

New York State's Regional Greenhouse Gas Initiative Investment Plan

2023 Operating Plan

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Acronyms and Abbreviations

BNL	Brookhaven National Laboratory
CBETA	Cornell-Brookhaven Energy Recovery Line Test Accelerator
CEF	Clean Energy Fund
CGC	Cleaner Greener Communities
CH ₄	methane
CIGS	copper indium gallium selenide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CU	Cornell University
DC	direct current
DEC	New York State Department of Environmental Conservation
DOE	United States Department of Energy
EEPS	Energy Efficiency Portfolio Standard
EIC	electron-ion collider
EPA	United States Environmental Protection Agency
eRHIC	Electron Relativistic Heavy Ion Collider
ERL	Energy Recovery Line
FY	fiscal year
GHG	greenhouse gas
GJGNY	Green Jobs - Green New York
GW	gigawatts
HPwES	Home Performance with ENERGY STAR®
IPCC	Intergovernmental Panel on Climate Change
kWh	kilowatt-hours
LIPA	Long Island Power Authority
LMI	low- to moderate-income
MMBTU	million British thermal units
MPP	Multifamily Performance Program
MW	megawatts
MWh	megawatt-hours
N ₂ O	nitrous oxide
NYCRR	New York Codes, Rules, and Regulations
NYGATS	New York State Generation Attributes Tracking System
NYPA	New York Power Authority
NYS	New York State
NYSERDA	New York State Energy Research and Development Authority
PEV	plug-in electric vehicle

PM	performance management
PSC	New York State Public Service Commission
PSEG-LI	Public Service Enterprise Group—Long Island
PV	photovoltaic
R&D	research and development
RE	renewable energy
REC	renewable energy certificate
REDC	Regional Economic Development Council
REV	Reforming the Energy Vision
RGGI	Regional Greenhouse Gas Initiative
RPS	Renewable Portfolio Standard
SBC	System Benefits Charge
SIT	State Inventory Tool
SUNY	State University of New York
W	watts
WAP	Weatherization Assistance Program

Summary of Benefits

The Regional Greenhouse Gas Initiative (RGGI) portfolio presents programs that reduce and avoid GHG and other air pollutant emissions as well as demonstrate New York State’s commitment to its environmental goals. Specifically, program investments listed in this update of the operating plan are anticipated to result in significant carbon dioxide equivalent (CO₂e) emission reductions, energy savings, and bill savings as presented in Table 1.

Table 1. Anticipated Remaining RGGI Benefits by Program

Program	Planned Expenditures (millions of dollars)		Net Energy Savings (MMBtu)		Net Electricity Savings or Renewable Energy Generation (MWh)		Net Greenhouse Gas Emission Savings ^a (Tons CO ₂ e ^b)		Cost Benefit Ratio (\$/Ton CO ₂ e)	
	Total Incentives ^c	Total Associated Costs ^d	Annual Savings ^e	Lifetime Savings ^f	Annual Savings ^g	Lifetime Savings ^f	Annual Savings ^g	Lifetime Savings ^f	\$/Ton Annual CO ₂ e Savings ^g	\$/CO ₂ e EXPECTED LIFETIME SAVINGS ^h
Green Jobs - Green New York										
One-to Four-Family Residential Buildings Program Financing	\$73.6	\$11.1	553,213	12,723,892	70,428	1,338,126	80,993	1,699,449	998	50
Energy Efficiency										
LIPA Energy Efficiency and Renewable Energy Initiative	\$60.0	-	7,236	-	143,763	2,587,725	83,936	1,514,167	715	40
EmPower Plus	\$98.9	\$13.0	625,822	15,019,727	8	152	45,977	1,103,407	2,436	101
Renewable Energy										
Community Heat Pump Systems	\$9.1	\$1.6	78,595	2,357,861	-	-	4,700	141,006	2,276	76
Renewable Heat New York	\$0.3	\$0.05	186	3,726	34	682	96	1,926	2,423	191
NY-Sun Initiative ⁱ	\$4.9	\$0.1	-	-	19,747	493,665	11,453	286,326	181	17
Innovative GHG Abatement Strategies										
Charge NY ^j	\$47.1	\$21.8	2,558,290	25,582,896	-148,762	-1,487,616	202,105	2,021,049	341	34
Clean Energy Fund										
Clean Energy Fund ^k	\$50.4	\$13.4	52,975	840,513	4,946	82,333	5,664	840,513	1,414	76
TOTAL Anticipated Benefits^l	\$344.2	\$61.1	3,876,317	56,528,616	90,164	3,015,067	434,924	7,607,843	809	53

- ^a These emission reductions are associated with both electric and fossil-fuel saving measures. Under a cap-and-invest system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions going into the atmosphere. However, electric efficiency projects will reduce end users’ responsibility or footprint associated with emissions from electricity production.
- ^b CO₂e stands for carbon dioxide equivalent and describes the amount of CO₂ that would have the same global warming potential as a given mixture of gases based on factors published by the Intergovernmental Panel on Climate Change.
- ^c Inclusive of incentive dollars for expenditures, encumbrances, and contract pre-encumbrances.
- ^d Inclusive of all non-incentive expenditures.
- ^e Inclusive of savings from all currently operational projects installed since program inception.
- ^f Annual Savings multiplied by the lifetime of the measure installed.
- ^g The sum of Total Incentives and Total Associated Costs divided by Annual Savings.
- ^h The sum of Total Incentives and Total Associated Costs divided by Lifetime Savings.
- ⁱ This initiative was referred to as “NY-Sun Long Island” in previous versions of the RGGI Operating Plan.
- ^j Net Energy Savings values represent MMBtu savings from the use of electric vehicles; the electricity required to charge the vehicles is 14,337 MWh cumulative annual and 143,366 MWh lifetime. Expected emission reductions and customer bill savings are net, including both MMBtu that add to the benefits and the electricity required to charge the electric vehicles that subtract from the benefits.

Table notes continued on the next page

Table 1 notes continued

- ^k These figures represent a proportional allocation of benefits relative to the percent of RGGI contributions to the total approved CEF budget.
- ^l Totals may not sum exactly due to rounding.

The Summary of Benefits provides a quantitative estimate of the benefits associated with deployment programs. Green Jobs - Green New York, Long Island Power Authority (LIPA), Efficiency and Renewable Energy, Community Heat Pump Systems, EmPower Plus, Renewable Heat, NY-Sun, Charge NY, and the Clean Energy Fund (CEF) are the deployment program areas that are expected to realize savings during the current plan timeframe.

Estimated benefits related to the community clean energy or other research and development (R&D) initiatives are not included in benefit calculations. 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 air emissions reductions. To the extent they are available, these benefits are described in the program description sections of this report.

For the purpose of this report, cumulative lifetime benefits have been calculated for total program investments made through December 31, 2022. Anticipated benefits over the timeline of the budget proposal have been calculated.

Benefit achievements are updated on a quarterly basis and can be found in New York State's RGGI-Funded Programs Status Report. Visit nyscrda.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/RGGI-Reports on the NYSERDA website for details.

1 Introduction

1.1 Background

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

New York State maintains a robust portfolio of clean energy programs and proceeds from the sale of RGGI CO₂ allowances that are used to supplement existing policies and programs. The plan is structured to result in immediate emission reductions, while building capacity for carbon emission mitigation action in the long-term. 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.

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

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

- Provide substantial benefits to consumers and the environment, resulting in GHG emission 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 in these activities.
- Empower communities to make decisions about energy usage that will lead to lower GHG 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 and simultaneously reduce 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 expands 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 State that help to expand the economy and support innovative State products and services that can be exported across the country or around the world.
- Build capacity for long-term GHG reduction. By training workers and partnering with industry, the RGGI program portfolio enables transformative activities through implementation of carbon-reducing projects.

The use of RGGI funds complements activities articulated by Clean Energy Fund (CEF) investment plans. RGGI-funded programs create synergies with existing efficiency and clean energy programs, and furthermore, 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 energy efficiency, increased fuel diversity (measured by the overall proportion of renewable electricity generation), reduced criteria pollution and low-income home weatherization are, therefore, enhanced by these complementary resources. As such, the plan is not designed as a standalone portfolio of program activities, nor are RGGI proceeds relied on as a sole source to achieve the State’s carbon mitigation goals. Rather, the plan should be considered in context of the other policies and programs that help 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 its clean energy goals. In short, RGGI will continue to complement NYSERDA’s future program activities aimed at reducing GHG emissions in New York State.

Building from the December 2022 version of the RGGI Operating Plan, this plan incorporates feedback and direction received during public stakeholder meetings in December 2022 and subsequent written comments from stakeholders. The scope and approach for allocating the anticipated proceeds was approved by NYSERDA’s Board of Directors in January 2023. Overall, the plan covers program investments comprised of the following RGGI funds:

- Anticipated proceeds from auctions to be held during fiscal years 2023–26
- Remaining program funds from prior auction proceeds

The use of previously obtained proceeds that comprise remaining program funds was approved by the board at earlier meetings.

1.2 Regulatory Context

RGGI is a multi-state cooperative effort to reduce GHG emissions from electric power plants by means of a cap-and-invest system. Under RGGI, the participating states designed cap-and-invest programs that set limits on CO₂ emissions from the regulated power plants in participating states. Over time, the cap declines so that CO₂ emissions from the power sector subsequently decrease.

The RGGI participating states complete periodic program reviews that include a comprehensive evaluation of program success, program impacts, additional reductions, imports and emission leakage, and offsets. The first regional RGGI Program Review was completed in early 2013 and in December 2017 the participating states completed a second regional program review resulting in updated Model Rule.¹ A third program review began in Summer 2021, whereby the participating states set out to conduct technical analyses to inform decision-making related to core Program Review topics (i.e., the regional CO₂ emission cap), solicit input from stakeholders and general public on key aspects of the Program Review process (i.e., timeline, core topics and objectives, modeling assumptions and results, and other policy and design considerations), as well as convene independent learning sessions with experts and other interested parties on key design elements. Activities for the third program review are anticipated to conclude on or about December 2023.

Each state is implementing this initiative through individual CO₂ Budget Trading Programs linked through the regional cap-and-invest program. Visit <http://www.rggi.org> for additional background on the initiative.

