

New York State Regional Greenhouse Gas Initiative- Funded Programs

Semiannual Status Report through June 30, 2023

Final Report | December 2023



NYSERDA

NYSERDA's Promise to New Yorkers:

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

Our Vision:

New York is a global climate leader building a healthier future with thriving communities; homes and businesses powered by clean energy; and economic opportunities accessible to all New Yorkers.

Our Mission:

Advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all.

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Final Report

Prepared by:

New York State Energy Research and Development Authority

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Acronyms and Abbreviations

| | |
|-------------------|---|
| AHPwES | Assisted Home Performance with ENERGY STAR® |
| DEC | NYS Department of Environmental Conservation |
| CBO | constituency-based organization |
| CGC | Cleaner, Greener Communities |
| CO ₂ | carbon dioxide |
| CO ₂ e | carbon dioxide equivalents |
| EEPS | Energy Efficiency Portfolio Standard |
| EFC | New York State Environmental Facilities Corporation |
| EPA | United States Environmental Protection Agency |
| ERP | Energy Reduction Plan |
| GHG | greenhouse gas |
| GJGNY | Green Jobs - Green New York |
| HPwES | Home Performance with ENERGY STAR® |
| kW | kilowatt |
| kWh | kilowatt-hour |
| LIPA | Long Island Power Authority |
| MMBtu | million British thermal units |
| MOU | memorandum of understanding |
| MPP | Multifamily Performance Program |
| MW | megawatt |
| MWh | megawatt-hour |
| NYPA | New York Power Authority |
| DOL | New York State Department of Labor |
| OBR | On-Bill Recovery Financing Program |
| PON | Program Opportunity Notice |
| PV | photovoltaic (also known as solar electric) |
| RFP | request for proposals |
| RGGI | Regional Greenhouse Gas Initiative |
| RPS | Renewable Portfolio Standard |
| SBC | System Benefits Charge |
| ST | solar thermal |
| WFD | Workforce Training and Development |

1 Introduction

In New York State, the Regional Greenhouse Gas Initiative (RGGI) program has been implemented through two complementary regulations: The New York State Department of Environmental Conservation (DEC) established the State's Carbon Dioxide (CO₂) Budget Trading Program (6 NYCRR Part 242, 6 NYCRR Part 200, General Provisions) and the New York State Energy Research and Development Authority (NYSERDA) established the CO₂ Allowance Auction Program (21 NYCRR Part 507). This report is prepared pursuant to the State's RGGI Investment Plan (2022 Operating Plan) and provides an update on the progress of programs through the quarter ending June 30, 2023. It contains an accounting of program spending; an estimate of program benefits; and a summary description of program activities, implementation, and evaluation. An amendment providing updated program descriptions and funding levels for the 2022 version of the Operating Plan was approved by NYSERDA's Board in January 2023.

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

2 Summary of Portfolio and Program Benefits

This section provides an overview of the expected quantifiable benefits related to carbon dioxide equivalent (CO₂e) reductions, energy savings, and participant energy bill savings with expended and encumbered funds through Q2 2023.¹ For more information on the methodology used to calculate CO₂e reductions and energy bill savings, see appendix A. For a list of former program names, reference appendix B. Appendix C shows the detailed benefit results.

NYSERDA begins tracking program benefits once project installation is complete and provides estimated benefits for projects under contract that are not yet operational (pipeline benefits). Estimated benefits are based on the expected lifetime benefits from installed and pipeline savings. The metrics presented in this section are estimates and not evaluated unless otherwise noted. Future evaluation and status reports will present the results as they are available. Program benefits may be reported prior to the financial reporting of funds spent, as fund transfers may lag behind the installation date. At this time, the program benefits include some projects that are jointly supported by other non-RGGI funding sources administered by NYSERDA.

The estimated cumulative annual and expected lifetime benefits as of June 30, 2023 at the portfolio and program levels are shown in Table 1 and Table 2, respectively.²

Section 4 of this report previously provided descriptions and updates for each RGGI-funded program. These details are now provided on the RGGI website.³

Table 1. Summary of Expected Cumulative Portfolio Benefits through June 30, 2023

| Benefits through June 30, 2023 ^a | Net Greenhouse Gas Emission Savings ^b (Tons CO ₂ e ^c) | Total Net Fuel Savings (MMBtu) | Net Efficiency Electricity Savings (MWh) | Net Renewable Energy Generation (MWh) | Total Net Electricity Savings/Generation (MWh) | Energy Bill Savings to Participating Customers (\$ Million) |
|--|---|--------------------------------|--|---------------------------------------|--|---|
| Cumulative Annual Installed Savings^d | 1,807,679 | 11,287,321 | 1,277,209 | 645,063 | 1,922,273 | \$630.8 |
| Cumulative Annual Pipeline Savings^e | 116,272 | 846,419 | 78,103 | 54,646 | 132,750 | \$31.7 |
| Cumulative Annual Committed Savings^f | 1,923,951 | 12,133,740 | 1,355,313 | 699,710 | 2,055,022 | \$662.5 |
| Expected Lifetime Total Savings^g | 34,272,535 | 188,967,064 | 26,010,920 | 15,070,045 | 41,080,965 | \$11,263.6 |

