

## **NYSERDA RGGI Program Cost Effectiveness**

### **Green Jobs Green New York - Multifamily Performance Program Assessments \$58/Ton CO<sub>2</sub>e**

Through GJGNY, the Multifamily Performance Program provides financing and co-funding for comprehensive energy assessments and the development of an Energy Reduction Plan (ERP), serving market-rate and low- to moderate-income residential buildings with five or more units to increase adoption of clean energy in NYS. Accomplishments:

- A total of 316 assessments were completed through December 2018
- Of the program cumulative 61,795 residential units served with installed measures

### **Energy Efficiency - Multifamily Carbon Emissions Reduction Program \$129/Ton CO<sub>2</sub>e**

The Multifamily Carbon Emissions Reduction Program (MCERP) provided financial assistance and technical support to owners of multifamily buildings converting their heating systems from #6 fuel oil to cleaner fuel alternatives.

Closed program - accomplishments:

- In total, 144 multifamily buildings have converted from burning #6 oil to cleaner alternatives, primarily natural gas or a blend of natural gas and #2 oil, through the Multifamily Carbon Emissions Reduction Program.

### **Community Clean Energy – Clean Energy Communities \$132/Ton CO<sub>2</sub>e**

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 roll up and help to deliver the regional sustainable growth strategies encouraged by the CGC program, consistent with the regional sustainability and economic development plans. Accomplishments:

- Clean Energy Communities Coordinators have helped 516 communities complete and submit 1,419 High Impact Actions, 1,264 of which were completed after program launch, through the Clean Energy Communities program.
- Two hundred thirty-three communities completed at least four High Impact Actions and became designated Clean Energy Communities.

### **Community Clean Energy - Regional Economic Development & GHG Reduction \$257/Ton CO<sub>2</sub>e**

The Regional Economic Development and Greenhouse Gas Reduction (REDGHG) Program supports projects identified as priority initiatives consistent with Governor Cuomo's Regional Economic Development Council (REDC) initiative and are not otherwise provided financial support by other NYSERDA programs or initiatives. REDGHG provides (1) cost-share funding for energy efficiency, clean and renewable energy, and/or innovative carbon abatement projects that address the regional priorities of the REDCs, (2) results in strategic investments, and (3) builds the capacity within the region to participate in the State's clean energy economy. REDGHG focuses on several end uses, including transportation, manufacturing and industrial process, buildings, agriculture, municipal processes, renewable electric generation, and district energy.

### **Energy Efficiency - Multifamily Performance Program \$317/Ton CO<sub>2</sub>e**

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

- Through December 31, 2018, 102 energy efficiency projects were completed, representing efficiency upgrades to 25,614 units.

### **Clean Energy Fund – Clean Energy Fund \$341/Ton CO<sub>2</sub>e**

#### **Green Jobs Green New York – 1-4-Family Residential Buildings Program Assessments \$342/Ton CO<sub>2</sub>e**

Home Performance with ENERGY STAR (HPwES) is a comprehensive energy efficiency services program for existing one- to four-family homes. Participating Building Performance Institute (BPI) GoldStar contractors conduct comprehensive home energy assessments and upgrades.

Accomplishments:

- A total of 99,569 residential GJGNY assessments completed with RGGI funds; 92,498 (93%) were provided at no cost to the customer.
- Of the program's cumulative 41,134 completed residential units that use a GJGNY assessment and/or GJGNY financing, 14,980 (36%) units are associated with income-qualified Assisted HPwES customers.

#### **Energy Efficiency – LIPA Energy Efficiency and Renewable Energy Initiative \$378/Ton CO<sub>2</sub>e**

The RGGI 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). Accomplishments:

- \$179.6 million in RGGI funds has been spent.
- Resulting in a cumulative total savings of 817,210 MWh and 18,889 MMBtu.

#### **Renewable Energy – NY-Sun Initiative \$461/Ton CO<sub>2</sub>e**

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. Accomplishments:

- 1,254 MW of solar PV capacity developed
- 1,454,007 MWh annual power produced

#### **Energy Efficiency – Home Performance with ENERGY STAR \$882/Ton CO<sub>2</sub>e**

Home Performance with ENERGY STAR (HPwES) is a comprehensive energy efficiency services program for existing one- to four-family homes and low-rise<sup>3</sup> residential buildings. 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, and insulation, and other measures that have a direct impact on reducing GHG emissions from oil and propane consumption. Accomplishments:

- As of December 31, 2018, 172 contractors are active in HPwES.
- A total of 9,465 energy efficiency projects completed at a contracted value of \$91.85 million.

