

Revised Regulatory Impact Statement  
6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

STATUTORY AUTHORITY

On December 20, 2005, New York State entered into a historic regional agreement to reduce greenhouse gas (GHG) emissions from power plants, an important step to protect our environment and meet the significant challenge of climate change. Under the agreement, the governors of 10 Northeastern and Mid-Atlantic states have committed to propose the Regional Greenhouse Gas Initiative (RGGI), a program to cap and reduce carbon dioxide (CO<sub>2</sub>) emissions from power plants in the region by 10 percent by 2019, for adoption in their states.<sup>1</sup> In order to carry out the state's commitment, the Department of Environmental Conservation (the Department) is proposing to establish the CO<sub>2</sub> Budget Trading Program (the Program) by promulgating 6 NYCRR Part 242, and to revise 6 NYCRR Part 200, General Provisions.

The burning of fossil fuels to generate electricity is a major contributor to a warming climate because fossil-fuel generators emit large amounts of CO<sub>2</sub>, the principal GHG. Overwhelming scientific evidence suggests that a warming climate poses a serious threat to the environmental resources and public health of New York State - the very same resources and public health the Legislature has charged the Department to preserve and protect. The warming climate threatens the State's air quality, water quality, marine and freshwater fisheries, salt and freshwater wetlands, surface and subsurface drinking water supplies, river and stream impoundment infrastructure, and forest species and wildlife habitats. Not only will the Program help counter the threat of a warming climate, it will also produce significant environmental co-benefits in the form of improved local air quality, forest preservation, improved agricultural manure handling practices leading to

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<sup>1</sup> In addition to New York, the other states participating in RGGI are: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, Rhode Island, and Vermont.

better water and air quality in rural areas of the State, and a more robust, diverse and clean energy supply in the State.

The statutory authority to promulgate Part 242 in the State derives primarily from the Department's obligation to prevent and control air pollution, as set out in the Environmental Conservation Law (ECL) at Sections 1-0101, 1-0303, 3-0301, 19-0103, 19-0105, 19-0107, 19-0301, 19-0303, 19-0305, 71-2103, 71-2105. The Department's obligation to preserve and protect the other natural resources and public health in the State as it relates to climate change extends beyond the control of air pollution, however, as set out in ECL Sections 11-0303, 11-0305, 11-0535, 13-0105, 15-0109, 15-1903, 16-0111, 17-0303, 24-0103, 25-0102, 34-0108, and 49-0309. The promulgation of the Program is also consistent with the Department's obligations under Energy Law 3-101 and Energy Law 3-103. The general powers of the New York State Energy Research and Development Authority (NYSERDA) that are relevant to the Program's ability to sell allowances in a transparent auction are set forth in the Public Authorities Law Sections 1850, 1851, 1854 and 1855.

The following are brief synopses of the above-identified statutory sections providing the Department with the authority to promulgate the Program.

#### Authority to Prevent and Control Air Pollution

ECL Section 1-0101. This section declares that it is a policy of New York State to conserve, improve and protect its natural resources and environment and control air pollution in order to enhance the health, safety and welfare of the people of New York State and their overall economic and social well being. Section 1-0101 further expresses, among other things, that it is the policy of New York State to coordinate the State's environmental plans, functions, powers and programs with those of the federal government and other regions

and manage air resources to the end that the State may fulfill its responsibility as trustee of the environment for present and future generations. This section also provides that it is the policy of New York State to foster, promote, create and maintain conditions by which man and nature can thrive in harmony by, among other things, preserving the unique qualities of special resources such as the Adirondack and Catskill forest preserves and providing that care is taken for the air resources that are shared with other states in the manner of a good neighbor.

ECL Section 1-0303. This section defines the term “pollution”. Pollution is defined as “the presence in the environment of conditions and or contaminants in quantities of characteristics which are or may be injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout such areas of the state as shall be affected thereby.”

ECL Section 3-0301. This section empowers the Department to coordinate and develop programs to carry out the environmental policy of New York State set forth in section 1-0101. Section 3-0301 specifically empowers the Department to: provide for the prevention and abatement of air pollution; cooperate with officials and representatives of the federal government, other States and interstate agencies regarding problems affecting the environment of New York State; encourage and undertake scientific investigation and research on the ecological process, pollution prevention and abatement, and other areas essential to understanding and achievement of the environmental policy set forth in section 1-0101; monitor the environment to afford more effective and efficient control practices; identify changes in ecological systems and to warn of emergency conditions; enter into contracts with any person to do all things necessary or convenient to carry out the functions, powers and duties of the Department; and adopt such regulations as may be necessary, convenient or desirable to effectuate the environmental policy of the State.

ECL Section 19-0103. This section declares that it is the policy of New York State to maintain a reasonable degree of purity of air resources. In carrying out such policy, the Department is required to balance public health and welfare, the industrial development of the State, propagation and protection of flora and fauna, and the protection of personal property and other resources. To that end, the Department is required to use all available practical and reasonable methods to prevent and control air pollution in the State.

ECL Section 19-0105. This section declares that it is the purpose of Article 19 of the ECL to safeguard the air resources of New York State under a program which is consistent with the policy expressed in section 19-0103 and in accordance with other provisions of Article 19.

ECL Section 19-0107. This section defines the terms “air contaminant” and “air pollution”. “Air contaminant” is defined as “a dust, fume, gas, mist, odor, smoke, vapor, pollen, noise or any combination thereof.” “Air pollution” is defined as “the presence in the outdoor atmosphere of one or more air contaminants in quantities, of characteristics and of a duration which are injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout the state or throughout such areas of the state as shall be affected thereby.” CO<sub>2</sub> and other GHGs fit well within these definitions because they are gases which are present in the outdoor atmosphere in quantities that engender and/or provoke climate change, which is injurious to life and property in New York State.

Recently, the United States Supreme Court in *Massachusetts v. USEPA*<sup>2</sup> ruled that the United States Environmental Protection Agency (EPA) has the authority to regulate CO<sub>2</sub> and other GHGs under the Clean Air

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<sup>2</sup> *Massachusetts v. United States Environmental Protection Agency*, 127 S.Ct. 1438 (April 2, 2007).

Act's (CAA) definition of "air pollutant."<sup>3</sup> Under the CAA "air pollutant" is defined as "any air pollutant agent or combination of agents, including any physical, chemical, biological, radioactive (including source material, special nuclear material, and byproduct material) substance or matter which is emitted into or otherwise enters the ambient air." The Supreme Court noted that the harms associated with climate change are serious and well recognized and the EPA does not dispute the existence of a causal connection between man-made GHG emissions and global climate change.<sup>4</sup> The Supreme Court further held that the USEPA must regulate CO<sub>2</sub> and other GHGs under Section 202 of the CAA, if EPA determines that CO<sub>2</sub> and other GHGs contribute to climate change.<sup>5</sup> This section of the ECL provides the Department with the authority to regulate CO<sub>2</sub> and other GHGs because the Department has determined that such gases are present in the outdoor atmosphere in quantities that engender and/or provoke climate change, which is injurious to life and property in New York State.

ECL Section 19-0301. This section declares that the Department has the power to promulgate regulations for preventing, controlling or prohibiting air pollution, and shall include in such regulations provisions prescribing the degree of air pollution that may be permitted and the extent to which air contaminants may be emitted to the air by any source in any area of the State.

ECL Section 19-0303. This section provides that the terms of any air pollution control regulation promulgated by the Department may differentiate between particular types and conditions of air pollution and air contamination sources. Section 19-0303 also provides that the Department, in adopting any regulation which contains a requirement that is more stringent than the CAA or its implementing regulations, must include in the Regulatory Impact Statement, an evaluation of the cost-effectiveness of the proposed regulation in comparison

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<sup>3</sup> 42 USC Section 7602(g).