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

Table 2. Summary of Expected Cumulative Annual Program Benefits through June 30, 2023

| Program | Costs (millions of dollars) | | Net Energy Savings (Annual MMBtu) | | | Net Electricity Savings or Renewable Energy Generation (Annual MWh) | | | Net Greenhouse Gas Emission Savings ^a (Annual Tons CO ₂ e ^b) | | | Cost Benefit Ratio (\$/Ton CO ₂ e) | |
|--|----------------------------------|---|--------------------------------------|----------------------------------|--|---|----------------------------------|--|--|----------------------------------|--|---|--|
| | Total Incentives ^c | Total Associated Costs ^d | Installed Savings ^e | Pipeline Savings ^f | Total Committed Savings ^g | Installed Savings ^e | Pipeline Savings ^f | Total Committed Savings ^g | Installed Savings ^e | Pipeline Savings ^f | Total Committed Savings ^g | \$/Ton CO ₂ e Savings ^h | \$/CO ₂ e EXPECTED LIFETIME Savings ⁱ |
| Renewable Energy | | | | | | | | | | | | | |
| NY-Sun Statewide Customer Incentives | \$30.9 | \$0.0 | - | - | - | 24,220 | 36,075 | 60,295 | 12,119 | 18,049 | 30,168 | 1,023 | 429 |
| NY-Sun Community Solar/K-solar | \$3.7 | \$0.9 | - | - | - | 5,108 | 647 | 5,755 | 2,556 | 324 | 2,879 | 1,582 | 2 |
| NY-Sun Long Island Incentives | \$53.4 | \$0.6 | - | - | - | 215,234 | 10,044 | 225,278 | 109,931 | 5,025 | 114,957 | 470 | 6 |
| Renewable Heat New York | \$9.0 | \$1.2 | 4,384 | - | 4,384 | 1,328 | - | 1,328 | 2,477 | - | 2,477 | 4,155 | 208 |
| Community Heat Pump Systems | \$10.5 | \$0.0 | - | - | - | - | - | - | - | - | - | - | - |
| NYSERDA PV Incentives | \$5.2 | \$0.1 | - | - | - | 96,542 | - | 96,542 | 50,796 | - | 50,796 | - | - |
| Energy Efficiency | | | | | | | | | | | | | |
| LIPA Energy Efficiency and Renewable Energy Initiative | \$289.6 | \$0.0 | 35,035 | - | 35,035 | 1,278,943 | - | 1,278,943 | 646,714 | - | 646,714 | 448 | 25 |
| EmPower Plus | \$82.5 | \$5.4 | 611,082 | 46,890 | 657,972 | 5,087 | 755 | 5,841 | 43,934 | 3,303 | 47,237 | 1,861 | 214 |
| Multifamily Performance Program | \$12.7 | \$2.1 | 477,253 | - | 477,253 | 20,987 | - | 20,987 | 41,430 | - | 41,430 | 357 | 24 |
| Multifamily Carbon Emissions Reduction Program ^l | \$5.7 | \$0.2 | - | - | - | - | - | - | 45,151 | - | 45,151 | 129 | 10 |
| Solar Hot Water (Thermal) Program | \$4.1 | \$0.1 | 14,217 | - | 14,217 | 22 | - | 22 | 959 | - | 959 | 4,407 | 220 |
| Green Residential Building Program | \$2.5 | \$0.3 | 36,548 | - | 36,548 | 1,573 | - | 1,573 | 2,798 | - | 2,798 | 981 | 44 |
| Innovative GHG Abatement Strategies | | | | | | | | | | | | | |
| Charge NY ^k | \$178.1 | \$3.4 | 5,013,894 | - | 5,013,894 | -314,151 | - | -314,151 | 202,162 | - | 202,162 | 898 | 90 |
| Community Clean Energy | | | | | | | | | | | | | |
| Regional Economic Development & GHG Reduction ^l | \$0.8 | \$9.4 | -82,448 | - | -82,448 | 79 | - | 79 | 31,918 | - | 31,918 | 321 | 18 |
| Clean Energy Communities ^m | \$3.8 | - | 1,253,297 | - | 1,253,297 | 213,891 | - | 213,891 | 178,348 | - | 178,348 | 378 | 25 |
| Directed | | | | | | | | | | | | | |
| Clean Energy Fund ⁿ | \$80.0 | \$22.7 | 599,554 | 462,505 | 1,062,059 | 88,191 | 74,562 | 162,753 | 94,240 | 61,976 | 156,216 | 658 | 40 |
| Green Jobs - Green New York ^o | \$173.3 | \$84.9 | 4,155,053 | 350,615 | 4,505,668 | 323,465 | 12,637 | 336,102 | 417,333 | 30,302 | 447,635 | 577 | 28 |
| Cross-Program Overlap ^p | N/A | N/A | -830,548 | -13,591 | -844,139 | -38,246 | -1,970 | -40,216 | -75,186 | -2,708 | -77,893 | N/A | N/A |
| TOTAL Annual Cumulative Benefits^q | \$945.9 | \$131.2 | 11,287,321 | 846,419 | 12,133,740 | 1,922,273 | 132,750 | 2,055,022 | 1,807,679 | 116,272 | 1,923,951 | 560 | N/A |
| TOTAL Expected Lifetime Cumulative Benefits^q | \$945.9 | \$131.2 | 172,761,053 | 16,206,011 | 188,967,064 | 38,457,758 | 2,623,207 | 41,080,965 | 31,987,917 | 2,284,618 | 34,272,535 | N/A | 35 |

Table notes are on the next page.

