

**OPERATING PLAN FOR INVESTMENTS IN NEW  
YORK UNDER THE CO<sub>2</sub> BUDGET TRADING  
PROGRAM AND THE CO<sub>2</sub> ALLOWANCE  
AUCTION PROGRAM**

**JUNE 21, 2010**

NEW YORK STATE  
ENERGY RESEARCH AND  
DEVELOPMENT AUTHORITY

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## **Preface**

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New York, and its nine partner states, pioneered the nation's first market-based, mandatory cap-and-trade program in the Regional Greenhouse Gas Initiative (RGGI). Just as the RGGI program is serving as a national model for mandatory greenhouse gas cap and trade regulations, New York is also creating a national model through its RGGI Operating Plan ("the Plan") to demonstrate how wise investment of auction proceeds can both stimulate the economy and reduce greenhouse gases.

The Plan offers resources for reducing emissions that contribute to climate change across the economy. The specific activities outlined in the Plan, in conjunction with other existing State programs, will immediately reduce greenhouse gas emissions. Further, the Plan will also invest in the technologies that are needed to achieve the aggressive carbon reduction framework necessary to achieve a stable climate. The combined short-term and long-term strategies set the stage for growth of New York's clean energy economy and include activities to help attain New York's "80 by 50" goal, established through Executive Order 24.

As designed, the programs listed in this Operating Plan will provide significant benefits, including:

- Customer energy bill savings of more than \$445 million
- 1.7 million barrel reduction in oil imports
- Creation or retention of approximately 1,400 jobs
- Greenhouse gas emissions reductions up to 2.0 million tons; equal to removing approximately 16,500 cars from the road

The Plan demonstrates how New York can lead the nation to develop and implement effective and comprehensive greenhouse gas programs such as:

*Fossil Fuel Efficiency Programs:* Existing heating systems and industrial operations require substantial quantities of oil, propane, and other fossil fuels. The programs presented in the RGGI Operating Plan will support the replacement of old, inefficient systems with premium efficiency equipment and reduce the resulting greenhouse gases coming from our homes and businesses.

*Electric Power System Improvement Program:* Using more electricity from clean, renewable resources will reduce the climate change impact of the current electric system. The activities initiated as part of the electric power system improvement program will support renewable energy technologies that can be installed now and those that New York will need far into the future.

*Transportation Efficiency Program:* With 40 percent of all greenhouse gases coming from transportation, transforming New York's transportation systems is absolutely necessary for meeting greenhouse gas reduction goals. The RGGI-funded transportation program will implement new strategies that introduce new technologies to improve the energy efficient operation of cars, trucks, and trains.

*Workforce Training Component of the Green Jobs – Green New York Program:* Retraining the State's workforce will expand the ability of New Yorkers to take advantage of job creation opportunities provided by these programs.

*Climate Smart Communities Programs:* Local governments across the State will be empowered to initiate and implement greenhouse gas reduction strategies and help local residents and businesses, and municipal policy will be created to take advantage of program opportunities.

RGGI auction proceeds will not be used to replace existing programs or program goals, including the System Benefits Charge, Renewable Portfolio Standard, Weatherization Assistance Program, Energy Efficiency Portfolio Standard, and various transportation programs funded by the federal Congestion Mitigation and Air Quality Improvement Program. Rather, these programs are designed to create synergies with existing efficiency and clean energy programs, and encourage redefinition of program goals in the context of a more comprehensive climate change strategy. The goals of increased energy efficiency, increased renewable energy installation, reduced criteria pollution, and low-income weatherization will be enhanced by these complementary resources.

As an example, New York's electric energy efficiency programs, which are designed to achieve 15 percent reduction in electric energy consumption by 2015, will help reduce the carbon footprint of electric customers participating in the program. Currently, these programs seek to achieve only electricity savings and often cannot address all the energy efficiency opportunities in homes and facilities. RGGI programs will leverage funding for existing electric energy efficiency programs and achieve additional efficiency savings and increased reductions in greenhouse gas emissions.

RGGI Operating Plan programs will also guide the way toward a clean-energy economy. The Plan intentionally strikes a balance between identifying and capturing today's most cost-effective greenhouse gas reductions and investing in long-term strategies and technologies. In the near term, RGGI programs will help reduce the cost of energy for New Yorkers and free energy dollars to invest in other products and services. Long-term programs will stimulate activity in New York's new energy and maintain the momentum and economic benefit initiated by the short-term programs. By using RGGI auction proceeds as envisioned in the Plan, New York will be prepared to realize the next generation of technologies required for the State to advance its comprehensive climate change goals.

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## **Executive Summary**

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New York has an opportunity to create and implement a comprehensive approach to carbon dioxide (CO<sub>2</sub>) and other Greenhouse Gas (GHG) mitigation from the sale of CO<sub>2</sub> allowances from the Regional Greenhouse Gas Initiative (RGGI). Proceeds from RGGI can simultaneously be used to augment existing policies and programs to advance strategic needs in New York, including the transition to a Clean Energy Economy. The Operating Plan (Plan) was structured to help launch a sustainable, continuing carbon mitigation plan while meeting the short-term needs of a healthy economy, and includes activities to help attain New York's "80 by 50" goal, established through Executive Order 24. The Operating Plan is also designed to help build the capabilities, required for an economy to thrive, by incorporating climate mitigation strategies and creating and promoting advanced energy technologies necessary to advance those strategies.

This version of the Operating Plan builds on the April 2009 version and incorporates feedback received during an open public meeting of the Advisory Group.<sup>1</sup> Feedback from the Advisory Group and subsequent written comments from stakeholders were considered in the development of this version of the Plan. Overall, the Operating Plan covers a three-year planning horizon<sup>2</sup> and articulates how approximately \$302 million dollars of CO<sub>2</sub> auction proceeds will be invested among 12 unique programs. The investments seek to advance the State's broad energy goal of moving toward a clean energy economy by providing reductions in greenhouse gases in the near term and positioning New York to make additional reductions in GHGs over the longer term. While almost three-quarters of the program budget will be directed at cost-effectively reducing GHGs in the near term, approximately one quarter of the anticipated funds will address areas that require longer investment horizons.

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

1. The program is cost-effective and maximizes the quantity of carbon equivalents reduced per program dollar invested.
2. The technology and investment has long-range potential to reduce GHG emissions in New York.
3. The program has the potential to reduce the cost of achieving the emission reduction goals of the CO<sub>2</sub> Budget Trading Program.
4. The program creates other benefits for New York, *e.g.*, creates jobs, leverages capital investment in New York to promote economic development, provides health and environmental benefits, and enhances municipal capacity to further reduce GHG emissions.
5. The initiative can help reduce the disproportionate cost burden and harmful environmental impacts on low-income families and environmental justice communities.
6. The program addresses the relative need for these funds based upon availability of other funding sources for the targeted activities.

These criteria served as guidance for the development of the overall portfolio of programs. They are not weighted; rather the intention is to achieve a strong balance of programs that cover these criteria. Also, the minimum or "critical mass" funding level needed to run an effective program was also an important

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<sup>1</sup> The Advisory Group consists of stakeholders representing a broad array of energy and environmental interests to advise NYSERDA on how to efficiently make use of proceeds from the sale of allowances consistent with the directives in the regulations.

<sup>2</sup> Covers NYSERDA's fiscal years 2009-10, 2010-11 and 2011-12. Each fiscal year commences on April 1.

consideration. The diverse portfolio of initiatives presented in the Operating Plan will balance the achievement of near-term results with the investment in long-term strategies that will provide sustained, ongoing reductions in greenhouse gases.

### **Overview of Proposed Programs**

An overview of the proposed programs and breakdown, by sector, over the three-year planning horizon is provided in Table ES-1 below.

**Table ES-1. Breakdown of Three-Year Program Budget by Sector (\$ million)**

<b>Sector</b>	<b>Three-year Program Funding</b>	<b>Percent of Funding</b>
Residential, Commercial, Industrial and Municipal	\$190.5	63.2%
Transportation	\$32.5	10.8%
Electric Power Supply and Delivery	\$51.0	16.9%
Sustainable Agriculture and Bioenergy	\$4.5	1.5%
Multi-Sector	\$23.0	7.6%
<b>Grand Total*</b>	<b>\$301.5</b>	<b>100%</b>

\* See Section 3 for details.

The budget for this version of the Operating Plan was estimated using the actual value of New York auction proceeds collected through the December 2009 auction (approximately \$180.7 million) and used a conservative value of \$1.86 per ton for future allowance sales, regardless of compliance period, through the March 31, 2012 timeframe. The \$1.86 per ton assumption does not reflect a prediction of future allowance prices; rather, it represents a prudent value for budgetary purposes. Additional details are provided in Section 3: Budget Overview.

As noted in Table ES-1 above, \$51 million in programs in the Electric Power Supply and Delivery are included for the three-year funding stream. Still, other programs using RGGI funding will bring the proposed funding for electric generation improvements to \$67.0 million or 22 percent of the three-year budget.<sup>3</sup> A number of projects being submitted under the Competitive Greenhouse Gas Reduction Industrial Pilot are also expected to involve electricity related GHG reductions.

The selected programs build upon NYSERDA's existing electric-focused programs (*i.e.*, System Benefits Charge, Energy Efficiency Portfolio Standard (EEPS), and Renewable Portfolio Standard). The programs are designed to demonstrate how RGGI funds can fill program gaps in all sectors and address all fuels by integrating various funding resources to capture additional efficiencies and GHG reduction and energy bill savings opportunities not currently available to New Yorkers and New York businesses.

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<sup>3</sup> \$10.5 million has been allocated to the Water and Wastewater Efficiency component of the Commercial, Industrial, Municipal and Institutional Program, and \$5.5 million has been budgeted for the electrified rail efficiency programs in the Transportation sector programs.

A discussion of the entire portfolio of programs, organized by sector, is provided below.

### **Residential, Commercial, Industrial and Municipal**

The purpose of the Residential, Commercial, Industrial and Municipal sector programs is to reduce energy consumed by end users through energy efficiency improvements and enhanced operating practices, which will reduce on-site emissions. Because these sectors are served by established electricity energy efficiency and renewable resource initiatives and programs, the initiatives included in the portfolio are designed to fill critical gaps by targeting fuels not adequately addressed through System Benefits Charge, Energy Efficiency Portfolio Standard, Renewable Portfolio Standard, and federally-funded efficiency activities. The programs included under the Residential, Commercial, Industrial and Municipal Sector are: Residential Space and Water Heating Efficiency; Green Jobs – Green New York; Commercial, Industrial, Municipal and Institutional; Climate Smart Communities Support; and Advanced Building Systems and Industrial Process Improvements.

#### Residential Space and Water Heating Efficiency

This initiative targets fossil-fuel-based measures and renewable energy measures not adequately addressed through other funding programs. This funding will expand the number of households served and increase opportunities for carbon reduction measures. Approximately 30 percent of the residential funding will be used to support energy efficiency improvements in low-income homes and multifamily buildings. In addition, the program includes incentives for the installation of 497 single-family residential and 13 multifamily solar thermal domestic hot water systems over the next three years, supporting the achievement of a recommendation of the Renewable Energy Task Force. Consistent with the Residential Green Buildings program established in Public Authorities Law 1872, financial incentives will be provided to builders and homeowners who decide to “go green” when building new homes or extensively renovating existing homes.

#### Green Jobs – Green New York

This statewide initiative promotes energy efficiency and the installation of clean technologies to reduce energy costs and greenhouse gas emissions. The program will provide subsidized energy audits to single-family, multifamily, small business, and not-for-profit building owners. The program will also provide financing options for the completion of energy efficiency upgrades. The program will support sustainable community development and create opportunities for green jobs.

#### Commercial, Industrial, Municipal and Institutional

The Commercial, Industrial, Municipal and Institutional Program offers two initiatives designed to achieve cost-effective CO<sub>2</sub>e<sup>4</sup> reductions.

The Competitive Greenhouse Gas Reduction Industrial Pilot will develop an innovative greenhouse gas reduction program to identify and fund the most cost-effective, market-ready mitigation options in New York.

Water and wastewater treatment uses three billion kilowatt-hours of electricity per year in New York. The Municipal Water and Wastewater Energy Efficiency Program initiative was designed in 2009 to capitalize on

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<sup>4</sup>CO<sub>2</sub>e stands for carbon dioxide equivalent and describes the amount of CO<sub>2</sub> 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. Throughout this document, references to CO<sub>2</sub> are equivalent to CO<sub>2</sub>e.

the opportunity presented by the proposed federal economic stimulus package that is expected to focus on improving infrastructure. The initiative will continue these efforts in 2010 by capitalizing on Green Project Reserve Funds offered by the U.S. Environmental Protection Agency (USEPA). Incorporating energy efficiency into water and wastewater infrastructure projects will pay dividends over the decades-long lives of these facilities.

### Climate Smart Communities Support

This activity will encourage and support municipalities' participation in the NYS Climate Smart Communities Program.<sup>5</sup> The Climate Smart Communities Program is a State and local partnership to engage municipalities in climate protection. The Climate Smart Communities Program will help municipalities reduce greenhouse gases and prepare for changes in climate that cannot be avoided. The program engages municipalities, encouraging community commitment to greenhouse gas reduction, smart growth, and investment in a green innovation economy.

Local governments are important partners in climate change mitigation and adaptation. This initiative offers dedicated outreach and technical support related to data gathering and tracking (carbon footprinting), goal setting, and guidance, and resources to assist with implementation. Regional outreach will be provided to municipalities through regional planning boards, other entities supporting municipal engagement and NYSERDA's Energy Smart Community Coordinators. This support will help municipalities establish their commitment to the Climate Smart Communities Program, inventory their GHG emissions, develop their climate action plan, and identify and obtain potential incentives for installation of GHG reduction and adaptation measures.

### Advanced Building Systems and Industrial Process Improvements

This program will support development and demonstration of technologies having significant GHG reduction potential from New York manufacturing industries and building systems. Funded projects will focus mainly on innovations that reduce the use of fossil fuels, have high replication potential by New York manufacturers, are likely to be cost-effective, and are not at the present time supported under SBC programs. Specific building-related activities include improvements in the thermal performance of building envelopes and windows; increased efficiency of heating and cooling systems; clean, biofuel technologies that displace the use of fossil fuels; cost-effective, efficient micro-combined-heat-and-power (Micro-CHP) systems for residential applications; and advanced solar thermal systems for residential, commercial, and institutional buildings. Industrial projects will target thermal efficiency improvements for fossil fuel-based processes and alternative processes that eliminate the use of fossil fuels. Projects may also include changes in material inputs and development of advanced controls that directly result in GHG reductions.

### **Power Supply and Delivery**

The objective of the Power Supply and Delivery programs is to help reduce GHG emissions from the electric power sector in New York. The initiative will support a broad portfolio of projects that reduce GHG emissions from electric power generation, transmission, and distribution.

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<sup>5</sup> The Climate Smart Communities Program is jointly sponsored by the NYS Department of Environmental Conservation, NYSERDA, The New York Department of State and the NYS Public Service Commission.

### Statewide Photovoltaic Initiative

NYSERDA and the Long Island Power Authority (LIPA) currently administer photovoltaic (PV) incentive programs that are experiencing a level of interest that exceeds the supply of funding. Using RGGI funds, NYSERDA and LIPA will supplement the existing incentive programs to meet the growing demand. Given current pricing, the program is expected to share the cost of installing approximately 10 megawatts of photovoltaic power over the three-year period, which will help achieve the State's goal of installing 50 megawatts of photovoltaic power on Long Island.

### Advanced Power Technology

The Advanced Power Technology Program (APTP) is focused on reducing greenhouse gas emissions in the long term. The initiative will focus on three areas: advanced renewable energy, advanced power delivery, and carbon capture, recycling, and sequestration.

The Advanced Renewable Energy component of the program will support site-specific, pre-development activities that will foster the market introduction of a broad range of promising renewable energy technologies in New York, including advanced biomass, tidal and off-shore wind technologies.

The Advanced Power Delivery portion of the program will support the demonstration of advanced technologies that promote widespread adoption of renewable resources and demand management strategies. The initiative will focus on applied demonstrations of advanced technologies that promote statewide interconnection of renewable resources, smart-grid capability, advanced meters, energy storage systems, innovative demand-side management strategies, and high efficiency power delivery technologies.

Projects under the Carbon Capture and Sequestration (CCS) component of the program will focus on assessing and demonstrating carbon capture, reuse, compression, and transport technologies, characterization and testing the State's geological sequestration potential, and support the development of carbon capture and sequestration demonstration projects in New York.

### **Transportation**

The objectives of Transportation sector programs are to reduce greenhouse gas contributions from the sector by reducing petroleum use and, where feasible, increasing the efficiency of electric mass transit. These objectives can be achieved by improving the efficiency of vehicles and transportation infrastructure, expanding the use of electricity and renewable fuels in the sector, and encouraging behavioral changes and smart growth policies that reduce vehicle miles traveled (VMT).

### Transportation Efficiency

The objective of this program is to improve vehicle and system efficiencies through measures that improve the efficiency of New York's vehicle fleet and rail system and reduce total VMT and congestion. Projects will include expanding hybrid and electric vehicle use in New York's heavy duty fleets and improving traffic flow by synchronizing traffic signals to allow smoother travel patterns. Electrified rail is a key mode of mass transit in New York's largest metropolitan areas and uses more than two billion kilowatt-hours of electricity each year. Substantial opportunities exist to increase the efficient use of electricity in significantly load-constrained areas and to reduce the greenhouse gas footprint of operations in these areas. The electrified rail component of the program will be coordinated with utility companies, primarily the New York Power Authority and Consolidated Edison of New York, Inc., and transit authority units, primarily Metropolitan Transit Authority Headquarters, the New York City Transit Authority, the Metro North Railroad, and the Long Island Railroad.

### Advanced Transportation Development

The goal of the long-term Advanced Transportation Development program is to increase the availability of improved technologies, products, systems, and services that provide substantial cost-effective GHG reductions. The program will support the development of advanced on-board chargers for plug-in hybrid electric vehicles (PHEVs), the development and demonstration of emerging technologies that improve electric rail efficiency, and the development of products such as hybrid-electric and hydraulic launch assist drive trains, efficient alternators, and idle-stop systems for urban duty vehicles (*e.g.*, taxis, delivery trucks, and buses). A key goal of the program is to reduce VMT by commercial and light duty, non-commercial vehicles.

### **Sustainable Agriculture and Bioenergy**

The Sustainable Agriculture and Bioenergy Initiative will foster efficiency and innovation and promote sustainable resource management techniques to reduce the lifecycle carbon intensity of the agriculture and bioenergy sectors in New York. The program will include a climate-friendly farming demonstration, develop methods to expand the supply and distribution chain for non-food feedstocks, and conduct research in biomass conversion technologies. The potential for carbon sequestration in New York's terrestrial ecosystem will be explored. Program priorities will be guided by findings and recommendations from the ongoing *Renewable Fuels Roadmap and Sustainable Biomass Feedstock Supply Study for New York*.

### **Multi-Sector Programs**

Multi-Sector initiatives seek to leverage auction proceeds and build the capacity to develop and implement new climate change mitigation and risk management solutions and realize a clean energy economy in New York.

### Clean Technology Industrial Development

The Clean Technology Industrial Development program seeks to create, attract, and grow industries in New York that can exploit emerging business opportunities in clean energy and environmental technologies while supporting the goal of carbon mitigation. Key elements of the program include partnering with New York research institutions to leverage federal funding in this area, procurement of risk capital, and business assistance.

### Climate Research and Analysis

This multidisciplinary initiative will increase understanding and awareness of the impacts of climate change on energy choices and provide a scientific, technical foundation for formulating effective, equitable, energy-related environmental policies, and resource management practices. Research will be undertaken to assess the potential ecological, public health, infrastructure, and economic impacts of climate change in New York, investigate how risks associated with climate change can be managed and minimized in the State, determine key parameters to be monitored to establish baselines and assess climate change impacts, and explore emerging climate change mitigation and adaptation strategies to be considered by New York resource managers and policy makers. In cooperation with the Department of Environmental Conservation, the Climate Research and Analysis program will include, as a priority, the assessment of potential carbon-offset areas and policy initiatives and will address other critical areas and issues related to climate change. The program will also conduct analysis to support the State's development of a comprehensive climate action plan, which will include activities to help attain New York's "80 by 50" goal, established through Executive Order 24.

## **Administration**

NYSERDA will administer the RGGI-funded programs in a transparent, open manner, using principles, policies, and procedures that have proven successful in administering similar programs in the past.

NYSERDA emphasizes stakeholder collaboration, initially to design programs that can best meet the State's energy and environmental goals and, on an ongoing basis, to monitor results and make necessary changes.

NYSERDA uses an open, transparent process for awarding and reporting on contracts: external reviewers serve on evaluation panels, which provide recommendations for project selection; projects are approved for funding by a multi-disciplinary internal committee; and contracts are awarded and reported in detail to the public through quarterly and annual procurement reports.

NYSERDA's principles reinforce the objective of responsible fiscal stewardship. The funding provided in the Operating Plan for program administration costs will provide funds sufficient to meet NYSERDA's responsibilities, including costs for personnel and fringe benefits and direct and indirect program administration costs. NYSERDA has traditionally operated its programs with a relatively low overhead, attempting to strike a balance between keeping program administration costs low while ensuring appropriate safeguards and protections.

## **Program Evaluation**

The overarching goals of the RGGI program evaluation are to provide a credible evaluation of the RGGI program portfolio and individual programs, and provide timely information to all stakeholders. That includes: progress toward program and public policy goals; progress in moving markets toward behavior that results in emissions reductions, increased energy efficiency, and use of renewable energy; and measuring efficiency and effectiveness of program implementation and administration. Program evaluation will ensure accountability in terms of the use of RGGI funds to meet overall program goals.

The budget for RGGI program evaluation activities is based on the program evaluation budget established for NYSERDA's current SBC-funded energy efficiency programs, which is limited to not more than five percent of total program funding. The five percent evaluation budget will support overall design and planning, implementation of plans by third-party contractors, reporting, and NYSERDA's management of evaluation activities.

NYSERDA will procure consultant services to assist with further design and development of the RGGI program evaluation approach. Final design and implementation of program-specific evaluation efforts will be undertaken by third-party evaluation contractors competitively selected by NYSERDA. Most of the evaluation budget will be allocated to independent, third-party contractors for design and implementation of the evaluation efforts.

NYSERDA will prepare an annual RGGI program evaluation and status report based on findings and inputs from the evaluation contractors. The annual report will include for each prior year: an accounting of all sales of CO<sub>2</sub> allowances and the funds generated by such sales, a summary description of program activities, an evaluation of the results and impacts of such program activities and program accomplishments, and an accounting of program administration costs and expenditures. The annual report will also provide information on the geographic distribution of program funding and benefits across the State.

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

The RGGI evaluation will be closely coordinated with NYSERDA's existing evaluation efforts for SBC and other programs. This coordination will be especially important for programs that receive SBC and RGGI funding to ensure that the evaluation does not become overly burdensome for program participants and to help minimize issues associated with survey respondent fatigue. Equally important, the evaluation efforts will also ensure proper accounting of benefits from separate funding sources.