In New York State, the RGGI Program has been implemented through two complementary programs: The New York State Department of Environmental Conservation (DEC) established New York State's CO₂ Budget Trading Program (6 NYCRR Part 242, 6 NYCRR Part 200, General Provisions) and NYSERDA established the CO₂ Allowance Auction Program (21 NYCRR Part 507).

¹ Visit https://www.rggi.org/sites/default/files/Uploads/Program-Review/12-19-2017/Model_Rule_2017_12_19.pdf for more information.

The CO₂ Allowance Auction Program established the rules through which New York State will sell most of its CO₂ allowances. The CO₂ Allowance Auction Program [21 NYCRR Part 507.4(d)] also creates the parameters for use of the proceeds from the sale of allowances 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.” The plan is designed to be consistent with these regulatory requirements.

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 as well as 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-funded programs work to empower communities to make decisions about energy usage that lead to lower carbon emissions as well as economic and societal co-benefits.

The Climate Leadership and Community Protection Act (Climate Act), signed into law in July 2019, charts a course for New York State to 85% greenhouse gas emissions reduction by 2050, a pathway to a carbon neutral economy, and a goal that 40% of the benefits from investments in clean energy and energy efficiency be realized by disadvantaged communities. This Operating Plan estimates² that 42% of commitments from January 2020 through this Plan period are expected to provide benefits to disadvantaged communities based on an interim definition of disadvantaged communities and low-to-moderate-income investments, as the Climate Justice Working Group completes its work to finalize statewide disadvantaged communities criteria.

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.

² Estimated benefits only coincide with the timeframe reported. Future benefits could be higher or lower.

1.4 Program Focus and Geographic Scope

RGGI funds have historically been used to support programs ineligible for funding from other sources. Similarly, today RGGI-funded activities complement and enhance CEF initiatives.³

Geographic equity of expenditures and benefits will be pursued across the portfolio of programs; however, not on a program-by-program basis. Certain programs may have a limited geographic focus, but 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.

1.5 Portfolio Development Criteria

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

- Cost-effectiveness measured by tons of carbon dioxide equivalence reduced per dollar invested.
- Long-range potential for the technology or investment to reduce GHG emissions in New York State.
- Potential to reduce the costs of achieving the RGGI emissions cap.
- Other benefits for New York State such as job creation, leveraging of capital investment to promote economic development, providing health and environmental co-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 qualitatively 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, with the

³ Visit <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={FC3FBD53-FBAC-41FB-A40E-3DA0A5E0866A}> for NYSERDA’s CEF supplement.

exception of agricultural methane projects. 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 planning period described in this plan are comprised of two components:

- Estimated future proceeds from fiscal years 2023–26
- Remaining program funds

2.1 Assumptions about Auction Proceeds for Operating Plan

Estimated auction proceeds for fiscal years 2023–26 are anticipated to total approximately \$695 million. For planning purposes, this Operating Plan maintains the future auction proceeds based on an auction allowance price of \$11.85, which is sustained through the end of the planning period and is based on a lookback average of recent auctions.

2.2 Summary of Proceeds Investment by Program

Table 2 provides a summary of proceeds investment by program and shows how the approximately \$2,723 million of funds expected to be made available through RGGI auctions have been, or will be, allocated among programs and other costs through fiscal year 2025.

The table shows cumulative allocations through March 2023 and reflects the planned and actual allocations for fiscal years 2023–2026. The table also summarizes the allocation of all current and planned proceeds through March 31, 2026.

Table 2. RGGI Revenue and Funding Allocation Plan

Category	Program	Cumulative Allocations through March 31, 2023	FY23-24 Plan	FY24-25 Plan	FY25-26 Plan	Cumulative Allocations through March 31, 2026
Proceeds	Number of allowances	456,350,245	20,043,750	19,163,257	19,440,617	514,997,868
	Allowance price	\$4.33	\$11.85	\$11.85	\$11.85	\$5.17
	RGGI Auction Proceeds	1,967,588,012	237,518,435	227,084,592	230,371,306	2,662,562,345
	Interest Earnings	26,073,081	11,022,000	12,345,000	12,464,000	61,904,081
	Total Revenues	1,993,661,093	248,540,435	239,429,592	242,835,306	2,724,466,426
Renewable Energy	NY SUN NYPA Customer Incentives	30,000,000	6,970,000	30,000,000	17,850,000	84,820,000
	NY SUN Community Solar/K-solar	7,500,000	-	-	-	7,500,000
	NY SUN Long Island incentives	55,000,000	-	-	-	55,000,000
	Residential PV Plus Storage	-	6,000,000	3,000,000	-	9,000,000
	Renewable Heat NY	10,300,083	-	-	-	10,300,083
	Community Heat Pump Systems	5,000,000	7,700,000	3,000,000	-	15,700,000
	Agrivoltaics	-	5,000,000	-	-	5,000,000
	Advanced Renewable Energy	2,837,698	-	-	-	2,837,698
	NYS Generation Attributes Tracking System	789,933	-	-	-	789,933
	NYSERDA PV incentives	5,319,821	-	-	-	5,319,821
Energy Efficiency	Clean Energy Workforce Opportunity Program	15,000,000	-	-	-	15,000,000
	LIPA Efficiency and RE	269,600,000	20,000,000	20,000,000	20,000,000	329,600,000
	Energy Storage (LIPA territory)	12,926,434	-	-	-	12,926,434
	EmPower Plus	71,475,905	30,000,000	30,000,000	45,000,000	176,475,905
	Pilot Projects with Municipal Utilities	2,000,000	1,000,000	-	-	3,000,000
	Disadvantaged Communities Schools / Buildings	25,600,000	17,300,000	6,500,000	-	49,400,000
	Multifamily Low Carbon Capital Planning / Pathway Projects	-	5,000,000	5,000,000	15,000,000	25,000,000
	New Construction and Challenges	-	10,000,000	10,000,000	15,000,000	35,000,000
	Climate Resiliency	-	5,000,000	5,000,000	5,000,000	15,000,000
	Support for 2 Million Homes Goal	-	-	-	15,000,000	15,000,000
	Multifamily Performance Program	15,046,683	-	-	-	15,046,683
	Multifamily Carbon Emissions Reduction	5,833,019	-	-	-	5,833,019
	Solar Thermal incentive	4,226,947	-	-	-	4,226,947
	Municipal Water/Wastewater	1,245,242	-	-	-	1,245,242
Green Residential Buildings	2,744,601	-	-	-	2,744,601	
Innovative GHG Abatement Strategies	Southern Tier Competition (76 West)	11,000,000	-	-	-	11,000,000
	Brookhaven National Lab- ION Collider	25,000,000	-	-	-	25,000,000
	Electric Vehicle/Charge NY	102,400,000	23,000,000	30,900,000	15,000,000	171,300,000
	Advanced Buildings & Industrial Innovations	13,307,654	-	-	-	13,307,654
	Climate Research & Analysis	8,729,296	-	-	-	8,729,296
	Competitive GHG Reduction Pilot	972,650	-	-	-	972,650
	Clean Energy Business Development	5,809,987	-	-	-	5,809,987
	Transportation Research	3,819,311	-	-	-	3,819,311

Table 2 continued

Category	Program	Cumulative Allocations through March 31, 2023	FY23-24 Plan	FY24-25 Plan	FY25-26 Plan	Cumulative Allocations through March 31, 2026	
Innovative GHG Abatement Strategies (continued)	Natural Carbon Solutions	2,000,000	3,000,000	2,000,000	-	7,000,000	
	Equity and Climate Transformation Research	800,000	900,000	900,000	-	2,600,000	
	Climate Mitigation and Resilience Research	1,000,000	500,000	-	-	1,500,000	
	Scoping Plan Implementation Research	-	5,000,000	3,000,000	-	8,000,000	
	Hydrogen Hubs	-	5,000,000	-	-	5,000,000	
	PV Manufacturing consortium	8,480,000	-	-	-	8,480,000	
	Carbon Sequestration	1,000,000	-	-	-	1,000,000	
	Community Clean Energy	Cleaner Greener Communities	94,261,895	-	-	-	94,261,895
Clean Energy Communities		10,273,120	3,000,000	3,000,000	-	16,273,120	
Climate Smart Communities		7,674,999	-	-	-	7,674,999	
Community Energy Engagement		4,400,000	-	-	-	4,400,000	
Economic Development Growth Extension		5,843,047	-	-	-	5,843,047	
Energy to Lead		3,000,000	-	-	-	3,000,000	
Renewable/Net-Zero Energy Demonstrations		7,500,000	-	-	-	7,500,000	
Healthy New Home Design & Construction Challenge		1,000,000	3,000,000	3,000,000	-	7,000,000	
Clean Energy Workforce Development		4,000,000	26,000,000	19,000,000	15,000,000	64,000,000	
Clean Energy Hubs		10,700,000	-	-	6,000,000	16,700,000	
Climate Action Consumer Awareness & Education		1,500,000	6,000,000	4,500,000	5,000,000	17,000,000	
Air Monitoring		8,000,000	-	-	-	8,000,000	
Regional Economic Development & GHG Reduction		10,246,443	-	-	-	10,246,443	
CEF		Transfer to(from) Clean Energy Fund	186,226,804	22,000,000	22,000,000	19,773,196	250,000,000
Directed		NYS Environmental Tax Credits	179,000,000	-	-	-	179,000,000
	NYS Environmental Protection Fund	15,000,000	5,000,000	5,000,000	5,000,000	30,000,000	
	Electric Generation Facility Cessation Mitigation	50,000,000	-	-	-	50,000,000	
	Green Jobs-Green NY- Original Legislation	112,000,000	-	-	-	112,000,000	
	Green Jobs-Green NY- Additional Funding	184,662,249	14,300,560	14,300,560	16,000,000	229,263,369	
	Transfer to Clean Energy Standard	719,424	-	-	-	719,424	
	NYS Budget Transfer	90,000,000	-	-	-	90,000,000	
	Federal Program Match Opportunities	-	50,000,000	54,000,000	55,000,000	159,000,000	

Table 2 continued

Category	Program	Cumulative Allocations through March 31, 2023	FY23-24 Plan	FY24-25 Plan	FY25-26 Plan	Cumulative Allocations through March 31, 2026
Administration and Other Non-Program Costs	Program Administration	59,896,359	16,500,000	16,500,000	16,500,000	109,396,359
	Program Evaluation	10,155,429	2,000,000	2,000,000	2,000,000	16,155,429
	Commensurate Benefit/Litigation reserve	21,900,366	-	-	-	21,900,366
	RGGI Inc Startup Costs	1,598,204	-	-	-	1,598,204
	RGGI Inc pro-rata costs	10,833,667	825,000	825,000	825,000	13,308,667
	State Cost Recovery	17,990,097	2,375,184	2,270,846	2,303,713	24,939,840
Total Funding Allocations		1,835,147,366	302,370,745	295,696,406	291,251,909	2,724,466,426
Surplus/(Shortfall)		158,513,727	(53,830,310)	(56,266,814)	(48,416,604)	0
Cumulative Surplus (Shortfall)		158,513,727	104,683,417	48,416,604	0	0

2.2.1 Program Funding Expansion Plan and Additional Funds

The RGGI Operating Plan Amendment addresses the potential for auction revenues to exceed the estimates being used to develop the operating plan for each year. Allowance auction proceeds may exceed the revenue estimates presented in this multiyear operating plan. Absent unforeseen circumstances, if additional revenue should become available, proceeds could be used to reduce deficits or expand funding for the existing portfolio of RGGI programs to the extent consistent with Part 242, the CO₂ Budget Trading Program regulation. Changes in actual program funding as a result of fluctuating auction revenues are accounted for in the RGGI Quarterly Program Status Reports. Visit nyscrda.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/RGGI-Reports on the NYSERDA’s website for details.