Table 2 continued

- ^a These emission reductions are associated with both electric and fossil-fuel saving measures. Under a cap-and-trade system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions going into the atmosphere. However, electric efficiency projects will reduce end users' responsibility or footprint associated with emissions from electricity production.
- ^b CO₂e stands for carbon dioxide equivalent and describes the amount of CO₂ that would have the same global warming potential as a given mixture of gases based on factors published by the Intergovernmental Panel on Climate Change.
- ^c Inclusive of incentive dollars for expenditures, encumbrances, and contract pre-encumbrances.
- ^d Inclusive of all non-incentive expenditures.
- ^e Inclusive of savings from all currently operational projects installed since program inception.
- ^f Inclusive of savings from all projects under a signed contract and projects with an application received that are not yet operational.
- ^g The sum of savings from columns Installed Savings and Pipeline Savings.
- ^h The sum of figures in columns Total Incentives and Total Associated Costs divided by the columns Total Committed Savings.
- ⁱ The sum of figures in columns Total Incentives and Total Associated Costs divided by the expected lifetime committed savings. Inclusive of cross-program overlap.
- ^j The Multifamily Carbon Emissions Reduction Program is a fuel-switching program and does not claim any energy or bill savings.
- ^k Net Energy Savings values represent MMBtu savings from the use of electric vehicles; the electricity required to charge the vehicles is removed from this table as this induced electricity consumption is the result of beneficial electrification. 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.
- ^l The Regional Economic Development and GHG Reduction program consists of 15 unique projects. The costs for all 15 projects are included in this table although only a subset of these projects actually report quantifiable energy benefits. The negative MMBtu savings are due to a manufacturing project that switched from burning #6 residual oil to natural gas and a transportation project that switched from burning diesel fuel to compressed natural gas (CNG). CNG is slightly less efficient than diesel from an energy perspective but results in carbon emission reductions.
- ^m The Clean Energy Communities program is operated statewide with funding from multiple sources, namely RGGI and CEF, and the benefits reported here are associated with RGGI funding only. Historically, benefits have been attributed and reported in proportion to the funding contributed by each source, which has reflected an approximate 50-50 split. For reference, the (annual) benefits reported for RGGI through the close of 2018 were 127,945 MWh, 298,783 MMBtu, and 93,032 CO₂e. Late in 2019 NYSERDA introduced a modification to the CEF Clean Energy Communities program, significantly increasing the investment (from \$14.2M to \$81.3M) and fundamentally shifting the proportion between RGGI and CEF funding sources. As such, beginning with Q3 2019 reporting, NYSERDA will simplify the approach to benefits attribution by utilizing geographic data (e.g., the actual location of High Impact Actions and grant payments) to attribute all benefits for this program. Projects reported in LIPA/NYPA territories will be attributed to RGGI in order to align with the funding that supports these projects, while all other reported benefits in SBC territory will be attributed to CEF. This line includes only the portion of projects in NYPA territory.
- ⁿ These figures represent a proportional allocation of benefits relative to the percent of RGGI contributions to the total approved CEF budget.
- ^o These figures represent the total savings from all Green Jobs – Green New York programs funded by RGGI. For more information on specific programs, refer to the GJGNY Annual Report
- ^p Cross-program overlap accounts for projects that received any combination of a GJGNY assessment, a GJGNY loan, or a RGGI-funded incentive through the Home Performance with ENERGY STAR[®] Program, NY-Sun Program or Renewable Heat NY Program.
- ^q Totals may not sum exactly due to rounding.

3 Funds

3.1 Proceeds

As of June 30, 2023, New York State sold more than 461 million CO₂ allowances and received more than \$2,041 million in auction proceeds. In addition, more than \$28 million in interest was earned on the RGGI portfolio and more than \$4 million in interest was earned on the Green Jobs - Green New York (GJGNY) program. All RGGI interest earnings were allocated to the RGGI portfolio and more than \$2.6 million in interest earnings were allocated to the GJGNY program. The allocated interest earnings are reinvested for program implementation and distributed across various RGGI programs. Detailed auction proceeds and total funds for NYS RGGI are presented in appendix D and appendix E, respectively. Total NYS RGGI funds are listed in Table 3, and detailed auction proceeds for NYS RGGI are visually displayed in Figure 1.