### **Highlights of Benefits**

An overview of the quantifiable benefits that are expected to be achieved through this portfolio of programs is presented below. In general, the selected programs will:

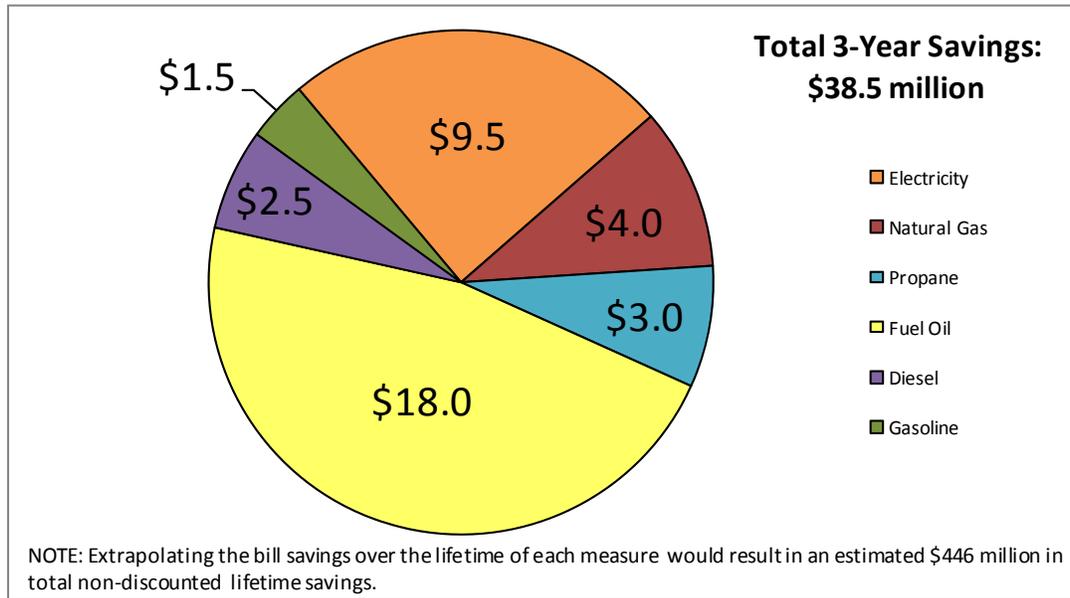
- Provide substantial consumer benefits through a range of energy efficiency and renewable initiatives.
- Invest in new technologies to reduce the carbon footprints associated with power supply and delivery in New York including smart-grid technologies, advanced renewables in support of a 30 percent RPS goal, and carbon capture and sequestration methods.
- Pave the way to transforming the transportation system in New York, invest in energy-efficient mass transit and plug-in hybrid electric vehicle technologies and infrastructure.
- Stimulate a clean energy economy and New York State economic competitiveness through support of advanced research centers, clean energy industrial development, and workforce development in New York.
- Build capacity for action, partnering with municipalities, schools, communities, institutions, and businesses through a variety of programs.
- Employ an innovative industrial sector greenhouse gas reduction pilot to identify the most cost-effective, market-ready mitigation options for New York. This program may be expanded to other sectors if the pilot is successful and additional funds become available.
- Reduce and avoid GHG and co-pollutant emissions, demonstrate New York's commitment to its environmental goals, and support a national, multi-sector GHG reduction program.

### **Energy Bill Savings**

The estimated three-year bill savings related to the five deployment programs<sup>6</sup> in the Operating Plan is \$38.5 million. The savings are broken down by fuel type in Figure ES-3. Extrapolating the savings over the lifetime of each measure will result in an estimated \$446 million in total non-discounted lifetime savings. Estimated savings related to the Climate Smart Communities program and the Competitive Greenhouse Gas Reduction Industrial Pilot are not included due to uncertainty with respect to project activities and associated savings.

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<sup>6</sup> Residential Space and Water Heating Efficiency, Green Jobs – Green New York, the Water and Wastewater Efficiency component of the Commercial, Industrial, Municipal and Institutional Program, Transportation Efficiency, and the Statewide Photovoltaic Initiative.

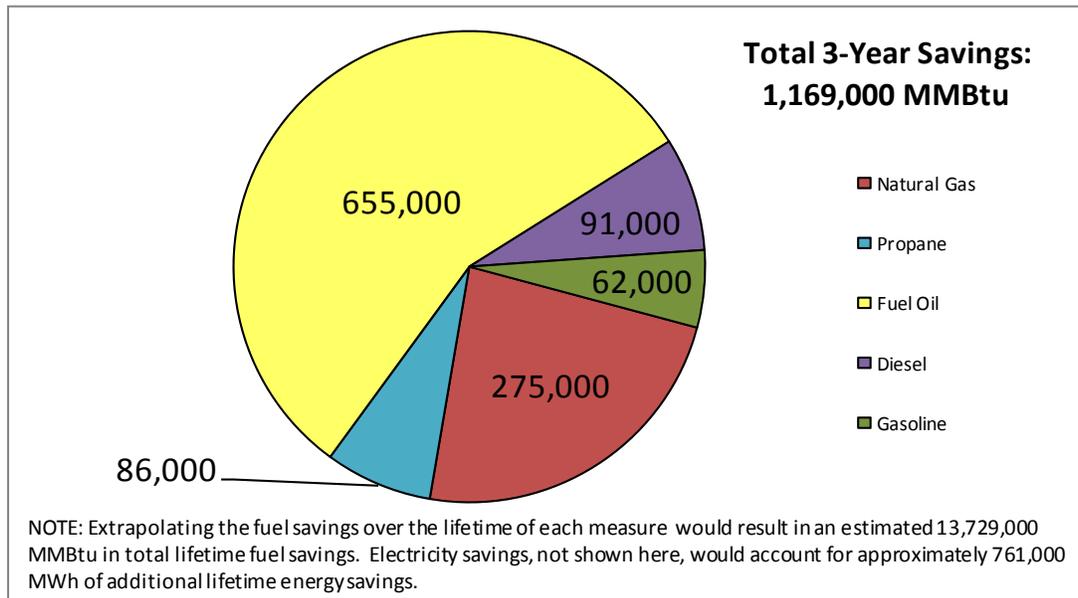
**Figure ES-3. Three-Year Bill Savings by Fuel Type (\$Million)<sup>7</sup>****Energy Savings**

The estimated three-year fuel savings related to the five deployment programs in the Operating Plan is 1,169,000 MMBtu across all fuels. These savings are broken down by fuel type in Figure ES-4.

Extrapolating the savings over the lifetime of each measure would result in an estimated 13,729,000 MMBtu in total lifetime fuel savings. Electricity savings would account for approximately 761,000 megawatt-hours of additional lifetime savings. Estimated savings related to the Climate Smart Communities Program and the Competitive Greenhouse Gas Reduction Industrial Pilot are not included due to the uncertainty in project activities and associated savings.

<sup>7</sup>Total three-year savings has been rounded to the nearest half million.

**Figure ES-4. Three-Year Energy Savings by Fuel Type (MMBtu)**



**Emissions Reductions**

Over a three-year period, the five deployment programs would reduce approximately 142,000 tons of CO<sub>2</sub><sup>8</sup> emissions, which is equivalent to taking approximately 16,500 vehicles off the road. This portfolio of programs will save approximately 655,000 gallons of diesel, 4,725,000 gallons of fuel oil, and 500,000 gallons of gasoline, which translates to a lifetime value of approximately 1.7 million barrels<sup>9</sup> of crude oil displaced. Extrapolating these results, the emissions reductions over the lifetime of the measures and practices would total approximately 314,000 tons of CO<sub>2</sub> from electricity savings and 1.2 million tons of CO<sub>2</sub> from fuel savings. If the Competitive Greenhouse Gas Reduction Industrial Pilot provides emissions reductions that cost \$30 per ton of CO<sub>2</sub> and achieves mostly fossil-fuel savings, the lifetime reductions from fuel savings associated with the overall portfolio of programs would be approximately 2.0 million tons of CO<sub>2</sub>.

**Job Creation**

Historical data and modeling on NYSERDA’s **New York Energy \$mart<sup>SM</sup>** electric efficiency programs indicate that for every million dollars of total program expenditures, 4.3 sustained jobs are created or retained. The RGGI portfolio includes a mix of programs; however, if job impacts are similar to the **New York Energy \$mart<sup>SM</sup>** Program, full expenditure of the \$342.6 million in RGGI funds, including administrative and evaluation costs, could create or help retain approximately 1,400 sustained jobs. Actual job impacts from the RGGI program may differ from this initial estimate and will be examined as part of the evaluation activities.

<sup>8</sup>These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of CO<sub>2</sub> allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, electric efficiency projects may not decrease the overall amount of CO<sub>2</sub> being emitted into the atmosphere by New York entities. Nevertheless, electric efficiency projects will reduce the end-users’ carbon-footprint since they will be responsible for a smaller percent of the emissions associated with electricity production.

<sup>9</sup>This estimate does not account for the full lifecycle costs for producing and distributing crude oil and petroleum products.

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# 1 Introduction

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New York has an opportunity to create and implement a comprehensive approach to carbon dioxide (CO<sub>2</sub>) and other Greenhouse Gas (GHG) mitigation from the sale of CO<sub>2</sub> allowances from the Regional Greenhouse Gas Initiative (RGGI). Proceeds from RGGI can be used to simultaneously augment existing policies and programs to advance strategic needs in New York, including the transition to a Clean Energy Economy. The Operating Plan has been structured to help launch a sustainable and continuous carbon mitigation plan while meeting the short-term needs of a healthy economy, and includes activities to help attain New York's "80 by 50" goal, established through Executive Order 24. The Operating Plan is also designed to help build the capabilities needed by an economy in order to thrive by enabling New York State residents, communities and businesses to incorporate climate mitigation strategies and adopt advanced energy technologies.

The Operating Plan represents a first step toward addressing carbon mitigation for all energy fuels and by all sectors of the economy. The approach, outlined in the Operating Plan, has gained wide acceptance among climate mitigation experts as exemplifying some of the steps necessary to adequately address the dramatic carbon emissions reductions needed to maintain carbon concentrations at current levels and avoid catastrophic climate change consequences. The Operating Plan has been organized according to primary economic sectors and identifies current opportunities that, if acted upon, can result in near-term carbon emissions reductions, and that will build infrastructure and expertise to promote the systemic changes necessary for widespread, long-term mitigation.

By adopting this comprehensive approach, New York hopes to provide a successful template for the design of carbon mitigation strategies that can be implemented within the State and support a possible national climate change platform.

Identifying emissions reductions opportunities in four primary sector areas — Residential, Commercial, Industrial and Municipal; Electric Power Supply and Delivery; Transportation; and Sustainable Agriculture and Bioenergy — can help decision makers identify and target program activities in two key ways. First, identifying areas for potential carbon reductions can direct programs toward cost-effective, near-term opportunities within each sector. Second, identifying long-term needs within sectors can help direct resources toward developing technology potentials and support the advancement of New York's innovation economy. As programs are designed in the four primary sectors, opportunities will be presented for short-term emissions reductions gains and for long-term next-generation technology research and development benefits. This sector and temporal approach to program identification will also help foster a more robust clean energy and innovation economy in New York.

The Operating Plan, however, is not intended to represent the totality of program activities and funding requirements that are necessary to achieve ultimate carbon mitigation goals. Rather, the Operating Plan should be considered in light of the many existing, and newly created, policies and programs that are designed to provide energy services to New Yorkers and help them achieve programmatic goals while simultaneously reducing carbon emissions. The Operating Plan has been designed to fill program gaps resulting from unmet funding needs, identify existing opportunities that have not received adequate resources, and target emerging opportunities that will feed the next generation of energy technologies that will be needed to meet ultimate targets.

In addition, despite the generous level of total funding across all government programs, incentive programs alone will not achieve deep emissions reductions over the long term. Deep emissions reductions will require systemic changes in government operations, buildings and infrastructure, and the energy consumption patterns of businesses and individuals. Systemic changes will result only from education campaigns and the capability of governmental resources to provide information and strategic planning to achieve energy efficiency and emissions reduction goals. Building the capability within private markets for energy services and the continued development of energy technologies must also be fostered so that market responses and customer choices can incorporate climate mitigation concerns. To add formal structure to the nascent development of governmental and market-based climate mitigation capabilities, the Operating Plan targets support for “capacity building” and recognizes that research and analysis must continue to ensure the evolutionary change toward a reduced-carbon economy is pursued.

The Plan is designed to meet the following objectives, to be achieved through the identified program activities:

- Provide substantial consumer benefits through expanded energy efficiency and renewable energy activities that complement existing programs. Expanded efforts will not supplant existing programs nor limit those programs’ economic development opportunities.
  - Commercial, Industrial, Municipal and Institutional
  - Residential Space and Water Heating Efficiency
  - Green Jobs – Green New York
- Invest in new technologies to reduce the carbon footprint of the electric power supply and delivery sector.
  - Statewide Photovoltaic Program
  - Advanced Power Technology Program
    - Advanced Renewable Energy
    - Advanced Power Delivery
    - Carbon Capture and Sequestration
- Create an investment strategy designed to result in a transformed transportation system.
  - Transportation Efficiency
  - Advanced Transportation Development
- Stimulate a Clean Energy and Innovation Economy.
  - Workforce Development component of the Green Jobs – Green New York program
  - Clean Technology Industrial Development
- Build capacity for sustainable energy efficiency and emissions reductions programs in State, regional, municipal, and other government institutions.
  - Climate Smart Communities Support Program
- Use new program strategies and ideas to develop innovative approaches to carbon reductions in the marketplace.
  - Competitive Greenhouse Gas Reduction Industrial Pilot

# **2 The RGGI Program and Greenhouse Gas Policy**

## **Context in New York**

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RGGI is a cooperative effort by 10 Northeastern and Mid-Atlantic States<sup>1</sup> to reduce CO<sub>2</sub> emissions from power plants. Under RGGI, the participating states have designed cap-and-trade programs that cap CO<sub>2</sub> emissions from power plants through 2015 and then lower the cap by 10 percent by 2018.

Each state is implementing this initiative through individual CO<sub>2</sub> Budget Trading Programs that are linked through the regional cap-and-trade program. Additional background on the initiative can be found at <http://www.rggi.org>.

In New York, the RGGI Program has been implemented through two complementary programs: The New York State Department of Environmental Conservation (DEC) has established New York's CO<sub>2</sub> Budget Trading Program (6 NYCRR Part 242, 6 NYCRR Part 200, General Provisions) and the New York State Energy Research and Development Authority (NYSERDA) has established the CO<sub>2</sub> Allowance Auction Program (21 NYCRR Part 507).

The CO<sub>2</sub> Allowance Auction Program has established the rules through which New York will sell most of its CO<sub>2</sub> allowances. The CO<sub>2</sub> Allowance Auction Program (at 21 NYCRR Part 507.4(d)) also creates the parameters for use of the proceeds from the sale of allowances, and that will be used to:

“ . . . promote and implement programs for energy efficiency, renewable or non-carbon emitting technologies, and innovative carbon emissions abatement technologies with significant carbon reduction potential.”

The Operating Plan was created to be consistent with the above regulatory requirements.

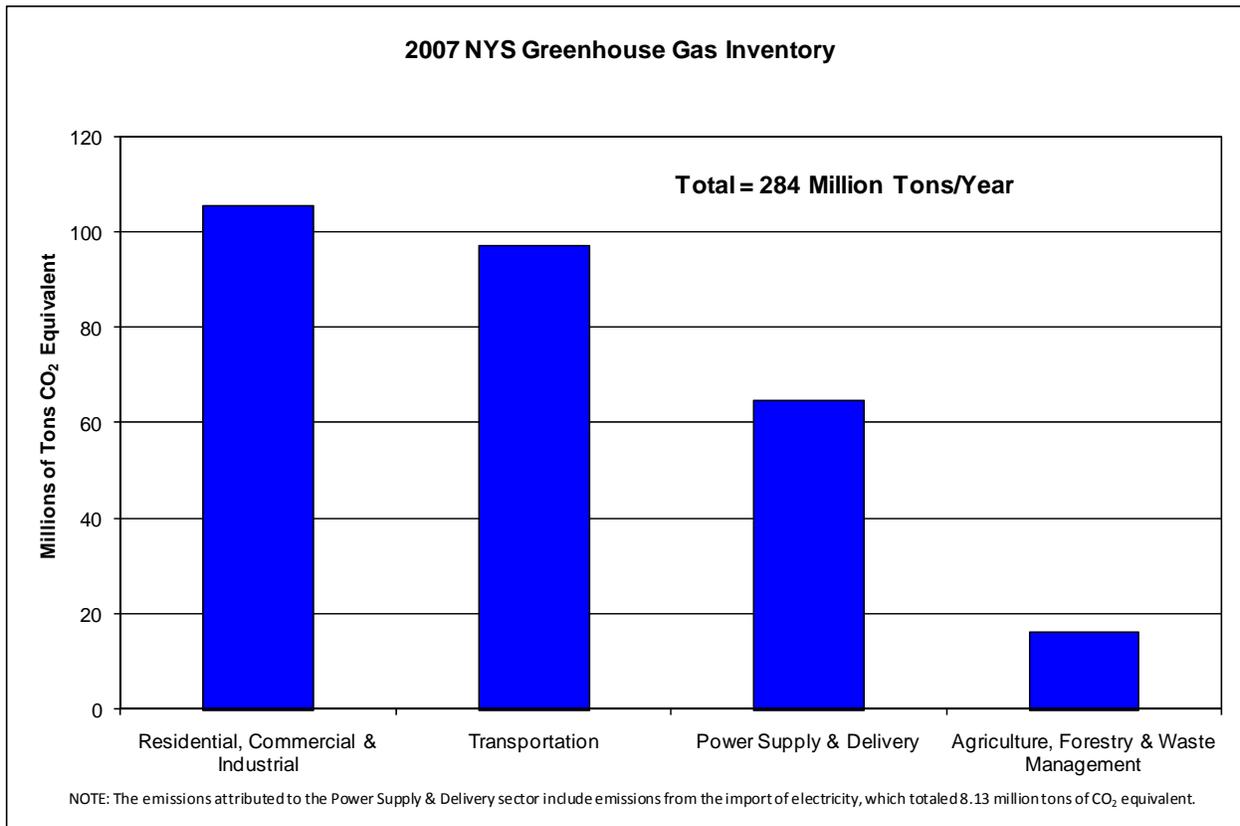
### **2.1 New York Greenhouse Gas Inventory**

To best inform New York agencies on Greenhouse Gas (GHG) emissions sources and levels and reduction opportunities, a Greenhouse Gas Inventory was completed. The Inventory quantified the total annual GHG emissions in New York in 2007 as 284 million tons of CO<sub>2</sub> and identified the sources of the emissions by sector. The emissions-by-sector breakdown is presented in Figure 2-1.

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<sup>1</sup> Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

Figure 2-1. 2007 New York Greenhouse Gas Inventory – Breakdown by Sector



The Inventory also identified the contribution in CO<sub>2</sub> equivalent (CO<sub>2</sub>e) tons of six primary greenhouse gases. The contribution of each gas is presented in Figure 2-2. The Inventory examined a list of 15 economic activities that produce GHG emissions.<sup>2</sup> As illustrated in Figure 2-2, the primary GHG emitted in New York is CO<sub>2</sub>.

<sup>2</sup> The non-fuel combustion sources of greenhouse gases include agricultural animals, agricultural soil management, crop waste combustion, manure management, municipal waste and wastewater, natural gas leakage, aluminum production, cement production, chemical manufacturing, carbon dioxide use, electricity distribution, iron and steel manufacturing, and limestone use.

**Figure 2-2. Breakdown of Primary Greenhouse Gas Emissions in New York for 2007**

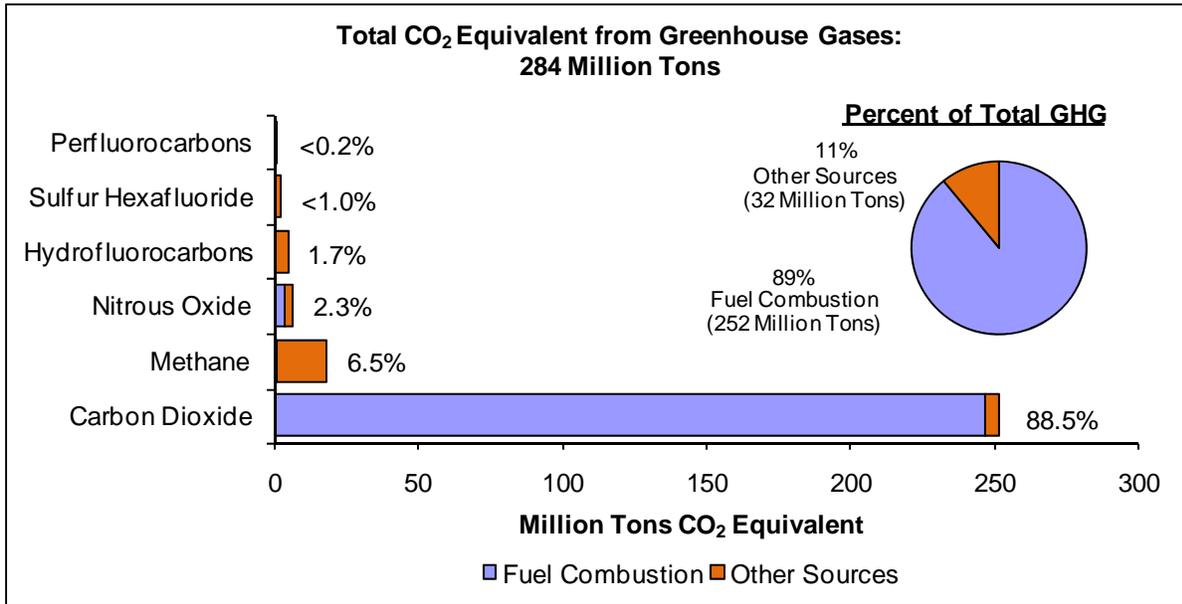
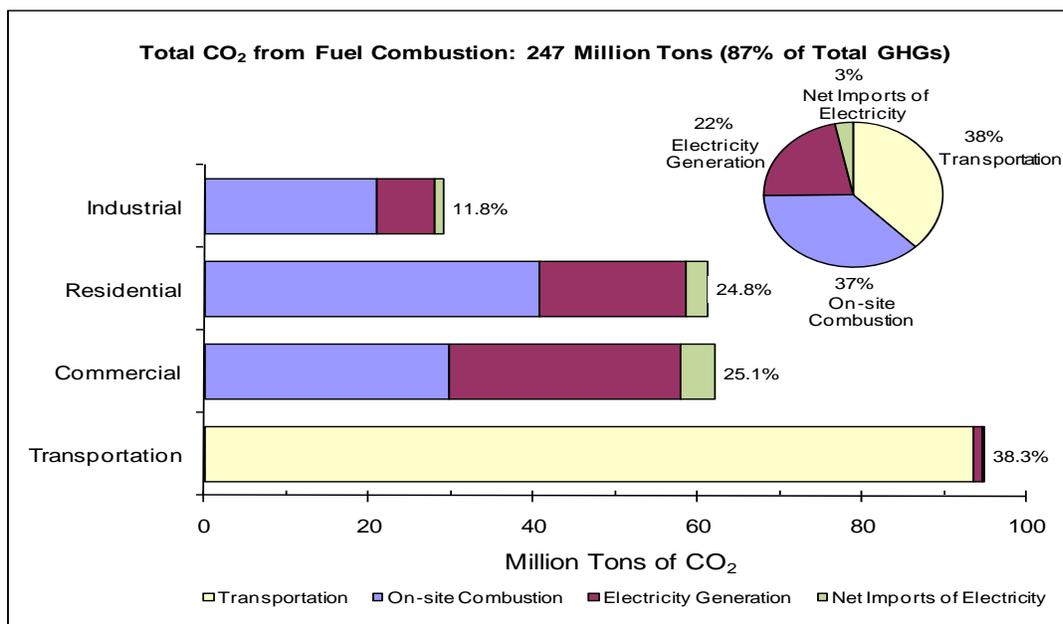


Figure 2-3, in general terms, demonstrates that the primary source of New York’s CO<sub>2</sub> emissions is fuel combustion, which accounts for nearly 90 percent of all GHG emissions in the State. Fuel combustion can be broadly translated into the energy used to power our businesses, heat our homes, and power our cars.