<sup>4</sup> Massachusetts v. United States Environmental Protection Agency, 127 S.Ct. at 1455, 1457 (April 2, 2007).

<sup>5</sup> Id. At 1462-63.

to the cost-effectiveness of reasonably available alternatives and a review of the reasonably available alternative measures along with an explanation of the reasons for rejecting such alternatives.

ECL Section 19-0305. This section authorizes the Department to enforce the codes, rules and regulations established in accordance with Article 19. Section 19-0905 also empowers the Department to conduct or cause to be conducted studies and research with respect to air pollution control, abatement or prevention.

ECL Section 71-2103 and Section 71-2105. This section sets forth the civil and criminal penalty structures for violations of Article 19.

#### Authority to Preserve and Protect Natural Resources and Public Health

Increased GHG emissions engender and/or provoke climate change, which threatens the State's water quality, marine and freshwater fisheries, salt and freshwater wetlands, surface and subsurface drinking water supplies, river and stream impoundment infrastructure, and forest species and wildlife habitats. The following sections provide the State with the authority to protect these vital State resources.

ECL Section 11-0303. This section directs the Department to maintain and improve the fish and wildlife resources of the State, including through cooperative agreements with other states.

ECL Section 11-0305. This section along with other things, authorizes the Department to regulate the taking of fish, and to identify, manage and conserve plants, animals and ecological communities that are rare in New York State, located on state owned lands under the jurisdiction of the Department.

ECL Section 11-0535. Climate change will likely affect the distribution of wildlife due to increased

temperature and changes in precipitation. This section prohibits the taking of endangered species and their habitats and authorizes the Department to promulgate regulations listing endangered species.

ECL Section 13-0105. This section states that it is the policy of the State to maintain the long-term health of the State's marine fisheries resources by, among other things, protecting and conserving habitats and maintaining water quality.

ECL Section 15-0109. This section directs the Department to exercise its powers so as to facilitate protection of the water resources of the state, including regulating the safe and proper flow of the rivers of the State.

ECL Section 15-1903. This section directs the Department to provide for the drainage of agricultural land so as to make the land more productive and to benefit the public health, safety and welfare.

ECL Section 16-0111. This section directs the Department to carry out a flood control program in the State.

ECL Section 17-0303. This section directs the Department to abate and prevent the pollution of waters in the State, including through cooperative agreements with other states.

ECL Section 24-0103. This section provides that it is the policy of the State to preserve and protect the State's valuable freshwater wetlands.

ECL Section 25-0102. This section provides that it is the policy of the State to preserve and protect tidal wetlands.

ECL Section 34-0108. This section directs the Department to carry out certain activities, including developing regulations, to address areas of coastal erosion hazards in the State.

ECL Section 49-0301. Under the Program, certain afforestation projects are eligible for offset credit since forests can function as biological carbon “sinks” removing CO<sub>2</sub> from the atmosphere and sequestering it in the form of biomass. These projects may be subject to conservation easements. This Section provides that in order to implement the State’s policy of conserving, preserving and protecting its environmental assets and natural resources, it must preserve open spaces and forest lands through conservation easements.

Energy Law Section 3-101. This section provides, among other things, that it is the energy policy of the State to obtain and maintain an adequate and continuous supply of safe, dependable and economical energy for the people of the State and to accelerate development and use within the State of renewable energy sources, all in order to promote the State’s economic growth, to create employment within the State, to protect its environmental values, to husband its resources for future generations, and to promote the health and welfare of its people. It further provides that the energy policy of the State encourages conservation of energy in the construction and operation of new commercial, industrial, and residential buildings and in the rehabilitation of existing structures. The Program’s regulatory structure and flexibility mechanisms ensure that a continuous supply of safe, reliable and economical energy will be available for the people of the State. The Program’s natural gas and oil/ end-use energy efficiency offset category also offers flexibility for generators and encourages the conservation of energy in the construction and rehabilitation of new and existing structures.

Energy Law Section 3-103. This section provides that every agency of the State shall conduct its affairs so as to conform to the State energy policy set forth in Energy Law Section 3-101.

## Authority Relevant to NYSERDA's Role in the Program

Public Authorities Law Section 1851 and 1854. The Program is designed to allocate most of the emissions allowances to the Energy Efficiency and Clean Energy Technology (EE&CET) Account which will be created and administered by NYSERDA. As stated in Section 242-5.3 of the proposed rule, the account will be established to promote and reward investments in energy efficiency, renewable or non-carbon emitting technologies, and/or innovative carbon emissions abatement technologies with significant carbon reduction potential. NYSERDA will administer the EE&CET Account so that most of the allowances will be sold in a transparent allowance auction or auctions and the proceeds of the auction or auctions will be used to promote the above-stated purposes of the EE & CET Account.

NYSERDA currently administers energy efficiency and clean technology programs similar to the programs and/or projects that will be funded by the EE&CET allocation pursuant to its authority under Section 1854. Specifically, this section states that “the purposes of NYSERDA shall be to develop and implement new energy technologies consistent with economic, social and environmental objectives, to develop and encourage energy conservation technologies...” “Energy conservation technologies” are defined in the Public Authorities Law Section 1851(11) as “all methods of conserving energy, of improving the efficiency of energy utilization and of preserving and protecting the environment...in connection with the use of energy.”

NYSERDA's authority under Section 1854 includes the following:

“1. Research, development and demonstration. To conduct, sponsor, assist and foster programs of research, development and demonstration in new energy technologies including but not limited to (a) energy conservation, (b) production of power from new sources with emphasis on renewable energy sources such as solar, wind, bioconversion and solid waste, (c) storage of energy with emphasis on inertial and battery storage, (d) conversion and/or technological improvement of facilities now utilizing nuclear fission energy and fossil

fuel energy technologies, (e) transmission and distribution of power, and (f) conversion of energy and improvements of efficiencies of such conversion, including the power after assessing and taking into account environmental considerations thereof, to establish, acquire, operate, develop and manage facilities therefor.”

“2. The provision of services. To provide services required for the development and use of new energy technologies and related methods by the industrial, commercial, medical, scientific, public interest, educational and governmental organizations within the state, including the power to establish, acquire and develop facilities therefore not otherwise available within the state, and to operate and manage such facilities.”

“11. To advise and assist the governor and legislature in the development and implementation of state policies relating to energy and energy resources.”

This authority will allow NYSERDA to administer the EE&CET Account so that the proceeds of the auction or auctions can be used to promote and reward investments in energy efficiency, renewable or non-carbon-emitting technologies, and/or innovative carbon emissions abatement technologies with significant carbon reduction potential and similar energy conservation technologies. The stated purposes of the EE&CET Account are consistent with NYSERDA’s authority to conduct, sponsor and assist programs related to new energy technologies and to provide services related to their development.

Public Authorities Law Section 1855. The general powers that are relevant to NYSERDA’s authority to establish and administer the EE&CET Account to promote and reward investments in energy efficiency, renewable or non-carbon-emitting technologies, an/or innovative carbon emissions abatement technologies with significant carbon reduction potential, and to sell allowances in a transparent auction are also set forth in Section 1855. NYSERDA’s authority under Sections 1854 and 1855 enables it to accept and sell the

allowances in order to acquire funding to promote and reward investments related to energy conservation technologies similar to the state purposes of the EE&CET Account.