Table 3. New York State's RGGI Auction Results and Funds through June 30, 2023

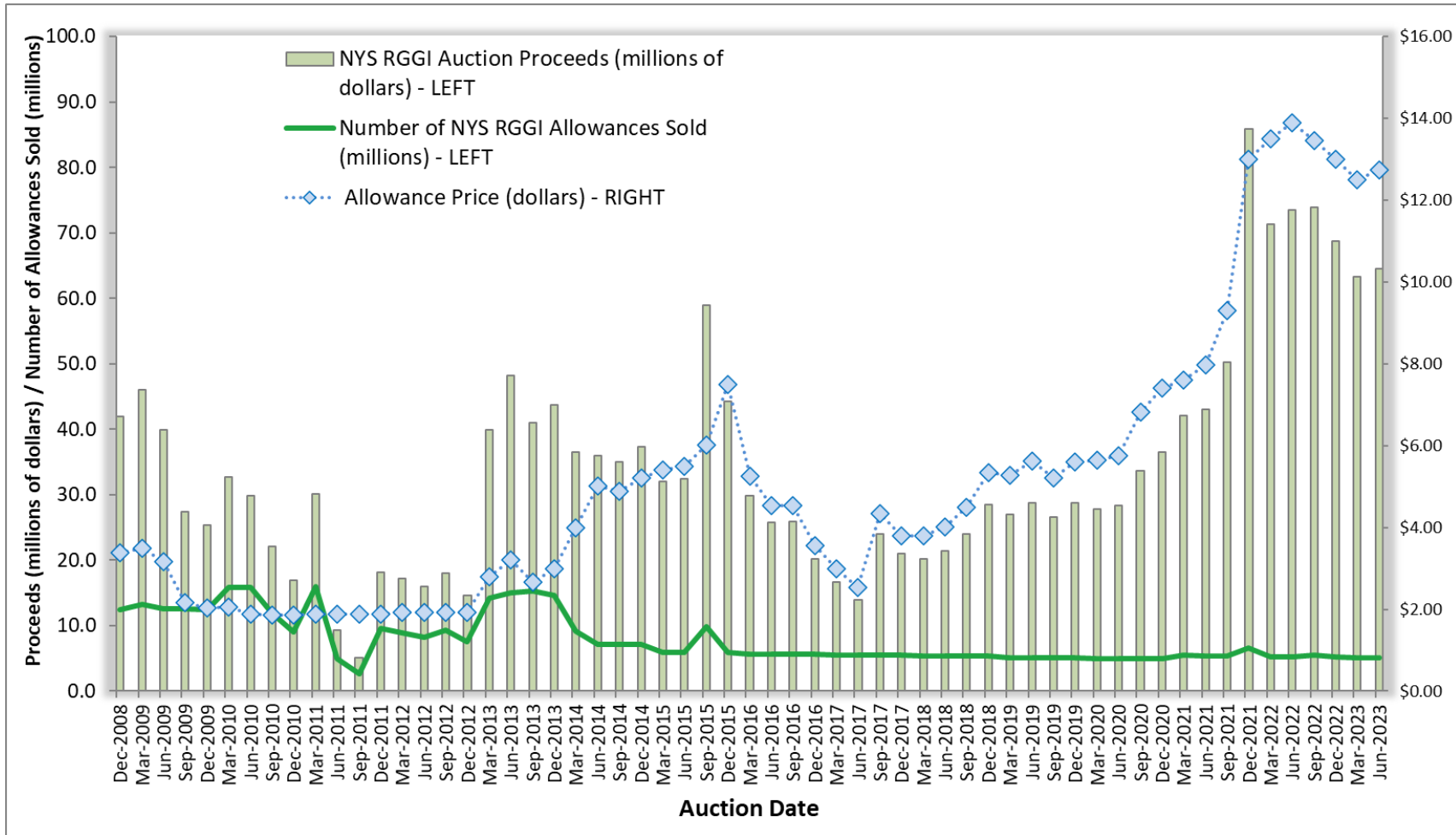
Source: RGGI, Inc. and NYSERDA

| Fund Category | NYS Allowances Sold | Cumulative Funds |
|----------------------------------|---------------------|------------------------|
| First Control Period Total | 144,305,904 | \$336,282,535 |
| Second Control Period Total | 128,764,643 | \$391,950,232 |
| Third Control Period Total | 72,401,365 | \$345,078,005 |
| Fourth Control Period Total | 61,594,969 | \$332,217,018 |
| Fifth Control Period Total | 54,349,331 | \$635,869,017 |
| RGGI Auction Proceeds | 461,416,212 | \$2,041,396,807 |
| RGGI Portfolio Interest Earnings | | \$28,858,618 |
| GJGNY Program Interest Earnings | | \$4,047,096 |
| TOTAL Funds | | \$2,074,302,521 |

- ^a The first control period for fossil fuel-fired electric generators took effect on January 1, 2009 and concluded on December 31, 2011. The second control period took effect on January 1, 2012 and concluded on December 31, 2014. The third control period took effect on January 1, 2015 and concluded on December 31, 2017. The fourth control period took effect on January 1, 2018 and extends through June 30, 2021. The fifth auction control period took effect on June 1, 2021.
- ^b RGGI program budgets have been increased based on anticipated auction revenues from the approved FY 2022–2023 Operating Plan. These amounts have been allocated but have not been received due to the timing of receipt of the proceeds.

Figure 1. New York State's RGGI Auction Results through June 30, 2023

Source: RGGI, Inc.



3.2 Budget

Financial data for the approved RGGI programs through June 30, 2023 are presented in Table 4, including the current expended, encumbered, and committed funds for each program and reflects how the more than \$2,042 million of approved funds are distributed across the seven major program areas and other costs:

- Renewable Energy
- Energy Efficiency
- Innovation GHG Abatement Strategies
- Community Clean Energy
- GJGNY
- Clean Energy Fund
- Clean Energy Standard

Previous versions of this report presented financial details on GJGNY programs, which are now available in the Green Job – Green New York Annual Report.⁴

Table 4. Available Funding and Financial Status through June 30, 2023 (Millions of Dollars)