The Inventory further refined the sources of CO<sub>2</sub> emissions by sector, as presented in Figure 2-3. This sector breakdown of CO<sub>2</sub> emissions identifies where the opportunities for overall carbon mitigation efforts are most effectively directed and dedicated.

**Figure 2-3. New York CO<sub>2</sub> Emissions from Fuel Combustion (2007)**



## 2.2 Policy Context

New York currently supports a broad range of policies and programs aimed at climate change issues and energy policy and program goals.

Most recently, Governor David A. Paterson signed Executive Order No. 24 setting a goal, by the year 2050, to reduce GHG emissions in New York State by 80 percent below the levels emitted in 1990. This Operating Plan includes a number of program activities to help attain New York’s “80 by 50” goal.

In addition, Governor Paterson has declared, as a central tenet of his administration, the initiation of policies and programs to transition New York to a clean energy economy. This comprehensive effort will require tapping into all elements of the State’s resources — government, industry, the university system — to work together to craft creative, effective strategies that will essentially transform how New York approaches energy use and how New Yorkers can access new energy products and services to meet their energy requirements.

To provide guidance in achieving this significant goal, Governor Paterson reinstated the planning process for a State Energy Plan (SEP). Governor Paterson’s Executive Order No. 2 instructed the State Energy Planning Board to include the GHG inventory and GHG mitigation strategies in the new SEP. In addition, Climate change in New York was highlighted in the State Energy Plan and was featured prominently in the near- and long-term policy and program recommendations presented therein.

A key component of the clean energy economy is advancement of a clean energy goal — a challenge to New York to meet 45 percent of its electricity needs through improved energy efficiency and renewable energy by 2015. This “45 by 15” goal encompasses achievement of both a 15 percent reduction in electricity use, mostly through the expansion of energy efficiency activities, and development of renewable energy resources adequate to meet 30 percent of New York’s electricity supply needs. In crafting the “45 by 15” goal, which will achieve the complementary goal of reducing greenhouse gases

from New York sources, Governor Paterson has fashioned one of the most aggressive energy policy goals in the country.

Governor Paterson's Renewable Energy Task Force similarly has made broad recommendations on expanding the use of renewable resources in New York beyond the electricity sector. Among other recommendations, the Task Force put forward challenges with respect to jumpstarting the replacement, in part, of fossil-fuel-fired heating and hot water systems with solar thermal system technologies, and helped to initiate a New York Biofuels Roadmap and Feedstock Inventory that will identify appropriate opportunities for sustainable development and sustainable use of biofuels.

To help achieve these and other energy policy goals, numerous New York institutions are implementing programs to advance clean energy economy goals. The New York State Public Service Commission (PSC) has progressively initiated programs for the advancement of energy efficiency and renewable energy over a span of decades, including the SBC, designed to promote market transformation efforts in energy efficiency markets, the Renewable Portfolio Standard, designed to achieve goals for renewable energy use for both distributed-scale and grid-connected technologies, and most recently, the Energy Efficiency Portfolio Standard, which is designed to achieve a large portion of the energy savings targets for the "45 by 15" goal. In addition to electric sector programs, the PSC instituted energy efficiency programs for natural gas. The DEC, in conjunction with the Environmental Facilities Corporation (EFC), implements programs to achieve improved environmental performance for municipal and State facilities, which often result in energy efficiency improvements. The New York State Department of Transportation and New York State Department of Agriculture and Markets leverage federal and State monies for system improvements, energy efficiency, and other energy needs in their respective sectors. The federally-funded Weatherization Assistance Program, which delivers energy efficiency services for low-income consumers, is implemented by the Division of Housing and Community Renewal. The New York Power Authority and the Long Island Power Authority have created and implemented electric energy efficiency, renewable and clean energy programs to meet the needs of their customers. Numerous other State agency programs and municipal government initiatives also exist to achieve comprehensive energy policy goals.

These efforts, while successfully fostering interagency cooperation, have been implemented mostly on a program-by-program basis and are primarily designed to meet specific goals and requirements of individual agencies. RGGI provides an opportunity to identify activities that may fall outside the scope of existing individual program activities and goals and to develop a more robust, complementary approach to energy efficiency and clean energy programs. By identifying market opportunities to be funded through RGGI, existing programs can be re-aligned to meet comprehensive climate mitigation strategies. Such realignment should foster a more systemic, synergistic approach to climate mitigation in the delivery of State programs and services.

As administrator of the RGGI Program, as well as other, separately funded, programs with individual program goals and targets, NYSERDA is challenged with working within the frameworks established by the individual agencies, successfully leveraging multiple incentive opportunities, accurately attributing the measurable results of each of the program activities, and delivering to the market programs that provide seamless incentives. The efficiency and renewable programs that are proposed in the Operating Plan build on existing program platforms that have successfully provided measurable results for programs focusing on reducing the use of electricity and natural gas. New activities from RGGI proceeds should permit development of an energy services market that takes a "whole-building" approach. Using this approach, an individual contractor can provide a client with information and services that examine an entire structure's energy opportunities including electric lighting, insulation, heating systems, and possible renewable energy applications. Prior to RGGI, contractors often had to leave efficiency opportunities unexamined because program incentives were limited to specific energy improvements by

virtue of the source of program funding. By applying a similar rationale to all programs in all sectors, New York can develop a holistic approach to its energy policies, expand the State's economic opportunities through RGGI investments, and realize broader and measurable GHG emissions reductions.

NYSERDA has longstanding experience in tracking program spending from various funding streams and accurately attributing program results to the appropriate source of funds. In some instances, individual NYSERDA programs, such as the low-income efficiency EmPower New York<sup>SM</sup> program, track incentive payments and attribute program results from as many as seven discrete active funding sources. To prepare for significant program expansion resulting from the Energy Efficiency Portfolio Standard (EEPS) decision, NYSERDA has already initiated new changes and upgrades to its database system to expand capacity and to track project activity funded by multiple funding streams. Also as a result of the EEPS program expansion, NYSERDA's evaluation activities are being designed to protect the integrity of program results, including co-benefits, and to appropriately align the measured benefits to the initiating funding source, enabling evaluators to most accurately align the progress of each program to the program's specific goals and targets. Coordination of the evaluation of efficiency activities funded from different funding streams, for example from programs using the whole-building approach, will be essential. Such coordination becomes necessary to ensure that program results are reported accurately and to ensure that evaluation data are not compromised by using multiple survey instruments or repeatedly surveying individual participants.

## **2.3 Program Goals**

The goals of the investments made with auction proceeds are to reduce GHG emissions in New York and to reduce the cost of complying with the CO<sub>2</sub> Budget Trading Program. Investments will be focused on GHG reduction opportunities related to energy production and use for all fuels and in all energy using sectors. Investments will seek to advance the State's broad energy goal of moving toward a clean energy economy by providing reductions in GHGs in the near-term and positioning New York to make additional reductions in GHGs over the longer term.

While the majority of funds will be directed at cost-effectively reducing CO<sub>2</sub> in the near term, at least 25 percent will address areas that may require longer investment horizons. The program can thus deliver near-term benefits to New York consumers while also positioning New York to progress toward a clean energy economy and pursue the aggressive carbon reduction framework that will be needed to ensure a stable climate.

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

## **2.4 Program Focus and Geographic Scope**

The Operating Plan focuses on activities related to energy production and use and is designed to capture opportunities to reduce CO<sub>2</sub> emissions resulting from fuel combustion activities, as depicted in the New York Greenhouse Gas Inventory (see Figure 2-2) and in accordance with the CO<sub>2</sub> Allowance Auction Program regulations. Initial RGGI Program activities that identify non-energy-related GHG emissions strategies will include analysis and characterization of opportunities for potential future funding.

As noted above, programs have been identified for funding, in part, based on the individual program's ability to provide cost-effective emissions reductions in the short term, while also providing sufficient funding for long-term activities to ensure that the evolution of climate strategies and programs is based on

the advancement of new technologies and capabilities. Where applicable, RGGI program funding will be used to complement current investments in the **New York Energy \$mart<sup>SM</sup>** program, which is part of New York's SBC programs, the RPS, and the EEPS and other agency programs that support the goals of the CO<sub>2</sub> Budget Trading Program.

Programs that develop and expand the infrastructure and capacity within New York, necessary for a sustained clean energy economy, and which effectuate significant GHG emissions reductions, will be a focus of the RGGI program. Municipal, and other local government initiatives for affecting climate change strategic planning and identifying projects, will expand program opportunities and engage a broader public interest in voluntary GHG mitigation activities. Capacity building for industries in all sectors of the economy will be designed to foster widespread, faster adoption of new technologies and services that result in GHG emission reductions and also promote the self-sustaining advancement toward a clean energy economy.

Recommendations of the Governor's Task Force on Renewable Energy have been considered in developing the Operating Plan.

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

RGGI-funded activities will fill gaps not otherwise eligible for funding from other sources.

## **2.5 Portfolio Development Criteria**

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

- Criterion 1: Cost effectiveness measured by quantity of carbon equivalents reduced per dollar invested
- Criterion 2: Long-range potential for the technology or investment to reduce GHG emissions in New York
- Criterion 3: Potential to reduce the costs of achieving the emissions reduction goals of the CO<sub>2</sub> Budget Trading Program
- Criterion 4: Other benefits to New York, *e.g.*, the potential to: create jobs, leverage capital investment in New York to promote economic development, provide health and environmental benefits, and enhance municipal capacity to further reduce GHG emissions
- Criterion 5: Opportunities to reduce the disproportionate cost burden and environmental impacts on low-income families and environmental justice communities
- Criterion 6: Need for funds based upon availability from other funding sources

These criteria served as guidance for the development of the overall portfolio of programs. They are not weighted; rather the intention is to achieve a strong balance of programs that cover these criteria. 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 Operating Plan will balance the achievement of near-term results with the investment in long-term strategies that will provide sustained, ongoing reductions of greenhouse gases.

Consistent with Part 242-10.3(d)(3), projects that receive funds under a program covered in the Operating Plan are not eligible to pursue CO<sub>2</sub> Emissions Offset credits under the CO<sub>2</sub> Budget Trading Program. Nevertheless, agricultural methane projects that receive CO<sub>2</sub> Emissions Offset credits under the CO<sub>2</sub> Budget Trading Program may also receive public benefits funds under a program covered in the Operating Plan. All entities, including compliance entities, may pursue projects under any of the proposed programs in the Operating Plan.

## **2.6 Program Metrics**

A number of program metrics are shown throughout this Operating Plan. The CO<sub>2</sub>e reductions shown throughout this document include CO<sub>2</sub> reductions plus the co-benefits of other greenhouse gas reductions. In addition, a Technical Appendix has been included to explain the methodologies used to calculate various metrics in the Plan.

Metrics and targets presented in this document (*e.g.*, dollars per ton) were established for early comparison purposes to facilitate program selection and are subject to modification in the event that changes are made to the discounting rate, discounting approach, evaluation methods, or emissions factors.

## **2.7 Customer Eligibility for Programs in the Operating Plan**

All energy customers in New York are eligible to participate in the fossil fuel reduction programs in the Operating Plan. Certain sectors are eligible for electric efficiency reduction incentives through the Water and Wastewater Efficiency Program, the Transportation Efficiency Program, and the Statewide Photovoltaic Program. All industrial customers are eligible to submit projects under the Competitive Greenhouse Gas Reduction Industrial Pilot program for fossil fuel or electric reduction measures. (See Section 4.1.3 for more details about this program).

# 3 Budget Overview

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This version of the Operating Plan includes a modified projection of auction proceeds and also accounts for recently enacted budget deficit reduction measures. In addition, it incorporates a provision for using a nominal amount of money for programs NYSERDA is obligated to fund pursuant to a consent decree that resolves the legal challenge to the State's Regional Greenhouse Gas Initiative (RGGI) program filed in January 2009 by Indeck Corinth, L.P.

## 3.1 Auction Proceeds Estimate

This Operating Plan assumes that approximately \$446.2 million dollars in auction proceeds are received from the sale of New York CO<sub>2</sub> allowances at the regional RGGI auctions during the December 2008 through March 2012 timeframe. This figure was estimated using the actual value of New York auction proceeds collected through the December 2009 auction (approximately \$180.7 million) and used a conservative value of \$1.86 per ton for future allowance sales, regardless of compliance period, through the March 31, 2012 timeframe. The \$1.86 per ton assumption does not reflect a prediction of future allowance prices; rather, it represents a prudent value for budgetary purposes. Additional details are provided below.

Under the program, RGGI participating states agreed upon a CO<sub>2</sub> emissions cap, *i.e.*, a regional CO<sub>2</sub> emissions budget, amounting to approximately 188 million tons of CO<sub>2</sub> per year. New York's share of the total annual emissions budget is 64,310,805 allowances. For the purpose of this planning budget, New York is assumed to sell 60,410,805 allowances each year from the current compliance period. This number was derived by subtracting 700,000, 1,500,000, and 1,700,000<sup>1</sup> allowances associated, respectively, with the voluntary renewable energy market set-aside account, the long term contract set-aside account, and a limited exemption for units with electrical output to the electrical grid from the New York's annual base budget of 64,310,805 allowances.<sup>2</sup>

In addition, approximately 3,020,540 allowances from future compliance periods were assumed to be sold each year. The number of allowances represents five percent of the 60.4 million allowances that are available for sale after the voluntary renewable energy market set-aside, the long-term contract set-aside, and the "behind the fence" exemption.

The estimated proceeds for the three-year period covered by the Operating Plan are summarized in Table 3-1.

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<sup>1</sup> This is an approximation based on DEC's calculation of the reduction of the CO<sub>2</sub> Budget Trading Program base budget for 2009 of 1,680,935.

<sup>2</sup> For more information, see the New York State Department of Environmental Conservation. Part 242, CO<sub>2</sub> Budget Trading Program.

**Table 3-1. Projected Auction Proceeds for Planning Purposes (\$ million)**

Allowance Vintage*	Proceeds Collected Through Dec. 2009	Estimate for Remainder of Fiscal Year 2009-10**	Fiscal Year 2010-11	Fiscal Year 2011-12	Total
Current 3-year Compliance Period	\$174.2	\$28.1	\$112.4	\$112.4	\$427.1
Future Compliance Period	\$6.5	\$1.4	\$5.6	\$5.6	\$19.1
<b>Total</b>	<b>\$180.7</b>	<b>\$29.5</b>	<b>\$118.0</b>	<b>\$118.0</b>	<b>\$446.2</b>

\* Compliance periods cover three-year periods beginning on January 1, 2009 but could be extended to four years under certain circumstances. For more details see New York Department of Environmental Conservation Part 242 CO<sub>2</sub> Budget Trading Program.

\*\* NYSERDA's fiscal year begins on April 1 and ends on March 31.

NYSERDA's Part 507.4 (d) regulation states that:

“[T]he proceeds of the CO<sub>2</sub> Allowance Auctions will be used by the Authority 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, and for reasonable administrative costs incurred by the Authority in undertaking the activities described in Part 507 and for administrative costs, auction design and support costs, and program design and support costs associated with the CO<sub>2</sub> Budget Trading Program, whenever incurred.”

Table 3-2 translates the projected auction proceed values into anticipated levels of funding available for investment in the programs described in Sections 4 through 8 of the Operating Plan.

**Table 3-2. Budget (\$ million)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Total
Total Revenue Estimate	\$210.2	\$118.0	\$118.0	\$446.2
Repayment of SBC Funds (for RGGI Inc. Start-up Costs)	(\$1.6)	-	-	(\$1.6)
Estimated Ongoing New York Share of RGGI, Inc. Costs	(\$0.35)	(0.7)	(0.7)	(\$1.8)
State Cost Recovery Fee (0.6%)	(\$1.26)	(0.71)	(0.71)	(\$2.7)
Deficit Reduction Plan (DRP) Transfer	(\$90.0)	-	-	(\$90.0)
Litigation Settlement	(\$7.6)	-	-	(\$7.6)
<b>Subtotal</b>	<b>\$109.4</b>	<b>\$116.6</b>	<b>\$116.6</b>	<b>\$342.6</b>
Program Evaluation (5%)	(\$5.47)	(\$5.8)	(\$5.8)	(\$17.1)
Program Administration (7%)	(\$7.66)	(\$8.16)	(\$8.16)	(\$24.0)
<b>Funds Available for Programs</b>	<b>\$96.3</b>	<b>\$102.6</b>	<b>\$102.6</b>	<b>\$301.5</b>

### **3.2 Repayment of SBC Funds**

The Public Service Commission issued an Order in Case 05-M-0090, dated August 27, 2007, authorizing that up to \$3 million of System Benefits Charge (SBC) funds, provided from interest earnings on unexpended SBC funds, be used to finance certain start-up costs of RGGI, Inc. In October of 2009, reimbursement of approximately \$1.6 million was made to the SBC account, and this value represents the amount of funds used to finance these start-up costs plus interest.

### **3.3 Ongoing New York Share of RGGI, Inc. Costs**

The Regional Greenhouse Gas Initiative, Inc. (RGGI, Inc.) is a non-profit corporation created to support development and implementation of New York's (and other participating states') CO<sub>2</sub> Budget Trading Programs.

NYSERDA has entered into an agreement with RGGI, Inc. for RGGI, Inc. to provide technical and support services for key elements of New York's CO<sub>2</sub> Budget Trading programs, including:

- Developing and maintaining a system to report data from emissions sources subject to RGGI, and to track allowances;
- Implementing a platform to auction CO<sub>2</sub> allowances;
- Monitoring the market related to the auction and trading of CO<sub>2</sub> allowances;
- Providing technical assistance to the participating states in reviewing applications for emissions offset projects;
- Creating and implementing a market monitoring program; and
- Providing technical assistance to the participating states to evaluate proposed changes to the states' RGGI programs.

New York's share of RGGI, Inc. costs was estimated to be \$700,000 per year during the planning period. This estimate was derived using the approved 2010 RGGI, Inc. budget.

### **3.4 State Cost Recovery Fee**

NYSERDA is assessed an annual State Cost Recovery Fee under Section 2975 of the Public Authorities Law for general governmental services. The fee is allocated proportionately by funding among all NYSERDA programs and funding sources. The RGGI budget includes an estimate based on the current annual assessment of the fee expected to be allocated to the RGGI funded programs.

### **3.5 Other Budget Components**

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

In January 2009, Indeck Corinth, L.P. filed a legal challenge to the State's Regional Greenhouse Gas Initiative ("RGGI") program. On December 22<sup>nd</sup>, a proposed consent decree that resolves the lawsuit was

approved by NYSERDA's Board of Directors; the decree was filed with Albany County Supreme Court on December 23<sup>rd</sup>.

The parties to the Consent Decree include not only the original parties to the litigation (Indeck, the New York State Department of Environmental Conservation, NYSERDA, and the New York State Public Service Commission), but also Con Edison, the two other generators that have long term contracts (LTCs) with Con Edison – Brooklyn Navy Yard Cogeneration Partners (BNYCP) and Selkirk – and the Department of Public Service (“DPS”). Under the settlement framework, Con Edison has agreed to purchase the shortfall in allowances that Indeck and Selkirk are likely to experience through the end of their LTCs in 2015 and that BNYCP is likely to experience through 2016, when DEC projects that the number of allowances in the LTC set-aside account will be sufficient to cover all of BNYCP's allowance needs thereafter. The PSC has agreed to consider approval of a tariff amendment allowing Con Edison to pass through the costs of purchasing allowances to its ratepayers. NYSERDA agrees to use a portion of the RGGI proceeds to provide benefits to Con Edison's customers that are “commensurate with,” or equal to, the costs associated with Con Edison's payment of allowance costs to Indeck, BNYCP and Selkirk. NYSERDA will use RGGI proceeds to invest in two or more smart grid programs (already approved by the PSC) that will yield energy savings and reduce carbon emissions in Con Edison's service territory, thereby reimbursing Con Edison ratepayers for the amounts provided by Con Edison to Indeck, BNYCP and Selkirk. Finally, DEC commits to maintain the LTC set-aside pool at 1.5 million allowances through 2016.

The parties estimate that the total commensurate benefit for years 2009-11, (*i.e.*, the amount of New York's auction proceeds to be used to provide commensurate benefits to Con Edison customers), is \$7.6 million.

### **3.6 Program Evaluation and Administration**

Program evaluation and administration costs have been budgeted at five and seven percent, respectively, of total revenues consistent with the maximum amounts authorized under NYSERDA's SBC-funded efficiency programs.

### **3.7 Summary of Program Funding**

Using the criteria described above and stakeholder feedback on the *Operating Plan Concept Paper*, NYSERDA identified a list of initiatives to be funded with auction proceeds. These programs are grouped into target areas, or sectors, that are consistent with the categories used in the climate action planning process that is underway: Residential, Commercial, Industrial and Municipal facilities; Transportation; Electric Power Supply and Delivery; Sustainable Agriculture and Bioenergy; and Multi-Sector. Descriptions of these programs and the rationale for their selection are provided in Sections 4 through 8 of the Plan. A summary of anticipated funding commitments is presented in Table 3-3 below.

**Table 3-3. Summary of Anticipated Funding Commitments (\$ million)**

Sector	Program	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years*	Total
Residential, Commercial, Industrial & Municipal	Residential Space and Water Heating Efficiency	-	\$10.95	\$32.15	\$9.9	\$53.1
	Green Jobs – Green New York	\$48.0	\$50.4	-	-	\$98.4
	Commercial, Industrial, Municipal and Institutional Program	\$7.5	\$15.0	-	\$3.0	\$25.5
	Climate Smart Communities Program	-	\$2.0	\$3.68	\$0.92	\$6.6
	Advanced Building Systems and Industrial Process Improvements	-	\$2.0	\$4.0	\$1.0	\$7.0
Transportation	Transportation Efficiency	-	-	\$16.4	\$4.1	\$20.5
	Advanced Transportation Development Program	-	\$2.0	\$8.0	\$2.0	\$12.0
Electric Power Supply and Delivery	Statewide Photovoltaic Initiative	\$12.0	-	-	-	\$12.0
	Advanced Power Technology	\$1.0	\$11.0	\$21.1	\$5.9	\$39.0
Sustainable Agriculture and Bioenergy	Sustainable Agriculture and Bioenergy Program	-	\$0.25	\$3.4	\$0.85	\$4.5
Multi-sector	Clean Technology and Industrial Development	-	\$7.75	\$5.8	\$1.45	\$15.0
	Climate Research and Analysis	\$2.0	\$1.0	\$4.0	\$1.0	\$8.0
<b>Annual Total</b>		<b>\$70.5</b>	<b>\$102.35</b>	<b>\$98.53</b>	<b>\$30.12</b>	<b>\$301.5</b>

\*Funds from the final auction of FY11-12 are anticipated to be committed in the subsequent quarter.

Table 3-4 below shows a breakdown of program funding by target area.