The ensuing sections of the report provide the following information for each program anticipated to have program investments:

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

2.2.2 Other Fees and Expenses

Additional information about other fees and expenses that are netted out from total auction proceeds are also shown and described in Table 2.

2.2.3 Repayment of System Benefits Charge 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 System Benefits Charge (SBC) funds to 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.

2.2.4 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 entered into an agreement for RGGI, Inc. to provide technical and support services for key elements of New York State's CO₂ Budget Trading program that include the following:

- Develop and maintain a system to report data from emissions sources subject to RGGI and to track allowances
- Implement a platform to auction CO₂ allowances
- Monitor the market related to the auction and trading of CO₂ allowances
- Provide technical assistance to the participating states in reviewing applications for emission offset projects
- Create and implement a market monitoring program
- Provide technical assistance to the participating states to evaluate proposed changes to the states' RGGI programs

New York State's share of RGGI, Inc. costs was estimated to be approximately \$825,000 per year during the planning period. This estimate is consistent with the New York's portion of the annual operating budgets approved by the RGGI, Inc. Board of Directors for 2022 and 2023.

2.2.5 State Cost Recovery Fee

NYSERDA assessed an annual State Cost Recovery Fee 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 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.

2.2.6 Other Budget Components

On December 4, 2009, New York State enacted 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 State's long-term fiscal health.

2.2.7 Program Evaluation and Administration

Program evaluation and administration costs have been budgeted for fiscal years 2023–2026 at approximately \$2 million and \$16.5 million, respectively. This amount reflects the projected funds required to support the continued management of projects from past initiatives, new program activity, and increasing levels of complexity and skills required to transform markets and understand and address needs of disadvantaged communities. This total translates to approximately 8% of the total funding allocations for the planning period, well under best practice benchmarks for general and administrative expenses.

3 Program Descriptions and Accomplishments

3.1 Renewable Energy

3.1.1 Renewable Heat NY

The Renewable Heat NY initiative was a long-term commitment to support the high-efficiency, low-emission, biomass heating industry. Renewable Heat NY program funding was fully allocated in August 2021 and the program stopped accepting new project applications. All pellet stove and small biomass boiler projects are complete and one large commercial pellet boiler project is undergoing commissioning and will be complete in 2023. The long-term market development strategy for Renewable Heat NY included the following objectives:

- Raise consumer awareness.
- Develop large-scale anchor customers to expand the wood pellet bulk delivery market.
- Promote supply chain development, including workforce training and support for product development, manufacturing, laboratory and field testing, and equipment certification.
- Leverage NYSERDA's issuance of the New York State Wood Heat Report to accelerate the use of biomass for heating, using the most efficient low-emission technologies.
- Provide financial incentives to consumers for advanced efficiency and low-emission technologies to reduce upfront costs.
- Provide support so that sustainable forestry practices are available and followed by small and large landowners.

This initiative sought to develop and expand local clusters of activity, thereby meeting the overarching goal of supporting the high-efficiency and low-emission biomass heating industry in the State. Renewable Heat NY provided supply chain and service network development (i.e., workforce development, training, and research and development), along with consumer incentives and financing. NYSERDA is developing a report that summarizes the results of the Renewable Heat NY program, which is expected in early 2024.

A market evaluation of the Renewable Heat NY program was completed in the third quarter of 2020. For more information on this evaluation please refer to section F.2. Completed Evaluations in the appendix of this report. The report is available on the NYSERDA website.¹

Key accomplishments as of this reporting period:

- To date, 25 full-day small biomass boiler trainings and 25 training webinars have been provided since the start of the program.
- A total of 655 installed projects.
- One large commercial pellet boiler project, participating in the Large Biomass Boiler program is undergoing commissioning.

After the Renewable Heat NY program funding was fully allocated in August 2021, pellet stove incentives for income-eligible customers were transitioned to NYSERDA's low- to moderate-income residential programs.

3.1.2 NY-Sun Initiative

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

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

Key accomplishments as of this reporting period:

- The Affordable Solar and Storage Predevelopment and Technical Assistance program provides funding to support the development of community-led solar and/or storage projects serving low- and moderate-income households as well as solar-serving multifamily, affordable housing properties. As of Q4 2022, 40 project applications have been awarded funding. Three projects are located on Long Island and funded by RGGI with a focus on a range of multifamily affordable housing properties, including those managed by the Long Beach Housing Authority.

- The Solar Energy Equity Framework (SEEF), includes the Multifamily Affordable Housing Incentive and the Affordable Solar Residential Incentive. These incentives support solar photovoltaic (PV) projects on regulated multifamily affordable housing and single-family low- and moderate-income (LMI) homes. As of Q4 2022, a total of 3,693 kilowatts (kW) of affordable housing and single-family LMI PV (366 projects) were built through the MW Block program in PSEG-Long Island territory with RGGI funding.
- The final Megawatt Block for Long Island residential solar PV projects closed in April 2016. A total of 100.3 megawatts (MW) of residential PV (12,636 projects) were built through the MW Block program with RGGI funding.
- The final MW Block for Long Island nonresidential solar PV projects closed in February 2019. There have been 58.2 MW (424 projects) of small commercial PV built in Long Island through the MW Block Program with RGGI funding, and 9.6 MW are still in the pipeline.

An impact evaluation of solar PV projects installed under NYSERDA’s NY-Sun program from May 1, 2016 through March 31, 2018 was completed in the third quarter of 2020. A subset of solar PV installations under the NY-Sun program benefitted from support by NY Green Bank (NYGB), a division of NYSERDA. Previous installations under the NY-Sun and predecessor programs were evaluated in the NYSERDA Solar Photovoltaic Program Impact Evaluation for 2008 and 2011–2016. The impact evaluation report is available on the NYSERDA website.² An evaluation of SEEF is underway now; future reports will summarize results. In addition, a market evaluation, including an update to balance-of-system cost data, is also underway and future reports will summarize results.

3.1.2.1 NYSERDA Solar Electric Program

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

Key accomplishments as of this reporting period:

- A total of 387 solar electric systems were installed outside Long Island using RGGI funding through December 31, 2022.

3.1.3 New York Generation Attribute Tracking

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

3.1.4 Advanced Renewable Energy Program

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

Key accomplishments as of this reporting period:

- GridMarket LLC has completed a small research project to analyze the characteristics of building load profiles using 15-minute interval meter data in the Con Edison distribution area. The company has also evaluated potential benefits to customers and the grid when applying energy storage technologies to modify load and integrate with renewable generation. The final report has been received by NYSERDA and activity is complete.
- An Offshore Wind Cost Benefit Study was completed. It assessed the potential costs, ratepayer impacts, environmental benefits, and economic benefits and impacts (job and other macroeconomic influences) to New York State associated with plausible scenarios of future offshore wind energy deployment in the New York Bight through 2025.³
- The Offshore Wind Master Plan, funded through the Clean Energy Fund, will include cost studies that build on the work completed for the Offshore Wind Cost Benefit Study.

3.1.5 Community Heat Pump Systems

While heat pump technology has become a proven decarbonization solution, providing buildings with clean thermal energy for space heating, cooling, and domestic hot water. Existing heat pump programs to date have targeted customers on an individual building-by-building basis, but community heat pump systems use a network of pipes to share water heating among a cluster of buildings. RGGI funds will be used to implement community heat pumps systems as part of a statewide program. This program will also provide support for systems in State and local government facilities, as well as Affordable Housing Developments. A community-based program will develop the infrastructure for larger-scale distribution and accelerate the deployment of heat pump systems across the State.

3.2 Energy Efficiency

3.2.1 LIPA Energy Efficiency and Renewable Energy Initiative

The RGGI funds provided to the Long Island Power Authority (LIPA) ensure that businesses and consumers on Long Island have access to similar clean energy and energy efficiency opportunities that are available throughout the State and to help advance statewide efforts toward achieving the clean energy goals of the 2015 New York State Energy Plan. The funds provided to LIPA have traditionally supported solar incentive programs consistent with the statewide NY-Sun program but have more recently supported

energy efficiency programs administered by PSEG Long Island (PSEGLI). In 2016, LIPA, NYSERDA, and PSEGLI collaborated to launch new approaches envisioned under Reforming the Energy Vision (REV) to support market transformation objectives, while also achieving greater carbon emission reductions. Funding and reporting requirements are established through a memorandum of understanding (MOU) between NYSERDA and LIPA. The following are the results from the first half of 2022.

Rebate spending for the second half of 2022 totaled \$26 million supported by \$20 million in RGGI funds, resulting in 149,398 megawatt-hour (MWh) savings. The largest portion of the spending (\$10.6 million) consisted of payments to businesses through PSEGLI's Commercial Efficiency Program (CEP). PSEGLI's Home Comfort central air conditioner program and PSEGLI's Efficient Products program were among the residential programs that were supported. The Efficient Products program includes support of LED light bulbs, pool pumps, appliance recycling and room air conditioners. To date, over \$269 million in RGGI funds have been spent, resulting in a cumulative total savings of 1,228,710 MWh and 35,035 million British thermal units (MMBtu).