Source: NYSERDA

| | Budgeted Funds ^a | Expended Funds ^b | Open Encumbrances ^c | Pre-Encumbrances ^d | Committed Funds ^e | Remaining Balance ^f |
|--|-----------------------------|-----------------------------|--------------------------------|-------------------------------|------------------------------|--------------------------------|
| Renewable Energy | | | | | | |
| NY-Sun Statewide Customer Incentives | 37.0 | 9.8 | 21.1 | 0.0 | 30.9 | 6.1 |
| NY-Sun Community Solar/K-solar | 7.5 | 3.4 | 0.8 | 0.0 | 4.2 | 3.3 |
| NY-Sun Long Island Incentives | 55.0 | 51.0 | 3.0 | 0.0 | 54.0 | 1.0 |
| Residential PV Plus Storage | - | - | - | - | - | - |
| Renewable Heat NY | 10.3 | 9.7 | 0.4 | - | 10.1 | 0.2 |
| Community Heat Pump Systems | 12.7 | 0.2 | 2.3 | 2.1 | 4.6 | 8.1 |
| Agrioltaics | 5.0 | - | - | - | - | 5.0 |
| Advanced Renewable Energy | 2.8 | 2.8 | - | - | 2.8 | - |
| NYS Generation Attributes Tracking System | 0.8 | 0.7 | 0.1 | - | 0.8 | 0.0 |
| NYSERDA PV Incentives | 5.3 | 5.3 | - | - | 5.3 | - |
| Total Renewable Energy | 136.4 | 82.9 | 27.7 | 2.2 | 112.8 | 23.6 |
| Energy Efficiency | | | | | | |
| Clean Energy Workforce Opportunity Program | 15.0 | 15.0 | - | - | 15.0 | - |
| LIPA Energy Efficiency and Renewable Energy | 289.6 | 274.6 | 15.0 | - | 289.6 | - |
| Energy Storage (LIPA territory) | 12.9 | 3.6 | 8.8 | - | 12.4 | 0.5 |
| EmPower Plus | 101.5 | 87.9 | 1.2 | - | 89.1 | 12.3 |
| Pilot Projects with Municipal Utilities | 3.0 | 0.2 | 0.8 | 1.5 | 2.5 | 0.5 |
| Disadvantaged Communities Schools/Buildings | 42.9 | 0.8 | 17.7 | 5.3 | 23.9 | 19.0 |
| Multifamily Low Carbon Capital Planning / Pathway Projects | 5.0 | - | - | - | - | 5.0 |
| New Construction and Challenges | 10.0 | - | - | - | - | 10.0 |
| Climate Resiliency | 5.0 | - | - | - | - | 5.0 |
| Multifamily Performance Program | 15.0 | 14.8 | 0.0 | - | 14.8 | 0.3 |
| Multifamily Carbon Emissions Reduction | 5.8 | 5.8 | - | - | 5.8 | - |
| Solar Thermal Incentive | 4.2 | 4.2 | - | - | 4.2 | - |
| Municipal Water/Wastewater | 1.2 | 1.2 | - | - | 1.2 | - |
| Green Residential Buildings | 2.7 | 2.7 | - | - | 2.7 | - |
| Total Energy Efficiency | 514.0 | 410.9 | 43.6 | 6.9 | 461.3 | 52.7 |
| Innovative GHG Abatement Strategies | | | | | | |
| Southern Tier Competition (76 West) | 11.0 | 10.7 | 0.2 | - | 10.9 | 0.1 |
| Brookhaven National Lab Ion Collider | 25.0 | 25.0 | - | - | 25.0 | 0.0 |
| Electric Vehicle/Charge NY | 125.4 | 85.7 | 1.2 | 0.0 | 86.9 | 38.5 |
| Advanced Buildings & Industrial Innovations | 13.3 | 10.9 | 0.3 | - | 11.2 | 2.1 |
| Climate Research & Analysis | 8.7 | 8.7 | - | - | 8.7 | 0.1 |
| Competitive Greenhouse Gas Reduction Pilot | 1.0 | 1.0 | - | - | 1.0 | - |
| Clean Energy Business Development | 5.8 | 5.7 | 0.1 | - | 5.8 | - |
| Transportation Research | 3.8 | 3.8 | - | - | 3.8 | 0.0 |
| Natural Carbon Solutions | 5.0 | - | - | 1.2 | 1.2 | 3.8 |
| Equity and Climate Transformation Research | 1.7 | 0.3 | 0.1 | - | 0.5 | 1.3 |
| Climate Mitigation and Resilience Research | 1.5 | 1.0 | 0.0 | - | 1.0 | 0.5 |
| Scoping Plan Implementation Research | 5.0 | 0.2 | 2.6 | - | 2.8 | 2.2 |
| Hydrogen Hubs | 5.0 | - | - | - | - | 5.0 |
| PV Manufacturing Consortium | 8.5 | 8.5 | - | - | 8.5 | - |
| Carbon Sequestration | 1.0 | 1.0 | - | - | 1.0 | - |
| Total Innovative GHG Abatement Strategies | 221.7 | 162.4 | 4.5 | 1.2 | 168.2 | 53.5 |
| Community Clean Energy | | | | | | |
| Cleaner Greener Communities | 94.3 | 77.9 | 12.3 | 3.2 | 93.4 | 0.8 |
| Clean Energy Communities | 13.3 | 2.3 | 0.4 | 0.2 | 2.9 | 10.4 |
| Climate Smart Communities | 7.7 | 5.8 | 1.4 | - | 7.2 | 0.5 |
| Community Energy Engagement | 1.4 | 1.4 | - | - | 1.4 | 0.0 |
| Economic Development Growth Extension | 5.8 | 5.6 | - | 0.0 | 5.6 | 0.3 |
| Energy to Lead | 3.0 | 2.0 | 1.0 | - | 3.0 | 0.0 |
| Renewable/Net-Zero Energy Demonstrations | 7.5 | 5.0 | - | 0.4 | 5.4 | 2.1 |
| Healthy New Home Design & Construction Challenge | 4.0 | - | - | - | - | 4.0 |
| Clean Energy Workforce Development | 30.0 | 3.2 | 1.0 | 0.1 | 4.2 | 25.8 |
| Clean Energy Hubs | 13.7 | 1.3 | 11.3 | - | 12.5 | 1.2 |
| Climate Action Consumer Awareness & Education | 7.5 | 0.8 | 0.4 | 0.1 | 1.2 | 6.3 |
| Air Monitoring | 8.0 | 3.0 | 5.0 | - | 8.0 | - |
| Regional Economic Development & GHG Reduction | 10.2 | 10.2 | - | - | 10.2 | 0.0 |
| Total Community Clean Energy | 206.4 | 118.5 | 32.7 | 3.9 | 155.1 | 51.3 |
| Directed | | | | | | |
| NYS Environmental Tax Credits | 179.0 | 179.0 | - | - | 179.0 | - |
| NYS Environmental Protection Fund | 20.0 | 15.0 | - | - | 15.0 | 5.0 |
| Electric Generation Facility Cessation Mitigation ⁹ | 50.0 | 45.2 | 1.1 | 0.2 | 46.5 | 3.5 |
| Green Jobs - Green New York | 298.4 | 258.2 | 3.1 | 0.7 | 261.9 | 36.5 ^h |
| Clean Energy Standard | 0.7 | 0.7 | - | - | 0.7 | - |
| NYS Budget Transfer ^l | 90.0 | 90.0 | - | - | 90.0 | - |
| Clean Energy Fund | 191.7 | 88.4 | 49.5 | - | 137.9 | 53.8 |
| Federal Program Match Opportunities | 50.2 | - | - | 0.2 | 0.2 | 50.1 |
| Total Directed | 880.1 | 676.5 | 53.6 | 1.0 | 731.1 | 149.0 |
| Administration and Other Non-Program^l | | | | | | |
| Program Administration ^k | 76.4 | 60.8 | - | - | 60.8 | 15.6 |
| Program Evaluations | 12.2 | 6.7 | 0.1 | - | 6.8 | 5.3 |
| Con Edison Smart Grid Program ^l | 21.9 | 21.9 | - | - | 21.9 | - |
| RGGI Inc. Costs ^m | 1.6 | 1.6 | - | - | 1.6 | - |
| New York State Cost Recovery Fee | 11.7 | 10.0 | - | - | 10.0 | 1.7 |
| Unallocated Interest Earnings | 19.7 | 16.2 | - | - | 16.2 | 3.5 |
| Total Administration and Other Non-Program | 143.4 | 117.1 | 0.1 | - | 117.3 | 26.1 |
| TOTALⁿ | 2,102.0 | 1,568.3 | 162.3 | 15.2 | 1,745.8 | 356.2 |