**Table 3-4. Program Funding by Target Area (\$ million)**

Target Area	Three-year Program Funding	Percent of Funding
Residential, Commercial, Industrial and Municipal	\$190.5	63.2%
Transportation	\$32.5	10.8%
Electric Power Supply and Delivery	\$51.0	16.9%
Sustainable Agriculture and Bioenergy	\$4.5	1.5%
Multi-Sector	\$23.0	7.6%
<b>Grand Total</b>	<b>\$301.5</b>	<b>100%</b>

As noted in Table 3-4 above, programs in the Electric Power Supply and Delivery target area have a proposed three-year funding stream of \$51.0 million. Nevertheless, other programs using RGGI funding

will bring the proposed funding for electric generation improvements to \$67.0 million or 22 percent of the three-year budget.<sup>3</sup> A number of projects being submitted under the Competitive Greenhouse Gas Reduction Industrial Pilot are also expected to involve electricity related GHG reductions.

### **3.8 Program Expansion Plan**

Because of the possible volatility discussed above in the ongoing allowance auction results, NYSERDA may make modest adjustments in the amounts allocated among the program areas, but substantial changes will be presented as part of the annual process of updating the Plan.

Allowance auction proceeds may exceed the estimates being used in this version of the Operating Plan. Under these circumstances, a more comprehensive Competitive Greenhouse Gas Reduction (CGGR) Program would be the top priority (assuming that “critical mass” funding is available and that the Industrial Sector CGGR pilot is successful).

Secondary program expansion priorities include:

- Providing additional funding for the measures described in the Transportation Efficiency and Advanced Transportation Programs;
- Increasing the level of funding for the fossil fuel efficiency measures described in the Residential Space and Water Efficiency Program;
- Providing additional funding for the business assistance component of the Clean Technology Industrial Development Program; and
- Providing additional funding for fossil efficiency measures for the commercial and industrial sectors.

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<sup>3</sup> 10.5 million has been allocated to the Water and Wastewater Efficiency component of the Commercial, Industrial, Municipal and Institutional Program, and \$5.5million has been budgeted for the electrified rail efficiency programs in the Transportation sector programs.

# **4 Residential, Commercial, Industrial, and Municipal Sectors**

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The Residential, Commercial, Industrial and Municipal building sectors present the most significant opportunities to reduce Greenhouse Gas (GHG) emissions. The purpose of the Residential, Commercial, Industrial, and Municipal program is to reduce energy used by end users through energy efficiency improvements and improved maintenance practices. As these sectors are served by established, operating energy efficiency and renewable resource programs, and infrastructure, the program will be designed to fill critical gaps. Gaps will be filled by targeting fuels not adequately addressed through the System Benefits Charge (SBC), Energy Efficiency Portfolio Standard (EEPS), and the Renewable Portfolio Standard (RPS) initiatives. Other strategies include targeting environmental justice communities, stimulating municipal commitments to GHG reductions, and promoting increased deployment of under-used and emerging energy efficiency and clean energy technologies. To the extent possible, strategies and tactics for these sectors will be integrated with strategies and tactics featured in existing programs.

## **4.1 Near-Term Programs to Reduce Greenhouse Gases**

The following programs have the potential to reduce GHG emissions in the near term with program implementation starting in the first few months after approval - installation horizons of up to a few years exist for large construction and renovation projects and are within months for many small, residential projects. Most of the near-term cost-effective initiatives are delivered through enhancements to existing programs.

### **4.1.1 Residential Space and Water Heating Efficiency**

NYSERDA currently offers a suite of programs providing comprehensive energy efficiency services for single and multifamily existing buildings and new construction, including low-income households. In addition to energy savings, these programs provide significant health and safety benefits through comprehensive testing and verification, improved air quality, and improved comfort. One of the most important benefits of the program has been the discovery and mitigation of significant levels of carbon monoxide in households at all income levels throughout the State. Nonetheless, the SBC and EEPS funding for these programs is primarily focused on achieving electric savings, with many energy efficiency opportunities left unimplemented as limits on the use of funding prohibit non-electric improvements and measures, such as heating equipment. Heating accounts for 30 to 40 percent of household energy costs, and improvements to heating and building shell systems can provide four times the energy cost savings of electric measures that consist primarily of lighting and appliance replacements.

NYSERDA has been able to use limited funds for gas efficiency measures, primarily for low-income consumers, in select gas utility service territories. NYSERDA will use RGGI funds for fossil-fuel based measures and renewable energy measures not eligible for SBC and EEPS incentives. Coordination of these funding sources will expand the number of households served and ensure that opportunities for carbon reduction measures are not lost.

RGGI funds will also be used to provide fossil-fuel efficiency programs for those not currently served by NYSERDA's programs due to funding restrictions, such as the Long Island Power Authority (LIPA) and New York Power Authority (NYPA) customers and electric service customers of municipal electric providers. In the event natural gas funding is not available, NYSERDA will use RGGI funding to support natural gas efficiency measures. Nearly 40,000 households will be affected by the RGGI program over three years, and reductions in residential heating fuel use resulting from the programs will equal more than four million barrels of oil during that period.

The following programs are near-term, cost-effective programs that have significant technical potential for reducing greenhouse gases in the residential sector. The suite of programs initially allocates \$16.3 million of the residential funding to low-income programs. In addition, the Solar Thermal Incentive Program will target low-income households, although no specific low income budget has been established.

The programs will seek to address environmental justice issues by directly targeting outreach to environmental justice communities and working with community-based organizations that address environmental justice issues by referring them to appropriate programs.

*Multifamily Performance Program.* RGGI funding for oil space and domestic water heating efficiency is proposed to supplement the SBC and EEPS funding for the Multifamily Performance Program (MPP), which serves buildings with five or more units. Existing MPP consulting firms will use the program's benchmarking tools, Energy Reduction Plan templates, and various auditing software packages to determine what measures are cost effective, their expected energy savings, and the costs to install them. Energy Reduction Plans identify the measures needed to reduce energy use by at least 15 percent and develop financing plans for consumers to identify sources of funding to finance the measures.

RGGI funding will be used to reduce oil and propane energy use in multifamily buildings by providing incentives to repair and replace space and domestic water heating systems and install insulation, air sealing, and other building shell energy efficiency measures. Electric reduction measures, including ENERGY STAR<sup>®</sup> lighting and refrigerators, will be provided using SBC and EEPS funding in buildings eligible for those services.

Buildings where the majority of tenants have incomes below 80 percent of the State Median Income will receive a fully subsidized audit; 60 percent of the program funds are targeted to low-income and affordable housing. NYSERDA will coordinate closely with the Weatherization Assistance Program to ensure the most effective use of both funding sources.

Electric customers of LIPA, NYPA and municipal electric providers will receive services for oil efficiency, including heating and shell measures, if not provided by their utility. NYSERDA will consider providing gas efficiency services through RGGI funds once EEPS funding targeting gas measures has been exhausted.

Approximately one third of the multifamily buildings in New York are heated with fossil fuels. NYSERDA proposes to service an estimated 7,639 low-income units and 5,033 market rate units over the three year period assuming SBC and EEPS funds are adequate to continue addressing the electric efficiency needs of those buildings.

*Multifamily Carbon Emission Reduction Program.* RGGI funds will be used to provide financial assistance and technical support to owners of multifamily buildings seeking to convert their heating and domestic hot water systems from those that burn #6 fuel oil to those that burn natural gas, #2 fuel oil, biodiesel, or those that seek to switch to a renewable energy source to supplement their fossil fuel use.

This program is positioned to help encourage early adoption of the City of New York's phase out of #6 fuel oil and early compliance with potential City-level legislation (Int. 194-2010) that would require all buildings that burn fuel oil to burn biofuel blends (at least B2), and would place sulfur limits on #4 fuel oil. Incentives will be based on the amount of carbon emissions avoided due to the conversion away from the use of #6 fuel oil. The result of this incentive design will be that building owners will reap the biggest financial reward by switching to the least carbon-intensive fuel possible. Participants in the Carbon Reduction Program will also be encouraged to achieve overall higher building energy efficiency through participation in the Multifamily Performance Program.

*EmPower New York<sup>SM</sup>*. RGGI funding for oil and propane space and domestic water heating efficiency is proposed to supplement the SBC and EEPS funding for EmPower New York<sup>SM</sup> (EmPower), which provides cost-effective energy reduction services to households with incomes at or below 60 percent of the State Median Income. In some regions of the State, NYSERDA currently administers additional gas funds to provide additional services to these households.

The RGGI funding will permit cost-effective oil and propane efficiency measures such as insulation, blower-door assisted air sealing, and heating systems repair and replacements. All households meeting the income eligibility requirements, regardless of electric service provider, will be eligible to apply for heating efficiency assistance. NYSERDA will continue to coordinate closely with the Weatherization Assistance Program (WAP) to ensure effective use of both funding sources.

EmPower is primarily a referral-based program, serving households referred by utilities, Offices for Aging, and other community-based organizations as being payment-troubled households. NYSERDA will coordinate with LIPA, NYPA and municipal electric service providers to ensure effective delivery of heating efficiency services to their customers. The expanded services will provide home performance measures in an estimated 1,700 households over the three year period. In the event gas funding is not available to supplement the EmPower program in all gas service territories of the State, NYSERDA may expand use of the RGGI funds for gas-fired heating systems.

*Home Performance with ENERGY STAR*. Home Performance with ENERGY STAR (HPwES) is a comprehensive energy efficiency services program for existing one-to-four family homes. The program uses a network of service providers accredited by the Building Performance Institute (BPI) to perform diagnostic testing on the home, recommend improvements, determine the payback period for those improvements, and install improvements selected by the homeowner. RGGI funding will allow HPwES to target customers using oil and propane for space and domestic water heating purposes. The funds will offset part of the cost for consumers to replace inefficient oil and propane heating equipment and other measures that have a direct impact on reducing oil and propane consumption (*e.g.*, insulation, air sealing).

Eligible electric measures for HPwES will be covered by SBC funds within the SBC territory. Larger incentives are provided to households whose incomes are below 80 percent of the higher of the State or area median income. NYSERDA will coordinate with LIPA, NYPA, and municipal electric service providers to offer these heating efficiency services to their customers. In markets where HPwES is not fully developed, NYSERDA will offer direct consumer incentives for the installation of space and domestic water heating equipment to minimize the lost opportunity of encouraging high efficiency equipment installations while markets are being developed. An estimated 978 lower-income households and 1,742 market-rate households will receive services over the three year period; approximately 75 percent of the funds are targeted to low-income households.

In the event gas funds are not available, NYSERDA may expand use of RGGI funds to gas-fired heating equipment.

*Green Residential Building Program.* Public Authorities Law (PAL) 1872 directs NYSERDA to create and administer a green residential building program in New York. The Green Residential Building Program (GRBP) is a market transformation initiative designed to change the building practices of the residential building industry for single-family and multifamily homes up to 12 units. Financial incentives will be provided to owners for new green residential buildings and extensively renovated existing residential buildings. Green buildings will reduce energy and greenhouse gas production and preserve natural resources. Other benefits are use of sustainable building materials, reduced waste, improved indoor air quality, and reduced indoor and outdoor pollution.

The program will build on the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Rating Systems and the National Green Building Standard (ICC 700-2008), developed by the National Association of Home Builders in coordination with the American National Standards Institute, and the International Codes Council, to set the definition of "green" for new residential building construction. A public rulemaking process has been completed, and final regulations have been approved by NYSERDA's Board of Directors. Incentives available for qualifying residential buildings will range from \$5,125 for a single-family building up to \$13,375 for an eleven-unit multifamily building. An estimated 2,300 buildings will be designated "green" over the three-year period.

*Solar Thermal Incentive Program.* RGGI funds will support incentives for the installation of solar thermal systems to replace fossil-fuel and electric domestic hot water systems. Incentives will be available for new and existing multifamily and single-family buildings. Incentives will be fully coordinated with the Multifamily Performance Program, Home Performance with ENERGY STAR, and the New York ENERGY STAR Homes Program, which is an SBC-funded program for one-to-four family new construction, and the new solar thermal program under the RPS. The Solar Thermal Incentive Program will support the recommendation published in the February 2008 *First Report of the Renewable Energy Task Force*, which called for "the State to support the installation of 1,100 solar thermal systems across New York by 2011." An estimated 497 single family residential and 13 multifamily installations will occur over the three-year period.

NYSERDA will explore existing incentive and education programs, in markets where solar thermal installations have been successful, to assist in designing program incentive levels and promoting this under-used technology. In addition, NYSERDA will continue to collect information from solar thermal installation sites in New York State to identify the most cost-effective applications for targeting purposes.

### **Budget**

This program has a total budget of approximately \$53 million. The anticipated funding commitments are shown in Table 4-1.

**Table 4-1. Residential Space and Water Heating Efficiency Program Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Multifamily Performance Program	\$0	\$2,500	\$4,600	\$900	\$8,000
MPP Market Rate	\$0	\$1,000	\$1,840	\$360	\$3,200
MPP Low Income	\$0	\$1,500	\$2,760	\$540	\$4,800
Multifamily Carbon Emission Reduction Program	\$0	\$2,000	\$6,400	\$1,600	\$10,000
EmPower New York	\$0	\$1,200	\$4,800	\$1,000	\$7,000
Home Performance with Energy Star	\$0	\$750	\$4,050	\$1,200	\$6,000
HP Market Rate	\$0	\$188	\$1,013	\$300	\$1,500
HP Low Income	\$0	\$563	\$3,038	\$900	\$4,500
Green Residential Building Program	\$0	\$4,000	\$8,000	\$4,000	\$16,000
Solar Thermal Incentive Program	\$0	\$300	\$2,100	\$600	\$3,000
Outreach	\$0	\$200	\$2,200	\$600	\$3,000
<b>Total</b>	<b>\$0</b>	<b>\$10,950</b>	<b>\$32,150</b>	<b>\$9,900</b>	<b>\$53,000</b>

**Metrics and Benefits**

Table 4-2 presents anticipated fuel savings and CO<sub>2</sub> reductions with a metric related to the program cost per ton reduced over the lifetime of the installed measure. Financial savings attributable to the Solar Thermal Incentive Program are included in savings estimates for the programs through which solar thermal systems will be funded.

**Table 4-2. Residential Space and Water Heating Efficiency Program Total Budget and Three-Year Savings**

Program	Total Budget (\$ Million)	Number of Participants*	3-Year Electricity Savings (MWh)	3-Year Fuel Oil Savings (mmBtu)	3-Year Residual Oil Replacement (mmBtu)	3-Year Propane Savings (mmBtu)	3-Year Natural Gas Savings (mmBtu)	3-Year CO <sub>2</sub> Reduction (Tons)**	Program Cost per Ton (Life-time)***
Multifamily Performance Program	8.0	12,672	N/A	308,759	N/A	N/A	N/A	25,032	29
MPP Market Rate	3.2	5,033	N/A	123,505	N/A	N/A	N/A	10,013	29
MPP Low Income	4.8	7,639	N/A	185,254	N/A	N/A	N/A	15,019	29
Multifamily Carbon Emission Reduction Program†	10.0	18,252	N/A	N/A	1,708,416	N/A	N/A	26,524	50
EmPower New York	7.0	1,700	N/A	88,400	N/A	37,886	N/A	9,816	63
Home Performance with Energy Star	6.8	2,720	N/A	104,071	N/A	43,475	N/A	11,242	51
HP Market Rate	2.3	1,742	N/A	26,019	N/A	10,870	N/A	2,634	73
HP Low Income	4.5	978	N/A	78,052	N/A	32,605	N/A	8,607	44
Green Residential Building Program	16.0	2,313	4,374	24,509	N/A	3,502	147,060	12,660	105
Solar Thermal Incentive Program	5.3	510	-39	33,536	N/A	623	N/A	2,746	131
<b>Total</b>	<b>53.0</b>	<b>38,165</b>	<b>4,335</b>	<b>559,275</b>	<b>1,708,416</b>	<b>85,486</b>	<b>147,060</b>	<b>88,019</b>	<b>57</b>

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

\*\*These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of CO<sub>2</sub> allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, electric efficiency projects may not decrease the overall amount of CO<sub>2</sub> being emitted into the atmosphere by New York entities. Still, electric efficiency projects will reduce end-users' carbon-footprints as they will be responsible for a smaller percent of the emissions associated with electricity production. It is estimated that 1,970 tons of this program's total three year CO<sub>2</sub> reduction will be attributed to the electric sector, which represents 2% of the total reduction.

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

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

The Residential Space and Water Heating Efficiency programs are designed to achieve the following criteria and benefits.

Criterion 1: Cost effectiveness as measured by quantity of carbon equivalents reduced per dollar. As shown in the suite of programs, provides cost effective carbon reduction in the residential sector.

Criterion 4: Other benefits to New York. The residential programs are based on a market transformation model that inherently supports job creation and skills development. The model ensures that contractors participating in the programs will sell the benefits of energy efficiency programs long after public subsidies are removed from the marketplace.

By leveraging RGGI funds with existing electric reduction programs funded through the SBC, participants will realize up to seven times more annual energy bill savings than when only electric measures are installed. Expected annual financial savings per participant attributable to RGGI funds are:

- Home Performance with Energy Star — \$529 to \$1,005
- EmPower program — \$603
- Green Homes Incentive Program — \$1,124
- Multifamily Performance Program — \$200 to \$280 per unit

Criterion 5: Opportunity to reduce the disproportionate cost burden and environmental impacts on low-income families and environmental justice communities. Approximately 30 percent of the residential funding will be used to support energy efficiency improvements in low-income homes and multifamily buildings. The work improves energy affordability for households and addresses potential health and safety issues while increasing the comfort and quality of the housing stock. Targeted outreach will increase awareness of the programs among environmental justice communities.

Criterion 6: Need for these funds based upon availability of other funding sources. As stated above, NYSERDA currently administers SBC and EEPs funds primarily focused on electric efficiency. NYSERDA also integrates limited gas efficiency dollars in some gas utility service areas to target high efficiency gas measures. RGGI funds will permit selected efficiency improvements in oil-heated households and buildings that are not being addressed adequately by other funding sources.

### **Program Outreach, Education, and Technology Transfer**

The proposed programs are designed to achieve significant, deep energy savings, to permanently transform the market for delivering such savings, and to ensure that home renovations, as well as product purchasing patterns and consumer behaviors, continue to provide energy savings long after the programs have delivered their services. Integral to the market transformation approach is the need to increase the awareness of and demand for comprehensive building performance services while simultaneously building an infrastructure of trained, certified technicians and accredited contractors.

Consumer demand and contractor recruitment will be achieved through a comprehensive marketing campaign which will include the development of promotional and educational materials, co-operative advertising, television, print ads, and radio spots. Regional outreach will be conducted through community-based organizations and attendance at local events such as home shows and trade fairs.

Marketing is a critical component in delivering services to market-rate customers since this, rather than financial incentives, is the most effective means of building consumer demand. Marketing costs typically represent less than 10 percent of NYSERDA's program budgets and will be used to target households not served by previous marketing campaigns, such as those on Long Island, and other areas that have significant concentrations of oil heat. In addition, RGGI funds will also be used to support the installation of residential solar thermal systems through outreach efforts targeted at increasing the market and demand for solar thermal.

Marketing funded through RGGI will build on existing materials when possible, and most of the funding will be used for print, radio, and on-line media purchases and attendance at events. The target number of households to be served is aggressive and will require aggressive marketing and public relations strategies. Programs will continually monitor participation rates and spend only the funds necessary to meet the program's goals.

Detailed information about existing residential and low income programs can be found at NYSERDA's consumer Web site, [www.GetEnergySmart.org](http://www.GetEnergySmart.org). Information about new programs will be added to the

site as program design and implementation details are completed. Other program administrators and stakeholders are encouraged to establish links on their own web sites to GetEnergySmart.org.

#### 4.1.2 Green Jobs – Green New York

Green Jobs – Green New York is a statewide program to promote energy efficiency and the installation of clean technologies to reduce energy costs and greenhouse gas emissions. The Program will provide subsidized energy audits to single family, multifamily, small business, and not-for-profit building owners. The Program will also provide financing options for the completion of energy efficiency services. The program will moreover support sustainable community development and create opportunities for green jobs. Please refer to the Green Jobs – Green New York Operating Plan for more details on the Program.

##### **Budget**

The program has a budget of \$98.4 million. Anticipated funding commitments are shown in Table 4-3 below.

**Table 4-3. Green Jobs – Green New York Program Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Fiscal Year 2012-13	Total
Residential	\$27,426	\$28,974	\$0	\$0	\$56,400
Small Business and Not-for-Profit	\$11,754	\$12,246	\$0	\$0	\$24,000
Workforce Development	\$3,920	\$4,080	\$0	\$0	\$8,000
Outreach and Marketing	\$4,900	\$5,100	\$0	\$0	\$10,000
<b>Total</b>	<b>\$48,000</b>	<b>\$50,400</b>	<b>\$0</b>	<b>\$0</b>	<b>\$98,400</b>

##### **Metrics and Benefits**

The Green Jobs – Green New York Program serves as a point of entry into existing energy efficiency programs for prospective projects through the audit and financing offerings. It is estimated that the Program will facilitate energy efficiency work in over 50,000 small residential, multifamily and small business/not-for-profit projects. It is anticipated that only a small portion of these projects (approximately 5 percent) will proceed solely through a GJGNY-funded audit or loan and without incentives from NYSERDA or another Program Administrator(s). Table 4-4 presents anticipated fuel savings, CO<sub>2</sub> reductions, and program cost per CO<sub>2</sub> ton reduced over the lifetime of the installed measure, specific to the projects that only receive an audit or loan through the Green Jobs – Green New York Program. Savings for projects that receive an audit or loan, in addition to other incentives through NYSERDA, will be reported under the program that is expected to provide the incentives (*e.g.*, Multifamily Performance Program).

**Table 4-4. Green Jobs – Green New York Program Total Budget and Three-Year Savings**

	Total Budget (\$ Million)	Number of Participants*	3-Year Electricity Savings (MWh)	3-Year Fuel Oil Savings (mmBtu)	3-Year Natural Gas Savings (mmBtu)	3-Year CO <sub>2</sub> Reduction (Tons)**	Program Cost Per Ton (Lifetime)***
Residential	69.0	2,596	2,388	20,248	47,248	5,398	\$1,276
Commercial/ Industrial	29.4	158	9,350	61,600	61,600	12,467	\$243
<b>Total</b>	<b>98.4</b>	<b>2,754</b>	<b>11,738</b>	<b>81,848</b>	<b>108,848</b>	<b>17,865</b>	<b>\$563</b>

\*The number of participants reflects the subset of the total number of participants that are expected to take part in the Green Jobs - Green New York (GJGNY) program only. It is expected that an additional 51,915 participants will take part in GJGNY as well as other NYSERDA- or utility-funded programs.

\*\*These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of CO<sub>2</sub> allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, electric efficiency projects may not decrease the overall amount of CO<sub>2</sub> being emitted into the atmosphere by New York entities. Nevertheless, electric efficiency projects will reduce end-users' carbon-footprints as they will be responsible for a smaller percent of the emissions associated with electricity production. It is estimated that 4,848 tons of this program's total three year CO<sub>2</sub> reduction will be attributed to the electric sector, which represents 27% of the total reduction.

\*\*\*Cost per ton is based on the present value of all program costs (including initial incentives, program administration, and performance-based incentives) divided by the estimated lifetime GHG emissions reductions. Future program costs are discounted using a five percent social discount rate. Though the full program budget is used to calculate the cost per ton value, the emission reductions used in the calculation are derived from the subset of GJGNY projects that proceed solely through a GJGNY-funded audit or loan without incentives from NYSERDA or another Program Administrator(s). Energy savings for projects that receive a GJGNY audit or loan in addition to other incentives through NYSERDA will be reported under the program that is expected to provide the incentives. The attribution of benefits between GJ/GNY and other programs will be more closely examined as part of the annual program evaluation process.

