if a switch to fluorescent lighting eliminates associated resistive heating from incandescent lighting.

^c Other fuel savings include savings from wood, propane, kerosene, steam, and coal.

^d These emission reductions are associated with both electric and fossil-fuel saving measures. Under a cap-and-trade system, the total number of CO₂ allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, electric-efficiency projects may not decrease the overall amount of CO₂ being emitted into the atmosphere by New York entities. Still, electric-efficiency projects will reduce end users' carbon footprints as they will be responsible for a smaller percent of the emissions associated with electricity production.

^e Cost per ton is based on the present value of all program costs (including initial incentives, program administration, and performance-based incentives) divided by the expected lifetime GHG emissions reductions. Future program costs are discounted using a five percent social discount rate.

^f This program is expected to support the switching of residual fuel oil to lower carbon fuels, which may cost more per delivered unit of energy. The potential additional cost to consumers associated with this fuel switching has not been included in the program metrics.

7 Industrial Innovations

7.1 Program Description

Industrial Innovations will target three industrial initiatives that are an evolution of the existing industrial programs. The project selection process will take into consideration fuel cycle GHG emissions. The activities will also help to create, attract, and grow industries in New York State that can exploit emerging business opportunities in clean energy and environmental technologies while supporting the goal of carbon mitigation. Funds will be used in a manner consistent with the regulations governing use of RGGI proceeds. The initiatives will be coordinated with the Regional Economic Development Councils.

The first program component of Industrial Innovations will focus on accelerating the adoption of emerging technologies that will improve the energy efficiency of industrial processes and data center operations in New York. The projects will focus on technical innovations that have high replication potential and can become cost-effective. The second component will provide assistance for the development of manufacturing methods and tools to enable the efficient mass production of clean energy technologies (e.g., solar electric or energy storage) in New York State. The third component will support development and demonstration of advanced manufacturing technologies that significantly reduce the energy intensity of industrial processes in the State.

7.2 Benefits

The Industrial Innovations program supports a variety of initiatives that result in quantitative and qualitative benefits in addition to increasing energy efficiency. The initiatives are consistent with program selection criteria by:

- Investing in technology that has significant potential to reduce GHG emissions in New York State.
- Providing economic development benefits associated with technology application at existing industrial and commercial facilities, with potential spill-over replication benefits at large multifamily facilities, and product development in New York industries.

For example, the Data Center program supports the development and validation of technologies that improve the energy-efficiency of IT hardware and associated supporting infrastructure. The program also aims to increase the penetration and integration of environmentally preferred power generation technologies within data centers. The goals of the program are to support technology development, analyze business cases, increase industry awareness of emerging technologies and best practices, and validate performance to a degree that would allow for inclusion in NYSERDA and utility deployment programs and accelerate market adoption.

It is expected that energy and carbon emission savings will be realized through supported demonstration projects and market replication. Product development projects also present the possibility of carbon and energy savings, but only after commercialization and deployment of those technologies; these savings will be directly related to the number of units sold. All supported projects may also yield product development metrics (e.g., patents, sales, license agreements, etc.) and the opportunity for increasing industry awareness.

Table 6 presents anticipated fuel savings, CO₂ reductions, and program cost per CO₂ ton reduced over the lifetime of the installed measure.

Table 6. Industrial Innovations Program Expected Lifetime Benefits.

Program	Planned Period Budget (\$ Million)	Number of Participants	Expected Lifetime Electricity Savings (MWh)	Expected Lifetime Natural Gas Savings (MMBtu)	Expected Lifetime # 2 Oil Savings (MMBtu)	Expected Lifetime #6 Oil Savings (MMBtu)	Expected Lifetime Other Fuel Savings (MMBtu) ^a	Expected Lifetime CO ₂ Reduction (Tons) ^b	Program Cost per Ton (Expected Lifetime) ^c
Industrial Innovations	15.9	49	65,634	1,312,688	262,538	N/A	175,025	128,369	122

^a Other fuel savings include savings from wood, propane, kerosene, steam, and coal.

^b Under a cap-and-trade system, the total number of CO₂ allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, renewable energy projects may not decrease the overall amount of CO₂ being emitted into the atmosphere by New York entities. Still, renewable energy projects will reduce end users' carbon footprints as they will be responsible for a smaller percent of the emissions associated with electricity production.

^c Cost per ton is based on the present value of all program costs (including initial incentives, program administration, and performance-based incentives) divided by the estimated lifetime GHG emissions reductions. Future program costs are discounted using a five percent social discount rate.

Specifically, the Industrial Innovations program anticipates working with up to 65 companies, and leveraging outside funding sources in excess of \$15.9 million.

8 Climate Research and Analysis

8.1 Program Description

Since its inception, the Climate Research and Analysis program has significantly increased the understanding and awareness of the environmental impacts of energy choices and emerging energy options. It will continue to provide a scientific foundation for formulating effective, equitable, energy-related environmental policies and resource management practices that can both reduce GHG emissions and guide strategies to prepare for a changing climate. The program will build upon the environmental research capabilities in New York State, and address critical climate change-related issues facing the State and the region, including the needs of environmental justice communities, and create opportunities for innovation. This program will support research studies, demonstrations, policy research and analyses, and outreach and education efforts related to the following questions:

- What are the most cost-effective greenhouse gas mitigation strategies for New York to pursue?
- What are the key parameters that need to be monitored to establish baselines and assess climate change impacts in New York?
- What are the current and predicted impacts of climate change to energy, transportation, telecommunications, water resources, coastal zones, ecosystems, agriculture, public health and the built environment in New York State, and how can risks associated with climate change be cost-effectively managed and minimized? Additionally, what opportunities exist to take advantage of opportunities related to a changing climate?

8.2 Benefits

These research initiatives are consistent with the program selection criteria and will:

- Inform decisions related to reducing the cost of achieving the emission reduction goals of local, state, and regional programs.
- Evaluate and document health and environmental impacts and opportunities.
- Guide initiatives designed to reduce the disproportionate cost burden and environmental impacts on low-income families and environmental justice communities.

The nature of the Climate Research program does not lend itself to tracking traditional quantifiable benefits such as GHGs saving. Nevertheless, there are real benefits associated with Climate Research that can be quantified in terms of numbers of critical research studies completed; publications; thought leadership summits held, such as conferences, workshops, and seminars; topical briefings provided; and funds leveraged through other funding sources that might not be available but for the cost-sharing opportunities presented through RGGI proceeds. Also tracked will be climate change-related policies and initiatives in New York State that are informed by program products. Table 7 presents the anticipated quantitative benefits associated with the Climate Research program over the three-year planning period.