PSEGLI has implemented several initiatives in support of New York State's clean energy goals. Long Island has been recognized as the first region of the State where all 18 Clean Energy Community grant awards have been claimed, with each community earning the designation as a Clean Energy Community. PSEG Long Island will continue to coordinate with NYSERDA around supporting communities by promoting the grant projects that will result from these awards. In support of statewide goals related to beneficial electrification, PSEG Long Island has focused on cold climate heat pump solutions for residential and commercial customers. Additionally, the Home Energy Management program was launched in the third quarter of 2017. The program consists of Home Energy Reports that are sent to 440,000 residential customers and an interactive portal which provides a disaggregation of electric usage and savings tips. The program was enhanced in the fourth quarter of 2017 to include a Home Energy Analyzer which is open to all residential customers to input home profile information for a customized energy plan. Additionally, the online Marketplace, which offers customers a variety of energy efficiency products, has been enhanced to include the sale of electric vehicle chargers.

Key accomplishments for this reporting period:

- More than \$10.5 million in rebates were paid to Long Island businesses saving 41,960 MWh as part of PSEGLI's Commercial Efficiency Program as incentive for 982 energy-efficiency projects installing measures such as lighting, HVAC systems, and efficient motors.

- During the second half of 2022 PSEGLI Residential Efficient Products program resulted in savings of 103,376 MWh for total incentive payments of over \$6.5 million, including rebates of more than \$4.2 million to PSEGLI residential customers for the purchase of light bulbs at local retailers. The remaining incentives paid for efficient product measures, such as catalog LED light bulbs, pool pumps, appliance recycling, and room air conditioners.
- PSEGLI residential customers were provided with incentives of over \$5.7 million to install 1,531 energy-efficient central air conditioning projects as part of PSEGLI's Home Comfort (formally known as Cool Homes) program, saving 1,165 MWh in Q3 and Q4 of 2022.

3.2.2 Residential Efficiency Services

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

3.2.2.1 Multifamily Performance Program

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

3.2.2.2 Multifamily Carbon Emission Reduction Program

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

3.2.2.3 EmPower New York

NYSERDA's EmPower New York (EmPower) program offers no-cost energy efficiency services to low-income (i.e., HEAP-eligible) homeowners and renters. These services include electric reduction and home performance measures such as appliance replacement, energy-efficient lighting, insulation, and air sealing. On-site energy education offers customers additional strategies for managing their energy costs. Participating contractors with certifications for the work they are performing provide services. Currently, 175 EmPower contractors are assisting in RGGI-funded projects.

Historically, EmPower used RGGI funding to serve low-income applicants that heat with oil and propane and were ineligible for EEPS funding. Currently, RGGI funds continue to support petroleum fuel-efficiency measures in households served by municipal electric utilities. These energy efficiency measures aid in the reduction of GHG emissions and provide long-term carbon reductions.

Key accomplishments as of this reporting period:

- Across New York State, 732 low-income households were served during Q3 and Q4 of 2022, bringing the total to 8,176 low-income households served under EmPower New York with RGGI funding through December 31, 2022.

An impact evaluation for this program was completed in Q2 2022 and is summarized in the evaluation section.

3.2.2.4 Green Residential Buildings Program

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

3.2.2.5 Home Performance with ENERGY STAR®

Home Performance with ENERGY STAR (HPwES) is a comprehensive energy efficiency services program for existing one- to four-family homes and low-rise⁴ residential buildings. On December 31, 2019, the market rate component of HPwES was sunset; however, the moderate rate component of HPwES, Assisted Home Performance with ENERGY STAR (AHPwES), which serves homeowners with

incomes less than 80% of area median income, remains an active program offering. The program uses a network of certified contractors to (1) perform diagnostic testing on the home, (2) recommend improvements, (3) determine the payback period for those improvements, and (3) install improvements selected by the homeowner. As of December 31, 2022, 175 contractors are active in AHPwES.

The program uses RGGI funds for municipal electric households for oil and propane efficiency measures, such as replacing inefficient oil and propane heating equipment, air sealing, insulation, and other measures that have a direct impact on reducing GHG emissions from oil and propane consumption. Income-qualified homeowners are eligible for incentives to make energy improvements. AHPwES applicants may also qualify for GJGNY assessment and financing programs.

Key accomplishments as of this reporting period:

- During Q3 and Q4 2022, 19 energy efficiency projects were completed at a contracted value of \$237,145, bringing the total to 9,766 energy efficiency projects completed at a contracted value of \$93.7 million.
- Of these recently completed projects, all were AHPwES, which serves homeowners with incomes less than 80% of area median income. As indicated above, the market rate component of HPwES ended in December 2019, and the remaining pipeline projects have been processed. In the future, it is expected that the only remaining project submissions will be AHPwES projects.

An impact evaluation for this program was completed in Q2 2022 and is summarized in the evaluation section.

3.2.2.6 Solar Thermal Incentive Program

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

3.2.2.7 Low-Rise Residential New Construction Program

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

3.2.3 Municipal Water and Wastewater Program

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

3.2.4 Building Electrification Pilot Projects

3.2.5 Disadvantaged Communities Schools/Buildings

This program will fund high-performance energy efficiency and electrification in affordable housing. NYSERDA has partnerships in place with NYS Homes and Community Renewal (HCR), NYC Housing Preservation and Development (HPD), and the New York City Housing Authority (NYCHA) and will continue supporting decarbonization projects with these agencies. In particular, this program will allow (1) HCR-regulated affordable housing located in non-SBC territories, including municipal electric territory or Long Island, to access building decarbonization grant funding as part of HCR's financing processes and (2) provide training, technical assistance, and strategic planning resources to support NYC HPD's development of a long-term, portfolio-wide decarbonization strategy. Additionally, this initiative will support work with public housing authorities, like NYCHA, to decarbonize building with an emphasis on advancing packaged heat pump systems to develop clean heat for all.

3.3 Innovative Greenhouse Gas Abatement Strategies

3.3.1 Industrial Innovations Program

The Industrial Innovations program is a longer-term program that supports development and demonstration of technologies with substantial GHG reduction potential and technologies relevant to New York State manufacturing industries and building systems. Funded projects will focus mainly on innovations that reduce the use of fossil fuels, have high-replication potential for the State's manufacturing base, and are likely to be cost-effective. Projects will focus on technical innovations, including thermal-efficiency improvements for fossil-fuel based processes and alternative processes that eliminate the use of fossil fuels directly and indirectly for technologies that bring about thermal destruction of byproducts. Projects also may include changes in material input and development of advanced controls, provided they directly bring about GHG reduction.

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

Key accomplishments as of this reporting period:

- A project with SulfCrete of Long Beach, NY continues to move forward—leveraging \$750,000 in federal funding from the United States Department of Energy (DOE) to supplement the \$400,000 NYSERDA funding award—and is benefiting from the involvement of Brookhaven National Labs for the commercial scale-up and demonstration of SulfCrete, a clean, energy-efficient alternative to conventional Portland cement concrete. The contract for this project is expiring at the end of 2023 but is expected to be extended to continue this project.
- A project with Sweetwater Energy involving building or installing manufacturing processes to supply cellulosic and lignin-based products made progress in previous quarters and came to a consensus to cease efforts in 2023. When active, the NYGB was engaged Sweetwater Energy.

3.3.2 Climate Research and Analysis Program

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

Key accomplishments as of this reporting period:

- The last RGGI-funded project in this program, on changes in hazardous algal blooms under future climate conditions, has been completed and the final report posted.⁵
- Over the years, the program has supported numerous research projects concerning climate change impacts and adaptation to assist policy- and decision-makers, through development of interactive tools, modeling, and reports. Research topics have included sea level rise, high-intensity precipitation, and extreme heat and health.
- Through the Community Risk and Resiliency Act (CRRA) process, the DEC previously adopted the NYSERDA-supported ClimAID projections for New York State as the official sea level rise projections for the State. NYSERDA staff continued to participate in an interagency working group to coordinate efforts on CRRA and the Climate Act. NYSERDA will continue to engage with this group, offering suggestions and support when appropriate.

3.3.3 Clean Energy Business Development

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

3.3.4 Charge NY

Charge NY will pursue three main strategies to promote plug-in electric vehicle (PEV) adoption by consumers across New York State. First, NYSERDA developed and implemented a rebate program for PEVs starting in 2017, accelerating purchases of PEVs by reducing higher upfront costs. Second, NYSERDA will invest in marketing and awareness-building activities to build interest in PEVs among the general public. A focus on building greater public knowledge and awareness of the capabilities of PEVs is essential to spur more private investment in PEV purchases and PEV charging stations. This work may also include other market development activities, such as policy and business model development studies that support new ways for critical stakeholders, such as utilities, local governments, and car dealers, to get involved in the PEV market. Third, NYSERDA will also support the installation of PEV charging stations at workplaces and multifamily buildings—location types that have been seen to be effective motivation for PEV adoption, based on usage data reported from previous installations. Regions of the State that have seen faster PEV adoption will be identified for additional charging station support, which ensures investments in infrastructure support areas with the greatest potential for additional PEV drivers. Charge NY will also initiate the deployment of a network of direct current (DC), fast charge stations across the State.

Key accomplishments as of this reporting period:

- Through December 2022, NYSERDA has issued more than 86,000 rebates. The program reached new heights in 2022, with rebate applications 60% higher than the number from any previous year (32,000 in 2022). As of Q1 2021, the Drive Clean Rebate program was entirely funded with RGGI proceeds. Outreach for the program included booths at the New York International Auto Show in 2018, 2019, and 2022 which was done in collaboration with other NYS agencies, ConEdison, Northeast States for Coordinated Air Use Management (NESCAUM), and the Greater New York Auto Dealers Association (GNYADA).
- NYSERDA launched a brand-neutral PEV consumer awareness campaign, *Drive Change. Drive Electric.* in collaboration with other northeastern states and 16 automakers in March 2018. The campaign aims to inform potential car buyers about the benefits of driving electric vehicles. The partners have reached consumers through paid and organic social media marketing, earned media, and the website, DriveElectricUS.com.
- In September 2018 NYSERDA launched Charge Ready NY, a charging station deployment program that provides \$4,000 rebates for the installation of EV charging stations at public, workplace, and multiunit dwelling locations and \$4,500 rebates for stations installed in disadvantaged communities. The program has exhausted all of its funding and resulted in the installation of over 4,000 charging ports.