In addition to fuel savings and CO<sub>2</sub> reductions, the Green Jobs – Green New York Program is responsible for non-carbon benefits as a result of the community and economic development initiatives that are inherent in the Program. The non-carbon impacts of the Program are presented in Table 4-5.

**Table 4-5 Green Jobs – Green New York Program, Non Carbon Benefits.**

	Number of Audits	Number of Loans	Number of Workers Trained	Number of CBOs under contract
Residential	46,500	4,641	N/A	N/A
Small Business/Not-For-Profit	5,000	1,020	N/A	N/A
Workforce Development	N/A	N/A	18,000	N/A
Outreach & Marketing	N/A	N/A	N/A	13
<b>Total</b>	<b>51,500</b>	<b>5,661</b>	<b>18,000</b>	<b>13</b>

### **Program Outreach, Education, and Technology Transfer**

The Green Jobs – Green New York Program will be designed by NYSERDA with consultation from an advisory council and several working groups, made up of members from public and private organizations. Successful implementation of the Program will require close coordination with various stakeholders from the energy efficiency, financing, and community development fields.

An overarching Outreach and Marketing effort will build awareness of the program and target small businesses, not-for-profit organizations, and residential and multi-family building owners across New York. Program awareness building initiatives will make the program broadly accessible through NYSERDA's hotline, Web site, participating contractors, and defined delivery channels. Priority audiences outlined in the GJGNY Legislation will be targeted via a coordinated community outreach effort, led by consortia of constituency-based organizations<sup>1</sup>. Selection of targeted communities will be coordinated with the Department of Environmental Conservation (DEC) and the Department of Housing and Community Renewal (DHCR). Communities will be targeted based on available demographic and socio-economic data. An effort will be made to reach out to minority- and women-owned businesses to target businesses that serve economically distressed communities and to add contractors in targeted geographic regions and areas where contractor coverage is currently limited. A competitive solicitation will be issued to select constituency-based organizations to conduct Outreach and Marketing to support the GJGNY Program. This two-pronged approach, a statewide effort to build awareness combined with targeted community outreach, will ensure budgets are aligned to deliver against GJGNY goals.

Early action Outreach and Marketing activities will support the continued growth of a strong foundation of accredited contractors and encourage workers to leverage training opportunities currently in place. Marketing messages will target contractors not currently BPI Accredited and will encourage additional companies to become accredited. These contractors will be targeted based on an assessment of regional coverage and the needs of the expanded GJGNY Program. Communication through networks of alliances, partnerships, and organizations supporting job placement will help develop the pipeline with workers prepared for green collar jobs. In addition, research will be conducted to better understand audience motivators and drivers; to determine the most effective messages; and to determine the challenges, opportunities, and barriers associated with accomplishing GJGNY objectives.

The GJGNY Outreach and Marketing effort will be designed to complement other Outreach and Marketing initiatives, including current NYSERDA Program Marketing and the Statewide Outreach and Education campaign.

#### **4.1.3 Commercial, Industrial, Municipal and Institutional (CIMI)**

NYSERDA will offer two initiatives designed to achieve cost-effective CO<sub>2</sub> reductions. This program includes one activity specified in the RGGI Early Action Plan and one new initiative. The initiatives include:

- Water and Wastewater Energy Efficiency Program

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<sup>1</sup> Constituency-based organization is defined in the GJGNY Act as an organization incorporated for the purpose of providing services or assistance to economically or socially disadvantaged persons within a specified community and that is supported by, or whose actions are directed by, members of the community in which it operates.

- Competitive Greenhouse Gas Reduction Industrial Pilot

*Water and Wastewater Energy Efficiency Program*

A unique opportunity exists to coordinate RGGI climate change goals and funding with federal economic stimulus goals and funding while installing infrastructure that will improve the environment and keep New York waters clean and healthy. Under the leadership of Governor David A. Paterson, New York State has been working to secure federal economic stimulus funds that will bolster efforts to finance a new generation of water and wastewater infrastructure via the Clean Water and Drinking Water State Revolving Fund Programs. The U.S. Environmental Protection Agency (USEPA) has dedicated funds under the Green Project Reserve to promote energy efficiency and green projects. Plants financed with State Revolving Fund monies can be constructed to the most energy efficient levels, thus minimizing carbon emissions and improving their economic and environmental performance.

A pilot program co-managed by the New York State Environmental Facilities Corporation (EFC) and NYSERDA will analyze and finance projects in participating communities under the Early Action Plan. The Municipal Water and Wastewater Energy Efficiency Program will continue into the second year of the Operating Plan period. EFC and NYSERDA will review projects on the State Revolving Fund Intended Use Plan (SRF IUP), including likely recipients of USEPA Green Project Reserve economic stimulus funds, and identify candidates for likely energy efficiency and carbon abatement opportunities. These efforts will be coordinated with NYPA in order to maximize program participation and cost-effectiveness.

Selected projects will receive technical analysis that will identify costs and savings associated with energy efficiency, process improvements, and carbon abatement opportunities. NYSERDA will secure one or more experienced New York water and wastewater consultants to perform the analysis and assist participant communities by providing information and assistance with project application procedures and processes. EFC and NYSERDA will work together to develop project proposals for presentation to participant communities. Project installations will be cost-shared through New York RGGI auction proceeds and the State Revolving Fund program administered by EFC. The result will be lower operating cost for the site communities and reduced climate impacts over the potentially decades-long lifetime of the new infrastructure.

*Competitive Greenhouse Gas Reduction Industrial Pilot*

NYSERDA will design and issue a competitive solicitation for energy and abatement projects that reduce greenhouse gas emissions in the industrial sector, including data centers. Projects will be selected based on a combination of technical merit and cost of delivering greenhouse gas reductions.

The Competitive Greenhouse Gas Reduction (CGGR) Industrial Pilot will balance the following goals:

- Solicit a variety of greenhouse gas reduction projects;
- Fund greenhouse gas reductions for the lowest cost;
- Measure and verify greenhouse gas reductions; and
- Obtain market price information for greenhouse gas reductions.

The CGGR Program will be designed based on lessons learned from:

- Prior competitive solicitations administered by NYSERDA, such as the Aggregated Load Reduction Program, the RGGI auction for CO<sub>2</sub> allowances, and the Renewable Portfolio Standard;
- Past New York demand-side management experience; and
- Other programs, such as Maine’s RGGI Industrial Bidding Program, NYSEG/RG&E’s EEPS Customer Block Bidding Program, Con Edison’s Targeted Program, Xcel Energy’s Custom Efficiency Program, and Connecticut Light and Power’s Request for Proposal Program.

Eligible strategies for technically viable GHG reduction projects include:

- Energy efficiency (including energy-efficient process improvements, for systems making use of electricity, purchased steam, oil, gas, propane, coal, and other energy sources except biomass);
- Biomass opportunities specifically described in the solicitation;
- Abatement; and
- Fuel source optimization.

Respondents will be required to specify the amount of funding needed to implement projects within program guidelines. Projects will be selected using clear and transparent selection criteria that includes technical merit, program and total costs on a \$/ton carbon equivalent basis, and other considerations. Measurement and verification will be required for all projects. Incentive payments for delivering greenhouse gas reductions will be performance-based and may be paid over defined performance periods and at multiple stages within projects.

Consistent with Part 242-10.3(d)(3), projects that receive funds under this Pilot are not eligible to pursue CO<sub>2</sub> Emissions Offset credits under the CO<sub>2</sub> Budget Trading Program.

Final pilot program design and release of the first solicitation are planned for the second quarter of 2010 after further design, research, and input from stakeholders. See Table 4-6 for the anticipated schedule.

**Table 4-6. Competitive Greenhouse Gas Reduction Pilot Anticipated Schedule**

<b>Milestone</b>	<b>Anticipated Date</b>
Develop conceptual program design	June 3, 2010
Issue solicitation for pilot program	June 25, 2010
Proposals due	August 13, 2010
Execute contracts	December 31, 2010
Meet with stakeholders to review process and results	January 15, 2011

If auction proceeds substantially exceed the estimates in this Operating Plan and the pilot program is successful, an additional competitive GHG reduction solicitation, that is open to more sectors and/or GHG reduction activities, may be issued.

**Budget**

The overall CIMI program has a three-year budget of \$25.5 million. Anticipated funding commitments are shown in Table 4-7 below.

**Table 4-7. Commercial, Industrial, Municipal and Institutional Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Fiscal Year 2012-13	Total
Municipal Water and Wastewater Efficiency	\$7,500	N/A	N/A	\$3,000	\$10,500
Competitive Greenhouse Gas Reduction Industrial Pilot	N/A	\$15,000	N/A	N/A	\$15,000
<b>Total</b>	<b>\$7,500</b>	<b>\$15,000</b>	<b>N/A</b>	<b>\$3,000</b>	<b>\$25,500</b>

**Metrics and Benefits**

The water and wastewater treatment efficiency initiative will address the criteria (listed on page 2-7) and provide the indicated benefits:

- Criterion 1: The program will provide cost-effective CO<sub>2</sub> reductions through energy efficiency improvement to water and wastewater treatment plants. The improvements are anticipated to be primarily electric efficiency.
- Criterion 3: Through investments in electric reduction, the program will help reduce the overall compliance costs of the CO<sub>2</sub> budget trading program.
- Criterion 4: In addition to the identified energy savings and the associated carbon reductions, this program will provide numerous other benefits. These benefits include improved water quality for the residents of New York, leveraging of federal economic stimulus funds, and increased employment opportunities that result from these infrastructure projects.

The CGGR initiative will address the criteria and provide the benefits described below:

- Criterion 1: The Pilot program will provide a framework for marketplace participants to compete for funding to support large greenhouse gas reduction projects primarily on a cost-per-ton of CO<sub>2</sub> equivalent basis.
- Criterion 3: To the extent that proposals include reductions in CO<sub>2</sub> through reduced electricity use, the costs of achieving the reduction goals of the CO<sub>2</sub> budget trading program should be reduced.
- Criterion 4: The Pilot program will likely result in additional benefits including job creation, leveraged capital investment to promote economic development, and environmental benefits.

The CGGR pilot is expected to attract a mix of proposals from the industrial sector for varied technologies and greenhouse gas reduction strategies. NYSERDA anticipates a pilot program cost-per-lifetime-ton of \$30. Program metrics and cost-per-ton will depend on the mix and cost of responding

proposals. The Competitive Greenhouse Gas Reduction Industrial Pilot expects to deliver 500,000 tons of lifetime CO<sub>2</sub>e reduction.

Table 4-8 shows anticipated fuel savings and CO<sub>2</sub> reductions for the Municipal Water and Wastewater Efficiency program along with an indicator of the program cost per ton reduced over the lifetimes of installed measures.

**Table 4-8. Municipal Water and Wastewater Efficiency Program Total Budget and Three-Year Savings**

<b>Program</b>	<b>Total Budget (\$ Million)</b>	<b>Number of Participants</b>	<b>3-Year Electricity Savings (MWh)</b>	<b>3-Year Natural Gas Savings (mmBtu)</b>	<b>3-Year Fuel Oil Savings (mmBtu)</b>	<b>3-Year CO<sub>2</sub> Reduction (Tons)*</b>	<b>Program Cost per Ton** (Lifetime)</b>
Municipal Water and Wastewater Efficiency	\$10.5	50	29,800	19,100	14,314	14,588	67

\*These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of CO<sub>2</sub> allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, electric efficiency projects may not decrease the overall amount of CO<sub>2</sub> being emitted into the atmosphere by New York entities. Nevertheless, electric efficiency projects will reduce end-users' carbon-footprints as they will be responsible for a smaller percent of the emissions associated with electricity production. It is estimated that 12,307 tons of this program's total three year CO<sub>2</sub> reduction will be attributed to the electric sector, which represents 84% of the total reduction.

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

**Program Outreach, Education, and Technology Transfer**

With respect to the water and wastewater treatment program, targeted and active outreach is necessary to reach and inform municipalities about this unique opportunity to reduce the long term operating expense at their water and wastewater facilities. NYSERDA will partner with EFC; and EFC, using the State Revolving Fund, Intended Use Plan, will take a leadership position in identifying and obtaining participation in the Program. NYSERDA and its Smart Focus on Water and Wastewater effort will assist, inform, and educate customers to expedite participation. In partnership with EFC, and coordination with NYPA, NYSERDA will focus additional outreach effort on municipalities in areas not currently exposed to NYSERDA programs, such as Long Island, New York City, and Westchester County.

With respect to the CGGR Pilot Program, potential respondents include:

- Manufacturers and data centers;
- Energy services companies;
- Aggregators;
- Engineering consultants; and

Representative groups that include:

- National Association of Energy Services Companies;
- Clinton Climate Initiative;
- Independent Power Producers of New York;
- New York Energy Association;
- Multiple Intervenors;

- Business Council of New York State;
- New York Energy Consumers Council;
- Uptime Institute;
- Data Center Dynamics; and
- American Council of Engineering Consultants.

With regard to technology transfer, results of the CGGR Industrial Pilot will be used to optimize future program design. Information and data will be shared with stakeholders, including RGGI advisory group organizations, to better inform the market capacity and cost of reducing greenhouse gas emissions. Case studies of successful projects will demonstrate successful market approaches to low-cost GHG reductions.

#### **4.1.4 Climate Smart Communities Support**

This activity will encourage and support municipalities' participation in the NYS Climate Smart Communities Program.<sup>2</sup> The Climate Smart Communities program is a State and local partnership to engage municipalities in climate protection. The Climate Smart Communities Program will help municipalities reduce greenhouse gases and prepare for changes in climate that cannot be avoided. The program engages municipalities, encouraging community commitment to greenhouse gas reduction, smart growth, and investment in a green innovation economy. The key elements of a successful local climate program include the following:

- *Demonstrate commitment to climate protection by completing the Climate Smart Communities Pledge.* Adopting the Climate Smart Communities Pledge is a public declaration of leadership and commitment to reducing emissions and adapting to a changing climate. Communities can adopt the model pledge, adding their own legislative findings or pledge elements. The Climate Smart Communities Pledge includes the elements of a successful local climate program. By reducing GHG emissions and preparing for changing climate, local climate programs protect public health and safety, and support a secure economic future. Each Climate Smart Community joins the State's most forward thinking municipalities in active climate action. Climate Smart Communities benefit from the experience and knowledge of communities with mature programs, and in turn help other communities to get started. The Climate Smart Communities Pledge demonstrates that local government is acting to protect the future of its citizens and of coming generations, reassures concerned citizens and invites everyone to join in doing something about climate change.
- *Develop a greenhouse gas inventory to determine how much GHG is currently emitted.* To guide municipalities through inventories, ICLEI- Local Governments for Sustainability USA, Inc. (ICLEI USA) and the Climate Registry, the two leading organizations in local GHG accounting, have developed programs for local government and community-wide inventories with software that ensures consistent GHG accounting nationwide. Local governments that join these organizations have access to comprehensive support as they develop emissions inventories.
- *Develop a Climate Action Plan for meeting established GHG reduction goals.* The first action most communities take to reduce GHG emissions is to assess their own operations for opportunities to reduce energy use. Local governments can reduce emissions through energy-

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<sup>2</sup> The Climate Smart Communities Program is jointly sponsored by the NYS Department of Environmental Conservation, NYSERDA, The New York Department of State and the NYS Public Service Commission.

related improvements to municipal buildings, green purchasing requirements, and improvements in infrastructure, solid waste management, and public transit. Communities can also incorporate climate protection and sustainability measures through land use, building code and transportation planning and regulation, and economic development plans.

- *Implement projects that result in GHG reductions.* Local governments are important partners in climate change mitigation and adaptation. This initiative offers dedicated outreach and technical support related to data gathering and tracking, goal setting, and guidance and resources to assist with implementation. Regional outreach will be provided to municipalities through Regional Climate Smart Coordinators who will engage with local governments, regional planning boards and similar entities, and with NYSERDA’s Energy Smart Community Coordinators and Focus on Local Governments points-of-contact. This support will help municipalities establish their commitment to the Climate Smart Communities Program, inventory their GHG emissions, develop their climate action plans, and identify and obtain potential incentives for installation of GHG reduction and adaptation measures

Further information about the Climate Smart Communities Program can be found at <http://www.dec.ny.gov/energy/50845.html> .

**Budget**

This program has a total budget of \$6.6 million. Anticipated funding commitments are shown in Table 4-9 below.

**Table 4-9. Climate Smart Communities Support Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Climate Smart Communities Support	\$0	\$2,000	\$3,680	\$920	\$6,600

**Metrics and Benefits**

The Climate Smart Communities Support program will result in measureable carbon reductions, provided the municipalities successfully implement their GHG reduction plans, and will enhance local planning by incorporating assessments of vulnerabilities and adaptation needs. Implementation will be further encouraged through NYSERDA incentives described in the Commercial, Industrial, Municipal, and Institutional Program above. Taken together, these programs will balance the following criteria:

- Criterion 1: Program cost effectiveness based on the societal and program dollars per ton of CO<sub>2</sub> equivalent.
- Criterion 3: Program potential to reduce GHG emissions through reduced electric consumption. This, in turn, decreases the cost of achieving the GHG reduction goals associated with this program.
- Criterion 4: Program potential to propagate climate change awareness and inspire energy-conscious behaviors. Program activities will be favored that can access and influence targeted groups and reach large audiences.

*Climate Smart Communities Support.* This program will be evaluated based on the number of entities reached through the program, achieved GHG reductions, and incorporation of adaption into local

planning and management programs. The program will provide a valuable outreach vehicle that will guide municipalities in their efforts to understand their energy and GHG mitigation needs and participate in programs to address identified needs and opportunities. The program is expected to serve as a point-of-entry to NYSERDA programs, and in addition to energy and GHG reduction benefits, increase program participation. The benefits to society will include reduced operating costs and positive publicity for participating local municipalities. Job and internship opportunities are expected to be offered in areas including GHG inventories; emissions reduction, transportation and adaptation planning; equipment retrofits; and alternative fuel and hybrid car maintenance. Public awareness and knowledge of climate change, its impacts, and mitigation and adaptation options are also key benefits.

### **Program Outreach, Education, and Technology Transfer**

The design of specific programs will take into account the expertise of existing advisory groups and programs currently being implemented and designed within NYSERDA, DEC, and other government and non-governmental organizations. Successful implementation of these programs will require close coordination with diverse public and private stakeholders including the New York State Conference of Mayors, regional planning and development boards, New York State Association of Towns, New York State metropolitan planning organizations, environmental justice organizations, and numerous State agencies.

NYSERDA's existing contacts in the community, including Energy Smart Community Coordinators and Focus on Local Governments points-of-contact will work with Regional Climate Smart Community Coordinators to reach target audiences. NYSERDA will also work through its Energy Smart Communities program to identify Energy Target Zones, including those located in environmental justice communities, that will benefit from the focusing of diverse energy efficiency and other energy services. Results of efforts in Energy Target Zones will be highlighted and communicated in case studies.

## **4.2 Longer-Term Investments to Address High Potential GHG Reductions**

The longer-term programs will support development and demonstration of technologies with substantial GHG reduction potential and that are relevant to New York manufacturing industries and building systems. Funded projects will focus mainly on innovations that reduce the use of fossil fuels; have high replication potential for New York's manufacturing base; are likely to be cost effective; and are not at present supported under SBC programs.

### **4.2.1 Advanced Building Systems and Industrial Process Improvements**

*Advanced Building Systems.* This initiative will support the development and demonstration of next generation technologies having significant GHG reduction potential and that are relevant to building systems. The projects will focus on technical innovations that collectively enable net-zero-energy buildings. The strategy will focus on absolute reduction of building energy loads and increases in systems efficiency prior to introduction of renewable energy sources, such as photovoltaic and solar thermal systems. Specific activities include improvements in the thermal performance of building envelopes and windows; increased efficiency of heating and cooling systems; clean, biofuel technologies that displace the use of fossil fuels; cost-effective, efficient micro-combined-heat-and-power (Micro-CHP) systems for residential applications; and advanced solar thermal systems for residential, commercial, and institutional buildings. Supported projects will have significant replication potential; are likely to be cost-effective; and are not adequately supported under SBC programs.

While building improvements present significant potential for GHG reductions, the extreme fragmentation in the industry impedes participants from focusing on developing new technologies and products. The technology areas having the more significant potential for GHG reductions would be the focus of this initiative. Improvements in heating system efficiencies will be emphasized for residential and small scale construction, and advances in cooling system efficiencies will be emphasized for larger commercial buildings. Improvement will be sought in materials and construction processes to reduce thermal and infiltration losses through improved building envelope and window systems. Innovations in heating, cooling, ground source heat pumps, ventilation, and distribution equipment will be pursued to reduce first costs, increase operating performance and reduce emissions. Micro-CHP and self-powered heating systems for residential and small-scale buildings will be developed to provide power during outages and improve efficient on-site use of primary fuels. Development of advanced controls to support automation and optimization of building environmental systems will be pursued. Development, demonstration, and testing of clean burning, efficient biofuels technologies will be supported.

The program will be administered through existing Advanced Buildings Program solicitations. Eligible projects must meet overarching GHG reduction requirements and not be receiving support from existing SBC funding sources.

*Industrial Process Improvements.* This initiative will support the development and demonstration of next generation technologies having significant GHG reduction potential, and that are relevant to New York manufacturers. The projects will focus on technical innovations that reduce and displace the use of fossil fuels; have high replication potential by New York manufacturers, are likely to be cost effective, and are not receiving adequate support from SBC programs.

Many New York industries are in a steady decline because of competition and the increasing costs of primary inputs including labor and energy. In many industries using thermal processes, the most immediate opportunity for reducing GHG emissions is in reduction of waste heat generated throughout production. On average, industrial processes result in losses of approximately 35 percent of initial thermal energy inputs. Improvements can be achieved through either increasing thermal efficiencies or replacing existing thermal processes with alternatives that are less energy intensive. Still, development and adoption of these technologies is impeded by limited capital, uncertain expectation of success, and risk aversion. Existing SBC programs have not been able to fully address this sector's needs.

Projects under this initiative will include 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 may also include changes in material inputs and development of advanced controls provided they directly bring about GHG reductions.

This program will be administered through existing Industrial Process and Productivity Improvements (IPPI) solicitations. Eligible projects must meet overarching GHG reduction requirements and not be receiving support through SBC funding under IPPI solicitations.

### **Budget**

This program has a three-year budget of \$7 million. Anticipated funding commitments are shown in Table 4-10.

**Table 4-10. Advanced Building Systems and Industrial Process Improvements  
Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Advanced Building Systems & Industrial Improvements	\$0	\$2,000	\$4,000	\$1,000	\$7,000

**Metrics and Benefits**

This initiative will address the criteria (listed on page 2-7) and provide the benefits described below.

Criterion 2: Invest in technology that has significant potential to reduce GHG emissions in New York.

Criterion 4: Other benefits, specifically economic development benefits associated with technology application at existing commercial, residential, and industrial facilities and product development in New York industries.

NYSERDA anticipates that approximately 50 percent of the funds will be invested in product development with New York companies. Results of previous investments in buildings and industrial product development demonstrate that for every \$1 invested by NYSERDA in such efforts, gross State product increases by \$3. The program will support technology demonstrations at ten industrial facilities, which will result in replication at other sites in the same industry. In addition to normal commercialization efforts, product development activities will also be coordinated with NYSERDA's deployment programs as an additional strategy to accelerate introduction into the markets of emerging technologies.

**Program Marketing, Outreach, and Technology Transfer**

This initiative will be marketed and technology transfer achieved by working with existing trade associations, university industry centers, and collaborations with non-government organizations, including the American Council for an Energy Efficient Economy, Clarkson Center for Advanced Materials Processing, Syracuse Center for Indoor Environmental Quality, and Rad Tech, an industrial trade group that advocates ultraviolet and infrared alternatives to thermal processing.