As defined in Section 242-1.2 (b)(11) of the proposed regulation, a CO<sub>2</sub> allowance is “[a] limited authorization by the Department ...under the Program to emit up to one ton of CO<sub>2</sub> subject to all applicable limitations contained in the Part. This limited authorization does not constitute a property right.” As stated above, these allowances will be sold in a transparent auction or auctions, the proceeds of which will be used for energy efficiency and similar energy conservation technologies. NYSERDA’s authority to auction the allowances is enumerated in their powers:

“10. To enter into any contracts and to execute all instruments necessary or convenient for the exercise of its corporate powers and the fulfillment of its corporate purposes under this title.”

“14. To accept any gifts or grants or loans of funds or property or financial or other aid in any form from the federal government or any agency or instrumentality thereof or from the state or from any other source and to comply, subject to the provisions of this title, with the terms and conditions thereof.”

“17. To do all things necessary or convenient to carry out its corporate purposes and exercise the powers given and granted by this title.”

Pursuant to this Section, NYSERDA has the authority to sell the allowances, enter into any contracts, and execute all instruments necessary to develop, research, promote and reward investments related to energy efficiency, renewable or non-carbon-emitting technologies, and/or innovative carbon emissions abatement technologies with significant carbon reduction potential and energy conservation technologies. Monies

received from the auction or auctions will be used for these purposes to ensure that the full value of the Program inures to the consumers who pay for the Program.

## LEGISLATIVE OBJECTIVES

With numerous legislative enactments, the Legislature has directed and empowered the Department to promote the safety, health and welfare of the public, protect the State's natural environment, and also help assure a safe, dependable and economical supply of energy to the people of the State. The warming climate represents an enormous environmental challenge for the State, because unabated, climate change will have serious adverse impacts on the State's natural resources, public health and infrastructure. Power plants that burn fossil fuel emit significant quantities of CO<sub>2</sub>, a chief contributor to the unnatural warming of our climate. New York power plants represent approximately one-quarter of all GHG emissions in the State. In 2005, New York power plants emitted approximately 61,000,000 tons of CO<sub>2</sub> into the atmosphere. By imposing emissions limitations on fossil fuel-fired electric generating sources under a flexible cap-and-trade program, the Department is acting to preserve and protect the State's environment while maintaining a reliable supply of electricity. These air quality improvements will mitigate the impacts of climate change in New York, thereby contributing to public safety, health and welfare. The regulatory flexibility provided under this program helps to ensure continued reliability and adequacy of the State's electricity supply, assists in the furtherance of public health, and is necessary for continued industrial development and preservation of physical property.

RGGI included an extensive stakeholder process that on a regional level provided both the environmental and electricity regulators with a sounding board on the structure and details of a regional carbon cap-and-trade program. A regional Stakeholder Group was carefully selected by the RGGI states to represent a wide range of interests and geographies in the RGGI region and was configured to a manageable size to allow

the individuals involved an opportunity to engage one another and discuss issues around one table, together with about 15 state representatives. The Stakeholder Group was comprised of 24 stakeholder organizations representing electric generator, environmental, consumer, and other affected interests from throughout the Northeast and Mid-Atlantic regions.

As part of the RGGI stakeholder process a Resource Panel of experts was assembled to assist the RGGI states with developing a framework for a regional carbon cap-and-trade program. Resource Panel experts attended stakeholder meetings and supported the process during the discussions among the stakeholders and the agency staffs. The Stakeholder Group and Resource Panel met more than 12 times and prior to each stakeholder meeting, agency staff attempted to distribute pertinent written material to the participants. All meeting documents were posted on RGGI web site. All stakeholder meetings were open meetings and members of the public were welcome to listen and were given an opportunity to comment.

In addition, to supplement the regional stakeholder process, New York carried out its own stakeholder process designed to inform interested parties of the status of the regional RGGI process and afford additional opportunities to provide input directly to New York's RGGI representatives. Nine meetings were held for New York State stakeholders. This process was intended to supplement, not replace, opportunities for public review and comment required in connection with rulemakings under applicable New York State law.

On December 5, 2006, the Department released a pre-proposal draft of the CO<sub>2</sub> Budget Trading Program rule to implement RGGI in New York. The Department held a public meeting allowing stakeholders the opportunity to provide oral comments on the pre-proposal. In addition, the Department allowed stakeholders and the public the opportunity to provide written comments until March 13, 2007. All comments were then reviewed and considered in the development of the final proposed rule.

On October 24, 2007, the Department and NYSERDA formally proposed 6 NYCRR Part 242 and 21 NYCRR Part 507, respectively. Public hearings regarding both proposed rules and the corresponding Draft Generic Environmental Impact Statement were held at four locations throughout New York State during the week of December 10, 2007. The Department and NYSERDA received thousands of comments regarding both rules. In response to these comments, the Department and NYSERDA are issuing a re-notice of both rules.

## NEEDS AND BENEFITS

### Introduction

Mitigating the impacts of New York's warming climate represents one of the most pressing environmental challenges for the State, the nation and the world. Extensive scientific work demonstrates the need for immediate worldwide action to reduce emissions from burning fossil fuels, as well as the great benefits that will accrue if the emissions are reduced through programs like RGGI. This section outlines the Department's analysis of the needs and considerable benefits of the Program.

First, this section sets forth a brief explanation of the basic science of global climate change, including an explanation of the greenhouse effect and the forcing effect that emissions of anthropogenic GHGs have on the warming climate. Next, it discusses the most recent scientific findings concerning changes that have already occurred in the region's climate. To further explain the need for the Program, the projected future impacts of climate warming on the region is followed by an explanation of Program benefits. First, the benefit of reducing power plant emissions is detailed, followed by a description of the benefits of the offsets component of the Program. Finally, the direct allocation of allowances for purposes of energy efficiency and clean energy technologies is explained.

## The Greenhouse Effect and the Warming Climate

A naturally occurring greenhouse effect has regulated the earth's climate system for millions of years. Solar energy from the sun that reaches the surface of the earth is radiated back out into the atmosphere as long wave or infrared radiation. CO<sub>2</sub> and other naturally occurring GHGs trap heat in our atmosphere, maintaining the average temperature of the planet approximately 50 degrees Fahrenheit (°F) above what it would be otherwise. An enhanced greenhouse effect, and associated climate change, results as large quantities of anthropogenic GHGs, especially CO<sub>2</sub> from the burning of fossil fuels, are added to the atmosphere.

Since the mid-1700's, atmospheric concentrations of GHGs have increased substantially due to human activities such as fossil fuel use and land-use change. This is of importance because CO<sub>2</sub>, as well as other GHGs, persist in the atmosphere for hundreds of years and, thus, have a lasting effect on the climate. Concentrations of CO<sub>2</sub> have increased 34 percent since the Industrial Revolution and are higher than any time in the last 800,000 years. There is clear scientific consensus that anthropogenic emissions of CO<sub>2</sub> are contributing to the observed warming of the planet, as presented most recently in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.<sup>6</sup> It is also reflected in the statement released on June 7, 2005 by the United States National Academies of Science and the national academies of 10 other industrial nations.<sup>7</sup> These science academies reached a number of important conclusions about the science and the need for governments to respond by reducing emissions:

- There is strong evidence that the climate is warming. The evidence comes from direct measurements of rising surface air and subsurface ocean temperatures, increases in sea levels, retreating glaciers and changes to many physical and biological systems.

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<sup>6</sup> IPCC WGI Fourth Assessment Report, Climate Change 2007: The Physical Science Basis, February 2007, and available at: <http://www.ipcc.ch>.

<sup>7</sup> Joint Science Academies' Statement: Global Response to Climate Change, issued June 7, 2005, and available at <http://www.nationalacademies.org/onpi/06072005.pdf>.