Table 7. Climate Research and Analysis Program – Anticipated Benefits

Climate Research	Projected Total Associated with Funds Described for this Planning Horizon
Research Studies	22
Publications	22
Conferences, Workshops, and Seminars	10
Briefings	19
Funds Leveraged	\$1,817,525

9 Clean Energy Business Development

9.1 Program Description

The Clean Energy Business Development program seeks to create, attract, and grow industries in New York State that can benefit from emerging business opportunities in clean energy and environmental technologies while supporting the goal of carbon mitigation. Key elements of the program include:

- Providing financial support to leverage private investment in early-stage and expansion-stage clean energy companies in New York and accelerate the market introduction of innovative energy efficiency, renewable energy, or carbon abatement technologies. Emphasis will be placed on early-stage and pre-revenue companies with high-growth potential. Implementation may mirror the process used by private and public seed or venture funding organizations with transparent decision criteria and evaluation/recommendations by qualified investment professionals.
- 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. The program is expected to maximize product competitiveness by identifying and capturing cost-saving opportunities associated with production.
- Develop and support a portfolio of programs designed to translate clean energy technology research into commercially viable business enterprises. This portfolio could include programs targeting the commercialization of academic, private, and public research; primary and secondary research on customer demand from the manufacturer to the end-user; technical and financial support to move new energy technologies to the point of commercial-scale manufacturing; cooperative programs to support the commercial introduction of new clean energy technologies; and, other programs that increase the likelihood of commercial success for clean energy technologies that are beneficial to New York State.
- Establishing a Photovoltaic Manufacturing Consortium (PVMC) to coordinate a multi-faceted industry-driven collaborative R&D initiative to advance copper indium gallium selenide (CIGS) manufacturing process, tools, and materials. The PVMC has established a CIGS manufacturing development facility in Albany, NY, that solar electric companies and researchers can use for product prototyping, demonstration, and pilot-scale manufacturing. This facility will allow users to evaluate and validate the CIGS technologies they develop without investing in costly prototyping equipment themselves, which will reduce the cost and risk of developing commercial CIGS-based PV products.

9.2 Benefits

The program provides the following benefits:

- Invests in businesses involved with technologies that have long-range potential to reduce GHG emissions in New York.
- Supports the establishment of public-private product development and applied research facilities to bring renewable energy technologies to market.
- Partners with firms to move new technologies from the development stage to the manufacturing stage.
- Provides other benefits to New York, such as the potential to create jobs, leverage capital investment to promote clean energy economic development.

Table 8 presents anticipated benefits from the program portfolio.

Table 8. Clean Energy Business Development Program – Anticipated Benefits

Clean Energy Business Development Funding Benefits	Projected Total Associated with Funds Described for this Planning Horizon
NY Companies/Clients Receiving Support	75
Start-ups Receiving Support	20
Funds Leveraged	\$5,000,000

10 Charge NY

10.1 Program Description

With RGGI funding for Charge NY, NYSERDA will pursue two main strategies to promote plug-in electric vehicle (PEV) adoption. First, NYSERDA will invest in an engagement campaign targeting employers, car dealers, retailers, and the general public to both engender greater support for PEVs through contests and recognition programs and to educate potential PEV and PEV infrastructure buyers about their options. Initial investments will include a pilot program for encouraging car dealers to increase PEV sales and a recognition program for workplaces across the State. This key aspect encourages PEV deployment that has been lacking and one that is essential to spur more private investment in PEV purchases and PEV charging stations.

Second, NYSERDA will support the installation of PEV charging stations at location types that have been seen to be effective drivers for PEV adoption based on usage data reported from previous installations, such as workplaces, municipal lots, and multifamily buildings. A combination of financial support and a purchasing collaborative to reduce costs for all participants will facilitate the installation. Regions of the State that have seen faster PEV adoption will be identified for additional charging station support, which will make sure that investments in infrastructure support areas with the greatest potential for additional PEV drivers. RGGI funds will also be used to initiate the deployment of a network of DC fast charge stations across the State.

10.2 Benefits

The Charge NY Program will provide significant environmental benefits including the reduction of GHG emissions through the displacement of petroleum use. The anticipated portfolio will have an array of projects dealing mainly with on-road transportation concentrating on PEVs and their associated charging infrastructure (Table 9). The increase in the installation of charging infrastructure across the State will help reduce the “range anxiety” for potential PEV owners thus spurring an increase in PEV acquisitions.

Table 9. Charge NY - Anticipated Benefits

Charge NY Funding Benefits	Projected Total Associated with Funds Described for this Planning Horizon
Funds Leveraged	\$ 3,000,000
Publically Accessible EV Charging Stations	300

11 Transportation Research

11.1 Program Description

Vehicle tailpipe emissions are the largest single contributor to urban air pollution. The goal of the Advanced Transportation Development program is to develop and increase the availability of improved technologies, products, systems, and services that provide cost-effective GHG reductions. The program will support the development of transportation, including infrastructure for plug-in electric vehicles, the development and demonstration of emerging technologies that improve highway, rail, marine, and air transportation system efficiency. This includes technologies that improve on and off road vehicle efficiency such as hybrid drive trains, efficient alternators, and idle-stop systems for urban duty vehicles. Projects that improve efficiency through planning, policy, or vehicle optimization may have little physical hardware developed, but are programmed to the same goal of GHG reduction. The RGGI funds will leverage and fill gaps in state and federal funding including Department of Transportation Congestion Mitigation and Air Quality Program, Department of Energy, and SBC Technology & Market Development funds.

11.2 Benefits

The Transportation Research program coincides with the program selection criteria in the following ways:

- Invests in technologies and systems with significant potential for reducing GHGs in New York.
- Provides other benefits, specifically related to air quality and environmental justice. Vehicle and infrastructure projects lower operating costs for public entities such as schools, municipalities, and public transit agencies.
- Develops and demonstrates products and services that increase the effectiveness of existing systems.
- Construction of cutting-edge infrastructure can encourage innovations and progress in the electrification of transportation.
- Provides funding for these initiatives that do not receive adequate support from other funding sources.
- Businesses often see savings in association with reduced fuel usage. Citizens will reap similar benefits, or have commercial savings passed down to them in the long term.
- Alternative fuel and transportation mode choices buffer fuel price fluctuations.
- Reduced fuel usage, modes of transit, and optimization schemes help increase the resiliency of the transportation network, such as having electric vehicles during a gasoline shortage.
- Many secondary benefits, such as reduction in travel time and fuel switching.