# 5 *Transportation*

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The objectives of transportation sector programs are to reduce greenhouse gas contributions from the transportation sector by reducing petroleum use and, where feasible, increasing the efficiency of electric mass transit. These objectives can be achieved by improving the efficiency of vehicles and transportation infrastructure, expanding the use of electricity and renewable fuels in the sector, and encouraging behavioral changes and smart growth policies that reduce vehicle miles traveled (VMT).

RGGI's transportation initiative consists of a portfolio of near- and long-term strategies that will cost-effectively reduce GHG emissions. The initiative focuses on new and improved technologies and includes programs that seek to develop and deploy high efficiency vehicles and improve the performance and efficiency of transportation systems.

In 2006, New York's transportation sector was responsible for 39 percent of GHGs emitted through fuel combustion and accounted for 79 percent of the petroleum used in the State. Transportation is the only sector in New York in which 2006 GHG emissions from fuel combustion are higher than 1990 levels. In addition, most of the petroleum used in the transportation sector in 2006 was imported into New York and thus was responsible for exporting energy dollars out of the State. New development and deployment programs are needed to reverse the increasing use of fuel and cost effectively reduce transportation GHG emissions. Most initiatives in the transportation area require substantial expenditures, and auction proceeds would complement, rather than supplant, existing federal and State funding.

The following programs seek to improve the energy efficiency of the transportation sector through system and vehicle efficiency improvements. These projects will also help educate New Yorkers about the connections between their transportation choices and climate change. Improving transportation system efficiencies by reducing congestion, lowering electricity needs, shifting to more efficient transportation modes, and improving vehicle efficiency through electrification, retrofits, and modernization are promising and complementary methods for reducing GHG emissions from the transportation sector.

## **5.1 Near Term Programs to Reduce Greenhouse Gases**

### **5.1.1 *Transportation Efficiency Program***

The objective of the Transportation Efficiency Program is to improve the efficiency of New York's vehicle fleet and rail system and reduce total VMT and congestion. New York's transportation system carried New York's 19 million residents, plus millions of visitors and commercial vehicles, almost 400 million miles per day in 2007. Vehicles in New York use 5.7 billion gallons of gasoline and 1.2 billion gallons of diesel fuel each year, emitting more than 60 million tons of CO<sub>2</sub> into the atmosphere. Electrified rail is a key mode of mass transit used in New York's largest metropolitan areas that uses a large amount of energy; the New York City Metropolitan Transit Authority (MTA) uses more than 2.1 million MWh per year for electrified rail propulsion. Substantial opportunities exist in the near- and long term to increase the efficient use of electricity via deployable technologies thus, reducing the GHG footprint of these operations.

Investment of RGGI funds in VMT- and congestion-reduction programs is necessary because these activities are unlikely to be undertaken without public support. Private companies and individual drivers neither perceive nor absorb the full costs of their transportation choices, which cause congestion, road deterioration, local air pollution, and climate change. Publicly financed programs to reduce VMT and improve traffic flow will help drivers choose transportation options that impose fewer costs on society. Vehicle efficiency projects should receive RGGI funding because the current funding available for similar projects, through the Congestion Mitigation and Air Quality Improvement Program (CMAQ), is available only for certain areas of New York. RGGI funding would be the only statewide funding available for these important projects and would help overcome market barriers to adopting these technologies. Additionally, CMAQ funds are dedicated to reducing only criteria pollutant emissions. While the projects proposed for RGGI funding will also reduce criteria pollutant emissions, they prioritize reducing CO<sub>2</sub> emissions. Initial transportation efficiency projects will include:

- *Traffic Signal Improvements.* Thousands of traffic lights in New York State use outdated lighting, sensing, and control technologies. Upgrading to energy efficient light emitting diode (LED) lights and installing system-wide controls that coordinate timing of signals would reduce electricity use through efficient lighting and transportation fuel use by reducing idling. This project would provide assistance in funding transportation system engineers and planners, developing algorithms for optimal traffic signal timing, and implementing capital improvements to traffic signals and intersections.
- *Electric Trailer Refrigeration Units.* Most refrigerated trailers used for trucking food are powered by separate diesel motors, but new hybrid-electric trailers can run on diesel while driving and use electricity from the electric grid while parked. This project would provide incentives to fleets and major depots to purchase hybrid trailers and install supporting infrastructure.
- *Heavy Duty Hybrid-Electric and Battery-Electric Vehicles.* Heavy duty hybrid-electric and battery-electric vehicles, such as buses and delivery trucks, are typically high mileage vehicles that make frequent starts and stops, ideal conditions for hybrid-electric and battery-electric drivetrains. The cost of the vehicles is typically double that of equivalent standard diesel vehicles. This project would provide financial incentives for public and private fleets to purchase hybrid-electric and battery-electric vehicles.

The electrified rail component of the program will continue a close working relationship with New York utility companies, primarily New York Power Authority (NYPA) and Consolidated Edison of New York, Inc. (Con Edison), and transit authority units including the Metropolitan Transit Authority, the New York City Transit Authority, Metro North Railroad, and the Long Island Railroad. Typical electrified rail projects that may be pursued under this program include:

- *Traction Power Regeneration Improvement:* One near-term opportunity involves modifying train propulsion systems and installing energy storage systems, either at trackside or directly on rail cars, to improve substantially the ability of railcars to capture and use regenerative braking energy.

- *Insulator Cleaning*: A possible mid- to long-term electrified rail initiative calls for development and deployment of semi-automated cleaning equipment for the thousands of electrical insulators supporting electrified third rails. The insulators, when dirty and corroded, enable substantial amounts of stray electrical current to be lost.
- *High Conductivity Third Rails*: Aluminium third rails reduce overall energy use by subway cars and have had limited use within the MTA system. Increased use of this relatively new technology can be promoted by disseminating the results of additional testing and demonstrations.

**Budget**

This program has a three-year budget of \$20.5 million; anticipated funding commitments are shown in Table 5-1.

**Table 5-1. Transportation Efficiency Systems Program Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Transportation Efficiency Programs	\$0	\$0	\$15,580	\$3,895	\$19,475
Outreach	\$0	\$0	\$ 820	\$ 205	\$ 1,025
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$16,400</b>	<b>\$4,100</b>	<b>\$20,500</b>

**Metrics and Benefits**

This initiative will address the criteria (listed on page 2-7) and provide the benefits described below.

- Criterion 1: Provide cost-effective GHG reduction measured by quantity of carbon equivalents reduced per dollar.
- Criterion 3: Reducing electricity use in electrified rail will reduce the cost of achieving the emission reduction goals of the CO<sub>2</sub> Budget Trading Program.
- Criterion 4: Other benefits include air quality and health improvements from reduced diesel emissions, reduced traffic congestion and related time savings and reductions in traffic accidents, and economic development benefits associated with the New York manufacturing jobs that will be created from producing products funded under this program.
- Criterion 5: Many of the worst air quality areas of New York State, which are disproportionately poor, may see marked air quality improvements by reducing emissions from TRUs and diesel trucks in particular.
- Criterion 6: The need for funds: Historical underinvestment in energy efficiency in the transportation sector continues because of budget shortfalls and prioritizing safety and service improvements. Other public benefit efficiency programs are not providing needed support, and without this program, these cost-effective measures are unlikely to be implemented.

Calculations based on traffic signal timing studies have shown exceptional fuel, maintenance, and time savings that provide large net benefits to the communities optimizing their traffic signals. Calculations based on NYSERDA’s experience with alternative fuel vehicle programs, and studies conducted for

NYSERDA suggest that these programs are among the most cost effective methods currently available for reducing petroleum use in the transportation sector. See Table 5-2 for various metrics related to this program.

**Table 5-2. Transportation Efficiency Systems Program Three-Year Budget and Projected Savings**

Program	Total Budget (\$ Million)	3-Year Diesel Savings (mmBtu)	3-Year Gasoline Savings (mmBtu)	3-Year Electricity Savings (MWh)	3-Year CO <sub>2</sub> Reduction (Tons)*	Program Cost per Ton (Lifetime)**
Transportation Efficiency Projects	\$20.5	90,773	62,456	6,149	15,084	65

\*These emission reductions are associated with both electric and fossil fuel saving measures. Under a cap-and-trade system, the total number of CO<sub>2</sub> allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, electric efficiency projects may not decrease the overall amount of CO<sub>2</sub> being emitted into the atmosphere by New York entities. Nevertheless, electric efficiency projects will reduce end-users' carbon-footprints as they will be responsible for a smaller percent of the emissions associated with electricity production. It is estimated that 2,539 tons of this program's total three year CO<sub>2</sub> reduction will be attributed to the electric sector, which represents 17% of the total reduction.

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

**Program Outreach, Education, and Technology Transfer**

Concerted outreach and education efforts will precede introduction of the traffic signal timing projects because lack of information is a critical factor in its current underuse. Project effectiveness will be determined by the number of traffic signals upgraded and the measured speed increases on roadways that receive upgraded signals and the extent to which these activities translate into broader statewide participation. NYSERDA will collaborate with New York metropolitan planning organizations, U.S. Department of Transportation, and NYS Department of Transportation. Through contacts with organizations including the Intelligent Transportation Society of America (ITSA), NYSERDA will share its experiences with innovative transportation systems programs and learn best practices from elsewhere in the country.

For vehicle electrification programs, NYSERDA has extensive experience working with public and private fleets and will rely on this experience to reach a broad group of potential applicants. Project effectiveness will be determined by the number of new vehicles purchased, reductions in fuel used by participating fleets, the use factors at electrified docks for electric refrigeration trailers, and the extent to which these activities translate into broader statewide participation. NYSERDA will collaborate with the U.S. Environmental Protection Agency, NYS Department of Environmental Conservation, and New York's Clean Cities Coalitions. Private fleet participants will be important partners in these exercises, and their successes will generate positive exposure and generate case studies that can be shared with other fleets. NYSERDA will share results through organizations such as the American Trucking Association and the Electric Drive Transportation Association (EDTA). All project results will be disseminated and shared with key stakeholders in New York.

Program outreach and technology transfer for electrified rail projects will build upon ongoing outreach activities by all participants in the stakeholder community, including consultants, manufacturers, transit system operators, and organizations such as the American Public Transportation Association (APTA) and the Electric Power Research Institute (EPRI). Key results from funded projects will continue to be presented by contractors and transit organizations at public forums such as annual meetings of APTA and the Transportation Research Board, and be published in such trade journals as *Mass Transit* and *Metro* magazine.

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## 5.2 Longer-Term Programs with Technical Potential for GHG Reductions

The Advanced Transportation Development program invests in next generation technologies that have significant technical potential for reducing GHG in the transportation sector. Current options are not capable of achieving long-term goals for GHG reductions, and the proposed long-term programs are designed to develop options and provide continual improvements in the performance and cost effectiveness of a variety of GHG reduction measures.

### 5.2.1 Advanced Transportation Development Program

The goal of the Advanced Transportation Development Program is to commercialize improved technologies, products, systems, and services that provide superior GHG reduction performance and cost-per-ton values. Activities include product development, field testing, performance validation, policy development, and business assistance associated with emerging products that provide verified GHG benefits. The program has the following elements:

*Plug-in Hybrid Vehicles (PHEVs) and Infrastructure.* Plug-in hybrid vehicles have been evaluated by United States national laboratories as having the potential to reduce GHG emitted by the mobile sector by 40 percent. When introduced in 2010 by major auto companies, plug-in hybrids may either result in a positive impact on the electric power grid or may add load that has negative effects. The future viability of plug-in hybrids will depend on their penetration rate, on their charging profiles, and on their compatibility with the electric grid. The development of advanced on-board chargers and the success of their interface with power infrastructure are critical for electrifying the transportation sector and present opportunities for long-term program activities.

*Electric Rail Efficiency.* New York's electrified commuter rail and subway systems use more than two billion kilowatt-hours each year, equaling more than one million tons of CO<sub>2</sub>. Analysis has shown that development, testing, and deployment of advanced technologies for electrified rail systems could reduce peak loads by as much as 20 percent. Over the past several years, NYSERDA's research and development program has developed several products that are being deployed, and other promising products are in the developmental stages. The program will continue to support development and demonstration of emerging technologies that can improve the energy efficiency of electric transportation by providing assistance from inception to full scale deployment. The program will continue to be administered in collaboration with the MTA through solicitations such as PON 1217 *Advanced Energy Systems for New York City Passenger Mass Transit*.

*Vehicle Efficiency.* The New York metro area is unique in terms of the extent and severity of duty cycles imposed on vehicles. Vehicles developed for a national market are not designed for the type of driving typical of New York City. Technological improvements, including hybrid-electric and hydraulic launch assist drivetrains, efficient alternators, and idle-stop systems can reduce the use of fuel by vehicles during urban driving. Working with representatives of businesses in the New York metro area, NYSERDA has supported the development of several products for urban commercial vehicles, such as taxis, delivery trucks, buses, and the hybrid-electric buses now used by the MTA. The program would expand efforts to accelerate commercialization of New-York-made products and other products that address the operation of vehicles in urban settings. Additional efforts will focus on technology advances that would make the use of the transportation system more efficient. This could concentrate on non-road vehicles, such as advanced locomotives and advanced ferries.

*Vehicle Miles Traveled Reduction.* The program will have commercial vehicle and light duty, non-commercial components and will be administered through collaborative solicitations such as PON 1239 *Sustainable Transportation Systems* with the NYSDOT.

The commercial component of the program will focus on opportunities to promote intermodal strategies for reducing VMT, petroleum use, and GHG emissions in the commercial rail, highway, and marine sectors. Rail transport is more efficient, by a factor of ten-to-one, in moving certain types of freight. Shifting freight transport from trucks to rail will reduce truck VMT.

The light-duty-vehicle component of the program will focus on changing land-use and behavior patterns that are fundamental to reducing VMT. While the desired changes will require years of effort, the long term greenhouse gas reductions will be enormous and the benefits merit a strong, sustained commitment to “smart growth.” The light-duty component would provide funding and coordination for analyses, studies, and demonstration projects that could catalyze changes in policy and land use. Key elements to be addressed by the program include promoting transit oriented development, bus rapid transit, ridesharing, vanpooling, and commuter reduction programs such as compressed work weeks and telecommuting.

**Anticipated Multiyear Program Schedule**

To the extent possible, program elements will be executed in parallel. Hardware demonstration and performance verification projects are expected to include design, procurement, installation, and operational milestones, and will usually require two years for implementation following contracting. Most of the software and behavioral modification projects will require two-year periods. Product development projects will require one-to-three more years to complete product development and prepare commercial prototypes for field testing.

**Budget**

The three-year budget for this program is \$12 million. RGGI activity could be integrated into current programs using a mix of focused and broad-based annual competitive solicitations in each of the program’s focus areas.

**Table 5-3. Advanced Transportation Development Program Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Advanced Transportation	\$0	\$2,000	\$8,000	\$2,000	\$12,000

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## **Metrics and Benefits**

This initiative will address the criteria (listed on page 2-7) and provide the benefits described below.

- Criterion 2: Invest in technologies and systems with significant potential for reducing GHGs in New York. The transportation sector is responsible for more GHG emissions than any other sector, yet the products and technologies currently dominating the market in that sector have not shown significant improvement in energy efficiency in more than 20 years. The transportation sector offers substantial potential for long-term improvements. Assessments of one technology, plug-in-hybrid electric vehicles, have shown that existing excess current electric grid capacity is more than adequate to handle the conversion of 75 percent of all the vehicles in the northeastern United States. Using the current generation mix, conversions would result in a 45 percent reduction in GHGs from the transportation sector. The long-term transportation programs include activities that will enable and accelerate the market penetration of plug-in-hybrid electric vehicles in New York.
- Criterion 4: Other benefits, specifically air quality and environmental justice. Vehicle tailpipe emissions are the largest single contributor to urban air pollution. Reduced urban transportation fuel use positively affects environmental justice issues and lowers operating costs for public entities such as schools, municipalities, and public transit agencies. Construction of cutting-edge infrastructure can encourage innovations and progress in the electrification of transportation.
- Criterion 6: The need for funds based on the availability of other funding sources. Historically, energy efficiency in the transportation sector has been largely ignored because of budget shortfalls and the use of capital for priority safety and service improvements rather than to reduce operating costs. No other funding sources are currently available to pay for cost-effective CO<sub>2</sub> reductions from the transportation sector, despite the fact that the transportation sector is the largest emitter of GHG in New York.

Additional benefits include improved transportation system performance that will save time, save energy, and reduce costs. New products manufactured in New York create jobs and improve the economy. Approximately 75 percent of the funds are expected to be invested in product development with New York companies. Results of studies of previous NYSERDA investments demonstrate that for every \$1 invested by NYSERDA in such efforts, \$3 of economic benefits are produced in New York.

In year two, new products and innovations are expected to emerge that will have verified benefits and will be eligible for incentive funding under short-term implementation of the RGGI program. The long-term goal for the Advanced Transportation Program is to accelerate the development of innovations and products that provide superior GHG reductions compared to current practice. Because of the long-range nature of the program, interim progress indicators will be used to illustrate success (*e.g.*, patents issued) and metrics used that capture the magnitude of commercial success upon ultimate deployment of technologies.

The long-term RGGI Transportation program will supplement, not supplant, transportation funding from NYSERDA's statutory funding source. As such, development and commercialization of activities currently underway will be accelerated and the program will be able to focus on new activities. Experience has shown that it requires, on average, \$2 million of NYSERDA funding, when matched \$3 to \$1 by other sources, to completely develop, build manufacturing capacity, and successfully launch a new hardware product. Based on this historical experience, over three years, making use of \$17 million, the Advanced Transportation Program will launch and achieve significant market penetration of eight or more new, cost-effective technologies that would not otherwise have emerged from development.

**Program Marketing, Outreach, and Technology Transfer**

The target audience for this program includes State and local government agencies and businesses that supply products and services to public entities. NYSERDA routinely collaborates with State and local agencies to bridge the gap between the needs of the public sector and the capabilities of the private sector. An important mechanism is to provide and manage competitive solicitations seeking solutions and improvements in the efficient operation of the State's transportation systems on behalf of State and local entities. NYSERDA will manage product development projects, fund testing of new products, and pursue program activities and case studies for pilot demonstrations that can be documented and showcased locally and regionally.

# 6 *Electric Power Supply and Delivery*

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The objective of the Electric Power Supply and Delivery programs is to help reduce GHG emissions from the electric power sector in New York. The initiative will support a portfolio of diverse projects relating to electric power generation and transmission and distribution systems that reduce GHG emissions throughout the sector. Implementation of an integrated strategy enabling smart-grid functionality will increase penetration of renewable resources and demand management technologies into the electric system. Maintaining a diverse portfolio of efficient generation resources provides a hedge against the rising cost and volatility of any single fuel. A strategic benefit is also realized by not being overly dependent on a single resource for maintaining electric system reliability.

Two programs, both near and long term, are targeted to reduce GHG emissions in the electric power sector. The near term project will be to expand solar energy and the long term will be to expand advanced renewable energy, power delivery, and carbon capture, recycling, and sequestration in New York State.

The program will be designed to simultaneously maintain system reliability, safety, and security.

## 6.1 **Near-Term Programs to Reduce Greenhouse Gases**

The Statewide Photovoltaic Program will focus on reducing GHG emissions in the short term by helping establish a sustainable market for solar energy throughout New York with targeted financial incentives. The program will support end-use solar installations for commercial, industrial, and residential customers and electric utility applications to improve the performance of distribution circuits and reduce peak electric load in critical load pockets.

### 6.1.1 **Statewide Photovoltaic Program**

Building an energy market based on clean, renewable resources requires coordinated and sustained State policies and investments. Through the efforts of the System Benefits Charge (SBC) programs and the Renewable Portfolio Standard (RPS), New York is investing in a comprehensive program to establish sustainable markets for solar energy. A critical barrier to widespread adoption of photovoltaic (PV) systems is high first costs that are out of reach for most residential and commercial customers. While prices are forecast to decrease over the next decade, incentive programs are necessary in the near term to share initial capital investments. Photovoltaic systems can also help manage buildings' peak power demands. One of the goals of the program is to demonstrate the near-term commercial application of PV technologies that can provide substantive improvements to the distribution system.

*Photovoltaic Incentive Program.* NYSERDA currently administers a photovoltaic incentive program with funds provided through the RPS, and the Long Island Power Authority operates a similar program in its franchise area. In both cases, customer demand in the program has exceeded the supply of funds. As the programs are being redesigned, RGGI funds will be used to keep the programs active and support growing customer demand. Given current pricing, the program is expected to share the cost of installing

approximately 10 megawatts of PV power over the three-year period, which will help achieve the State's goal of installing 50 megawatts of PV power on Long Island.

**Budget**

**Table 6-1. Statewide Photovoltaic Program Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Statewide Photovoltaic Incentive Program	\$12,000	\$0	\$0	N/A	\$12,000

**Metrics and Benefits**

This program will address the criteria (listed on page 2-7) and provide the benefits described below.

- Criterion 2: The programs will invest in technology that has significant long-term potential to reduce GHG emissions in New York.
- Criterion 3: Through investments in distributed electricity generation, the programs will help reduce the overall compliance costs of the CO<sub>2</sub> budget trading program.
- Criterion 4: The programs will provide other benefits, including job creation and increased geographic equity, since PV systems will be installed and funded statewide.
- Criterion 5: The programs will provide emission-free, on-peak power that reduces generation by power plants that are often located in environmental justice communities.

**Table 6-2. Statewide Photovoltaic Program Total Budget and Three-Year Savings**

Program	Total Budget (\$ Million)	3-Year Electricity Savings (MWh)	3-Year CO <sub>2</sub> Reduction (Tons)*	Program Cost per ton (Lifetime)**
Statewide Photovoltaic Incentive Program	\$12	15,107	6,239	136

\*These emission reductions are associated with electric saving measures only. Under a cap-and-trade system, the total number of CO<sub>2</sub> allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, electric efficiency projects may not decrease the overall amount of CO<sub>2</sub> being emitted into the atmosphere by New York entities. Nevertheless, electric efficiency projects will reduce end-users' carbon-footprints as they will be responsible for a smaller percent of the emissions associated with electricity production.

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

**Program Marketing, Outreach, and Technology Transfer**

The Statewide Photovoltaic Program will be integrated into existing delivery mechanisms for Long Island and the rest of New York. While PV system installers will have primary responsibility for marketing, software tools, educational brochures are available to help consumers evaluate the appropriateness of photovoltaic systems for their needs. Implementation and technology transfer for the program will involve developing partnerships with utilities for planning and implementation.

## 6.2 Longer-Term Investments to Address High Potential GHG Reductions

The Advanced Power Technology Program is designed to reduce GHG emissions in the long term. The program will focus on three primary areas — advanced renewable energy, advanced power delivery, and carbon capture, recycling, and sequestration — and will provide support activities to yield substantial GHG reductions. Other advanced power generation systems and technologies may be explored in the future.

### 6.2.1 Advanced Power Technology Program

*Advanced Renewable Energy.* New York must commit substantial resources to the development and commercialization of various renewable resource options in order to meet long-term environmental goals. The objective of this program is to support development activities that will foster the introduction of environmentally preferred products and renewable energy technologies in New York markets. Activities to be undertaken include the following:

- Analytical assessments of the technical and commercial viability of new innovative, early stage products and technologies that result in an increase in the State's capacity to produce and employ environmentally preferred and renewable power;
- Development of products and technologies from definition of design through proof-of-concept;
- Engineering studies, surveys, measurements and various other project pre-development efforts associated with the planned extraction, harvesting, and management of renewable fuels and feed stocks for a specific site area for use in the production of electricity (*i.e.*, off shore-wind, solar, hydro, landfill gas, and biomass);
- Validation of environmentally preferred or renewable energy products, technologies and projects through testing and associated analyses, and field evaluation/demonstration at specified site areas; and
- Funding engineering and evaluation services to ensure project performance.