- Most of the warming in recent decades can be attributed to human activities.
- The scientific understanding of climate change is now sufficiently clear to justify taking action to reduce GHG emissions.
- Action taken now to reduce emissions will reduce the magnitude and rate of climate change.
- Any remaining uncertainty about the science is not sufficient to warrant further delay in taking action to reduce GHG emissions.
- Any delay in taking action will increase the risk of adverse effects of climate change, and will likely incur a greater cost.

Since the release of the statement in June 2005, additional scientific studies have been released that further substantiate the national science academies' conclusions. In an issue brief released in March 2006, the World Resources Institute (WRI) provides a survey of the most significant climate-related scientific studies released in 2005.<sup>8</sup> In its summary of the studies, WRI concluded that the physical consequences of climate change are no longer theoretical, but can be observed in the environment, and that the effects of climate change are at a scale that adds urgency to the efforts to prevent additional change.

#### Impacts of Emissions Already Observed in New York's Climate

Scientists have already observed significant warming in New York's climate due in part to increased concentrations of GHGs in the atmosphere.<sup>9</sup> Since 1970, the Northeast United States has been warming at a rate of 0.5°F per decade. Winter temperatures have risen even faster, at a rate of 1.3°F per decade from 1970 to

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<sup>8</sup> WRI Issue Brief: Climate Science 2005 Major New Discoveries, by Kelly Levin and Jonathan Pershing, dated March 2006.

<sup>9</sup> Climate Change in the U.S. Northeast, A Report of the Northeast Climate Impacts Assessment (2006), available at: [http://www.climatechoices.org/ne/resources\\_ne/jump.jsp?path=/assets/documents/climatechoices/NECI\\_A\\_climate\\_report\\_final.pdf](http://www.climatechoices.org/ne/resources_ne/jump.jsp?path=/assets/documents/climatechoices/NECI_A_climate_report_final.pdf).

2000. Temperature increases in the coastal areas of the state have been more dramatic. The observed warming has resulted in the following impacts to the Northeast climate:<sup>10</sup>

- More frequent extreme-heat days (maximum temperatures greater than 90°F);
- A longer growing season;
- Earlier leaf and bloom dates for plants;
- Shifts in the mating cycles of frogs to earlier in the year;
- Earlier migration of Atlantic salmon in northeastern rivers;
- An increase in heavy rainfall events;
- Earlier breakup of winter ice on lakes and rivers;
- Earlier spring snowmelt resulting in higher and earlier spring river flows;
- Less precipitation falling as snow and more as rain;
- Rising sea surface temperatures and sea level; and
- Reduced snow pack and increased snow density.

In summary, scientists have concluded that the New York climate has already begun migrating south, gradually taking on the characteristics of the climate formerly found in the states south of New York.<sup>11</sup>

#### Impacts of Emissions Predicted for New York's Climate in the Future

In addition to examining the observational changes that have already occurred in the New York climate, scientists have invested considerable effort in attempting to identify the future trends for the Northeast climate. The extent of the environmental threat from future regional climate change depends largely on whether atmospheric GHG concentrations and emissions of CO<sub>2</sub> and other GHGs are reduced.

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<sup>10</sup> Id.

<sup>11</sup> Id.

In order to estimate the effect of climate change on the region, a group of 40 independent scientists is cooperating in a study to examine climate changes under two future CO<sub>2</sub> emission scenarios. The first scenario represents a world with fossil fuel-intensive economic growth resulting in atmospheric CO<sub>2</sub> concentrations of more than triple pre-industrial levels by 2100 (the Higher Emissions Scenario). The second scenario assumes a world with high economic growth with a shift to less fossil fuel-intensive industries and the introduction of clean and resource efficient technologies (Lower Emissions Scenario). Under the Lower Emissions Scenario, atmospheric CO<sub>2</sub> concentrations approximately double from pre-industrial levels by 2100.

Under the Higher Emissions Scenario, where the burning of fossil fuels remains unabated, scientific projections for the Northeast climate show:

- By the end of the century, winters are expected to warm by 8 to 12°F and summers by 6 to 14°F.
- An increase in the number of extreme heat days. In New York City, for example, scientists have estimated that we can expect the number of 90°F days to increase from an average of between 15 and 20 days per year from 1961 to 1990, to between 35 and 50 days per year from 2040 to 2069. Similar relative increases are projected for Buffalo, New York.
- Winter precipitation, is projected to increasingly fall as rain rather than snow, and there will be increased risk of winter flooding.
- By the end of the century, the southern and western parts of the Northeast could experience as few as five to 10 snow-covered days, compared with 10 to 45 days historically.
- The frequency of heavy rainfall is projected to increase across the Northeast. In addition, extreme storms are expected to travel further up the East Coast and affect the Northeast.
- Rising temperatures will increase the evaporation rates and reduce soil moisture in New York and the Northeast. This evaporation may lead to increases in the frequency of short-term droughts and extension of summer low-flow periods.

- Rising winter and spring temperatures mean earlier snow melt and earlier high spring flows.
- Northeastern sea surface temperatures are projected to rise by 8°F.
- Northeastern sea levels are projected to continue to rise between eight and 33 inches by the end of the century.

It is clear from these projections about New York’s potential future climate changes will have adverse impacts on New York’s environment and human health. However, the scientific literature confirms that reducing emissions of GHGs like CO<sub>2</sub> will help to mitigate the potential impacts of climate change.

More intense and prolonged periods of summertime heat can result in increased mortality and heat illnesses, especially in cities that experience the heat island effect. The term “heat island” refers to urban air and surface temperatures that are higher than nearby rural areas. Many U.S. cities and suburbs have air temperatures up to 10°F warmer than the surrounding natural land cover.<sup>12</sup> The EPA reports that a one degree Fahrenheit increase in average temperature could more than double heat related fatalities in New York City from 300 to 700 per year.<sup>13</sup> Higher temperatures, resulting from increased levels of GHG emissions, also contribute to conditions that enhance the formation of ground-level ozone, as higher temperatures are a condition required for its formation. Other conditions required include the presence of strong ultra-violet radiation (sunlight), stable air masses, and the presence of ozone precursors such as volatile organic compounds (VOCs) and oxides of nitrogen (NO<sub>x</sub>). The increased concentrations of ground-level ozone promote respiratory illness in children, the elderly, and those with pre-existing illnesses. Increased temperature and precipitation levels also produce conditions favorable to the introduction or spread of vector-borne illnesses such as Lyme

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<sup>12</sup> <http://www.epa.gov/hiri/about/index.html>.

<sup>13</sup> United States Environmental Protection Agency. “Climate Change and New York.” September 1997. Page 3.

Disease, Equine Encephalitis, West Nile Virus, and other diseases spread by mosquitoes, ticks, and wild rodents.<sup>14</sup>

New York's shoreline could also be adversely affected by the warming climate. New York has approximately 2,625 miles of coastline including barrier islands, coastal wetlands, and bays.<sup>15</sup> The major contributor to sea level rise is thermal expansion and melting of glaciers and ice sheets. In New York City for example, sea level has risen 0.27 cm/year on average over the last hundred years and is expected to increase over the next century to an average of approximately 0.60 cm/year.<sup>16</sup> Accelerated sea level rise due to global climate change is expected to increase the frequency and magnitude of storms such as the 100-year storm, which would result in increased flood damage. The return period of the resulting 100-year flood could be reduced to once every 50 years by the 2080s, and as often as once every four years in worst case scenarios.<sup>17</sup>

New York's public water supply could also be stressed by changes in temperature and precipitation. The majority of drinking water is obtained from surface flow, which can be highly variable. According to data obtained from the New York State Department of Health, approximately 15,527,300 people in New York State obtain drinking water from surface water sources. The remaining State population, approximately 5,529,220 people, obtains drinking water from ground water sources.<sup>18</sup> A portion of the Northeast, including New York,

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<sup>14</sup> National Assessment Synthesis Team (NAST), 2001: Climate Change Impacts On The United States, The Potential Consequences of Climate Variability and Change. Page 450.