Table notes are on the next page.

Table 4 continued

- ^a Includes auction proceeds and allocated interest on the RGGI and GJGNY portfolios. The allocation is consistent with the budget presented in the RGGI Operating Plan.
- ^b Invoices processed for payment by NYSERDA.
- ^c Remaining funding obligated under a contract, purchase order, or incentive award.
- ^d Planned funding for contracts awarded and under negotiation; and planned funding under active development through open solicitations with upcoming proposal due dates, adjusted so that the sum of the project commitments does not exceed the figures in the Budgeted Funds column. NYSERDA's annual audited financial statements may reflect project commitments in excess of the figures in Budgeted Funds. These commitments are expected to decrease over time due to project attrition and differences in estimated versus actual costs.
- ^e The sum of figures in columns Expended, Encumbered, and Pre-Encumbered funds.
- ^f The difference between figures in columns Budgeted Funds and Committed Funds.
- ^g The Electric Generation Facility Cessation Mitigation Program was enacted in the 2015–2016 New York State Budget and is designed to support communities that are transitioning local economies that have been reliant on fossil fuel power plants as a source of financial support. See the Final 2016 RGGI Operating Plan Amendment at: <https://www.nyserda.ny.gov/Researchers-and-Policymakers/Regional-Greenhouse-Gas-Initiative/Useful-Documents> for more information.
- ^h The Residential Financing figures include certain loans issued where bond proceeds used to finance the pledged loans received subsequently. The Residential Financing figures also include pre-encumbrances for approved loans not yet issued, which will be funded from additional funds to be transferred to GJGNY and not yet reflected in the column Budgeted Funds shown in this table.
- ⁱ On December 4, 2009, NYS enacted numerous deficit reduction measures that included the transfer of \$90 million in RGGI auction proceeds to the General Fund following the global financial crisis.
- ^j Includes NYSERDA's upfront administrative expenses related to the development and implementation of the CO₂ Budget Trading Program, the CO₂ Allowance Auction program, and the RGGI Operating Plan.
- ^k The values for figures in rows Program Administration, Metrics and Evaluation, and the NYS Cost Recovery Fee represent aggregate funds and commitments for RGGI-funded activities, NOT including GJGNY. For information on GJGNY finances, refer to the GJGNY Annual Report.
- ^l On December 22, 2009, NYSERDA's Board approved a proposed consent decree that resolves the legal challenge to the State's RGGI program. In October 2010, State Supreme Court Judge Thomas J. McNamara signed a Stipulation and Order of Discontinuance signed by all the parties, thereby formally ending the litigation. The parties to the consent decree presently estimate that the total commensurate benefit for the calendar years 2009–2017 is \$20.8 million and agreed to dedicate such funds for the development of smart grid technologies in the Con Edison territory. The budget reflects allocations that are intended to fund NYSERDA's estimated liability for each calendar year control period consistent with the timing of estimated cash payments due to Con Edison. NYSERDA is also responsible for certain additional costs that may be incurred through 2017. NYSERDA's annual audited financial statements show an amount expended of \$18 million to reflect these additional estimated costs that were required to be recorded. The litigation period ended December 31, 2016. This Plan Amendment notes that total paid by NYSERDA is \$21,900,366.
- ^m The first-year budget includes RGGI Inc. start-up costs and the State's share of ongoing RGGI Inc. expenses. RGGI Inc. is a nonprofit corporation created to support development and implementation of the CO₂ Budget Trading Program.
- ⁿ Totals may not sum exactly due to rounding.