### **Energy Efficiency – Green Residential Building Program \$890/Ton CO<sub>2</sub>e**

#### **Energy Efficiency – Low-Rise Residential New Construction Program \$1,171/Ton CO<sub>2</sub>e**

This program is designed and intended to encourage the construction of new single-family homes and low-rise residential dwelling units that operate more energy efficiently and reduce long-term GHG emissions, are more durable, and provide a healthier environment for their occupants. Accomplishments:

- 24 builders have constructed homes eligible for RGGI incentives so far
- Total of new dwelling units constructed to date is 263.

#### **Green Jobs Green New York – 1 to 4 Family Residential Buildings Program Financing \$1,338/Ton CO<sub>2</sub>e**

GJGNY financing is available to participants in HPwES to finance the installation of recommended energy efficiency improvements with the possibility of reimbursement through energy savings. Net-metered technologies, including solar electric systems, and solar thermal systems are also eligible for GJGNY financing. Accomplishments:

- A total of 24,025 loans have been issued totaling \$282.6 million.
- A total of 8,009 OBR Loans have closed, valued at approximately \$112.8 million.
- Of the total 24,025 loans closed, 7,601 are solar electric loans valued at approximately \$126.9 million.
- Ten ground source heat pump loans have closed, valued at approximately \$202,000.
- There are 51 renewable heat or solar thermal loans of which 49% represent assisted customers.

#### **Green Jobs Green New York – Small Commercial EE Program Financing \$1,929/Ton CO<sub>2</sub>e**

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. Accomplishments:

- Through the program's end a total of 3,367 GJGNY-funded assessments had been 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.

#### **Energy Efficiency – EmPower New York \$2,409/Ton CO<sub>2</sub>e**

NYSERDA's EmPower New York 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. Accomplishments:

- Currently, 167 EmPower contractors are assisting in RGGI-funded projects.

- A total of 7,078 households have been served under EmPower New York with RGGI funding through December 31, 2018.

#### **Innovative GHG Abatement Strategies – Charge NY \$3,469/Ton CO<sub>2</sub>e**

Charge NY will pursue three main strategies to promote plug-in electric vehicle (PEV) adoption by consumers across New York State. First, NYSERDA will develop and implement a rebate program of up to \$2,000 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. Third, NYSERDA will also support the installation of PEV charging stations at workplaces, municipal lots, and multifamily buildings—location types that have been seen to be effective motivation for PEV adoption based on usage data reported from previous installations. Accomplishment

- Through December 2018, NYSERDA has issued over 12,000 rebates.

#### **Energy Efficiency – Solar Hot Water (Thermal) Program \$3,998/Ton CO<sub>2</sub>e**

NYSERDA's Solar Thermal Incentive Program incentivizes the installation of solar thermal technologies for the production of hot water to displace electric heated hot water systems. Program closed – accomplishments:

- In total, 14,216 MMBtu's have been saved through 180 projects and their solar thermal contribution to domestic hot water.

#### **Renewable Energy – Renewable Heat New York \$4,109/Ton CO<sub>2</sub>e**

The Renewable Heat NY initiative is a long-term commitment to help the high-efficiency, low-emission biomass heating industry reach scale. Accomplishments:

- Total of 536 installed pellet stove projects.
- Two large commercial pellet boiler projects are in process.

#### **Renewable Energy - NYSERDA Solar Electric \$4,495/Ton CO<sub>2</sub>e**

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. Accomplishments:

- There was a total of 221 solar electric system installations outside of Long Island using RGGI funding through December 31, 2018.

#### **Other programs with no CO<sub>2</sub> reductions claimed**

#### **New York Generation Attribute Tracking (NYGATS)**

NYSERDA established the New York Generation Attribute Tracking System (NYGATS) to record electricity generation attribute information within NYS, and to process generation attribute information from energy imported and consumed within the State as a basis for creating tradable generation attribute certificates. As previously ordered by the Public Service Commission (PSC), this project is also supported with System Benefits Charge (SBC) environmental disclosure program funding.