<sup>15</sup> National Oceanic and Atmospheric Administration (NOAA). Treasure Our New York Coasts and Estuaries. June 2003. Page 1.

<sup>16</sup> Goddard Institute for Space Studies Institute on Climate and Planets (GISS ICP). Climate Impacts in New York City: Sea Level Rise and Coastal Floods. 2002. Page 3.

<sup>17</sup> GISS ICP. Rising Seas: A View From New York City. August 2000. Page 2.

<sup>18</sup> New York State Department of Health. Drinking water program: Facts and Figures. [http://www.health.state.ny.us/nysdoh/water/facts\\_figures.htm](http://www.health.state.ny.us/nysdoh/water/facts_figures.htm).

has experienced drought conditions on six occasions in the last 20 years and several other areas have experienced situations that required restrictions on water use.<sup>19</sup> The New York City water supply comes from a 2,000 square mile watershed area in upstate New York that is greatly influenced by temperature and precipitation levels.<sup>20</sup> Residential development and increased population in communities surrounding the water supply area are placing additional strain on the water supply. Extended periods of drought would therefore be expected to place additional stress on the system.

Lake Erie and Lake Ontario are critical water sources to New York State which would also be threatened by global climate change. New York relies on these Great Lakes for drinking water, hydroelectric power, commercial shipping, and recreation, including boating and fishing. New York State has approximately 331 miles of shoreline along Lake Ontario and approximately 77 miles along Lake Erie.<sup>21</sup> Global climate change is likely to lower the water levels of the Great Lakes through increased evaporation. Simulations run by the Canadian Climate Center using the Canadian Climate Center Model project the average water levels to decrease from 1.5 to three feet for the Great Lakes within three decades.<sup>22</sup> This scenario could severely affect commercial shipping. Each one inch loss in draft (the depth that the hull of a ship is below the surface of the water) in the Great Lakes shipping channels causes the ships used for interlake transportation to lose 270 tons of cargo capacity.<sup>23</sup>

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<sup>19</sup> NAST. Page 119.

<sup>20</sup> NAST. Page 123.

<sup>21</sup> Michigan Department of Environmental Quality: Shorelines of the Great Lakes.  
[http://www.michigan.gov/deq/0,1607,7-135-3313\\_3677-15959-,00.html](http://www.michigan.gov/deq/0,1607,7-135-3313_3677-15959-,00.html).

<sup>22</sup> Slivitzky, Michel and Limno-Tech, Inc. Ecological Impacts of Water Use and Changes in Levels and Flows. June 2002. Page 11.

<sup>23</sup> Climate Change and Water Quality in the Great Lakes Basin 2003: Report of the Great Lakes Water Quality Board to the International Joint Commission. Chapter 3.2 page18.

Agriculture and forests in New York will also be affected by global climate change. The majority of crops grown in New York may be able to withstand a warmer climate with the exception of cold weather crops. These include apples, potatoes, and others which would shift to the north or have reduced growing seasons. These shifts would eventually result in a different crop mix for New York's farmers. Dairy farmers would also be impacted since milk production is maximized under cooler conditions ranging from 41 to 68 °F.<sup>24</sup>

Global climate change could also affect the current forest mix in New York. It could change from the current mixed forest to a temperate deciduous forest. New York State's Adirondack Park is the largest forested area east of the Mississippi and it consists of six million acres including 2.6 million acres of state-owned forest preserve.<sup>25</sup> One of the most significant hardwood ecosystems in the world is likely to be threatened by global climate change. For example, it is projected that sugar maple trees will be displaced to the north as the climate changes and temperatures increase. Global climate change would also negatively impact New York's maple syrup industry since specific temperature conditions are required in order for the sugar maples to produce sap. As forest species change, the dulling of fall foliage will likely have a negative impact on regional tourism.<sup>26</sup> Distribution of wildlife is also likely to change due to increased temperature and changes in precipitation. As a result, cold-water salmon, trout fisheries and migratory birds could be adversely impacted due to loss or changes in habitat.

In its discretion to protect the safety, health, and welfare of the public and the environmental resources of the State, the Department proposes the Program relying not only on the specific potential harms identified

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<sup>24</sup> Garcia, Alvaro. Dealing With Heat Stress In Dairy Cows. South Dakota Cooperative Extension Service. September, 2002. Page 1.

<sup>25</sup> New York State Adirondack Park Agency (APA). [http://www.apa.state.ny.us/About\\_Park](http://www.apa.state.ny.us/About_Park).

<sup>26</sup> NAST. Page 125.

above, but also on the overall nature and extent of threat of harm to the State from global climate change.

### Reducing Emissions from Power Plants in New York.

The global community must reduce its GHG emissions well below 1990 levels within a few decades if we are to stabilize atmospheric concentrations of CO<sub>2</sub> at acceptable levels. Failure to significantly reduce global GHG emissions by as early as 2020 could eliminate the ability to achieve stabilization levels of 450 ppm CO<sub>2</sub> or lower, compared with today's concentration of 360 ppm CO<sub>2</sub>.<sup>27</sup> The stabilization of atmospheric CO<sub>2</sub> concentration at 450 ppm could lead to increases in global average temperatures of between 2.0 and 7.2 °F by 2100. The more the temperature changes, the greater the risks to ecosystems. Higher temperatures also increase the likelihood of extreme climate events and the occurrence of higher ground-level ozone concentrations.

Although New York is home to only 0.3 percent of the world's population, it emits 0.9 percent of the world's carbon emissions. New York State's emissions exceed those of Sweden and the Netherlands, countries that have committed to cutting their emissions to eight percent below 1990 levels by 2012.<sup>28</sup>

The Center for Clean Air Policy (CCAP) and the Governor's Greenhouse Gas Task Force agree that national action to establish a comprehensive policy to cap GHG emissions is the optimal approach. However, in the absence of national action, state action and regionally coordinated policies offer a path for progress on this critical issue.

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<sup>27</sup> Center for Clean Air Policy (CCAP) in collaboration with the New York Greenhouse Gas Task Force, Recommendations to Governor Pataki for Reducing NYS Greenhouse Gas Emissions, April 2003. Page ES1.

<sup>28</sup> CCAP. Page ES4.

It is well known that the burning of fossil fuels in power plants in New York is a major contributor to increased atmospheric concentrations of CO<sub>2</sub>. In 2005, power plants in New York burned fossil fuels to produce approximately 61 million tons of CO<sub>2</sub> and significant amounts of other harmful pollutants that impact the health and welfare of New Yorkers. This represents approximately one-quarter of the State's total GHG emissions. Therefore, any effort to curb the State's contribution to atmospheric concentrations of CO<sub>2</sub> must address CO<sub>2</sub> pollution from power plants.

In addition to contributing to global climate change, the burning of fossil fuels contributes to other air quality problems, including increases in local concentrations of NO<sub>x</sub>, mercury and SO<sub>2</sub>. A program that creates an incentive to generate electricity from non-fossil fuel sources simultaneously addresses both CO<sub>2</sub> emissions and these other harmful pollutants.