3.3.5 Transportation Research

The goal of the Transportation Research Program is to commercialize technologies, products, systems, and services that provide superior GHG reduction. Activities include product development, performance validation, field testing, policy development, and business assistance to help emerging technologies achieve successful commercialization. This program has not received new funding in several years and is winding down. Work on these contracts is coming to a close. For the final open project, Unique Energy Solutions is in the process of upfitting 12 electric delivery trucks for United Parcel Service (UPS), six of which are complete.

3.3.6 Carbon Capture, Recycling, and Sequestration

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

3.3.7 Advanced Buildings

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

3.3.8 Competitive Greenhouse Gas Reduction Pilot

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

3.3.9 Brookhaven National Laboratory Ion Collider

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

3.3.10 Natural Carbon Solutions

Achieving a net-zero carbon economy will require reducing emissions across all sectors. The agriculture and forestry sectors are looked upon to contribute carbon sequestration (i.e., negative emissions) as well as emissions reductions. The Natural Carbon Solutions program will catalyze technology and business

solutions and lay the foundation for an economically self-sustaining bioeconomy in New York State. By establishing a marketplace of natural emissions-lowering solutions the program will demonstrate pathways to support disadvantaged rural communities, economic development, existing agriculture, and forestry industries, while increasing jobs and revenue.

3.3.11 Equity and Climate Transformation Research

The Equity and Climate Transformation Research program will establish an engaged, participatory research framework to study the social dimensions of an equitable and inclusive transition in a manner that centers the lived experiences of underserved and overburdened communities and prioritizes beneficial outcomes for disadvantaged communities. The program will provide the investment necessary to develop both formal proposals for long-term funding as well as pilot initiatives. These pilot initiatives will aim to (1) test initial research hypotheses, (2) engage with a diverse set of NYS communities to understand how they would most benefit from this research and how they can be most effectively engaged in the process and (3) convene academics. The creation of an Equity and Climate Transformation Research Agenda will support scientifically rigorous inquiry that also advances transformative, inclusive solutions to climate action challenges in New York State. The work will inform strategies for effective climate awareness and consumer education initiatives.

3.3.12 Climate Mitigation and Resilience Research

RGGI funds will support additional work done by the Climate Action Council Integration Analysis team and leverage current research investment to expand on energy and environmental analyses. This will include additional sensitivity analyses on land-use and climate change impact scenarios. This research would map out the risks and vulnerabilities related to climate change impacts for both the business-as-usual energy system and the carbon neutral energy system.

3.3.13 Scoping Plan Implementation Research

The Climate Leadership and Community Protection Act (Climate Act) was signed into law in 2019 as one of the most ambitious climate laws in the world, putting the State on a course to reduce greenhouse gas emissions and achieve net-zero emissions, increase renewable energy usage, and ensure climate justice. RGGI funds will be used to support work to realize recommendations included in the Climate Action Council's final Scoping Plan. This work may include technical analysis to support activity requiring more detailed information, such as natural gas system planning for decarbonized future, planning an economy wide cap-and-invest program, or support for a clean transportation standard.

3.3.14 Hydrogen Hubs

NYSERDA will support the deployment of clean hydrogen infrastructure as part of a regional initiative along with six other states in the northeast. Funding for this initiative will be used to support pre-engineering work for projects, stakeholder engagement, and project development.

3.4 Community Clean Energy

3.4.1 Climate Smart Communities

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

3.4.2 Economic Development Growth Extension Program

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

3.4.3 Cleaner Greener Communities

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

Key accomplishments as of this reporting period:

- All contracts from the third round of funding have been previously executed. There are currently only 15 projects that remain open—the rest have been closed.

3.4.4 Regional Economic Development and Greenhouse Gas Reduction Program

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

3.4.5 Reforming the Energy Vision Campus Competition Program

The Energy to Lead Competition is a competitive solicitation issued by NYSERDA's REV Campus Challenge initiative. The program challenges colleges and universities across the State to develop and implement plans to advance building decarbonization and innovative, cost-effective clean energy solutions on their campuses and local communities. Institutions are encouraged to incorporate students, curriculum integration, and community engagement into their projects. Proposals with the best solutions to achieve deep energy savings and combat climate change through energy efficiency, renewables, or GHG emission reductions will win approximately \$1 million each to help implement their plans. There were three rounds of the Energy to Lead Competition, which is no longer accepting applications.

Proposals for the first round of the Energy to Lead Competition were due April 4, 2016. NYSERDA received 40 proposals from 33 institutions. The winning institutions and their proposed projects were announced on May 16, 2016, and included two awards funded through RGGI:

- Bard College's Micro Hydro for Macro Impact project will use local dams to develop micro hydropower. The project is expected to avoid 335 metric tons of GHG emissions annually, equivalent to taking 70 cars off the road annually.
- The State University of New York at Buffalo will implement the Localizing Buffalo's Renewable Energy Future project, which will install 100 MW of clean solar power throughout the city. The implementation involves partnership with the City of Buffalo and several not-for-profit and educational partners.

In August 2017, NYSERDA launched a second round of the Energy to Lead Competition with proposals due January 29, 2018. NYSERDA received 24 proposals from 19 institutions. The winning institutions and their proposed projects were announced on October 22, 2018 and included one award funded through RGGI:

- Suffolk County Community College will implement net zero energy components during construction of its Renewable Energy and STEM Center. The project will showcase clean energy technologies to the broader community, promote student engagement in clean energy projects, and integrate curricula to develop a qualified workforce.

In September 2019, NYSERDA launched a third round of the Energy to Lead Competition with proposals due February 22, 2020. NYSERDA received 18 proposals from 17 institutions. The winning institutions were announced on June 8, 2021 and included one award funded through RGGI:

- The City College of New York Building Performance Lab will develop a control based, systematic process for facilities staff and building operators to increase their ability to effectively manage and properly commission major energy consuming systems on campus. The project will deploy, test, and document a systematic process to engage students and facility staff in implementing building automation, system-based procedures that offer control of electricity use.

Key accomplishments as of this reporting period:

- The State University of New York at Buffalo completed their project as of Q3 2022 with completing the installation of rooftop solar panels at four campus buildings. The on-site and off-site solar should enable the university to achieve their goal of 100% of purchased electricity to be renewable energy. In addition, the university's sustainable living learning lab (GRoW Home) supported through this project has been frequently leveraged by students and faculty as a learning and meeting space.
- Bard College filed an application with the Federal Regulatory Commission (FERC) on May 1, 2019 for an exemption from licensing for the micro hydropower project. Bard is still awaiting FERC approval, which is expected Q2 2023. A local law was passed that supports and eases the installation of micro hydropower facilities, so Bard has been able to proceed with design and purchasing. The micro hydropower dam is on schedule to be constructed and operational in Spring/Summer of 2023.
- Suffolk County Community College has been steadily moving forward with the construction of their net zero Renewable Energy & Science, Technology, Engineering, and Math (STEM) Center. The major construction aspects of the building are complete, and the certificates of occupancy and substantial construction of the building is expected to be complete Q2 2023 with classes beginning Fall 2023. The building's solar array and geothermal system are installed, and building commissioning is well underway.
- The City College of New York Building Performance Lab has been assessing building equipment use and operations as well as establishing baselines from energy-use data. The project staff and facility staff are coordinating together to find the most optimal improvements to their operations by integrating the new System Advisor Model (SAM) platform on the campus. The project team has been actively training facility staff and implementing energy reduction projects. Initial results from the project have been compiled, which show significant energy reduction and an avoided cost of \$279,000.

3.4.6 Clean Energy Communities

In the fall of 2015, NYSERDA, through the third and final round of the Cleaner, Greener Communities (CGC) program, awarded three contracts for regionally based outreach and technical assistance services

to support NYSERDA's new Clean Energy Communities program. These services expand on the efforts undertaken previously through Climate Smart Communities (CSC) and Economic Development Growth Extension (EDGE). In addition, communities that receive the Clean Energy Communities designation will be eligible to apply for grants to implement innovative clean energy projects.

The statewide Clean Energy Communities program, which is co-funded through the Clean Energy Fund (CEF), supports local governments with a common platform and the coaching, facilitation, technical assistance, and expertise for implementing the local-level policies and planning needed to drive future clean energy market activities. These local-level actions accumulate and help to deliver the regional sustainable growth strategies encouraged by the CGC program, consistent with the regional sustainability and economic development plans. The Clean Energy Communities program also complements the New York State Department of Environmental Conservation's (DEC) Climate Smart Communities Certification Program by assisting communities working toward certification.

Key accomplishments:

- Clean Energy Communities Coordinators have helped 823 communities complete and submit 3,381 High Impact Actions, 3,168 of which were completed after the program launch, through the Clean Energy Communities program.
- Four hundred and seventy-one communities completed at least four High Impact Actions and became designated Clean Energy Communities.

A market evaluation of the Clean Energy Communities program was completed in the fourth quarter of 2019. For more information on this evaluation please refer to section F.2. Completed Evaluations in the appendix of this report. Additionally, an impact evaluation was completed in Q4 2021.

3.4.7 Community Energy Engagement

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

3.4.8 Priority Population Workforce Development

NYSERDA has committed more than \$127 million, including \$19 million in RGGI funds, to support workforce development and training initiatives. These efforts will help train and prepare more than 40,000 New Yorkers for growing clean energy job opportunities and assist clean energy businesses in recruiting, hiring, and training workers. More importantly, these efforts prioritize training programs for the State’s most underserved populations—low-income individuals, veterans, disabled workers, single parents, the formerly incarcerated, and individuals from disadvantaged communities—and will also help integrate displaced workers into the clean energy industry. NYSERDA has provided funding to support important partnerships with labor, colleges and universities, community-based organizations, not-for-profits, manufacturers, trade associations, and others, to ensure workers are trained through continuing education courses, certificate programs, degree programs, internships, apprenticeships, and on-the-job training. Additionally, NYSERDA supports clean energy businesses, transitioning fossil fuel workers, and new entrants into the workforce through the three initiatives summarized below. To date, the majority of RGGI funds are earmarked for these three programs which prioritize funding and, in some cases, offer higher incentives for individuals from disadvantaged communities and priority populations.