*Advanced Power Delivery.* The objective of this component is to support the development and demonstration of advanced technologies that promote statewide interconnection of renewable resources, smart-grid capability, advanced meters, energy storage systems, and innovative demand-side management strategies. Activities include targeted demonstration projects that ensure grid reliability, safety, and security as the delivery network accommodates low-carbon technologies such as renewable power generation, plug-in hybrid electric vehicles, and efficient combined heat and power distributed generation systems. Activities will be closely coordinated with other renewable and transportation initiatives supported with RGGI funds to avoid overlaps.

Specific projects may include the following:

- *Smart-Grid and Advanced Metering.* Integration of distribution network smart-grid technologies and advanced meters have the potential to provide benefits for utilities and end-use customers. GHG reductions and energy cost savings are realized through changes in consumer behavior that result from exposure to real-time price signals via advanced meters. Improved system reliability is achieved with the use of improved sensors and controls on the utility distribution network.
- *Micro-Grid Combined Heat and Power.* Strategically deployed micro-grids can improve system reliability by providing power to critical isolated networks throughout the State. Micro-grids can

be outfitted with efficient distributed generation systems that satisfy the electric and thermal needs of end-use customers within isolated networks.

- *Energy Storage Systems.* Large-scale energy storage systems can be integrated with commercial wind farms to stabilize the intermittent characteristic of these renewable resources. Solution-mined salt caverns may provide the necessary underground storage to support multiple compressed air energy storage systems throughout New York. Energy storage is critical for increasing market penetration of renewable power systems including solar, run-of-river hydro, and wind. Small-scale storage systems may also be used to improve the performance of electric distribution circuits.
- *Superconducting Cable.* Approximately ten percent of the electric energy produced in New York is lost throughout the transmission and distribution systems. Superconducting cables and components have the potential to significantly reduce overall system losses while simultaneously increasing asset use in networked distribution circuits.

*Carbon Capture, Recycling, and Sequestration.* Given the level of sophistication of current and emerging power generation technologies, carbon capture and sequestration are the only means now available to permit continuing use of fossil fuels without releasing climate-changing GHG into the atmosphere. Current U.S. DOE estimates put New York's onshore sequestration potential at more than three billion tons of CO<sub>2</sub>, enough capacity to eliminate all of the State's power plant-generated emissions for nearly 50 years. By capturing and sequestering the lifetime emissions from one 600-megawatt integrated gasification combined-cycle power plant, the release into the atmosphere of more than 150 million tons of CO<sub>2</sub> could be avoided. Before these benefits can be realized, however, capture technologies need to advance and site-specific geological research needs to be conducted to determine the best methods and locations to sequester CO<sub>2</sub>. Projects funded through this program will focus on assessing and demonstrating carbon capture, reuse, compression, and transport technologies, characterizing and testing the State's geological sequestration potential, and supporting development of carbon capture and sequestration demonstration projects in New York.

Some specific elements necessary to capture CO<sub>2</sub> will be pursued. Key technologies such as membranes, are necessary to improve the efficiency of air separation systems, and technologies to remove CO<sub>2</sub> from the flue gas exhaust of fossil-fueled power plants. The feasibility of reusing CO<sub>2</sub> will be evaluated since significant carbon reductions can be realized from enhanced oil recovery and from the production of chemicals and aggregates (*e.g.*, biodiesel from algae, CO<sub>2</sub> recovered from cement production, aggregate material produced from CO<sub>2</sub> for use in road construction). Improved compression and transportation methods can reduce the cost of carbon capture and sequestration projects.

Elements in CO<sub>2</sub> sequestration research will focus on assessing the technical potential of on-shore and off-shore geological sequestration in New York, assessing the deliverability of CO<sub>2</sub> through injection testing and assessing potential economic and environmental impacts. Because geology varies widely throughout the State, detailed characterizations of potential high-value sites, including collection and analysis of geological samples, field injection testing, and techniques for estimating storage capacities will be developed.

New York policy makers view carbon capture with geological sequestration as a critical solution to the problem of millions of tons of CO<sub>2</sub> entering the atmosphere. Given this huge potential, a major thrust of this program will be to identify and support one or more large-scale demonstrations in New York. Large-scale demonstration of these technologies will require significant leveraging of funds from the federal government and the power sector. NYSERDA will coordinate with DOE's carbon sequestration partnerships to maximize public resources and avoid any/all duplication of efforts.

Developing technology for capturing CO<sub>2</sub> will be pursued throughout the multiyear period. Initial work will provide support for the necessary technical and geological research that will lead to one or more large-scale demonstration projects.

- *Short Term 2009-2010.* The following activities will be completed in the 2009-2010 time frame: identify strategic capability for capture and reuse technologies, complete the statewide onshore geological and environmental characterization to assess the ultimate estimated storage capacity for New York following the guidelines of the U.S. DOE carbon sequestration partnerships; develop a geologic and economic model specific to New York to identify attractive sequestration locations; solicit site-specific geological characterization projects and seek opportunities to fund work on other sequestration modalities (e.g., mineralization, shale adsorption); integrate site-specific data into the statewide model; and identify strategic partners for demonstration projects.
- *Medium Term 2010-2012.* Medium term activities will include: define goal-oriented activities for carbon sequestration characterization, environmental interface issues, and technology research and demonstration; secure a number of small-scale injection tests in New York; update the State model to identify geological sequestration potential in New York; identify resources to support demonstration projects, and begin investigating long-term potential for offshore geological sequestration.
- *Long Term 2012.* The expected funding of \$5 million per year is not sufficient to finance long-term, multiyear demonstrations; significant public and private funding will be needed to support a large-scale demonstration. To complete one or more large-scale demonstration projects in New York of 300,000 or more tons per year, this program will need to formalize relationships with partners, including carbon-source generators, oil and gas companies, and federal funding sources.

**Budget**

The Advanced Power Technology Program includes a three-year budget of \$39 million. The estimated funding commitments are itemized in Table 6-3 below. Adherence to the schedule will depend upon how quickly key stakeholders can mobilize support for the demonstration projects. Most of the funds are expected to support milestone activities in the second and third years.

**Table 6-3. Advanced Power Technology Program Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Advanced Renewable Energy	-	\$4,500	\$8,400	\$2,100	\$15,000
Advanced Power Delivery	-	\$5,000	\$7,500	\$2,500	\$15,000
Carbon Capture, Recycling, and Sequestration	\$1,000	\$1,500	\$5,200	\$1,300	\$9,000
<b>Total</b>	<b>\$1,000</b>	<b>\$11,000</b>	<b>\$21,100</b>	<b>\$5,900</b>	<b>\$39,000</b>

\*Funding for early-stage technology development will be dependent on an increase in the scale of revenues obtained through RGGI auctions.

The estimated three-year budget assumes a standardized schedule for all demonstration projects. For instance, all demonstration projects are expected to include design, procurement, installation, testing, and

analysis milestones. NYSERDA will work with utilities and other State and federal entities to maximize potential leveraging and partnering opportunities.

The Advanced Power Technology program will be coordinated closely with generators, renewable resource developers, and electric utility companies to ensure that projects provide significant potential to reduce long-term GHG emissions.

### **Metrics and Benefits**

*Advanced Renewable Energy.* This program component will address the criteria (listed on page 2-7) and provide the benefits described below.

- Criterion 2: Invest in technology that has significant potential to reduce GHG emissions in New York.
- Criterion 3: Help to reduce the cost of achieving the emissions reduction goals of the CO<sub>2</sub> budget trading program by decreasing reliance on GHG emitting resources.
- Criterion 4: Increase long-term potential for new renewable developments that will increase prospects for economic development and add environmental benefits.
- Criterion 6: Provide financial support for renewable energy generation technologies that cannot compete with other mainstream renewable resources, but will likely become necessary over the long term to achieve renewable energy goals.

Based on historical experience with similarly designed activities at similar funding levels, the program can reasonably be expected to support the demonstration of up-to-ten renewable generation pilot projects, several energy conversions and repowering projects, and characterization and evaluation of up to twenty sites for potential development of renewable generating technologies. If successful, these activities could stimulate development of new and improved technologies and renewable fuel harvesting and management practices and support the deployment of multiple energy production facilities that can compete favorably with other mainstream renewable technologies. Experience with the RPS program indicates that the development of new power generation projects results in material economic benefits to New York. In the case of the RPS program, for every dollar invested to date in incentives for energy production from new renewable resources, New York expects to reap nearly \$4 in direct benefits. While the level of return cannot be estimated with accuracy for projects to be supported through the new program component, the expectations for long-term economic benefits are high.

The resources to be supported through this program component are not market ready and therefore cannot compete today with the current generation of renewable resources. Still, for New York to achieve its ambitious long-term RPS and climate change goals, building an inventory of new technologies and projects capable of producing electric energy using the full complement of natural and renewable fuels found in the State will become necessary. Success will be measured by increased capacity to produce energy from various renewable generating projects and technologies and success indicators for this program component would include:

- Quantitative databases for site-specific resource characterization (*e.g.*, geologic and atmospheric conditions, suitability of fuels) are established and ready for application by private developers, local, State, and federal authorities in the pursuit of developing renewable energy generating resources.
- Pipeline of environmentally preferred products/technologies/projects used in the production of renewable energy are validated/tested via bench-testing/certification or field demonstration.

- Inventory of sites, renewable fuel supplies, technologies, business entities, and potential increase in capacity to generate renewable energy is identified.

*Advanced Power Delivery.* The Advanced Power Delivery component of the Advanced Power Technology Program will address the criteria (listed on page 2-7) and provide the benefits described below.

Criterion 1: Investing in smart-grid technology that facilitates renewable resource market penetration and thereby provides potential in the long term for significantly reducing GHG emissions.

Criterion 2: Helping to reduce the cost of achieving the emission reduction goals of the CO<sub>2</sub> Budget Trading Program by improving the efficiency and reliability of the electric grid.

Criterion 3: Leveraging capital investment from public and private entities outside New York to support innovative transmission and distribution infrastructure projects, and economic development.

The primary objective of the activities undertaken for this program component is to support effective transmission and distribution demonstration projects that enable significant market penetration of renewable resources, efficient combined heat and power systems, and demand-side management applications while concurrently maintaining high levels of grid security, safety, and reliability. Success indicators for this program component include:

- Determine energy storage design requirements to satisfy a renewable portfolio standard exceeding 30 percent.
- Coordinate with New York companies to design and manufacture components for smart-grid applications.
- Demonstrate how effective integration of smart-grid technology and advanced meters can provide co-benefits for utilities and consumers.
- Establish micro-grids that facilitate interconnection of efficient combined heat and power systems and enable effective islanding of mission critical circuits.
- Evaluate innovative grid monitoring tools to prevent cascading outages and subsequent damage to low carbon generation and storage systems.
- Demonstrate technologies that reduce congestion and energy losses associated with the electric power delivery system.
- Leverage funding from external entities to support in-state technology demonstrations.

Four to five demonstration projects will be pursued over the three-year period at a total cost of \$15 million. These projects must be highly leveraged with external cost shares since a critical mass of funding is necessary to support commercially viable large-scale demonstrations.

*Carbon Capture, Recycling, and Sequestration.* This program component will address the criteria (listed on page 2-7) and provide the benefits described below.

Criterion 2: Invest in technology with significant potential to reduce GHG emissions in New York.

Criterion 4: Provide other benefits to New York in the form of increased employment by technology providers and leveraged capital investment to promote economic development.

The activities proposed through this program will focus on assessing and demonstrating carbon capture, reuse, compression, and transport technologies, and characterizing and testing the State's geological sequestration potential. The following activities are expected in this part of the initiative: identify strategic capability for capture and reuse technologies, demonstrate capture and reuse technologies (*e.g.*, membranes, well stimulation, enhanced oil/gas recovery, compressors, carbon black production); complete the statewide onshore geological and environmental characterization to assess the ultimate estimated storage capacity for New York; develop a geologic and economic model specific to New York to identify attractive sequestration locations; solicit site-specific geological characterization projects; seek opportunities to fund work on other sequestration modalities (*e.g.*, mineralization, shale adsorption); integrate site-specific data into the statewide model; secure a number of small-scale injection tests in New York; and begin investigating long-term potential for offshore geological sequestration.

A major benefit of the planned geological research is that such data are equally valuable for other subsurface resource needs including geothermal energy generation, compressed air energy storage, and natural gas exploration. These programs are linked by a basic understanding of the State's geology and the ability to demonstrate technological solutions in these areas. Success indicators for this program component include:

- Creating quantitative databases relating to geologic reservoir quality, injectivity, and site potential for on- and offshore areas of New York;
- Completing one or two CO<sub>2</sub> injection tests to sequester 5,000 to 10,000 tons of CO<sub>2</sub>;
- Measuring reduction of risk from deploying carbon capture and sequestration technology in New York through proper geological characterization and identification of environmental interface issues;
- Increasing the number of companies working to expand carbon capture and sequestration technology development and manufacturing in New York;
- Increasing employment in companies producing carbon capture and sequestration technologies;
- Developing retrofits for existing combustion plants to reduce CO<sub>2</sub> emissions;
- Reducing significantly the CO<sub>2</sub> emissions from combustion plants as a result of widespread deployment of carbon capture and sequestration technologies in New York; and
- Increasing investments in the power generation sector and manufacturing.

### **Program Outreach, Education, and Technology Transfer**

Project results will be disseminated and shared with all key stakeholders in New York. Project effectiveness will be determined by the economic and technical performance of the technology demonstrations and the extent to which these activities are deployed statewide.

The target audience for this program is regional and national trade associations, power project developers, engineering firms, government authorities, utility companies, and universities. Program activities and case studies for pilot-scale demonstrations will be documented and shared publicly to showcase the potential for broad in-state and regional applications. NYSERDA has managed several competitive solicitations dealing specifically with advanced technology characterization efforts and field demonstrations. These existing efforts can be used to execute numerous aspects of this program, including marketing opportunities to prospective participants.

# 7 Sustainable Agriculture and Bioenergy

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The Sustainable Agriculture and Bioenergy program is intended to reduce the lifecycle carbon intensity of bioenergy choices; reduce emissions derived from the agriculture, forestry and waste management sectors; and, characterize the potential for carbon sequestration in New York's terrestrial ecosystem. Priorities will be guided by findings and recommendations from the *Renewable Fuels Roadmap and Sustainable Biomass Feedstock Supply Study for New York*. The first phase will focus on feedstock supply development. In the second phase, attention will be focused on demonstrations of climate-friendly farming. The third phase will focus on market, policy, and institutional issues identified in the *Roadmap*.

Activities undertaken in this program may include:

*Market, Policy, and Institutional Issues.* Explore new business strategies to address the unique challenges presented by commercialization of bioenergy products, including overcoming financial barriers associated with long-term supply contracts for biomass and providing incentives to growers and foresters.

*Develop Performance Standards.* Develop methods to accurately estimate costs and benefits for different types of bioenergy systems implemented over specific timeframes and with respect to various scales of production, and develop performance-based standards for the bioenergy industry to measure CO<sub>2</sub> reduction.

*Non-Food Feedstock Supplies.* Develop methods to sustainably expand non-food feedstock resources, promote sustainable resource management techniques, and identify sustainable biomass supplies throughout New York (e.g., new crop breeding and development, integrated cropping systems, and resource mapping).

*Outreach.* Support education, outreach, and technology transfer activities for stakeholders and, in coordination with NYSERDA's multi-sector workforce development initiatives, provide workforce development and training aimed at strengthening the sustainable biomass supply and technology infrastructures.

*Analysis and Demonstrations.* Develop methodologies for determining baseline inventories, and identify and measure opportunities for greenhouse gas reductions and mitigation with respect to New York lands, on its farms, and in its forests.

*Develop Tools and Models.* Develop the necessary tools and models for the agricultural sector to participate in a market-based program for greenhouse gas reductions.

## **Budget**

The total budget for this initiative is \$4.5 million. The anticipated funding commitments are shown in Table 7-1.

**Table 7-1. Sustainable Agriculture and Bioenergy Program Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Sustainable Agriculture and Bioenergy	-	\$250	\$3,400	\$850	\$4,500

**Metrics and Benefits**

This initiative will address the criteria (listed on page 2-7) and provide the benefits described below.

Criterion 2: Invest in technology that has significant technical potential.

Criterion 4: Other benefits, specifically addressing economic opportunities in rural areas.

This initiative will substantially expand the bioenergy industry, which includes new large and small businesses along the biomass supply chain. Participants in program activities may include forest landowners, farmers, equipment suppliers, biomass brokers, product manufacturers, and end-users. Job creation will occur in a variety of supporting industries and at diverse locations, such as rural upstate regions that formerly supported and relied upon the paper industry. In-state production of biofuels will encourage construction of efficient distribution channels and infrastructure for fuel supplies while reducing the use of fossil fuels and carbon emissions. Various activities supporting sustainable agriculture will be pursued, *e.g.*, revised tilling practices and use of co-products, to reduce greenhouse gases, resulting in cleaner water, air, and soil, and enhancing wildlife habitats. Use of clean biofuel and bioheat will improve air quality in communities affected by environmental justice issues. Important biofuel and bioheat research that is capable of generating substantial benefits and is generally ineligible for SBC and other NYSERDA funding will be pursued.

Program success indicators may include acres of biocrops planted, numbers of new biocrops developed, gallons of biofuels made in New York, and numbers of new businesses and jobs created in the bioenergy industry. Increased employment opportunities, particularly in rural communities, are an expected outcome.

**Program Marketing, Outreach, and Technology Transfer**

Solicitations will target the biomass community in New York, including forest and agriculture researchers, feedstock generators, processors, and end-users. The programs will be implemented with the close coordination and support of the New York State Department of Agriculture and Markets and the Department of Environmental Conservation. The *Renewable Fuels Roadmap* will provide a starting point for program marketing.

# 8 *Multi-Sector Programs*

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Some GHG reduction goals cannot be addressed within the confines of a single initiative and require a multidisciplinary approach that includes collaboration with government and private sector stakeholders. The following initiatives seek to leverage auction proceeds and build capacity in New York to develop and implement new climate change mitigation and risk management solutions and move toward a clean energy economy.

## 8.1 **Long-Term Programs with Significant Technical Potential for GHG Reductions**

The following programs require long-term investments and have significant potential to reduce greenhouse gases and lay the foundation in New York for new economic activity and growth in emerging clean energy markets.

### 8.1.1 ***Clean Technology Industrial Development***

The Clean Technology Industrial Development program seeks to create, attract, and grow industries in New York that can exploit emerging business opportunities in clean energy and environmental technologies while supporting the goal of carbon mitigation. Key elements of the program include advanced industrial research and development of innovative technologies, providing risk capital and business assistance, and development of advanced research centers.

*Advanced Industrial Research and Development.* According to a recent Council on Competitiveness report,<sup>1</sup> 50 percent of growth in the annual U.S. Gross Domestic Product is attributable to increased innovation. As part of the *100-Day Energy Action Plan*, the Council prioritized the need to drastically increase investments in research and development and market commercialization to deliver secure, sustainable, affordable clean energy while generating well-paying domestic jobs. RGGI funding will be used to make pre-emptive investments to bolster New York's university-industry collaborative infrastructure to make the institutions more competitive and able to attract the expected federal funding that will target innovation research centers. In addition, RGGI funds will be used to provide matching support for proposals from New York institutions and companies in an effort to bring deferral investments into New York. (See Table 8-1.)

*Risk Capital for Clean Technology Market Development.* Financial incentive programs will be launched to reduce project risk and enable private capital investments at key points in the growth of clean technology businesses. Project examples may include pilot plants employing new carbon-reducing and energy saving process technologies, advanced biofuels pilot production facilities, and manufacturing

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<sup>1</sup> Council on Competitiveness, *A 100-Day Energy Action Plan: For the 44th President of the United States*, 2008. This report is part of the Council's Energy Security, Innovation & Sustainability Initiative.

facilities for new clean technology products developed within the RGGI program. Possible financing models may include the existing SBC-funded Manufacturing Incentive Program (PON 1176), loan programs, and loan guarantees. Based on NYSERDA’s experience with the Manufacturing Incentive Program, RGGI funds for this initiative are expected to represent between 5-and-15 percent of the capital investment required to build a commercial-scale facility.

*Clean Technology Business Assistance Resources.* Clean energy business incubators and other business assistance projects have been recently established through SBC funding (PON 1216). The RGGI-funded Clean Technology Industrial Development Program can be used to enhance the existing program model by extending the reach of SBC-funded programs to areas outside the SBC mandate, (e.g., transportation) and establishing Clean Technology Resource Programs to support existing business assistance networks. These programs will provide specialized information on clean technology markets, legal and regulatory information, financial models, and rosters of companies and executives in New York. The programs would be responsible for providing networking opportunities within the clean technology sector in New York and for information maintenance and dissemination and support for existing general business assistance providers such as Small Business Development Centers, Technology Development Organizations, and business incubators.

**Budget**

This program has a three-year budget of \$15 million. The anticipated funding commitments are shown in Table 8-1 below.

**Table 8-1. Clean Technology Industrial Development Programs Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	3-Year Total
Clean Technology Industrial Development		\$7,750	\$5,800	\$1,450	\$15,000

**Metrics and Benefits**

*Advanced Industrial Research and Development.* The program will address the criteria (listed on page 2-7) and provide the benefits described below.

Criterion 2: Long-range potential for the technology and investments to reduce greenhouse gas emissions in New York.

- In the mid- to long-term, new technologies have potential to reduce and mitigate CO<sub>2</sub> production.
- In the long-term, long-term state-of-the-art commercially available products will significantly reduce CO<sub>2</sub> production.

Criterion 4: Other benefits to New York, e.g., the potential to create jobs, leverage capital investment in New York to promote economic development.

- In the short- to medium term: obtain leveraged industrial funding and leveraged peer-reviewed federal funding, establish spinoff companies.
- In the mid- to long-term: business partnerships help establish and support New York businesses in relevant technology areas and a qualified workforce supports growing New York businesses.

- In the long-term: state-of-the-art commercially available products significantly reduce CO<sub>2</sub> production and significant New York business activities occur in target areas.

*Risk Capital for Clean Technology Market Development:* This program will address the criteria (listed on page 2-7) and provide the benefits described below.

Criterion 2: Long-range potential for the technology and investments to reduce greenhouse gas emissions in New York.

- Customers increase for new energy efficient and low-carbon-emission process technologies.

Criterion 4: Other benefits to New York, *e.g.*, the potential to: create jobs, leverage capital investment in New York to promote economic development.

- Return on investment is enhanced for projects and facilities.
- Revenue is generated from new projects and facilities.

*Clean Technology Business Assistance Resources.* The program will address the criteria (listed on page 2-7) and provide the benefits described below.

Criterion 4: Other benefits to New York, *e.g.*, the potential to create jobs and leverage capital investment in New York to promote economic development.

- Companies that access resources generate revenue, attract investments, and experienced growth in employment.

*Cluster Development.* The program will address the criteria (listed on page 2-7) and provide the benefits described below.

Criterion 4: Other benefits to New York, *e.g.*, the potential to: create jobs, leverage capital investment in New York to promote economic development.