RGGI, 6 NYCRR Subpart 218-8, "Greenhouse Gas Exhaust Emission Standards," and the renewable portfolio standard (RPS) are key components of New York's comprehensive GHG reduction policy. These programs will reduce GHG emissions from the electricity generating sector and the motor vehicles sector which are the two largest contributors of GHG emissions in New York State.

The primary objectives of the RPS are to improve New York's environment, increase energy diversity in order to reduce reliance on fossil fueled energy sources and provide a competitive energy market. The RPS requires that 25 percent of the electricity purchased in New York State within the next decade be obtained from renewable energy sources. The state's current energy portfolio includes approximately 17 to 18 percent renewables. Eligible energy sources include biogas (landfill and sewage gas), biomass, fuel cells, hydroelectric, solar, tidal, and wind. The RPS proposes to create a competitive energy market by allowing load serving

entities to enter into individual agreements with generators or to participate in a centralized procurement method managed by a state agency or authority that would solicit bids for renewable energy.

Section 177 of the Clean Air Act (42 USC 7507) permits states other than California to adopt motor vehicle emission standards, provided those standards are identical to California's standards. The Department has adopted California GHG exhaust emission standards (Subpart 218-8) for new motor vehicles to reduce emissions of GHGs. New York has chosen to adopt California's more stringent motor vehicle standards since the early 1990s, in order to obtain emission reductions from new motor vehicles not provided by Federal new motor vehicle standards.

New York and the other RGGI participating states are aware that climate change is a global problem and that effective action at the national and international level is necessary to stabilize atmospheric GHG concentrations at acceptable levels. However, action at the state and regional level to reduce GHG emissions in general and to implement the RGGI Program will reduce the risk of injury to New York and its citizens and residents from climate change. The risks of injury from a warming climate increase with the rate and magnitude of the warming. In turn, the rate and magnitude of warming is primarily dependent upon the level of CO<sub>2</sub> emissions. The greater the emissions, the greater and faster the temperature change will be, with greater resulting injuries. The lower the level of emissions, the smaller and lower the total temperature change will be, with lesser injuries. Thus, the reductions in CO<sub>2</sub> emissions from power plants under RGGI will contribute to a reduction in the risk of injury to New York and its citizens and residents from global climate change. In addition, by implementing RGGI now, New York and the RGGI states can:

- Reduce the long-term costs of addressing climate change. By acting now, states can avoid the need for more disruptive measures later.

- Position the region ahead of competitors. Taking early action to reduce the region’s carbon-intensity will create a competitive advantage relative to other parts of the country when action at the national and international level becomes unavoidable.
- Capture environmental co-benefits. Reducing power sector carbon emissions will provide numerous environmental co-benefits, including reduced emissions of other pollutants associated with fossil-based electricity generation. Additional co-benefits will be realized through the offsets component of the Program which will encourage afforestation, reduced agricultural emissions, and reduced consumption of natural gas, propane, and home heating oil. Still further co-benefits will be realized by allocating 100 percent of the allowances to EE & CET purposes.
- Drive new technology. By attaching tangible financial value to avoided carbon emissions, RGGI will provide a market incentive for developing and deploying new technologies that can increase fuel efficiency, utilize non-carbon resources (including renewable technologies such as wind and solar power), and reduce or eliminate carbon emissions from combustion sources. In addition, to the extent that the allocation of allowances will spur additional investments in clean energy technologies, the allocations will drive the deployment of new technologies in the State.
- Promote improved supply-side and demand-side efficiency. RGGI will create a direct incentive to reduce the fossil fuel inputs required to produce electricity through more efficient generating technologies. RGGI’s offsets provisions will create incentives to promote improved demand-side efficiency, including not only more efficient technologies for reducing electricity consumption, but technologies for reducing primary energy consumption—both natural gas and home heating oil—in residential and commercial buildings. In addition, the allocation of allowances to create incentives for energy efficiency will provide direct incentives for end-use and supply-side energy efficiency projects in the State.

- Improve the region’s energy security and reduce its exposure to higher energy prices. By creating a market incentive for low-carbon and non-carbon electricity technologies and by promoting increased supply-side and demand-side efficiency, RGGI will reduce the Northeast’s long-term exposure to high fossil fuel energy prices. Oil and natural gas prices, in particular, have risen sharply in the last few years and markets for both fuels are expected to remain tight and volatile for some time to come. Efficiency improvements and advances in new energy technology fostered by RGGI can help buffer the region from the considerable economic risks associated with continued dependence on these fuels.
- Stimulate economic development. RGGI will provide a positive stimulus for economic growth in the region by creating incentives for new technologies that could be developed in-region, promoting a more efficient and cleaner electricity generating sector, prompting other activities through its offsets program and improving efficiency.

## Emissions Leakage

There is an active debate as to the magnitude of the potential threat of leakage and the manner in which leakage may occur. “Emissions Leakage” refers to a potential shift of electricity generation from capped sources subject to RGGI to higher-emitting sources not subject to RGGI. The concept of “leakage” applies to both environmental and economic issues. The term generally refers to the migration of emissions from a regulated to an unregulated geographic area, but it also may refer to the related migration of economic activity as well. As such, emissions leakage may pose two concerns, namely: a less effective environmental program and a drop in economic activity, including employment.<sup>29</sup>

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<sup>29</sup> WRI White Paper: Greenhouse Gas Emissions Trading in the U.S. States: Observations and Lessons from the OTC NOx Budget Program, A. Aulisi, A.E. Farrell, J. Pershing, S. VanDeveer. 2005.

Under RGGI, “emissions leakage” is defined as the increase in CO<sub>2</sub> emissions outside the RGGI region that may “net out” (or partially eliminate) a portion of the emissions reductions made within the RGGI region under the Program. Leakage is an important concept in the context of CO<sub>2</sub> emissions and policy because electricity is routinely transmitted across regional boundaries to meet economic and reliability objectives. Accordingly, the potential exists for entities to meet a portion of their carbon compliance obligations by increasing imports of electricity from outside the RGGI states.

In the development of the Program, emissions leakage from the electric generating sector within RGGI to the unregulated electric generating sector outside of the RGGI region was evaluated. This evaluation not only looked at leakage for the pollutant being regulated, CO<sub>2</sub>, but also factored in the potential for leakage of other pollutants from the electric generating sector such as NO<sub>x</sub> and SO<sub>2</sub>. As Federal action under the Clean Air Interstate Rule (CAIR) resulted in emissions caps for NO<sub>x</sub> and SO<sub>2</sub> from the electric generating sector, emissions may shift, but will not increase as a result of RGGI. Thus the environmental effectiveness of these programs is not impacted by leakage.

In order to estimate the amount of potential leakage, the electricity sector modeling analysis estimated CO<sub>2</sub> emissions outside the RGGI states as well as CO<sub>2</sub> emissions within the RGGI states. Cumulative CO<sub>2</sub> emissions reductions are compared between the RGGI region and the entire region modeled ‘i.e.’, the Eastern Interconnection<sup>30</sup> (which includes the RGGI region) plus the eastern Canadian provinces. Cumulative emission reductions within the RGGI states (2006 through 2021, including offsets) are projected to be 230 million tons. Over the same period, cumulative reductions in the entire region modeled are projected to be 155.3 million tons,

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<sup>30</sup> The Eastern Interconnection (EI) includes the eastern two-thirds of the continental United States (excluding most of Texas and Florida). The Canada portion includes Ontario east to the Maritime Provinces.

due to the leakage of 74.7 million tons or about 32 percent from the RGGI states to surrounding regions.