NYSERDA’s Internship and On-the-job Training programs provide a wage subsidy to clean energy businesses and organizations, helping reduce the risk of hiring and training new workers in many emerging fields, including high-efficiency HVAC and energy efficiency.

- **The Clean Energy Internship** program introduces the clean energy industry and relevant career experiences to students, recent graduates, and individuals from disadvantaged communities.
- **The On-the-Job Training** program, administered in partnership with the Department of Labor, provides higher incentive levels and flexible participation options for small businesses, minority- and women-owned businesses, businesses hiring heat pump workers, and businesses hiring members of priority populations and disadvantaged communities.
- **The Climate Justice Fellowship** program funds the professional development, training, and mentoring for 150 full-time fellows to work on climate justice initiatives, ensuring an equitable clean energy transition for all New Yorkers, but especially for those disproportionately burdened by environmental health hazards and those who could benefit the most from clean energy.

3.4.9 Clean Energy Hubs: Community and Stakeholder Engagement

NYSERDA will continue building local capacity within disadvantaged communities and improve stakeholder engagement through the Clean Energy Hubs program, which will increase engagement of residents and communities in New York City, support the participation of community-based and advocacy organizations in stakeholder meetings, and supporting local projects. NYSERDA will launch a network of Community Energy Hubs, which will build on the success of the Community Energy Engagement Program, in which community and locally based organizations across New York State provided outreach and education services to help low-income residents and small businesses make informed energy choices and access incentives and other resources to implement clean energy projects. The Hubs will be designed to enhance community-level engagement and capacity building by supporting clean energy concierge services. These services will be provided to residents, small businesses, nonprofits, and multifamily building owners in disadvantaged and underserved communities to increase awareness and adoption of clean energy programs and solutions, with the focus of creating a more inclusive clean energy economy.

In addition, NYSERDA will help to increase the capacity of organizations to advance clean energy projects at the local level. NYSERDA will advance a pilot effort to increase the potential for community-based organizations to plan for and develop community-scale clean energy projects that can benefit disadvantaged communities with capacity development grants. RGGI funds allocated to this program will allow for statewide activities alongside efforts supported through the Clean Energy Fund.

3.4.10 Healthy Homes New Design and Construction Challenge

This program will create a healthy home builder and developer network to get builders to design and offer carbon-neutral homes. Funding will also be used to run a healthy Neighborhood Design Challenge to support all electric sub-divisions and planned communities, as well as promote the benefits of healthy homes. Through this program, NYSERDA can accelerate the pivot to decarbonization of residential new construction and build market capability across (i.e., focus on Long Island area to complement existing activities already using Clean Energy Funds elsewhere in the state), which will support requiring decarbonized new construction via code and regulations on an accelerated five-year track.

3.4.11 Climate Action Consumer Awareness and Education

RGGI funding will be used to increase awareness and understanding of the critical need for and benefits of climate action in New York State. This investment will include an umbrella campaign to encourage broad engagement that is coordinated with a targeted marketing effort to impact the purchase decisions and actions that are needed to reach the State's goals. The targeted effort will address specific barriers across critical sectors and encourage adoption of new technologies that will improve quality of life and help decarbonize our buildings and economy.

3.4.12 Statewide Community Air Quality Monitoring

NYSERDA has allocated \$8 million in RGGI funding for community air monitoring. The statewide initiative, led by the New York State Department of Environmental Conservation, has been designed to monitor air quality in 10 disadvantaged communities, home to approximately five million New Yorkers living in areas historically overburdened by environmental pollution. Using air sensor-equipped, low-emissions vehicles on public roads, this initiative is measuring hyperlocal, community-based air pollution levels to screen for local sources of air pollution street-by-street in these communities for one year. The initiative is currently collecting this hyperlocal air pollution data to help identify sources contributing to disproportionate air pollution burdens and develop strategies to reduce air pollution within these communities, including greenhouse gas emissions contributing to climate change.

Key accomplishments as of this reporting period:

- Public engagement undertaken throughout the State. DEC held two community meetings prior to the start of the monitoring to help define the study areas. DEC continues to engage the public with project update meetings. Currently they have started the third round of project update meetings for each of the 10 communities.

- Ten communities have been selected for monitoring, which has commenced in:
 - July 2022: Bronx, Manhattan, Capital Region, Buffalo/Tonawanda/Niagara Falls.
 - September 2022: Brooklyn, Queens, Hempstead/New Cassel/Roosevelt/Uniondale/Westbury, Mount Vernon/Yonkers/New Rochelle, Syracuse, Rochester.
- An online system has been developed and launched to access the progress data, which is currently available to the DEC, NYSERDA, Climate Justice Working Group members, and relevant Community Based Organization identified by DEC.

3.5 Green Jobs - Green New York

Green Jobs - Green New York (GJGNY) provides funding for energy assessments, low-cost financing for energy upgrades, and technical and financial support to develop a clean energy workforce. GJGNY is a statewide effort to strengthen communities through energy efficiency and uses constituency-based organizations (CBO) to support program outreach in underserved communities. GJGNY enables New Yorkers to make a significant difference in homes, businesses, and neighborhoods—making them more comfortable, sustainable, and economically sound. GJGNY is administered by NYSERDA and made available by the Green Jobs - Green New York Act of 2009. The GJGNY 2021 Annual Report issued in October 2022, presents financial data for the approved GJGNY programs through June 30, 2022.⁶

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

By far the greatest demand for GJGNY funding generates from the residential revolving loan fund, with issued loans totaling its original allocation in less than three years. The residential revolving loan fund is now maintained primarily through proceeds from the sale of bonds, along with limited RGGI funds. More details regarding the bond issuance process and sustainability of the loan fund are in the annual report.

Funding allocated to individual components of Green Jobs - Green New York is nearly fully committed or expended. In order to maintain required elements of the GJGNY Act, NYSERDA included GJGNY initiatives in the planning of the CEF.⁷ NYSERDA is working with stakeholders to incorporate lessons learned from GJGNY into CEF planning to ensure benefits from the initiatives continue, particularly those benefitting the LMI sector.

A measure adoption rate assessment of GJGNY residential energy audit-only projects was completed in the fourth quarter of 2020. For more information on this evaluation please refer to section F.2. Completed Evaluations in the appendix of this report.

3.5.1 Assessments

One- to Four-Family Residential Buildings Program Assessments

HPwES is a comprehensive energy efficiency services program for existing one- to four-family homes. As of January 1, 2020, the HPwES program is no longer active; however, the Assisted HPwES program (available to LMI one- to four-family homes) remains operational. Participating certified contractors conduct comprehensive home energy assessments and upgrades. Free and reduced-cost home energy assessments are available to homeowners in New York State through the GJGNY Act of 2009, which drives increased participation in this program and cuts additional GHG emissions.

Key accomplishments as of this reporting period:

- A total of 3 GJGNY funded assessments were completed in Q3 and Q4 2022, bringing the total to 99,951 residential GJGNY assessments completed with RGGI funds; 92,860 (93%) were provided at no cost to the customer.
- Of the program's cumulative 54,908 completed residential units that use a GJGNY assessment and/or GJGNY financing, 25,028 (46%) units are associated with income-qualified Assisted HPwES customers.
- Constituency-based organizations assisted with the completion of 3,177 units, or 6% of all completed GJGNY residential retrofits.

A summary of results from an evaluation of GJGNY audit-only projects can be found in section F.2. Completed Evaluations in the appendix of this report.

Multifamily Performance Program Assessments

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

Small Commercial Energy Efficiency Program Assessments

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

In Q1 2019, the GJGNY Energy Study offering was re-launched. This offering provides subsidized energy assessments and technical assistance to help small businesses (100 full-time employees or less) and not-for-profit organizations (any size) improve their energy efficiency and reduce their energy costs by identifying economically viable improvements that could yield substantial annual energy savings, including building electrification analysis. Eligible small-businesses and not-for-profits are not required to pay into the Systems Benefit Charge (SBC). A GJGNY Energy Study contractor was competitively selected by NYSERDA to provide these energy assessments.

Key accomplishments:

- During the initial program offering, a total of 3,367 GJGNY-funded assessments were completed.
- The 2015 Small Commercial Energy Efficiency Program Impact Evaluation reported 44% of the energy savings recommended through program audits were implemented, resulting in an estimated total of 1,481 GJGNY-funded completed projects through February 28, 2017.
- Since the re-launch in Q1 2019, a total of 30 GJGNY funded assessments have been completed.

3.5.2 Financing

One- to Four-Family Residential Financing

GJGNY financing is available to participants to finance the installation of recommended energy efficiency improvements with the possibility of reimbursement through energy savings.

Net-metered technologies, including solar electric systems, are also eligible for GJGNY financing. The

Smart Energy Loan, the Residential Renewable Energy Tax Credit Bridge Loan (Bridge Loan), and the innovative On-Bill Recovery (OBR) option are the three low-interest rate financing choices available through GJGNY, which enable more projects, resulting in greater reductions of GHG emissions.

Key accomplishments as of this reporting period:

- A total of 35,963 loans have been issued totaling \$441.2 million.
- Assisted HPwES and market rate customers make up 60.7% of all GJGNY loans issued as of December 31, 2022, representing 45.3% of the total loan funds.
- A total of 10,677 OBR Loans have closed, valued at approximately \$162 million, and 323 Bridge Loans, valued at approximately \$3.8 million.
- Of the total 35,963 loans closed, 12,692 are solar loans valued at approximately \$217.9 million.
- 280 ground source heat pump loans have closed, valued at nearly \$6.2 million.
- 1,061 air source heat pump loans have closed, valued at nearly \$16.5 million.
- There are 81 renewable heat loans of which 15% represent assisted customers.

Multifamily Performance Program Financing

This program concluded with the closing of the Multifamily Performance Program. Multifamily buildings may take advantage of the Small Commercial Energy Efficiency Program Financing to assist in the financing of energy efficiency or clean energy technologies improvements.

Key accomplishments as of this reporting period:

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

Small Commercial Energy Efficiency Program Financing

The GJGNY Small Commercial Energy Efficiency Program offers financing to help small businesses and not-for-profit organizations improve their energy efficiency and reduce energy costs to support the goal of increased clean energy adoption statewide. In June 2011, NYSERDA launched the Participation Loan product to small business and not-for-profit customers. NYSERDA provides 50% of the loan principal, up to \$50,000 at 2% interest and the participating lender provides the remaining loan principal at its market interest rate. In June 2012, NYSERDA launched the OBR Loan for small business and not-for-profit customers, making a NYSERDA loan available for up to \$50,000 at 2.5% interest to finance recommended energy efficiency improvements. Customers can then repay their loan through a charge on their utility bill. In July 2019, NYSERDA increased its interest rate for both Participation Loans and OBR

Loans to the Wall Street Journal Prime Rate of Interest + 200 basis points, fixed at closing. Twelve lenders have agreed to offer Participation Loans. NYSERDA is negotiating a contract with a single lender of originate OBR loans on a statewide basis.