- Spinoff companies from R&D Centers
- Revenue growth at spinoff companies
- Patent licenses issued to local companies and companies attracted to the local area
- New jobs created from industry attraction
- Leveraged external financial support for cluster activities, including funding from local sources

### **Marketing, Outreach, and Technology Transfer**

The opportunity for program leverage support will be marketed to research and business institutions across New York. Risk capital programs and business assistance programs will be marketed to clean technology companies in New York and to service providers that serve the industry.

#### **8.1.2 Climate Research and Analysis**

This aspect of the RGGI program is designed to increase the understanding and awareness of the environmental impacts of energy choices and emerging energy options and provide a scientific, technical foundation for formulating effective, equitable, energy-related environmental policies and resources management practices. The Climate Research and Analysis program will support environmental accountability, help build an environmental research capability in New York to address critical climate

change-related problems facing the State and the region, including the needs of environmental justice communities, assist in developing life-cycle analysis methods for program development and evaluation, and create opportunities for innovation. The program will focus on answering the following questions:

- What are the potential ecological, public health, infrastructure, and economic impacts of climate change in New York, and how can risks associated with climate change be managed and minimized?
- What are the cost-effective climate change mitigation and adaptation strategies for New York to pursue?
- What are the key parameters that need to be monitored to establish baselines and assess climate change impacts in New York?

In cooperation with the Department of Environmental Conservation, the Climate Research and Analysis program will include, as a priority, the assessment of potential carbon-offset areas and policy initiatives and will address other critical areas and issues related to climate change. The program will also support New York State's efforts through the Climate Action Council to develop a comprehensive climate action plan.

This program will use RGGI funding to support the research studies, demonstrations, policy research and analyses, and outreach and education efforts described below.

Research studies will build on the two current statewide assessments related to greenhouse gas abatement options and impact and adaptation strategies. The studies areas will address a broad spectrum of climate change issues, and will focus on questions such as:

- Evaluating the impacts of climate change on infrastructure and land use to provide guidance for planners.
- Characterizing potential changes to the agricultural sector due to climate change and identifying adaptation and mitigation strategies and opportunities.
- Improving understanding of the direct and indirect effects of climate change on air quality and human health in New York and identifying ameliorative strategies.
- Evaluating climate-related changes that can threaten the viability of natural resources in New York, including shorelines, tidal wetlands, wildlife species, forests, and hydrological resources.
- Defining the effect of climate-related changes on the ecological cycling of carbon and nutrients.
- Improving and refining greenhouse gas reduction curves for New York.

Demonstrations will be conducted to identify and assess the benefits and co-benefits of strategies that would be of significance to New York metropolitan and environmental justice areas, such as heat island mitigation strategies.

*Policy Research and Analysis.* The program will consider all sectors, not only those involving cap-and-trade strategies, and include integrated policy analyses. Guidelines and protocols could be developed to assist RGGI when considering new carbon-offset areas and policy initiatives.

*Outreach and Education.* Initiatives will be used to inform scientists, resource managers, educators, students, outreach professionals, planners, and policy makers about likely climate change impacts, adaptation measures, emergency response plans, and other related measures. Efforts will be fully integrated with other NYSERDA education and climate-related outreach activities.

**Budget****Table 8-2. Climate Research and Analysis Anticipated Funding Commitments (\$000)**

	Fiscal Year 2009-10	Fiscal Year 2010-11	Fiscal Year 2011-12	Out Years	Total
Research and Analysis	\$2,000	\$1,000	\$4,000	\$1,000	\$8,000

**Metrics and Benefits**

Program success will be measured using a uniform set of metrics previously developed for NYSERDA's Environmental Monitoring, Evaluation and Protection (EMEP) program with input from NYSERDA's Energy Analysis group. Success indicators include: acceptance and use of research results and policy analyses by the scientific and policy communities; briefings to federal, State and local policy makers on project findings; project-related publications in peer-reviewed journals; citations of funded research in scientific journals and policy documents; project-related presentations at conferences and scientific meetings; and related projects leveraged with NYSERDA resources.

In addition, these research initiatives will inform decisions related to reducing the cost of achieving the emission reduction goals of the CO<sub>2</sub> Budget Trading Program, evaluate and document health and environmental benefits, and guide initiatives designed to reduce the disproportionate cost burden and environmental impacts on low-income families and environmental justice communities.

**Marketing, Outreach, and Technology Transfer**

Solicitations will be aimed at State and federal institutions, policy makers and regulators; scientific and public interest groups; universities; and energy and environmental analysts. Technology transfer efforts will include: close coordination with New York Department of Environmental Conservation Office of Climate Change; presentations to the Governor's Office and Legislature, including the Environmental Justice Task Force; presenting findings at NYSERDA conferences; project updates and data on NYSERDA and principal investigator web sites; publishing technical articles in peer-reviewed journals; publishing NYSERDA final reports; and publishing short summary papers that translate research results into a form useful for policy makers and others.



# **9 Program Evaluation and Reporting**

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The overarching goals of the RGGI program evaluation are to: provide a credible evaluation of the RGGI program portfolio and individual programs and provide timely information to all stakeholders to include progress toward program and public policy goals, progress in moving markets toward behavior that results in emissions reductions and increased energy efficiency and use of renewable energy, and measuring efficiency and effectiveness of program implementation and administration. Program evaluation will ensure accountability in the use of RGGI funds to meet overall program goals.

The evaluation and reporting activities outlined herein will be applied to the portfolio of RGGI programs described in this Operating Plan, regardless of any partnership arrangements or coordinating programs offered by other entities. RGGI program evaluation and status reports will address the portfolio of programs, funding and benefits included in this Operating Plan.

A separate evaluation plan will be developed for the Green Jobs – Green New York (GJGNY) Program. Evaluation and reporting activities for GJGNY will be outlined in the operating plan for that program. Evaluation and reporting activities discussed within this Section 9 pertain to all other RGGI programs.

## **9.1 Evaluation Budget**

The budget for RGGI program evaluation is based on the program evaluation budget established for NYSERDA's current System Benefits Charge-funded (SBC) energy efficiency programs, which is limited to not more than five percent of total program funding. The five percent evaluation budget will support: overall design and planning, implementation of plans by third-party contractors, reporting, and NYSERDA's management of the evaluation activities. Implementation of the evaluation plans, which is likely to be the most resource intensive area, will involve collection and analysis of primary and secondary data by independent contractors. Primary data collection activities that may be undertaken by evaluation contractors include: on-site verification; metering and monitoring of installed measures; and fielding in-person, telephone, e-mail, and other types of surveys and interviews.

Some RGGI-funded program activities are substantially different than the programs currently administered through the SBC. Nevertheless, NYSERDA will use its best efforts to leverage existing evaluation experience and staffing to maximize economies of scale.

## **9.2 Evaluation Approach**

NYSERDA intends to tailor its evaluation to the specific types of RGGI programs and their approach to achieving CO<sub>2</sub> reductions. Individual programs will receive varying levels of evaluation depending on need. The focus of the evaluation work will be on assessing program impacts, namely CO<sub>2</sub> reductions. Notwithstanding, process and market evaluations are also planned, especially for programs that are not already receiving process or market studies under another funding source such as the SBC. Each of these three main areas of program evaluation is described briefly below.

### **9.2.1 Impact Evaluation**

Impact evaluation measures the outcomes and co-benefits attributable to programs, calculates the cost-effectiveness of programs, and compares the outcomes to the goals set forth for the programs. Key metrics for evaluating impacts of the RGGI programs include, but may not be limited to, the following direct outcomes and co-benefits: CO<sub>2</sub> reductions; electricity and fuel savings; customer bill savings; program cost per ton of CO<sub>2</sub> reduced; and job creation.

The types of programs presented in the Operating Plan are expansive in terms of the sectors and fuels covered and the ways in which they reduce CO<sub>2</sub>. NYSERDA has the most experience evaluating impacts from programs that provide direct emission reductions through on-site electric and fossil fuel efficiency projects. For programs that fall into this category, NYSERDA plans to first measure and verify the electric and fossil fuel savings attributable to the programs, and then apply emission factors to determine CO<sub>2</sub> reductions. Measurement and verification and attribution (net-to-gross) analysis will be conducted on a sample of completed projects according to industry best practices and will build on NYSERDA's experience with SBC Program evaluation. Similar approaches may be appropriate as well for on-site generation projects that are displacing electricity otherwise purchased from the grid. Once the evaluation of electric and fossil fuel savings is complete, NYSERDA plans to apply default emission factors available from secondary sources. Default factors are commonly used in lieu of source testing due to the time and cost of such testing.<sup>1</sup> Evaluations will ensure that appropriate emission factors, taking into consideration the technology, timing, and location of projects, are applied to fossil fuel savings.

Evaluation strategies for programs other than those that provide emission reductions through on-site energy efficiency and generation projects may be explored in detail by NYSERDA and contractors procured to provide assistance in this area. Generally, these programs will receive appropriate impact, market, and process evaluations. Specific evaluation plans will take into consideration the level of rigor necessary for the program-reported emission-reduction estimates to apply an appropriate level of rigor in the evaluations. For example, programs involving detailed and project specific technical studies of expected emission reductions may require less emphasis by evaluation than other programs.

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

### **9.2.2 Process Evaluation and Market Characterization/Assessment**

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

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

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<sup>1</sup>*National Action Plan for Energy Efficiency (2007)*. Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. [www.epa.gov/eeactionplan](http://www.epa.gov/eeactionplan), Chapter 6.

### **9.2.3 Use of Evaluation Results**

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

## **9.3 Evaluation Implementation**

Evaluation of New York’s RGGI programs will be managed by NYSERDA’s Energy Analysis group. Energy Analysis is organizationally separate from NYSERDA groups that administer programs and has been responsible for managing evaluation of NYSERDA’s major energy efficiency, electric demand reduction, renewable energy, and research and development programs for more than a decade. The staff and knowledge base within Energy Analysis will be leveraged to provide effective, efficient evaluation management of the RGGI programs. Stakeholder input on evaluation of the RGGI programs will be sought.

NYSERDA plans to procure the services of a consultant to assist with design and development of the RGGI program evaluation approach. The consultant would assist NYSERDA in the following general areas:

- Research and recommend protocols for evaluating greenhouse gas emission reduction programs across sectors.
- Recommend specific greenhouse gas emissions factors and alternatives.
- Explore methods for valuing greenhouse gas emissions reductions.
- Develop evaluation strategies specific to New York’s RGGI Programs.

Final design and implementation of program-specific evaluation efforts will be undertaken by one or more third-party evaluation contractors competitively selected and managed by NYSERDA. Most of the five percent evaluation budget will be allocated to the independent, third-party contractors for design and implementation of the evaluation effort. Relying largely on independent contractors to perform evaluations bolsters program accountability.

The RGGI evaluation will be closely coordinated with NYSERDA’s existing evaluation efforts for SBC and other programs. This coordination will be especially important on programs that receive SBC and RGGI funding to ensure that the evaluation does not become overly burdensome for program participants and help to minimize issues associated with survey respondent fatigue. Equally important, the evaluation efforts will ensure proper accounting of benefits from separate funding sources.

## **9.4 Evaluation and Status Reports**

NYSERDA will prepare an annual RGGI program evaluation and status report using program progress tracking and findings and inputs from the independent evaluation contractors. The annual report will include for each prior year: an accounting of all sales of CO<sub>2</sub> allowances and the funds generated by such sales, a summary description of program activities, an evaluation of the results and impacts of such

program activities and program accomplishments, and an accounting of program administration costs and expenditures. The annual report will also provide information on the geographic distribution of program funding and benefits across the State.

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

Metrics and targets presented in this document (*e.g.*, dollars per ton) were established for early comparison purposes to facilitate program selection and are subject to modification in the event that changes are made to the discounting rate, discounting approach, evaluation methods, and emissions factors.

# 10 Administration

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## 10.1 Guiding Principles

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

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

## 10.2 Procurement Policies and Procedures

In administering all of its programs, including those proposed in the Operating Plan, contracts are procured in accordance with NYSERDA's *Procurement Contract Guidelines (Guidelines)*, approved annually by NYSERDA's Board of Directors pursuant to Public Authorities Law Section 2879. The *Guidelines* generally require NYSERDA to use its best efforts to secure offers from potential contractors on a competitive basis and requires advance notice of pending solicitations to be published in the *State Contract Reporter*. Historically, more than 97 percent of NYSERDA's contracts are awarded on a competitive basis. For the remaining three percent, the Guidelines permit waiver of the competitive solicitation requirements for: work that is expected to cost \$25,000 or less; unsolicited proposals, single source and sole source vendors; and other designated reasons.

Programs and contract awards also receive extensive internal review. NYSERDA's Program Planning Committee annually reviews and NYSERDA's Board approves a multiyear strategic program plan setting forth NYSERDA's programmatic goals and strategies. Internal oversight of program planning activities is also carried out by a multi-disciplinary Program Development Management Committee (PDMC), consisting of senior management from all NYSERDA units, who review and approve requests for issuance of solicitations and procurement. Solicitations and program contracts are also reviewed and approved by a project team, including program staff and representatives of Contracts Management, Energy Analysis, Communications, and Counsel's Office.

Selection of contracts is accomplished in an extremely transparent manner. Proposals submitted in response to solicitations are reviewed and evaluated in accordance with the criteria noted in the solicitation by a Technical Evaluation Panel (TEP), comprised of NYSERDA staff and outside reviewers

with relevant expertise. The TEP makes recommendations to program staff, who present the results for review and approval to the Management Review Team (comprised of the Vice President, General Counsel, and Director of Contract Manager) or, at the Vice President's discretion, to the PDMC. A number of NYSERDA programs also provide incentives to any qualified program participant who meets pre-defined program terms and conditions.

### **10.3 Financial Tracking Systems**

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

- NYSERDA's accounts are under the control of the Commissioner of the Department of Taxation and Finance, NYSERDA's statutory fiscal agent. Funds for the RGGI-funded activities are segregated from other funding sources to facilitate an accurate accounting of all receipts, interest earnings, and disbursements.
- Pursuant to NYSERDA's By-laws, contracts and agreements may only be signed by one of NYSERDA's Officers. This centralized authorization function provides for effective segregation of financial and contracting duties and facilitates effective accountability.
- All payment requests receive a multi-disciplinary review prior to payment. Finance department staff checks the mathematical accuracy of the invoice and compliance with contract budget terms. Project management staff ensures that costs are appropriate and that the contractor's activities are consistent with the statement of work. Contract Management department staff ensure that terms and conditions of the contract such as insurance requirements are followed.

NYSERDA uses an automated accounting system that facilitates an accurate and timely accounting of all program expenditures. Staff salary costs charged to the RGGI-funded programs are based upon staff time allocations and the allocation of staff salary costs to various activity and funding codes are reviewed and approved by management quarterly. Contractual arrangements and program incentives are entered, maintained and monitored in the automated accounting system, which tracks each individual contract or agreement, recording the amount of the contract agreement and expenditures incurred to date.

The automated accounting system described above allows NYSERDA to produce various monthly financial reports that are distributed to NYSERDA management and program staff for review. In addition, this information is used to prepare evaluation and financial status reports as required by the evaluation plan.

### **10.4 Administration Budget**

The budget for program administration costs has been based on the program administration budget established for NYSERDA's current SBC-funded energy efficiency program, which is limited to not more than seven percent of total funding. Many of the RGGI-funded program activities may be substantially different than the programs currently administered through the SBC, and therefore the staff resources necessary to properly administer the programs may be higher. Nevertheless, NYSERDA management will use its best efforts to leverage off existing staff resources to achieve the maximum level of economies of scale possible. Ultimately, if the staff resources needed to administer the programs are determined to

be higher than the amount proposed in the budget in the Operating Plan, NYSERDA will present a request to amend the Operating Plan and program administration budget.

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

The staffing plan also acknowledges that while most staff will be needed to support programs during the years that the RGGI funds are auctioned, some staff will be required for several years after auctions are complete to continue oversight of multi-year programs. The “effective” administrative rate during early years of the RGGI program is approximately five percent to accommodate those expenditures in the later years so that overall the costs would not exceed seven percent.

Program staff undertake a variety of tasks depending on the nature and design of the programs. As approximately 97 percent of NYSERDA contracts are awarded through competitive processes, program staff write solicitations, manage proposal review processes, develop contracts, and then oversee the performance of the contracts through their duration, including reviewing and verifying invoices, and ensuring programs are charged appropriately to the related funding sources.

In the energy efficiency deployment program areas, contracts may include those for program implementation, quality assurance, marketing and outreach, application and incentive processing, technical assistance, workforce training, and other technical support. In the research and development and demonstration areas, contracts may be for technology or product development, pilot demonstrations, data collection and analysis, technical assistance, and business development assistance

Program staff review applications of contractors in the field who desire to become program partners and deliver services, provide oversight of the performance of those partners, and work to resolve any issues that may arise between customers and program partners. Program staff review individual incentive applications from program partners and from buildings, and process them for payment. Program staff also collect, review and analyze data, and develop reports. Program staff coordinate activities with other State agencies, utilities and other organizations that may have related programs, or may be one of several funding sources for programs, and update program plans as needed to reflect changing market conditions. Finally, program staff review individual projects, perform on-site inspections, and follow up on quality installation issues and corrective actions.



# Technical Appendix

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This appendix describes the general methods and assumptions that are used to calculate the energy savings, emission reductions, bill savings and cost-effectiveness metrics presented in the Operating Plan for Investments in New York under the CO<sub>2</sub> Budget Trading Program and the CO<sub>2</sub> Allowance Auction Program (Plan).

## Energy Savings

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

## CO<sub>2</sub>e Reductions

Emissions factors are used to translate the energy savings data into annual greenhouse gas emissions reduction values. The greenhouse gases evaluated in the Plan include carbon dioxide, methane, and nitrous oxide. Because each of these gases has a different global warming potential,<sup>1</sup> emissions for gases other than carbon dioxide are converted into carbon dioxide equivalent units (CO<sub>2</sub>e) through multiplication with their appropriate Intergovernmental Panel on Climate Change (IPCC) global warming potential value,<sup>2</sup> shown in Table TA-1.

**Table TA-1. Global Warming Potentials**

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

NOTE: These values represent a 100-year time horizon.

Source: Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report: Climate Change 1995.

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<sup>1</sup> A global warming potential is a measure that estimates how much a given mass of a greenhouse gas contributes to global warming. It is calculated over a specific time interval, which is 100 years for the IPCC Second Assessment Report values.

<sup>2</sup> IPCC, 1995. Second Assessment: Climate Change 1995. According to EPA guidance, this inventory uses potentials from the IPCC Second Assessment report, rather than values from the more current Third Assessment: Climate Change 2001 report. New York DEC regulation Part 242 1.2 (49) uses the Third Assessment values. Reconciliation between these two methodologies will be investigated as part of the program implementation and evaluation process.

Table TA-2 shows the emission factors used in the Plan to calculate emissions from on-site fuel combustion, which are derived from U.S. Environmental Protection Agency emission coefficients. The CO<sub>2</sub>e values represent aggregate CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions. If a program in the Plan covers more than one sector (*e.g.*, the Commercial and Industrial Program) then the estimated reduction is based on a straight average emission factor.

**Table TA-2. Fuel Combustion Emission Factors by Sector**

	Transport (lb CO <sub>2</sub> e/MMBtu)	Residential (lb CO <sub>2</sub> e/MMBtu)	Commercial (lb CO <sub>2</sub> e/MMBtu)	Industrial (lb CO <sub>2</sub> e/MMBtu)
Coal	0.00	225.83	211.68	208.69
Natural Gas	117.25	117.25	117.25	117.06
#2 Oil/Distillate/Diesel	162.81	162.14	162.14	161.80
#6 Oil/Residual	-	-	174.59	174.20
Kerosene	-	-	160.28	159.89
Propane	140.51	139.84	139.84	139.45
Gasoline	165.08	-	-	-
Aviation Fuel	156.30	-	-	-
Wood	-	17.52	17.52	4.34

Source: EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990

An average emission factor of 826 lb CO<sub>2</sub>e/MWh is used to estimate emission reductions associated with electricity use reductions for all sectors. This value includes emissions from in-state electricity generation as well as emissions associated with net-imports of electricity.<sup>3</sup> While electricity savings may not lead to near-term emission reductions under the Regional Greenhouse Gas Initiative (RGGI) CO<sub>2</sub> cap, savings will potentially reduce imports of electricity to New York; the demand for CO<sub>2</sub> allowances, leading to a possible future reduction in the cap; and the carbon-footprint of end-users, as they will be responsible for a smaller percent of the emissions associated with electricity production.

### Bill Savings

Annual bill savings values for each program are estimated by multiplying the energy savings by sector-specific fuel price data. Table TA-3 shows fuel prices by sector. Electricity prices represent average values for six service territories and exclude basic service charges.

<sup>3</sup> The emission factor for electricity is based on data from *Patterns & Trends- New York State Energy Profiles: 1994 – 2008* (NYSERDA, January 2010) and methodology from the GHG Inventory and Forecast prepared for the 2009 New York State Energy Plan (August 2009).

**Table TA-3. Fuel Prices by Sector**

Sector	Electricity (\$/kWh)	Natural Gas (\$/MMBtu)	Fuel Oil (\$/MMBtu)	Propane (\$/MMBtu)	Diesel (\$/gal)	Gasoline (\$/gal)
Residential	0.141	14.66	27.78	34.45	N/A	N/A
Commercial	0.168	10.59	22.71	28.02	N/A	N/A
Industrial	0.080	10.52	22.93	29.36	N/A	N/A
Transportation	0.050	N/A	28.79	N/A	3.99	3.28

Source: NYSERDA's *Patterns and Trends - New York State Energy Profiles: 1994 – 2008*, January 2010.

Source: Typical bill data from the New York State Public Service Commission, January – July, 2009.

Source: Metropolitan Transit Authority/New York Power Authority

Source: U.S. Department of Energy's Energy Information Administration's Natural Gas Navigator (accessed in May 2010).

### Cost-Effectiveness

Cost-effectiveness (in units of dollar cost per ton of CO<sub>2</sub>e reduction) can be based purely on expected program expenditures (Program Cost-Effectiveness) or on the total life-time societal costs and savings associated with a program (Total Cost-Effectiveness). The recently developed national “cost curve study”<sup>4</sup> and the cost curves that are currently being developed for New York State as part of the Climate Action Plan development process present Total Cost-Effectiveness for greenhouse gas abatement measures in all sectors of the economy. In developing the Plan, Total Cost-Effectiveness was estimated as a screening tool, but only the Program Cost-Effectiveness was used in the detailed program analysis process. For this reason the Plan only presents Program Cost-Effectiveness in the metric tables associated with each proposed program.

Cost per ton of CO<sub>2</sub>e reduction is based on the present value of program costs (including initial incentives, program administration, and performance-based incentives) divided by the estimated lifetime greenhouse gas emission reductions.

The choice of whether to discount energy savings/emission reductions is debated in the literature. For the current Plan, only program costs were discounted using a five percent (5%) social discount rate. As the evaluation protocols are developed this topic will be revisited, and based on expert opinion, a decision will be made whether the cost-effectiveness metrics should be evaluated with or without emission discounting.

<sup>4</sup> McKinsey & Company, “Reducing U.S. Greenhouse Gas Emissions: *How Much at What Cost?*” December 2007



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**OPERATING PLAN FOR INVESTMENTS IN NEW YORK UNDER THE CO<sub>2</sub> BUDGET  
TRADING PROGRAM AND THE CO<sub>2</sub> ALLOWANCE AUCTION PROGRAM**

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**JUNE 21, 2010**

**STATE OF NEW YORK**

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