Demonstration projects will provide fuel and emissions savings. Product development efforts will yield outcomes such as patents, license agreements, and sales. The current portfolio has an array of projects mainly dealing with on-road transportation and concentrating on vehicles, infrastructure, logistics, and fuel. Table 10 summarizes the benefits associated with research funding.

Table 10. Transportation Research - Anticipated Benefits

Transportation Research Funding Benefits	Projected Total Associated with Funds Described for this Planning Horizon
Funds Leveraged	\$3,751,631
NY Companies Receiving Support	21
Start-ups Receiving Support	5
Products developed	3
Patents	3
Product sales	\$600,000

12 Competitive Greenhouse Gas Reduction (CGGR) Pilot

12.1 Program Description

Under this program, a competitive solicitation(s) will be developed and issued for market-ready projects that reduce GHG emissions at electric generating facilities in New York. Projects will be selected based on a combination of technical merit/replication potential and cost of delivering GHG reductions. The electric generation sector will be the initial focus of the program. It is anticipated that projects could include, but not be limited to, supply-side energy efficiency and advanced controls that will reduce GHG emissions cost-effectively. If additional funds become available, the scope of future program initiatives could be broadened to include other sectors.

12.2 Benefits

The program will address the program selection criteria and provide the following benefits:

- Provide a framework for marketplace participants to compete for funding to support large GHG reduction projects primarily on a cost-per-ton of CO₂ equivalent basis.
- Reduce the costs of achieving the reduction goals of the CO₂ budget trading program by achieving CO₂ reduction through more efficient electricity generation.
- Result in additional benefits including job creation, leveraged capital investment to promote cleaner economic development, and environmental benefits.

The CGGR program is expected to attract a mix of proposals from the power generation sector for varied technologies and GHG reduction strategies. NYSERDA anticipates bid prices could range from \$5 to \$30 per ton and total funding could deliver 500,000 to 3,000,000 tons of lifetime CO₂ reductions.

13 Cleaner, Greener Communities

13.1 Program Description

This program was announced by Governor Cuomo in his 2011 State of the State address. It builds on the Climate Smart Communities program, providing enhanced support for development and implementation of regional sustainability plans to help ensure that the State's ongoing and substantial investments in infrastructure help to move communities and New York State as a whole toward a more environmentally sustainable future. The program encourages communities to use public-private partnerships and develop regional sustainable growth strategies in areas such as emission control, energy efficiency, renewable energy, low-carbon transportation, and other carbon reductions. The program emphasizes activities associated with smart growth such as creating green jobs, building green infrastructure, investing in environmental justice communities, and strengthening environmental protection.

The program has two primary components: Phase I was the development of regional sustainable growth plans and Phase II is implementation of elements of the sustainability plans. Ten region-specific planning teams were competitively selected under Phase I to develop a plan for each of the State's 10 Regional Economic Development Council regions. Approximately 10 percent of the budget was made available during Phase I for communities to develop regional sustainability plans to reduce GHG pollution and improve residents' health and quality-of-life. The remaining 90 percent of the budget will be used to support the Phase II implementation component of the program for proposals to implement individual projects related to the plans that will result in immediate and long-lasting GHG emissions reductions and enhance community climate resiliency. Projects that have garnered community acceptance and approval, as well as those projects that include public-private partnerships, will be encouraged. Consideration will be given to support implementation projects in multiple types of communities (i.e., rural, suburban, and urban communities). RGGI proceeds will only be used for the implementation of plan elements that fall within the scope of the permissible use of RGGI proceeds. The first round solicitation for Phase II funding was released and awarded in 2013. NYSERDA awarded approximately \$31 million to 45 projects across the State. The second round solicitation to select projects for Phase II funding was released in May 2014 and proposals were received in June 2014. NYSERDA recently announced awards in December 2014.

Outreach and community support for the overall Cleaner, Greener Communities initiative will be provided in part through Climate Smart Communities and the Economic Development Growth Extension (EDGE) Program. NYSERDA program implementation support is being provided by a competitively selected contractor.

13.2 Benefits

The Cleaner, Greener Communities program will reduce GHG emissions and enhance local planning through development and implementation of regional sustainability plans (Table 11). The regional sustainability plans provided baseline GHG inventories, and described long-term and short-term sustainability goals for the region. These goals include GHG reductions and sustainability goals for energy supply, transportation, water management, waste management, land use, open space, agriculture, housing, and economic development. The plans identify the most effective opportunities for achieving carbon reductions, energy-efficiency savings, and renewable energy deployment; and include appropriate metrics that will be used to measure GHG reduction progress and co-benefits such as job creation and energy savings. Implementation support is being provided on a competitive basis for specific projects that provide the greatest opportunities for achieving carbon reductions, energy-efficiency savings, and renewable energy deployment consistent with a region’s sustainability plan and Regional Economic Development Council Strategic Plan. Although additional, unique benefits will be tracked for many projects, the following benefits will be tracked for all projects. Benefits will be estimated at the beginning of a project, refined at the end, with changes in benefits over time projected out for periods of 5, 15, and 30 years post project completion.

Table 11. Cleaner, Greener Communities Program Benefits

Cleaner Greener Communities Program Benefit	Unit
GHG Emissions Savings / year	MTCDE/year
Total Conventional Energy Savings	MMBtu
Conventional Energy Cost Savings	\$
Permanent Jobs Created	number
NYSERDA CGC Investment (funding requested)	\$
Investment by Others I(matching and leveraged)	\$

Three types of projects were awarded (eligible) under the first solicitation for Phase II support including:

1. Category 1: Photovoltaic and Electric Vehicle Supply Equipment Permitting Incentive Applications.
2. Category 2: Planning Initiatives (comprehensive planning, zoning amendments or other innovative planning-related initiatives).
3. Category 3: Community-Scale Sustainability Projects (community-scale sustainability projects that are innovative and transformational in their contributions to advancing sustainable development; thereby creating direct community benefit and reduction of carbon emissions. Project types include showcase or anchor construction projects, as well as innovative projects or programs that stimulate market transformation).