4 Program Evaluation

Several RGGI evaluation studies are underway or in the planning stages as of the second quarter of 2023. 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**⁵ 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.

4.1 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 third 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.

4.2 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.

4.3 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 Q1 2024.

A comprehensive statewide industrial stock baseline study for key industry sectors began 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.

Updates to the Residential Building Stock Assessment and Commercial Statewide Baseline Study are planned to be scoped in Q1 2024.

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,⁶ 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,⁷ 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.^{8,9} 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/vxyc-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. RGGI-Funded Completed Evaluations

F.1 Completed Evaluations

| Published Year | Program | Evaluation Study Title | Link to Report |
|----------------|---|---|--|
| 2013 | Green Jobs – Green New York | Green Jobs - Green New York Jobs Quantification Study | Phase 1: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/EERP/GJGNY/Evaluation-Reports/2013-gjgny-phase1.pdf Phase 2: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/EERP/GJGNY/Evaluation-Reports/2013-gjgny-phase2.pdf |
| 2014 | Multifamily Performance Program | Multifamily Performance Program Process/Market Evaluation | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-MPP-Process-Evaluation.pdf |
| 2015 | Multifamily Performance Program | Multifamily Performance Program Impact Evaluation | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-MPP-Impact-Eval.pdf |
| 2015 | Economic Development Growth Extension | Economic Development Growth Extension Process Evaluation | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-economic-development-growth-extension-process-evaluation.pdf |
| 2015 | Multifamily Carbon Emission Reduction Program | Multifamily Carbon Emission Reduction Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/RGGI-Multifamily-Carbon-Emissions-Impact-Eval.pdf |
| 2015 | Green Jobs – Green New York | GJGNY Small Commercial Energy Efficiency Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Small-Comm-Impact-Evaluation-July-2010-December-2013.pdf |
| 2016 | Cleaner Greener Communities | Cleaner Greener Communities Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/2016-Cleaner-Greener-Communities-Market-Evaluation-Wave2.pdf |
| 2016 | Green Jobs – Green New York | GJGNY Constituency-Based Organization Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/GJGNY-CBO-Outreach-Program-Process-Evaluation.pdf |
| 2015 | Home Performance with ENERGY STAR | Home Performance with ENERGY STAR Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2012-2013-HPwES-Process-Evaluation-Market-Characterization-Assessment- |

| | | | |
|------|-----------------------------|---|---|
| | | | <p><u>FinalReport.pdf</u></p> <p>Unregulated Fuels Impact Evaluation: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/HPwES-unregulated-fuels-impact-evaluation.pdf</p> |
| 2016 | Green Jobs – Green New York | Green Jobs - Green New York Jobs Quantification Study | <p>Phase 1 Update (2016): https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/GJGNY-Jobs-Analysis-Phase-I.pdf</p> <p>Phase 2 Update (2016): https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/GJGNY-Jobs-Analysis-Phase-II.pdf</p> |
| 2015 | Transportation | Advanced Transportation Research Program | <p>Logic Model: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Transportation-LM-Report.pdf</p> <p>Case Study: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/Saab-Sensis-Advanced-Airport-Departure-Manager-Transportation-cs.PDF</p> <p>Case Study: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/Adaptive-Control-Decision-Support-System-Traffic-Management-Transportation-cs.pdf</p> <p>Case Study: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/Alstom-Transportation-cs.pdf</p> <p>Case Study: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/2016-transportation-case-study-electric-refrigeration.pdf</p> <p>Case Study: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2016ContractorReports/2016-Transportation-Case-Study-Buffalo-Niagara-Medical-Campus.pdf</p> <p>Case Study: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/Transportation-Case-Study-Report-Leviton.pdf</p> |

| | | | |
|------|-----------------------------------|--------------------------------------|---|
| 2015 | Community Solar | Community Solar NY Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Community-Solar-NY-Final-Initiative-Level-Logic-Model-Report.pdf |
| 2017 | Single Family Residential | Residential Non-Energy Impact Study | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/SmallResidential-NEI-PhaseI.pdf |
| 2017 | Wastewater Energy Efficiency | Wastewater Energy Efficiency Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/WWEP-Impact-Evaluation-Final-Report.pdf |
| 2015 | Transportation | Transportation Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Transportation-LM-Report.pdf |
| 2017 | Transportation | Advanced Transportation Research | <p>Volume 1 - Executive Summary: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/Clean-Transportation-Market-Characterization-Study-Vol1.pdf</p> <p>Volume 2 - New York State Transportation Market: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/Clean-Transportation-Market-Characterization-Study-Vol2.pdf</p> <p>Volume 3 - Electric Vehicles Market Characterization and Baseline Assessment: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/Clean-Transportation-Market-Characterization-Study-Vol3.pdf</p> <p>Volume 4 - Transportation Demand Management Market Characterization and Baseline Assessment: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/Clean-Transportation-Market-Characterization-Study-Vol4.pdf</p> <p>Volume 5 – Appendices: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/Clean-Transportation-Market-Characterization-Study-Vol5.pdf</p> |
| 2017 | Technology and Market Development | Clean Energy Business Development | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/ICBD-MCA-Final-Report.pdf |
| 2017 | Technology and Market Development | Power Systems Program | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/2017-05-CleanPowerTechnologyInnovationImpactEvaluationReport.pdf |