#### **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.

### **Industrial Innovations Program**

The Industrial Innovations program is a longer-term program that supports development and demonstration of technologies with substantial GHG reduction potential and technologies relevant to NYS manufacturing industries and building systems.

### **Climate Research and Analysis Program**

The Climate Research and Analysis Program supports research studies, demonstrations, policy research and analyses, and outreach and education efforts.

### **Clean Energy Business Development**

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

- NYSERDA is working with the impact investment group Investors' Circle to develop a local network in New York City, which has been branded as Investors' Circle New York (IC NY). The group held monthly meetings/events to bring together the impact/social investing community in the New York metropolitan area, introduced clean energy investment opportunities to IC NY members, and provided feedback to the clean energy companies on how to successfully pitch to the impact/social investing community.
- Energy storage is an enabling technology important to the market penetration and value of intermittent renewable energy resources such as solar and wind. Financial support for the New York Battery and Energy Storage Technology Consortium (NY-BEST) Test and Commercialization Center in Rochester is partially provided by RGGI.
- 76West is an initiative focused on clean energy business development in the Southern Tier. As outlined in the 2015 State of the State address, this \$20 million investment will catalyze a clean energy business cluster that builds on the local strengths and assets of the Southern Tier.
- The Photovoltaic Manufacturing Consortium (PVMC) is a \$5 million effort with more than 40 industrial collaborators as members or affiliates. Its goal is to accelerate the development, commercialization, manufacturing, field testing, and deployment of next-generation solar electric and lightweight photovoltaic systems.

### **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.

### **Carbon Capture, Recycling, and Sequestration**

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

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

The program's largest supported project was TriCarb, located in Rockland County, NY. TriCarb leveraged NYSERDA funding with more than \$8 million of U.S. Department of Energy funds to investigate the potential for geological sequestration in the Newark Basin. This project characterized geological formations of the Newark Basin to determine whether these formations represent an opportunity for large-scale sequestration of carbon dioxide, through seismic analysis and gathering geological data. The geological characteristics of some of the formations do offer some potential for sequestration. More research would be needed before such an operation was undertaken.

### **Advanced Buildings**

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

Key accomplishments:

- The final report for the Energiesprong/Transition Zero assessment has been completed.

### **Competitive Greenhouse Gas Reduction Pilot**

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

Program closed - accomplishments:

- Both projects awarded under this program continue operating with improved performance. The Con Ed East River Generating Station CGGR project completed its third and final year of operation and resulted in a 453% improvement in emissions rate reduction post modification. The project has also delivered emissions benefits of 83% and 393% reductions in its first and second year of operation respectively. The Caithness Long Island Energy Center CGGR has delivered emission reductions of 143% and 83% in its first two years of operation.

### **Brookhaven National Laboratory Ion Collider**

Cornell University (CU) and the Brookhaven National Laboratory (BNL) are designing, building, and commissioning the Cornell-BNL ERL Test Accelerator (CBETA), a four-pass, 150 MeV electron Energy Recovery Linac (ERL) that is a prototype for advanced technology to be used in the future BNL eRHIC accelerator. The Cornell-BNL FFAG-ERL Test Accelerator (C\_) will be a unique resource to carry out accelerator science and enable exciting research in nuclear physics, materials science and industrial applications. This pilot-scale facility is located at Cornell University where all field testing/validation will occur. The work is being conducted at Cornell to

fully leverage an existing \$32 million facility located on Cornell's campus. This results in significant overall cost savings for the ERL project.

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

### **Climate Smart Communities**

Established in 2009, the Climate Smart Communities (CSC) Program is comprised of a network of local governments across the State that have committed, by adopting the Climate Smart Communities Pledge, to reduce greenhouse gas (GHG) emissions and better prepare for unavoidable changes in climate. In addition to NYSERDA, the CSC program works in partnership with five other State agencies: The DEC, the Department of State (DOS), the Public Service Commission (PSC), the Department of Transportation (DOT), and the Department of Health (DOH). The main outreach and technical assistance components of the three-year pilot program ended in November 2015. NYSERDA will continue to offer similar outreach and technical assistance to communities through the new Clean Energy Communities program which launched in August of 2016. No relevant accomplishments listed.