Table 12 summarizes the benefits of the Community-Scale Sustainability Projects awarded under round one of Phase II.

Table 12. Benefits of Community-Scale Sustainability Projects

Annual Savings (or results) by Project Close			
Metric Name	Direct	Leveraged	Total
Permanent Jobs (FTE)	56	360	416*
Cost Savings / year (\$)	1,612,471	20,775,246	22,387,717
Energy Savings / year (MMBtu)	948,218	726,195	1,674,412
GHG Savings / year Metric Tons of CO ₂	30,013	95,581	125,593
Total Lifetime [20 year] savings (or Results)			
Metric Name	Direct	Leveraged	Total
Permanent Jobs (FTE)	56	360	416*
Cost Savings /	32,249,414.09	415,504,920	447,754,335
Energy Savings / (MMBtu)	18,964,354.13	14,523,893	33,488,247
GHG Savings / Metric Tons of CO ₂	600,253.36	1,911,613	2,511,866

* Estimated jobs sustained over 20 years.

14 Green Jobs - Green New York

14.1 Program Description

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 green-collar workforce. GJGNY is a statewide effort to strengthen New York State communities through energy efficiency. It enables New Yorkers to make a significant difference in homes, businesses and neighborhoods – making them more comfortable, more sustainable, and more economically sound. GJGNY is administered by NYSERDA and made available by the Green Jobs – Green New York Act of 2009. NYSERDA supports a broad range of education and training programs aimed at creating an experienced clean energy workforce. Participants gain the skills and credentials needed to meet the demand for energy efficiency, renewable energy technologies, and support the state’s growing clean energy economy. Through public-private partnerships, NYSERDA Workforce Development Programs support the development and delivery of cutting-edge training programs, and provide financial support to those who wish to pursue new career training, professional certifications and critical on-the-job training. Please refer to the Green Jobs-Green New York Operating Plans for more details (<http://www.nyserderda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Program-Planning/GJGNY-Planning/Reports-and-Operating-plans/Operating-Plans.aspx>).

14.2 Benefits

GJGNY serves as a point of entry into existing energy-efficiency programs for prospective projects through the audit and financing offerings. It is anticipated that only a small portion of these projects will proceed solely through a GJGNY-funded audit or loan and without additional incentives from NYSERDA or another Program Administrator(s). In the 2010 Operating Plan, an attempt was made to attribute savings across various funding sources. The effect on the RGGI Operating Plan was that no savings were given to the GJGNY Program for projects that program staff estimated would receive other support besides an audit and/or loan only. Since that time, experience has shown that it is extremely difficult to predict how much implementation of audit recommended measures will go through support programs previously identified. Additionally, management has agreed that reporting on each respective portfolio of coordinating programs such as RGGI/GJGNY and EEPS will state the full benefits contributed to by each funding source, and NYSERDA-wide reporting will ensure there is no double counting. Therefore, the Plan does not attempt to disaggregate savings by funding source. Table 13 presents anticipated fuel savings, CO₂ reductions, and program cost per CO₂ ton reduced over the lifetime of the installed measure.

Table 13. Green Jobs - Green New York Program - Expected Lifetime Benefits

Benefits for the Green Jobs, Green New York Program were calculated for Residential and Small Commercial programs only. No benefits are calculated for Workforce Development or Marketing and Outreach related funds.

Program ^a	Planned Period Budget (\$ Million)	Number of Participants ^b	Expected Lifetime Electricity Savings (MWh)	Expected Lifetime Natural Gas Savings (MMBtu)	Expected Lifetime # 2 Oil Savings (MMBtu)	Expected Lifetime #6 Oil Savings (MMBtu)	Expected Lifetime Other Fuel Savings (MMBtu) ^c	Expected Lifetime CO2 Reduction (Tons) ^d	Program Cost per Ton (Expected Lifetime) ^e
Residential	14.0	27,820	121,924	3,837,442	2,209,563	N/A	349,681	463,800	48
Residential - One-to-Four Family	9.1	11,851	89,495	3,329,038	2,004,420	N/A	335,157	406,079	37
Residential - MultiFamily	5.0	15,970	32,429	508,404	205,143	N/A	14,524	57,721	119
Small Business	9.8	1,883	71,851	577,598	223,341	N/A	33,090	76,838	191
Total	23.8	29,704	193,775	4,415,040	2,432,905	N/A	382,772	540,638	70

^a Projects that receive GJGNY-supported audits and/or financing may also receive incentives through the System Benefits Charge (SBC), Energy Efficiency Portfolio Standard (EEPS), Regional Green House Gas Initiative (RGGI), and/or utility programs, such that the projects' energy savings may not all be attributable solely to GJGNY. For the purpose of this Operating Plan, the potential savings associated with all projects is shown (after applying an adjustment factor to account for the anticipated implementation rate). No savings are estimated for the financing portions of these programs.

^b The number of participants in the multifamily residential sector represents individual units rather than buildings.

^c Other fuel savings include savings from wood, propane, kerosene, steam and coal.

^d These emission reductions are associated with both electric and fossil-fuel saving measures. Under a cap-and-trade system, the total number of CO₂ allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, electric efficiency projects may not decrease the overall amount of CO₂ being emitted into the atmosphere by New York entities. Still, electric-efficiency projects will reduce end users' carbon footprints as they will be responsible for a smaller percent of the emissions associated with electricity production.

^e Cost per ton is based on the present value of all program costs (including initial incentives, program administration, and performance-based incentives) divided by the expected lifetime GHG emissions reductions. Future program costs are discounted using a five percent social discount rate.

With regard to workforce development, the GJGNY Program will help to create jobs and assist in reducing the disproportionate cost burden and environmental impacts on low-income families and environmental justice communities.

GJGNY workforce development and training activities are expanding New York State's capacity to deliver training services through working with community-based training organizations, expanding existing training centers, providing much-needed training equipment and tools, and minimizing barriers to delivering field testing and certification examinations. The initiative is also providing direct-entry, on-the-job, and apprenticeship incentives to help defray the costs associated with bringing on new hires. Workforce development and training activities promote the widespread implementation of energy efficiency measures and provide meaningful employment opportunities for job seekers.