| | | | |
|------|--|--|---|
| 2019 | Green Jobs – Green New York | GJGNY On-Bill Recovery | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/HPwES-On-Bill-Recovery-Evaluation-2014-2016.pdf |
| 2019 | Residential | Residential Building Stock Assessment | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/building-stock-potential-studies/2019-residential-building-stock-assessment-report.pdf |
| 2020 | Green Jobs – Green New York, Residential | GJGNY Audit-Only Measure Adoption Rate Study | https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2016-2018-GJGNY-Audit-Only-MAR-Impact-Evaluation-Report.pdf |
| 2020 | Renewable Heat NY | Renewable Heat NY | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2020-Renewable-Heat-NY-Market-Evaluation-Report-Final.pdf |
| 2020 | Residential | Home Performance with ENERGY STAR and EmPower New York Impact Evaluation (Billing Analysis, 2012–2016) | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2020-Retrofit-Billing-Analysis-Final-Report.pdf |
| 2020 | NY-Sun | NY-Sun Solar Photovoltaic Program Impact Evaluation | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/NYSERDA-Solar-PV-Program-Impact-Evaluation-Final.pdf |
| 2019 | Clean Energy Communities | Clean Energy Communities Market Evaluation | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2019-03-NYSERDA-Clean-Energy-Communities-Market-Evaluation-Report.pdf |
| 2020 | Commercial | Commercial Baseline Study | https://www.nyserda.ny.gov/About/Publications/Evaluation-Reports/Building-Stock-and-Potential-Studies/Commercial-Statewide-Baseline-Study |
| 2021 | Clean Energy Communities | Clean Energy Communities Impact Evaluation (2016–2018) | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2021-NYSERDA-Clean-Energy-Communities-Impact-Evaluation-Report.pdf |
| 2022 | Residential | Clean Energy Engagement Market Evaluation (2020) | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2023-03-Matter-No-16-02180-NYSERDA-CleanEnergyCommunities-Report.pdf |
| 2022 | Residential | NYSERDA Residential Retrofit Impact | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Matter-No1602180NYSERDA-Retrofit-Impact-CEF-Report-FinalOctober2022.pdf |

| | | | |
|------|----------------|--|--|
| | | Evaluation (2017–Q1 2019) | |
| 2022 | Residential | Home Performance and EmPower New York Impact Evaluation | https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Matter-No1602180NYSERDA-Retrofit-Impact-CEF-Report-FinalOctober2022.pdf |
| 2022 | Transportation | Charge NY / Drive Clean Rebate Market and Impact Evaluation (2021) | Market: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Transportation/2022-12-Matter-No-16-02180-NYSERDA-CleanTransportation-EV-RebateMarketReport.pdf Impact: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Transportation/2022-12-Matter-No-16-02180-NYSERDA-CleanTransportation-EV-RebateImpactReport.pdf |

Endnotes

- ¹ These metrics represent the benefits that can be discretely counted at this time and typically associated with traditional deployment programs. These programs include Green Jobs - Green New York, Residential Efficiency Services, NY-Sun, Renewable Heat NY, and LIPA Efficiency and Renewable Energy. These metrics do not reflect emission reductions, participant bill savings, and other possible benefits resulting from non-deployment programs such as Transportation Research and Clean Energy Communities. Therefore, the benefits associated with the overall RGGI portfolio are anticipated to be greater than the subset of programs represented here.
- ² Cumulative annual benefits are reflective of the annual impacts from all currently operational projects installed, projects under a signed contract and projects with an application received that are not yet operational since program inception. Expected lifetime benefits are reflective of the total impacts over the entire effective useful lifetime of the measures associated with all currently operational projects installed, projects under a signed contract and projects with an application received that are not yet operational since program inception. Please see Table A-4 in appendix A for the measure-life assumptions.
- ³ RGGI Funded Programs <https://www.nyserdera.ny.gov/About/Funding/Regional-Greenhouse-Gas-Initiative/Regional-Greenhouse-Gas-Initiative-Funded-Programs>
- ⁴ Green Jobs-Green New York Annual Report <https://www.nyserdera.ny.gov/About/Publications/Program-Planning-Status-Reports/GJGNY-Advisory-Council-Reports>
- ⁵ Formerly known as Evaluability Assessment.
- ⁶ 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.
- ⁷ 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.
- ⁸ 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.
- ⁹ Beginning with Q4 2016, NYSERDA updated emission factors for natural gas, #2 oil, #6 oil, kerosene, propane, wood and steam to be consistent with emission factors used in the updated NYS Greenhouse Gas Inventory (<https://www.nyserdera.ny.gov/About/Publications/EA-Reports-and-Studies/Energy-Statistics>). These factors are derived from EPA’s February 2016 State Inventory Tool release (<https://www.epa.gov/statelocalclimate/state-inventory-and-projection-tool>). Steam emission factors have been updated to be consistent with New York City’s updated Greenhouse Gas Inventory http://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/NYC_GHG_Inventory_2014.pdf

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