Key accomplishments as of this reporting period:

- A total of 51 OBR Loans have been closed with a total value of \$1.6 million, which represents 94% of the total financing value of \$1.7 million.
- A total of 37 Participation Loans have closed with a value of \$2.1 million. NYSERDA's share of the total value is \$1.2 million.

Predevelopment Financing

In March 2021, NYSERDA provided \$3 million in GJGNY funding and entered into a direct contract with New York City Energy Efficiency Corporation (NYCEEC), a not-for-profit lender, to issue predevelopment loans (including Integrated Physical Needs Analysis [IPNA]), Investment Grade Energy Assessment [IGEA] studies, or similar predevelopment energy/engineering studies to assess energy efficiency improvements and renewable energy installations in eligible buildings located in New York State). NYCEEC will issue loans for which NYSERDA provides 100% of the loan principal, up to \$150,000, at zero percent interest and will also issue loans, which NYSERDA provides 25% of the loan principal, up to \$500,000, between zero and 5%. Though we expect most loans will be at zero percent to help reduce the interest rate to the borrower, NYCEEC provides the remaining loan principal and will set their rate.

Key accomplishments as of this reporting period:

- One new loan was issued by NYCEEC under the program, bringing the program total to 12 loans issued.
- One loan was paid off with a Maximum Commitment amount of \$60,000.
- Forty-six percent of the Maximum Commitment of the loans has been disbursed, with \$264,643 in funding provided toward the commitment.
- Average Principal Balance for all loans was \$22,054 at the end of 2022 Q4.

Loan Loss Reserve Financing

NYSERDA provided \$10 million of GJGNY funding to fund a Loan Loss Reserve (LLR) Program and launched an open solicitation accepting applications in December 2020. The Loan Loss Reserve/Credit Enhancement provides support for financing products which support clean energy improvements in

residential (1–4 unit) dwellings, small commercial (100 employees or less), not-for-profit and multifamily (5+ unit) buildings (eligible properties) located in New York State communities. The Loan Loss Reserve will provide reimbursement for defined losses on individual transactions.

Key accomplishments as of this reporting period:

- One new application is in the process of being approved, with four total program participants approved at this time.
- A total of \$2.5 million awarded through this reporting period, with the total awarded as follows: \$1.5 million for residential sector support and \$1 million for multifamily sector support.
- To date no funding has been used to reimburse losses.

3.5.3 Workforce Development, Outreach, and Marketing

Workforce Development

The GJGNY Workforce Training and Development (WFD) initiative complements other NYSERDA and New York State Department of Labor (DOL) programs targeted at preparing individuals for energy efficiency, solar thermal, and solar electric careers in New York State. WFD programs also help to build the State’s capacity for long-term carbon reduction and facilitate energy education programs that will help build a clean energy future. Specifically, WFD efforts under GJGNY seek to expand energy-specific content in State Registered Apprenticeship and third-party accredited building trades programs. Expectations are to increase access to technical training workshops for skills enhancement and certification. In addition, the WFD programs are expected to bridge the gap between training and employment through on-the-job training incentives for businesses seeking to hire and train new workers while reaching out to low-income communities to expand training opportunities. From the program’s inception through its conclusion in March 2019, a total of 4,184 New Yorkers were trained in a range of energy efficiency and renewable energy courses.

NYSERDA issued PON 3982 On-the-Job Training (OJT) for Energy Efficiency and Clean Technology Program Opportunity Notice, which includes approximately \$520,000 in GJGNY workforce training funds that will be made available to eligible New York State employers outside of the System Benefits Charge (SBC) service territory and to support additional new hires at all businesses statewide as a supplement to Clean Energy Fund funding. This program supports wages for new hires on a first-come, first-served basis for eligible clean energy businesses. The program includes higher wage subsidies for employers that hire workers with additional barriers to employment. To date, 71 people have been hired and approximately \$520,000 in wages and training subsidies have been awarded GJGNY funds.

Additional RGGI funding (\$2.25 million) has been added to the OJT program, supporting 115 additional hires with \$938,786 awarded for those new workers through the end of 2022.

NYSERDA's PON 4000 Clean Energy Internship Program also includes \$2.25 million in RGGI funding to support internships at eligible New York State employers outside of the SBC service territory and to support additional interns as a supplement to Clean Energy Fund funding. As of the end of 2022, 351 interns have been hired and approximately \$1,758,135 has been paid to employers to support these internships with RGGI funding.

Outreach and Marketing

GJGNY provided community-based outreach, enabled one-to-one assistance with the process of participating in the program to deliver services in underserved communities. GJGNY also provided outreach services in targeted communities through constituency-based organizations (CBO), which located residents, businesses, not-for-profits, multifamily building owners, and potential workforce candidates to participate in the program. The results of the outreach efforts were detailed in previous reports, which identified what strategies worked best for their teams. Although the GJGNY outreach funding is depleted and the CBO program is no longer active, community outreach and regional engagement utilizing constituency and other locally based organizations continue under the Community Energy Engagement Program (CEEP). For additional information about that program refer to section 4.4.7 Community Energy Engagement of this report.

3.6 NY Green Bank

The NY Green Bank has replenished its funding from the RGGI Portfolio and therefore will no longer provide programmatic updates in this report. Updates can be found in the metrics report filed quarterly with the Public Service Commission.⁸ Refer to Appendix F: Closed RGGI-Funded Programs and Completed Evaluations for more information.

3.7 Energy Storage

In April 2019, NYSERDA launched a deployment incentive program for bulk and retail energy storage projects on Long Island. NYSERDA made available approximately \$55 million in financial incentives.⁹ Retail incentives for projects up to 5 megawatts (MW) were deployed for residential or commercial storage projects, and these funds continue to be committed. In 2021, NYSERDA agreed to transfer the remaining \$40 million of unallocated RGGI storage incentives to LIPA to support energy efficiency in

return for LIPA committing to have a minimum of 200 MW of energy storage deployed within their service territory by 2025. This includes storage procured through a bulk storage request for proposals (RFP) that the Public Service Enterprise Group–Long Island (PSEG-LI) issued to procure at least 155 MW of bulk storage.¹⁰

Programmatic updates are provided in the annual State of Storage Report.¹¹

3.8 Program Evaluation

Several RGGI evaluation studies are underway or in the planning stages as of the fourth quarter of 2022. The study objectives and timing are discussed in the following sections. Other study plans are also in development and will be detailed in future quarterly reports. The following types of evaluation activities are being performed:

- **Impact Evaluation** measures the outcomes and benefits of a program, calculates the cost-effectiveness of the program, and compares the outcomes to the program goals.
- **Market Evaluation** develops an understanding of markets and market actors, provides information to support program design and delivery, and tracks changes in markets over time.
- **Process Evaluation** reviews oversight and operations, gauges customer satisfaction, and recommends process and efficiency improvements.
- **Logic Model Reports** inform evaluation work by documenting the relationships between program activities; activity outputs; and the short-, medium-, and long-term outcomes the program intends to induce.
- **Evaluation Readiness Reviews**¹² help identify whether a program has various factors in place that will ensure an evaluation is justified, feasible, and likely to provide useful information.

In addition, building and facility stock studies receiving support from RGGI evaluation funds are described in sections 4.8.1 and 4.8.2.

3.8.1 Evaluation of Energy Efficiency and Other Deployment Programs

NY Green Bank Financial Market Evaluation: An evaluation to assess NY Green Bank (NYGB) market transformation activities is currently underway. This evaluation is the first update to the 2019 NY Green Bank Financial Market Transformation Baseline Study. In addition to updating baseline metrics from the 2019 study, this evaluation includes case studies showcasing achievements of NYGB. The results of this evaluation will be used to inform NYGB, NYSERDA, and the financial community of the

progress NYGB has made in achieving its goals, which include addressing market barriers and financing gaps, increasing investor confidence, and achieving scale in clean energy financing since the baseline activities in the 2019 NYGB Financial Market Evaluation. This evaluation is currently underway, and results are anticipated in the third quarter of 2023.

EmPower New York and Assisted Home Performance Impact and Process evaluation: The EmPower New York (EmP) and Assisted Home Performance (AHP) Impact and Process Evaluation (also referred to as the Single Family LMI Retrofit Programs Impact and Process Evaluation), is planned to begin in the second quarter of 2023. The evaluation will cover EmPower and Assisted Home Performance projects from April 1, 2022, to March 31, 2023. The evaluation will include a rigorous billing analysis with electric and natural gas utility and delivered fuel data, a survey of participants to understand energy use behaviors and their experience of the program, and a contractor survey to understand decision they make and their experience of the program.

3.8.2 Evaluation of Renewable Energy Programs

NY-SUN Solar Energy Equity Framework Evaluation: An evaluation of the NY-SUN Solar Energy Equity Framework is underway now and will assess market drivers influencing the equitable adoption of solar energy and determine impacts and market benefits of NYSERDA's solar efforts. Future reports will summarize results.

NY-SUN Market Adoption/Balance-of-System Evaluation: An evaluation encompassing solar adoption, system characteristics, barriers and drivers influencing adoption, as well as an update to balance-of-system cost data is underway now and future reports will summarize results.

3.8.3 Building and Industrial Facility Stock Studies

NYSERDA has undertaken major building stock studies to assess residential and commercial markets across a broad range of customer segments and energy measures. The goals of these studies have been to (1) better understand building stock and associated energy use, including saturations of energy-consuming measures, penetrations of energy-efficient equipment, building characteristics and energy management practices and (2) use this information to estimate the technical, economic, and achievable energy

efficiency opportunities in New York State in the next three, five, and 10 years. These studies have been supported by the System Benefits Charge (SBC), Energy Efficiency Portfolio Standard (EEPS), CEF and RGGI funds; RGGI funds have supplemented the budget to allow for robust data collection on fuel measures.