15 NYS Generation Attribute Tracking System (NYGATS)

15.1 Program Description

NYSERDA's New York Generation Attribute Tracking System (NYGATS) provides an auditable accounting platform to create unique, serialized Certificates that document the environmental and nonenvironmental characteristics or attributes of each megawatt-hour of electricity generated from both renewable and nonrenewable resources in the New York Independent System Operator (NYISO) market settlement system, and for small generators not settled by the NYISO that meet the requirements of the Environmental Disclosure Program (EDP), Renewable Portfolio Standard (RPS), or are supported by the voluntary renewable energy market.

NYGATS will also characterize the attributes of electricity imports and exports, and have the capability to interface and exchange information with other certificate tracking systems necessary to account for all electricity generated, imported and consumed in New York State.

Through the development of NYGATS, entities will be able to verify and substantiate ownership of Renewable Energy Certificates (RECs) to either support regulatory compliance or to validate environmental attributes in trading markets.

The system may also serve as an important building block for a potential future imports policy under RGGI as well as compliance activity associated with EPA Clean Air Act, Section 111(d). As previously ordered by the Public Service Commission, this project will also be supported with System Benefit Charge environmental disclosure program funding.

15.2 Benefits

NYGATS tracking of environmental characteristics or attributes of each megawatt-hour will provide a platform to support energy policies and provide emissions data for a growing renewable electricity market. NYGATS' transparency will enable individuals or communities of consumers to make deliberate decisions on the energy they purchase and consume that can ultimately lead to lower carbon emissions as well as economic and societal co-benefits. NYGATS' capability will support or complement existing programs, such as RPS, Environmental Disclosure Program, and RGGI as well as support the development and implementation of State 111(d) Plans, including metrics on the progress of New York State's environmental goals.

16 NY Green Bank

16.1 Program Description

NY Green Bank (NYGB), a division of NYSERDA, is a \$1 billion initiative proposed by Governor Cuomo in his 2013 State of the State address. NYGB is a key component of Governor Cuomo's strategic statewide vision to scale up clean energy markets, enhance New York State's competitiveness for clean energy businesses, and make the State's energy systems more efficient and resilient.

NYGB's mission is to accelerate clean energy deployment in New York State by working in partnership with the private sector to transform financing markets. NYGB uses various commercial and market-based strategies to address financial market barriers and gaps that impede the flow of private capital for the clean energy sector. NYGB is market-focused and market responsive, operating in the wholesale (not retail) markets. In all of its investments, certain minimum criteria must be met including: generating expected financial returns on a portfolio basis so that NYGB is self-sustaining; transactions contribute to financial market transformation; and critically, certain clean energy outcomes are expected. Specifically, clean energy outcomes include the potential for energy savings and/or clean energy generation – all contributing to GHG reductions in support of New York's clean energy policies.

RGGI proceeds allocated to NYGB support the key RGGI goal of GHG emissions reduction through investment in qualifying renewable energy, energy efficiency, and other clean energy technologies. NYGB's focus is on proven technologies and scalable and replicable projects and investments, in the context of partnering and co-investing with private sector participants. NYGB's commercial approach to proposal evaluation, addressing and pricing risk and structuring transactions to meet its investment criteria support outcomes for the investment of RGGI proceeds by NYGB that align with RGGI's overall goals. NYGB's ability to recycle its capital through numerous successive projects (as initial investments mature or are monetized), as well as mobilize and leverage private capital to invest alongside NYGB mean that each dollar of RGGI proceeds deployed by NYGB can be expected to have a greater impact.

16.2 Benefits

NYGB is a cost-effective and complementary component of New York State’s evolving portfolio of clean energy initiatives. It uses demonstrated financing tools to promote self-sustaining markets, while enabling private sector financing to expand the frontiers of current commercial clean energy investment opportunities, ultimately increasing the deployment of proven clean energy technologies in New York State. With a flexible, nimble, and dynamic approach, NYGB is able to actively identify and alleviate existing market gaps and barriers, and allow market forces to reduce the need for government support. NYGB’s objectives are well-aligned with those of RGGI because NYGB is specifically focused on accelerating the deployment of proven clean energy technologies and its minimum investment criteria include demonstrated clean energy and GHG reduction benefits.

NYGB partners with the private sector to address and alleviate gaps and barriers in current clean energy financing markets through a variety of approaches and transaction structures. Rather than compete with private sector clients and partners NYGB looks to crowd them in to the marketplace, and its collaborative transactions are specifically aimed at transforming clean energy financing markets by enabling greater scale, new and expanded asset classes, and greater liquidity. The benefits of NYGB activity come not just from the investment of its own funds, but from the ability to leverage private capital into the clean energy sector, materially increasing the capital mobilized, motivating faster and more extensive private participation in the clean energy marketplace, and advancing clean energy financing markets to create a more efficient, reliable, and sustainable energy system in the State.

Central to achievement of its objectives is NYGB’s ability to efficiently recycle funds. Unlike a pool of public funds that is dispensed once to qualifying projects as nonrefundable grants or subsidies, funds entrusted to NYGB are disbursed under commercial arrangements generating investment income and requiring repayment in accordance with agreed terms for each product and client/partner project. This means that as each dollar from NYGB cycles through successive investments, benefits generated will be compounding and not just attributable to funds advanced to a single clean energy project. Further, as the commercial markets expand into and increasingly accommodate clean energy finance needs previously supported by NYGB, the multiplier effect on NYGB’s investments will continue, as NYGB moves to the next “near-frontier” of clean energy market activity.

All New Yorkers benefit from a thriving clean energy sector that grows the economy and improves the environment, while receiving greater returns and public benefits for every dollar spent on clean energy.

17 Program Evaluation and Reporting

The overarching goals of the RGGI program evaluation effort are to provide objective and credible information that supports optimum program operation and outcomes, and provides program accountability. The evaluation effort will assess progress toward meeting stated program and public policy goals, as well as progress in moving markets toward behaviors that result in emissions reductions and increased energy efficiency and use of renewable energy.

The evaluation and reporting activities outlined herein will be applied to the portfolio of RGGI programs described in this Plan. RGGI program evaluation and status reports will address the portfolio of programs, support, and benefits included in this Plan.

A separate evaluation operating plan has been developed for the Green Jobs - Green New York (GJGNY) Program. Evaluation and reporting activities discussed within this section pertain to all other RGGI programs.