This issue has been extensively examined by the RGGI Emissions Leakage Staff Working Group. On March 14, 2007, the Emissions Leakage Staff Working Group forwarded to the RGGI Agency Heads a final preliminary report evaluating potential emissions leakage, 'Potential Emissions Leakage and the Regional Greenhouse Gas Initiative (RGGI): Evaluating Market Dynamics, Monitoring Options, and Possible Mitigation Mechanisms'. Concurrently, the Staff Working Group solicited comments from stakeholders through May 17, 2007.

The report did not make any policy recommendations regarding emissions leakage mitigation mechanisms at that point, but instead provided a qualitative review of policy mechanisms as a starting point for discussion by Agency Heads about how to address potential emissions leakage. Development of the report was informed by a workshop held in June 2006 at the University of Vermont Law School.

The preliminary report has been followed by a final report in which staff, where appropriate, provided a more detailed qualitative and quantitative analysis of the potential effects of the various emissions leakage mitigation policy options initially considered. The final report, 'Potential Emissions Leakage and the Regional Greenhouse Gas Initiative (RGGI): Final Report of the RGGI Emissions Leakage Multi-State Staff Working Group to the RGGI Agency Heads, March 2008', includes policy recommendations for addressing leakage. The final report was submitted to the Agency Heads on March 31, 2008.

Determining the extent and cause of leakage will be important to development of a mitigation strategy or strategies. Discussions are on-going with the ISOs and it is anticipated that leakage tracking capability will be in place in 2008 to establish a baseline in advance of the start of the Program. In addition, the leakage report

has outlined multiple policy options that RGGI states could adopt to mitigate potential emissions leakage. RGGI states could cooperate in implementing a package of mitigation strategies that reduce electricity demand and act as a complement to the RGGI cap-and-trade program. Some examples include:

- Implementation of energy efficiency portfolio standards<sup>31</sup>
- Maximization of RGGI allowance allocation dedicated to support end-use energy efficiency
- Harmonization across the RGGI region of the most up-to-date building codes and standards for commercial and residential buildings
- Harmonization across the RGGI region of the most up-to-date appliance and equipment energy efficiency standards
- Development and implementation of policies and market incentives to reduce market barriers to combined heat and power and other clean distributed generation applications.

If adopted, these mitigation strategies would provide continued reductions in both electricity and natural gas demand. These reductions would result in direct regional economic benefits by lowering wholesale energy costs, avoiding the need for new transmission and distribution infrastructure, improving electricity system reliability, and lowering consumer energy bills. Each mitigation strategy is designed to reduce electricity, and therefore can be expected to help indirectly reduce emissions leakage.<sup>32,33</sup>

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<sup>31</sup> CASE 07-M-0548 - Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard. (Issued and Effective May 16, 2007)  
[http://www.dps.state.ny.us/Case\\_07-M-0548.htm](http://www.dps.state.ny.us/Case_07-M-0548.htm)

<sup>32</sup> Potential Emissions Leakage and the Regional Greenhouse Gas Initiative (RGGI): Evaluating Market Dynamics, Monitoring Options, and Possible Mitigation Mechanisms, Initial Report of the RGGI Emissions Leakage Multi-State Staff Working Group to the RGGI Agency Heads, March 14, 2007.

While the leakage report is being offered to guide the region in making critical policy decisions, should monitoring indicate that leakage needs to be addressed, a number of states including New York,<sup>34</sup> are already moving to implement significant energy efficiency programs now for a number of economic and environmental reasons within their respective states. While these actions are not being implemented to directly address potential leakage under the Program, by meeting the stated goals, they will in effect mitigate leakage.

### The Benefits of the Offsets Component of the Program

Offsets are an integral part of RGGI and the Program. An “offset” is a project-based GHG reduction (or sequestration) occurring at sources that are not subject to the Program that may be used by regulated sources for the purpose of compliance with the Program. To maintain the environmental integrity of the Program, these project-based reductions must be additional to activities likely to be conducted under a business-as-usual (BAU) Case. Offsets not only provide significant environmental and/or economic co-benefits, they also provide flexibility for regulated sources.

Initially, CO<sub>2</sub> offset allowances may represent up to 3.3 percent of the CO<sub>2</sub> budget source’s CO<sub>2</sub> budget emissions limitation for a control period. If there has been a stage one trigger event, CO<sub>2</sub> offset allowances may represent up to five percent and, in the case of a stage two trigger event, CO<sub>2</sub> offset allowances may represent up to 10 percent of the CO<sub>2</sub> budget source’s CO<sub>2</sub> budget emissions limitation for a control period. A stage one

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<sup>33</sup> Potential Emissions Leakage and the Regional Greenhouse Gas Initiative (RGGI): Final Report of the RGGI Emissions Leakage Multi-State Staff Working Group to the RGGI Agency Heads, March 2008

<sup>34</sup> CASE 07-M-0548 - Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard. (Issued and Effective May 16, 2007)  
[http://www.dps.state.ny.us/Case\\_07-M-0548.htm](http://www.dps.state.ny.us/Case_07-M-0548.htm)

trigger event is the occurrence of any twelve month period that completely transpires following the market settling period and is characterized by an average CO<sub>2</sub> allowance price that is equal to or greater than the stage one threshold price (\$7.00 adjusted annually by the consumer price index). A stage two trigger event is the occurrence of any twelve month period that completely transpires following the market settling period and is characterized by an average CO<sub>2</sub> allowance price that is equal to or greater than the stage two threshold price (\$10.00 adjusted annually by the consumer price index).

Eligible offset projects may be located in any RGGI participating state or in any state or other United States' jurisdiction in which a cooperating agency has entered into a memorandum of understanding with the Department to carry out certain obligations relative to CO<sub>2</sub> emissions offset projects in that agency's jurisdiction. For offset projects located in whole or in part of any participating state, the application must be filed with the appropriate regulatory agency in the participating state in which the majority of the CO<sub>2</sub> equivalent emissions reduction or carbon sequestration is taking place. For offset projects in any state or other United States jurisdiction in which a cooperating regulatory agency has entered into a memorandum of understanding with the department and the appropriate regulatory agencies of all participating states, an application can be filed with the appropriate regulatory agency in any participating state.

After the occurrence of a stage two trigger event, the Department may award CO<sub>2</sub> offset allowances to the sponsor of CO<sub>2</sub> emissions credit retirements. The credit retirements may include the permanent retirement of greenhouse gas allowances or credits issued pursuant to any governmental mandatory carbon constraining program outside of the United States or certified GHG emissions reduction credits issued pursuant to the United Nations Framework Convention on Climate Change (UNFCCC) or protocols adopted through the UNFCCC process.

The fundamentals of the Program design point to a limited need for offsets for compliance coupled with significant flexibility that will allow sources to bank offsets. Not only will sources be able to bank emissions reductions achieved through offsets prior to the start of the Program, from 2006 to 2008, but sources will be able to bank offsets allowances to meet future compliance needs.

In developing requirements for the initial set of eligible offsets categories and project types, the State evaluated potential offsets based on: the possible use of standardized requirements; substantial low-cost supply of offsets available within the State; the existing methodology for calculation of emissions reductions; and the existence of monitoring and verification protocols. Offset categories were also evaluated based on whether they would provide significant environmental and or economic co-benefits as well as valuable experience that would support possible future expansion of the Program to other sources and sectors.

The rule establishes standards-based requirements for each of the offset categories thereby creating certainty for project developers. These benchmarks or thresholds will be used instead of requiring a case-by-case additionality analysis of each offset. Set out below is a description of each offset type and the benefits that accrue to New York from projects within that type.