A building stock assessment of the multifamily sector commenced in the first quarter of 2021. While this Multifamily Building Stock Study is funded through a separate funding portfolio, outcomes from the study will have broad applicability. The overall objective of the study is to evaluate and develop a baseline of the existing multifamily building stock and associated energy use, including the saturations of energy consuming equipment (electric, gas, and other fuels), the penetrations of energy-efficient equipment, renewables, and energy-management practices. Data collection is underway, and results of this study are expected in Q4 2023.

A team of evaluation consultants was competitively selected in Q1 2021 to conduct a comprehensive statewide industrial stock baseline study for key industry sectors. Work commenced in Q2 2022. While the work is funded through a separate funding portfolio, the outcomes from the study will have broad applicability. The Statewide Industrial Stock Baseline Study will help identify the industries, industrial facilities, and end uses that offer opportunities for greenhouse gas reductions, energy efficiency, beneficial electrification, and renewable energy for achieving the New York State Climate Leadership and Community Protection Act's (Climate Act) 2050 goals and beyond. Results from the secondary analysis phase of this work are anticipated in Q1 2023, while the comprehensive analysis, including a potential study, is anticipated Q4 2023.

An update to the Residential Building Stock Assessment is planned to be scoped in Q3 2023.

Appendix A. Savings Calculations Methodology

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

A.1 Energy Savings

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

A.2 CO₂ Reductions

Emission factors translate the energy savings data into annual GHG emission reduction values. The GHG evaluated in the report include carbon dioxide, methane, and nitrous oxide. Because each of these gases has a different global warming potential,¹³ 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,¹⁴ shown in Table A-1.

Table A-1. Global Warming Potentials

These values represent a 100-year time horizon.

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

Gas	Global Warming Potential
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	25
Nitrous Oxide (N ₂ O)	298

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

Table A-2. Fuel Combustion Emission Factors by Sector

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

For projects installed prior to 2016, a marginal emission factor of 1,160 pounds of CO₂e/MWh is used to estimate emission reductions associated with electricity reductions for all sectors.^{15 16} When a project is installed and committed from 2016 onward, a marginal emission factor of 1,103 pounds of CO₂e/MWh is applied to estimate emission reductions associated with electricity use reductions for all sectors. Although electricity savings may not lead to near-term emission reductions under the RGGI CO₂ cap, savings will potentially reduce imports of electricity to NYS. The demand for CO₂ allowances, which could lead to a possible future reduction in the cap as well as reduce the carbon footprint of end users—as users will be responsible for a smaller percent of the emissions associated with electricity production.

A.3 Bill Savings

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

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

Table A-3. Fuel Prices by Sector^a

Sector	Electricity (\$/kWh)	Natural Gas (\$/MMBtu)	Fuel Oil/ Distillate (\$/MMBtu)	Propane (\$/MMBtu)
Residential	0.18	8.57	27.54	37.01
Commercial	0.16	5.09	21.77	25.07
Industrial	0.12	5.09	22.74	31.04
Transportation	0.05	N/A	26.93	N/A
C&I	0.14	5.09	22.23	28.06

Sector	Residual (\$/MMBtu)	Kerosene (\$/MMBtu)	Wood (\$/ Cord)	Coal (\$/MMBtu)	Gasoline (\$/MMBtu)
Residential	N/A	29.84	7.83	N/A	N/A
Commercial	14.75	29.84	N/A	5.78	N/A
Industrial	14.75	24.64	N/A	4.24	N/A
Transportation	N/A	N/A	N/A	N/A	N/A
C&I	14.75	27.24	N/A	5.01	28.36

^a 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 2014 retail prices as reported in NYSERDA's Patterns and Trends- NYS Energy Profiles: 1997–2014 (NYSERDA 2016).

Table A-4. Program Measure Life Assumptions

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

Program	Electricity Measure Life	Fuels Measure Life
GJGNY—Single-Family Residential Assessment Component	18	24
GJGNY—Single-Family Residential Loan Component	19	23
GJGNY—Multifamily Residential Assessment Component	13	15
GJGNY—Small Commercial Loan Component	13	21
RGGI—Multifamily Performance Program	13	15
RGGI—Multifamily Carbon Emissions Reduction Program	N/A	13
RGGI—EmPower New York	N/A	24
RGGI—Home Performance with ENERGY STAR	18	24
RGGI—Green Residential Building Program	18	24
RGGI—Solar Thermal Incentive Program	N/A	20
RGGI—Low-Rise Residential New Construction Program	18	24
RGGI—NYSERDA Solar Photovoltaic Initiative	25	N/A
RGGI—Cleaner, Greener Communities	15	15
RHNY—Boilers	20	20
RHNY—Pellet Stoves	20	20
LIPA Efficiency	18	NA
LIPA Photovoltaic and Efficiency Initiative	25	N/A
Regional Economic Development and GHG Reduction	18	18
Charge NY	10	10

Appendix B. Former Program Names

Table B-1. Former Program Names

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

Appendix C. Summary of Portfolio Benefits

Table C-1. Summary of Portfolio Benefits

Visit: <https://data.ny.gov/Economic-Development/Summary-of-Portfolio-Benefits-from-RGGI-funded-Pro/euip-iahh> on OpenNY.

Table C-2. Summary of Fuel Savings by Type

Visit: <https://data.ny.gov/Energy-Environment/Fuel-Savings-by-Type-from-RGGI-Funded-Projects/3dbk-8jiw> on OpenNY

Appendix D. NYS RGGI Auction Proceeds

Table D-1. NYS RGGI Auction Proceeds

Visit: <https://data.ny.gov/Energy-Environment/New-York-State-RGGI-Auction-Proceeds/vxte-b4mv> on OpenNY.

Appendix E. Total NYS RGGI Funds

Table E-1. NYS RGGI Funds

Visit: <https://data.ny.gov/Energy-Environment/New-York-State-RGGI-Funds/bkzt-72yv> on OpenNY.

Appendix F. Closed RGGI-Funded Programs and Completed Evaluations

Information on Closed RGGI-Funded Program and Completed Evaluations can be found in the most recent RGGI Status Report: <https://www.nyserda.ny.gov/About/Publications/Program-Planning-Status-Reports/RGGI-Reports>

Endnotes

- ¹ Baseline Market Evaluation of Renewable Heat New York, <https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2020-Renewable-Heat-NY-Market-Evaluation-Report-Final.pdf>
- ² Solar Photovoltaic Program Impact Evaluation for 2011-2016, <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2018-Solar-Photovoltaic-Impact-Evaluation-2011-2016.pdf>
- ³ Offshore Wind Policy Options, <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/Offshore-Wind-Policy-Options-Paper.pdf>
- ⁴ HPwES low-rise buildings encompass buildings with three stories or less, with eight units or less, and are constructed using building techniques common to one- to four-family homes. They must be served by residential-scale heating equipment with a maximum rating of 300,000 Btu. Taller residential buildings that fit these criteria are also eligible. Examples include brownstones, row housing, and other urban-style buildings.
- ⁵ Climate Change Vulnerability of Eutrophication, <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Environmental/22-32-Climate-Change-Vulnerability-of-Eutrophication-acc.pdf>.
- ⁶ Green Jobs Green New York Annual Report <https://www.nyserda.ny.gov/About/Publications/GJGNY-Advisory-Council-Reports>
- ⁷ The Clean Energy Fund (CEF), one of Reforming the Energy Vision's (REV) three strategic pillars, is designed to deliver on the State's commitment to reduce ratepayer collections, drive economic development, and accelerate the use of clean energy and energy innovation. It will reshape the State's energy efficiency, clean energy, and energy innovation programs. Visit <http://www.nyserda.ny.gov/About/Clean-Energy-Fund> for more details regarding CEF planning.
- ⁸ New York Green Bank Public Filings <https://greenbank.ny.gov/Resources/Public-Filings>
- ⁹ This funding, originally allocated to the NY Green Bank, has been returned to the RGGI portfolio as the bank has recouped on the original investment.
- ¹⁰ PSEG-Long Island 2021 Bulk Energy Storage Request for Proposals, <https://www.psegliny.com/aboutpseglongisland/proposalsandbids/2021bulkenergystoragerfp>
- ¹¹ State of Storage in New York, Annual Energy Storage Deployment Report, <https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={7137DCF7-178A-4D93-AC22-76301A071024}>
- ¹² PSEG-Long Island 2021 Bulk Energy Storage Request for Proposals, <https://www.psegliny.com/aboutpseglongisland/proposalsandbids/2021bulkenergystoragerfp>
- ¹³ A global warming potential is a measure that estimates how much a given mass of a GHG contributes to global warming. Calculations span over a specific time interval, which is 100 years for the IPCC Second Assessment Report values.
- ¹⁴ IPCC, 2007. Fourth Assessment: Climate Change 2007. This inventory uses potentials from the IPCC Fourth Assessment Report, rather than values from more current assessments. The Fifth Assessment Report was released in 2014–15. New York DEC regulation Part 242 1.2 (49) uses the Third Assessment values, while the EPA GHG Reporting Rule and the NY GHG Inventory and Forecast use the Fourth Assessment. Reconciliation between methodologies will be investigated as part of the program implementation and evaluation process.
- ¹⁵ Per the Clean Energy Advisory Council (CEAC) Metrics, Tracking and Performance Assessment (MTPA) Working Group, NYSERDA has adopted a marginal electricity grid emission factor of 1,103 pounds CO₂e/MWh for projects completed after 2015 (<http://documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=190731&MatterSeq=50399>). Projects completed prior to 2016 will maintain the 1,160 pounds CO₂e/MWh previously used, based on analysis of grid emissions at that time. Carbon emissions reductions are now expressed in terms of metric tons. Reports published prior to August 2020 represented carbon emissions in short tons.

¹⁶ Beginning with Q4 2016, NYSERDA updated emission factors for natural gas, #2 oil, #6 oil, kerosene, propane, wood and steam to be consistent with emission factors used in the updated NYS Greenhouse Gas Inventory (<https://www.nysерda.ny.gov/About/Publications/EA-Reports-and-Studies/Energy-Statistics>). These factors are derived from EPA’s February 2016 State Inventory Tool release (<https://www.epa.gov/statelocalclimate/state-inventory-and-projection-tool>). Steam emission factors have been updated to be consistent with New York City’s updated Greenhouse Gas Inventory http://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/NYC_GHG_Inventory_2014.pdf