17.1 Evaluation Budget

The budget for RGGI program evaluation is based on the program evaluation budget established for NYSERDA's current SBC-funded energy-efficiency programs, which are limited to not more than 5 percent of total program funding. The evaluation budget will support: overall evaluation design and planning, implementation of plans by third-party contractors, and NYSERDA's management of the evaluation activities. Implementation of the evaluation plans will involve collection and analysis of primary and secondary data by independent contractors. Primary data collection activities that may be undertaken by evaluation contractors include: on-site verification; metering and monitoring of installed measures; and conducting in-person, telephone, email, and other types of surveys and interviews. NYSERDA will use its best efforts to leverage existing evaluation experience and staffing to maximize economies of scale.

17.2 Evaluation Approach

NYSERDA tailors evaluation to the specific types of RGGI programs and their approach to achieving CO₂ reductions. Individual programs will receive varying levels of evaluation depending on need. The focus of the evaluation work will be on assessing program impacts, namely CO₂ reductions. Process and market evaluations are also planned, especially for programs that are not already receiving process or market studies under another support source such as the SBC. Each of these three main areas of program evaluation – impact, market and process – is described briefly in this section.

The types of programs presented in this Plan are expansive in terms of the sectors and fuels covered and the ways in which they reduce CO₂. NYSERDA has divided programs into two broad categories for purposes of evaluation:

- Deployment Programs that provide direct emission reductions through on-site electric or fossil-fuel efficiency measures, or on-site generation that displaces grid electricity.
- Research and Development Programs that provide less direct, longer-term benefits in advancing information, technologies and markets.¹³

These two categories of programs present different evaluation needs, especially in the area of impact evaluation, as described in the following section.

17.2.1 Impact Evaluation

Impact evaluation measures the outcomes and co-benefits attributable to a program, calculates the cost-effectiveness of a program, and compares the outcomes to the goals set forth for the program. Key metrics for evaluating impacts of the RGGI programs include, but may not be limited to, the following direct outcomes and co-benefits: CO₂ reductions; electricity and fuel savings; customer bill savings; program cost per ton of CO₂ reduced; and job creation.

For deployment programs that provide direct emission reductions through on-site electric and fossil-fuel efficiency projects, NYSERDA first plans to measure and verify the electric and fossil-fuel savings attributable to the programs, and then apply emission factors to determine CO₂ reductions. Measurement, verification, and attribution analysis will be conducted on a sample of completed projects according to industry best practices and will build on NYSERDA's experience with SBC Program evaluation. Similar approaches may be appropriate as well for on-site generation projects that are displacing electricity otherwise purchased from the grid. Once the evaluation of electric and fossil-fuel savings is complete, NYSERDA plans to apply default emission factors available from secondary sources. Default factors are commonly used in lieu of source testing due to the time and cost of such testing.¹⁴ Evaluations will ensure that appropriate emission factors, taking into consideration the technology, timing, and location of projects, are applied to fossil-fuel savings.

¹³ Programs in this second category are: Clean Energy Business Development, Advanced Power Technology, Climate Research and Analysis, Transportation Research and Industrial Innovations.

¹⁴ U.S. Environmental Protection Agency. 2007. National Action Plan for Energy Efficiency. *Model Energy Efficiency Program Impact Evaluation Guide*. Prepared by Steven R. Schiller, Schiller Consulting, Inc. (www.epa.gov and eeactionplan), Chapter 6.

Evaluation strategies for Research and Development Programs (i.e., those programs that do not provide emission reductions through on-site energy efficiency and generation projects) will be explored in detail by NYSERDA and contractors procured to provide assistance in this area. Specific evaluation plans will take into consideration the level of rigor necessary for the program-reported emission-reduction estimates to apply an appropriate level of rigor in the evaluations. For example, programs involving detailed and project specific technical studies of expected emission reductions may require less emphasis by evaluation than other programs.

NYSERDA recognizes the importance of providing information on the geographic distribution of program funding and benefits, and will examine how best to present this information within available technical capabilities. Impacts for specific populations, such as low-income and environmental justice communities, will be examined for programs expected to address such populations. Additionally, some co-benefits such as job creation will be addressed, at the portfolio level, in the evaluation.

As the RGGI portfolio evolves, plans to evaluate newer programs will be added. Impact evaluations underway or planned for the current cycle include, but are not limited to:

- Multifamily Performance Program: measurement and verification, and attribution analysis of projects completed 2009-2011, inclusive of RGGI fuel incentive recipients.¹⁵
- Multifamily Carbon Emission Reduction Program: measurement and verification of the fuel use and emission impacts attributable to the program.
- Home Performance with ENERGY STAR[®] Program: assessment of energy and emission impacts from Green Jobs-Green NY “assessment only” participants who may have installed measures on their own in the absence of incentives; measurement and verification of impacts attributable to RGGI fuel incentives.¹⁶
- Municipal Water and Wastewater Program: measurement and verification of energy savings and emission impacts attributable to the program.
- GJGNY Small Commercial Program: Examine measure adoption rate and estimate energy impacts from completed audits.
- Residential Non-Energy Impact Study: identify and begin to quantify “measurable” nonenergy impacts from residential programs, including possibly HPwES and the Green Residential Building Program.¹⁷
- Industrial Innovations Manufacturing: An energy impact evaluation will review engineering assumptions in a sample of projects and feature a small number of site visits and case studies to estimate energy savings. The study will use both on-site energy savings estimates and technology sales estimates (where applicable) to determine the total impact of the program.

¹⁵ This study is a larger SBC/EEPS evaluation, which is being leveraged to support RGGI evaluation.

¹⁶ Ibid.

¹⁷ Ibid.

17.2.2 Process Evaluation and Market Characterization/Assessment

Process evaluation reviews oversight and operations, gauges customer satisfaction and recommends process, and efficiency improvements. Formative process evaluations, conducted early in the program development, can offer actionable recommendations to help improve program efficiency and effectiveness and optimize the desired program outcomes.

Market characterization and assessment develops an understanding of markets and market actors; provides information to support program design and delivery; and tracks changes in markets over time. This area of evaluation provides “market intelligence” to help target programs to best achieve their goals.

Though not every program may receive evaluation, both process and market evaluation will be performed on all types of programs within the RGGI portfolio. Process and market evaluations underway or planned for the current cycle include, but are not limited to, the following. As the RGGI portfolio evolves, plans to evaluate newer programs will be added.