### **Economic Development Growth Extension Program (EDGE)**

The EDGE Program facilitated by Regional Outreach Contractors performs on-the-ground outreach, education, and marketing of NYSERDA program opportunities to residents, businesses, institutions, and local governments across the State to promote the value of energy efficiency, sustainable growth practices, clean energy technologies, and innovations using carefully constructed public-private partnerships.

The EDGE Program concluded April 30, 2016.

Program closed - accomplishments:

- A total of 1,102 partnerships were developed that may help to identify and assist in customer engagement.
- A total of 1,489 public outreach activities, such as events, presentations, or other speaking engagements were conducted.
- A total of 4,117 projects were referred to various NYSERDA programs.
- A total of 3,215 project referrals from partners were received.

### **Cleaner, Greener Communities**

In coordination with the Climate Smart Communities program, this program provides support for development and implementation of a variety of sustainability strategies to help ensure that the State's ongoing investments in infrastructure aid in moving communities and NYS as a whole toward a self-sustaining, more environmentally sound future. The program encourages communities to use public-private partnerships and develop regional sustainable growth strategies in areas such as energy efficiency, renewable energy, low-carbon transportation, and other carbon reductions.

### **Reforming the Energy Vision Campus Competition Program**

This is a competitive solicitation issued by NYSERDA that challenges colleges and student-led coalitions across the State to develop and implement plans to advance clean energy on their campuses or in their local communities in new ways. Four awards have been made to date:

- Bard College’s Micro Hydro for Macro Impact project will use local dams to develop micro hydropower. The project is expected to avoid 335 metric tons of GHG emissions annually, equivalent to taking 70 cars off the road.
- The 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.
- Broome Community College’s Geothermal Learning Laboratory project includes installing a closed loop geothermal system that uses the heat energy stored in the earth; real-time, public data-sharing about the system’s operations; and development of hands-on, geothermal material for secondary schools.
- 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.

### **Community Energy Engagement**

Through this program, trusted, local organizations conduct energy awareness and education with residential, multifamily, and small business customers with an emphasis on increasing the amount of funding and financing leveraged for the completion of clean energy projects. Additionally, the initiative focuses on improving energy affordability and increasing deployment of distributed energy resources for community members of all income levels, with a focus on low- to moderate-income (LMI) households and communities. Key accomplishments as of this quarter:

- Community Energy Advisors have conducted outreach to over 1,200 potential customers regarding clean energy opportunities, of which more than 300 expressed interest in applying for programs.
- Community Energy Advisors also continue to network and collaborate with partner organizations, including, but not limited to, contractors, local nonprofits, utility service representatives, and local social service agencies.
- Community Energy Advisors conducted targeted program outreach focused on promoting the Solar for All program and the Energy Study Aggregation Program.

### **Multifamily Performance Program Financing**

The Multifamily Performance Program under GJGNY includes programs and incentives for owners, facility managers, developers, and condo/co-op boards of multifamily buildings with five or more units to support the goal of increased clean energy adoption statewide. These programs make it easier to assess, fund, implement, and measure energy efficiency upgrades that improve building performance and reduce costs. Accomplishments:

- Through December 31, 2018, 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 low-interest financing to help small businesses and not-for-profit organizations improve their energy efficiency and reduce their energy costs to support the goal of increased clean energy adoption statewide. Fifteen lenders have agreed to offer either Participation Loans or OBR loans. Accomplishments:

- A total of 44 OBR Loans have been closed with a total value over \$1.4 million, which represents 93% of the total financing value over \$1.5 million.
- A total of 31 Participation Loans have closed with a value of \$2.1 million. NYSERDA's share of the total value is \$999,892.

### **Municipal Water and Wastewater Program**

Selected projects received RGGI-funded technical analyses to identify costs and savings associated with energy efficiency, process improvement, and carbon abatement opportunities in support of EPA-funded grants and financing for plant upgrades.

Program closed - accomplishments:

- Technical energy analyses completed for projects in 59 communities.
- Through January 2017:
- Communities have installed systems resulting in annual savings of 19,503 MWh and 51,425 MMBtu.
- New York City was still installing systems which will result in additional annual savings of 13,336 MWh.