- Multifamily Performance Program: assess program experience, identify program improvements, characterize and assess the market for supported technologies and services. Includes RGGI fuel efficiency incentive recipients and GJGNY audit/loan participants.¹⁸
- Home Performance with Energy Star Program: assess program experience, identify program improvements, characterize and assess the market for supported technologies and services. Includes RGGI fuel efficiency incentive recipients and GJGNY audit/loan participants.¹⁹
- Clean Energy Business Development: A process evaluation will assess the effectiveness of program operations with particular focus on Proof-of-Concept Centers (POCC) implementation, identify how lessons learned are disseminated, and determine if POCC’s are working toward becoming sustainable without NYSERDA investment. A Social Network Analysis will map the current state of the clean energy network in New York.
- Advanced Power Technology: A process evaluation will assess effectiveness of solicitations and project selection, identify barriers to greater program participation, and research best practices from other similar programs.
- Transportation Research: A process evaluation will assess effectiveness of solicitations and project selection, identify barriers to greater program participation, and research best practices from other similar programs.
- Industrial Innovations Manufacturing: A process evaluation will assess effectiveness of solicitations and project selection, identify barriers to greater program participation, and determine overall participant satisfaction of the program. A market characterization study will determine a market baseline of selected technologies funded by the program, and identify external factors that most influence program success. A market impact assessment will measure changes of relevant market characteristics and compare them to the market baseline.

¹⁸ This study is a larger SBC/EEPS evaluation, which is being leveraged to support RGGI evaluation.

¹⁹ Ibid.

17.2.3 Baseline Studies

Within the evaluation, NYSERDA is also conducting 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: 1) to 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 New York in the next three and five years. Though these large studies are being supported by SBC funding, RGGI funds are supplementing the budget to allow for robust data collection on fuel measures.

17.2.4 Use of Evaluation Results

The evaluation and program implementation activities described in this Plan will be integrated with the ultimate goal of “real time” feedback from the evaluation effort being used to help inform and improve programs. Early evaluation results will be used to help identify possible issues with program performance, and provide recommendations to NYSERDA as to how those issues might be rectified. Reports by NYSERDA’s independent evaluation contractors will be made publicly available so interested parties can review any programmatic recommendations that are made. NYSERDA will use evaluation data and information to make programmatic changes in the annual Plan updates, or as needed.

17.3 Evaluation Implementation

17.3.1 Staff and Contractor Resources

Evaluation of New York’s RGGI programs will be managed by NYSERDA’s Performance Management and Evaluation Systems (PMES) group. PMES is organizationally separate from NYSERDA groups that administer programs. PMES staff has been responsible for managing evaluation of NYSERDA’s major energy efficiency, electric demand reduction, renewable energy, and research and development programs for nearly 15 years. The staff and knowledge base within PMES will be leveraged to provide effective, efficient evaluation management of the RGGI programs. Stakeholder input will be sought to inform evaluation of the RGGI programs.

For the subset of programs operating in the deployment space, NYSERDA has procured the services of two main evaluation contractor teams. One provides impact evaluation services and the other provides process evaluation and market characterization/assessment for the RGGI programs. A third main evaluation contractor team has been procured to conduct impact, process and market evaluation for RGGI programs that focus more on research and technology development and demonstration.²⁰ NYSERDA elected to parse out these program activities under a separate evaluation contractor due to nature of their approach and expected outcomes.

NYSERDA also works with three other evaluation contractors, currently under contract, who provide overarching/support services:

- General Evaluation Assistance -- assists NYSERDA staff to plan, coordinate, and maximize the usefulness of all of the evaluation activities.
- Survey Research – administers large-scale survey research and provides input on sampling and survey methodology to support evaluation studies.
- Economic/Environmental Evaluation – specializes in economic and environmental analyses. Tasks performed in support of the RGGI program may include: researching and recommending protocols for evaluating GHG emission reduction programs across sectors, recommending specific GHG emissions factors and alternatives, and exploring methods for valuing GHG emissions reductions.

Final design and implementation of program-specific evaluation efforts will be undertaken by one or more of NYSERDA's third-party evaluation contractors, in conjunction with PMES staff.

The RGGI evaluation will be closely coordinated with NYSERDA's existing evaluation efforts for SBC and other programs. This coordination will be especially important on programs that receive SBC and RGGI funding to ensure that the evaluation does not become overly burdensome for participants and issues associated with survey respondent fatigue are minimized. Such coordination will also aid in achieving greater efficiency and cost-effectiveness of the evaluation overall.

17.4 Reporting

NYSERDA will prepare an annual RGGI program evaluation and status report using progress tracking, findings, and inputs from the independent evaluation contractors. The annual report will include for each prior year: an accounting of all sales of CO₂ allowances and the funds generated, a summary description of program activities, a quantification of benefits, and an accounting of the administration costs and expenditures. The annual report will also provide information on the geographic distribution of program funding across the State.

²⁰ This evaluation contractor will also provide evaluation services for NYSERDA's SBC funded Technology & Market Development Program.

Quarterly, NYSERDA will prepare a RGGI program status report updating progress made in each major program area. The reports will include: a summary description of program activities and implementation, an estimate of benefits, and an accounting of the costs and expenditures.

Metrics and targets presented in this document (e.g., dollars per ton) were established for early comparison purposes to facilitate program selection. They are subject to modification in the event that changes are made to the discounting rate, discounting approach, evaluation methods, emissions factors, and budget levels. Previous RGGI Operating plans assumed each Program's longest-lived measure life as an input for the expected lifetime benefit calculations. Beginning with the 2013 RGGI Operating Plan, each Program's savings-weighted average end of useful measure-life was used as an input for the expected lifetime benefit calculations. Using the savings-weighted average end of useful measure-life provides a more realistic lifecycle for the persistence of energy, bill, and emission savings. Furthermore, at the time of development of this Plan, the extent to which program participants will leverage complementary RGGI program support as well as other non-RGGI program support is unknown. Quarterly status reports will quantify and report all such cross-program overlap, and the reported actual benefits and outcomes of the RGGI programs in this Operating Plan will be inclusive of such quantified cross-program overlap.

18 Administration

18.1 Guiding Principles

The members of NYSERDA's Board, management, and staff are committed to carrying out their responsibilities with accountability and transparency through efficient, effective operations.

NYSERDA uses an open, stakeholder-based planning process in developing, operating, and evaluating its programs. The involvement between NYSERDA's technically diverse, knowledgeable staff and external stakeholders in program planning, project selection, and program evaluation results in more effective program administration and provides for increased transparency and effectiveness. NYSERDA places emphasis on independent, objective analysis, and the free exchange of ideas and information in an effort to produce the best programs and policies. Management also promotes and encourages honest and ethical behavior within the workplace to fulfill its responsibility of ensuring proper stewardship of public resources. Programs are adapted to changing needs and carried out in a responsive manner, while maintaining sound fiscal and managerial controls. Lastly, NYSERDA strives to achieve efficient and effective operations, using relatively modest staffing levels.

18.2 Procurement Policies and Procedures

In administering all of its programs, including programs proposed in the Plan, contracts are procured in accordance with NYSERDA's *Procurement Contract Guidelines* (Guidelines), approved annually by NYSERDA's Board pursuant to Public Authorities Law Section 2879. The Guidelines generally require NYSERDA to use its best efforts to secure offers from potential contractors on a competitive basis and requires advance notice of pending solicitations to be published in the *State Contract Reporter*. The Guidelines permit waiver of the competitive solicitation requirements for: work that is expected to cost \$50,000 or less; unsolicited proposals, single source and sole source vendors; and other designated reasons.

Selection of contracts is accomplished in an extremely transparent manner. Proposals submitted in response to solicitations are reviewed and evaluated in accordance with the criteria noted in the solicitation by a Technical Evaluation Panel (TEP), comprised of NYSERDA staff and outside reviewers with relevant expertise. A number of NYSERDA programs also provide incentives to any qualified program participant who meets pre-defined program terms and conditions.

18.3 Financial Tracking Systems

NYSERDA will provide an efficient and accurate accounting of all program expenditures and administrative costs using its well-established system of internal controls and a variety of system procedures. The programs are subjected to annual audit by independent auditors appointed by NYSERDA's Board. In addition:

- NYSERDA's accounts are under the control of their statutory fiscal agent, the Commissioner of the Department of Taxation and Finance. Funds for the RGGI-funded activities are segregated from other sources to facilitate an accurate accounting of all receipts, interest earnings, and disbursements.
- Pursuant to NYSERDA's by-laws, contracts and agreements exceeding \$25,000 may only be signed by one of NYSERDA's officers. This centralized authorization function provides for effective segregation of financial and contracting duties and facilitates effective accountability.
- All payment requests receive a multi-disciplinary review prior to payment.

NYSERDA uses an automated system that facilitates an accurate and timely accounting of all program expenditures. The automated accounting system also produces various monthly financial reports that are distributed to NYSERDA management and program staff for review. In addition, this information is used to prepare evaluation and financial status reports as required by the evaluation plan.

18.4 Administration Budget

Included in Program Administration are direct salaries and benefits for program staff, as well as a proportionate allocation of salaries and benefits for support staff (e.g., contracts, finance, information technology, legal, and marketing and outreach), facilities and equipment costs, travel, supplies, etc. Fixed costs are applied proportionally across all funding sources, using program staff salary costs as a percentage of total salary costs, and therefore reflect economies of scale. These estimates are based on historical experience with the SBC-funded programs, and consider administrative efficiencies.

Appendix A: Methods and Assumptions

This appendix describes the general methods and assumptions that are used to calculate the energy savings, emission reductions, bill savings, and cost-effectiveness metrics presented in the Operating Plan (Plan) for Investments in New York under the CO₂ Budget Trading Program and the CO₂ Allowance Auction Program.

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 CO₂e Reductions

Emissions factors are used to translate the energy savings data into annual GHG emissions reduction values. The GHGs evaluated in the Plan include carbon dioxide, methane, and nitrous oxide. Because each of these gases has a different global warming potential,²¹ 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,²² 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 (IPCC) Second Assessment Report: Climate Change 1995

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

²¹ A global warming potential is a measure that estimates how much a given mass of a GHG contributes to global warming. It is calculated over a specific time interval, which is 100 years for the IPCC Second Assessment Report values.

²² IPCC, 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. New York 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.

Table A-2 shows the emission factors used in the Plan to calculate emissions from on-site fuel combustion, which are derived from U.S. Environmental Protection Agency (EPA) emission coefficients. The CO₂e values represent aggregate CO₂, CH₄, and N₂O emissions. If a program in the Plan covers more than one sector (e.g., the Commercial and Industrial Program), then the estimated reduction is based on a straight average emission factor.

Table A-2. Fuel Combustion Emission Factors by Sector

Sources: U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006, Annexes 2 & 3 and EPA State Climate Energy Program's State Inventory Tools released on 1/3/2011

	Transport (lb CO₂e/MMBtu)	Residential (lb CO₂e/MMBtu)	Commercial (lb CO₂e/MMBtu)	Industrial (lb CO₂e/MMBtu)
Coal	N/A	224.89	211.43	207.58
Natural Gas	117.25	117.14	117.14	113.38
#2 Oil/Distillate/ Diesel	163.22	163.78	163.78	161.80
#6 Oil/Residual	N/A	N/A	166.28	174.20
Kerosene	N/A	162.10	162.10	159.89
Propane	140.51	136.94	136.94	139.45
Gasoline	159.09	N/A	N/A	N/A
Aviation Fuel	160.86	N/A	N/A	N/A
Wood	N/A	15.79	15.79	3.92
Steam	N/A	139.30	139.30	N/A

An average emission factor of 625 lb CO₂e/MWh is used to estimate emission reductions associated with electricity use reductions for all sectors. This value includes emissions from in-state electricity generation as well as emissions associated with net-imports of electricity.²³ While electricity savings may not lead to near-term emission reductions under the RGGI CO₂ cap, savings will potentially reduce imports of electricity to New York; 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.

²³ The emission factor for electricity is based on data from *Patterns & Trends- New York State Energy Profiles: 1997 – 2011* (NYSERDA 2013) and methodology from the GHG Inventory and Forecast prepared for the 2014 Draft New York State Energy Plan (April 2014).

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; basic service charges have been excluded.

Table A-3. Fuel Prices by Sector²⁴

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

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

²⁴ 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- New York State Energy Profiles: 1997-2011*

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

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

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State of New York
Andrew M. Cuomo, Governor

New York's Regional Greenhouse Gas Initiative Investment Plan (2014 Operating Plan)

Final Report
December 2014

New York State Energy Research and Development Authority
Richard L. Kauffman, Chair | John B. Rhodes, President and CEO