## Offset Types

Landfill Gas: avoided methane emissions from eligible landfills.<sup>35</sup>

Under the Program, certain landfill gas (LFG) destruction projects are eligible for offset credits. Anaerobic decomposition of municipal solid waste emits methane and CO<sub>2</sub> into the atmosphere which can be

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<sup>35</sup> <http://www.epa.gov/lmop/>.

captured and flared or combusted to generate electricity. Almost any entity can use LFG for a variety of purposes. Utilities and power providers can purchase LFG which will allow them to add a renewable energy component to their energy portfolios. In addition, municipalities, local industrial customers, and other organizations that need a direct and constant power supply are good candidates for LFG use. The gas can be piped directly to a facility for use as either a boiler or industrial process fuel.

Co-benefits to LFG projects include improvements in local air quality and odor reduction as well as the displacement of other electricity generation if a project includes an electricity generating unit component. If LFG is converted to energy: less fossil fuel is used, resulting in a reduction of emissions of air pollutants that contribute to ozone formation; explosion threats and unpleasant odors created by the landfill are diminished; and overall landfill management is improved. These improvements make the area surrounding the landfill a better place to live and enhance the community.

SF<sub>6</sub>: reduction of fugitive emissions from electricity transmission and distribution infrastructure.<sup>36</sup>

Sulfur hexafluoride (SF<sub>6</sub>) is a potent, non-hazardous, inert gas with a global warming potential almost 24,000 times that of CO<sub>2</sub>. The primary use of SF<sub>6</sub> is as an insulating gas for the switches and circuit breakers used in electricity transmission and distribution systems. The majority of SF<sub>6</sub> emissions occur during the handling of the gas. For this reason, equipment maintenance of leaking equipment, knowledge of the type and age of SF<sub>6</sub> containing equipment, and proper handling and maintenance protocols are very important.

Under the Program, offsets can be procured through improved SF<sub>6</sub> management programs and the

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<sup>36</sup> <http://www.epa.gov/electricpower-sf6>.

replacement of older, leakier equipment with new equipment that is more resistant to leakage and requires charging with smaller volumes of SF<sub>6</sub>. Other co-benefits include increased grid reliability and efficiency, cost savings due to decreased use of SF<sub>6</sub>, and protection of the environment since this gas is the most potent GHG gas known.

Afforestation: conversion of marginal agricultural land or non-forested land to forest.<sup>37</sup>

Under the Program, certain afforestation projects are eligible for offset credit. It is generally understood that forests can function as biological carbon “sinks,” removing CO<sub>2</sub> from the atmosphere and sequestering it in the form of biomass. Afforestation offsets credits may be obtained by funding projects to plant and manage new forests or to convert marginal agricultural land to forest.

One co-benefit of afforestation is that it will result in improved air and water quality, both by the direct removal of pollutants from air and/or water by trees, and by the indirect effects, such as conservation of a permeable ground surface, which would tend to reduce flooding and erosion. In addition, afforestation may provide potential energy savings because of the moderating effect of tree cover on local temperatures and wind. Recreational opportunities for hikers, sportsmen, bird-watchers and other recreational users of forests may be expanded through the creation of new forests; wildlife habitat for many species, especially those that utilize young forest habitats, may be increased.

To the extent that afforestation offsets credits result in managed forests, the forest-products industry may

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<sup>37</sup> Sampson, Neil, “Potential for Agricultural and Forestry Carbon Sequestration in the RGGI Region.” November 4, 2004; <http://conserveonline.org/workspaces/necarbonproject>.

benefit from the increased availability of timber from privately-owned lands, which currently comprise more than two thirds of the forest land in New York State. Finally, the potential funds available through afforestation projects could make it more economically feasible for landowners to maintain open space on their properties, thus reducing the rate of forest fragmentation. If realized, such a co-benefit could also help keep forests less vulnerable to damage from exotic, invasive pests and pathogens such as the Asian long-horned beetle, emerald ash borer, Sirex wood wasp, and sudden oak death syndrome, among many others.

#### Agricultural methane.<sup>38</sup>

Under the Program, manure methane digesters may qualify for offset credit. Anaerobic digesters are enclosed vessels that use naturally occurring bacteria to decompose manure and other organic material and produce biogas, a mixture of mostly methane and CO<sub>2</sub>. In fact, they operate in a similar fashion to the natural decomposition that occurs in a cow's stomach. Because digesters capture methane and other air pollutants, they reduce potentially harmful emissions from manure and provide superior odor control.

The co-benefits associated with the use of manure digesters include a reduction in waste emissions, a reduction in process emissions from a change in management practice, and a reduction in combustion emissions from the generation of grid-connected electricity. Additional benefits include a reduction in fugitive GHG emissions through the land application of digested effluent as well as reduced NO<sub>x</sub> emissions associated with a more limited application of purchased nitrogen fertilizer.

Along with the significant reductions in air pollution emissions and odors, anaerobic digestion provides

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<sup>38</sup> <http://www.epa.gov/agstar>.

water quality benefits. Nutrient management planners are better able to plan the rates and timing of manure applications in order to maximize the amount of nutrients available to plants, minimize losses to the environment, and reduce nutrient imports to the farm in the form of purchased fertilizer. Importantly, anaerobic digestion is also an effective method of reducing high Biological Oxygen Demand (BOD) in the effluent. Reductions in BOD can significantly reduce the potential risk to surface waters in the event that these wastes enter waters via nonpoint source transport mechanisms.

Electricity produced by means of anaerobic digestion of livestock waste is an eligible category under the State RPS. Often times, the captured biogas is combusted to provide direct benefits such as heating water, or the captured biogas is combusted in an engine generator to produce electricity for both on-site and off-site use. Unlike many other renewable energy sources, anaerobic digestion carries the added benefit of simultaneously reducing a potent GHG which would otherwise be released into the atmosphere.

Natural gas and oil/ end-use energy efficiency.<sup>39</sup>

Under the Program, natural gas and oil end-use efficiency projects may qualify for offset credits. As with electricity efficiency projects, natural gas and oil end-use efficiency projects reduce GHG emissions while reducing end-user energy costs. These projects are particularly attractive due to presently high and fluctuating natural gas and heating oil prices and the large projected increase in natural gas demand in the future. Natural gas offsets are also attractive since they can help mitigate the impacts of the Program on both the natural gas

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<sup>39</sup> <http://www.neep.org>, American Council for an Energy-Efficient Economy (<http://www.aceee.org>), DOE's site (<http://www.eere.energy.gov/index.html>), US Green Building Council (<http://www.usgbc.org/>).

market and the natural gas transmission and distribution infrastructure in the region. Reducing natural gas end-use has the added benefit of reducing methane emissions from leaks in the natural gas distribution system.

New York has implemented an increasing number of initiatives over the past several years aimed at improving end-use energy efficiency, some of which naturally overlap with the areas targeted by this offset. Public or system benefit programs are funding market transformation efforts, including research and development of innovative products and the introduction and acceptance of energy efficient end-use products. New York has also moved to adopt higher efficiency standards for new construction and appliances. This offset is designed to spur further end-use efforts through a variety of measures whose benefits will be, as with other offset types, incremental to savings from existing efforts.

The complementary approach of utilizing existing initiatives in addition to this offset will help create an incentive for end-use efficiency improvements across the state by providing a broad but targeted public funding mechanism. The offset provides a robust structure, with stringent monitoring and verification procedures, to realize innovative efficiency improvements. Co-benefits from this offset include a possible reduction in consumer energy bills, a potential postponement of the need for additional fuel infrastructure such as pipelines and storage, a decrease in GHG, SO<sub>2</sub> and NO<sub>x</sub> emissions, and a reduction of fossil fuel use.

#### Allocating Allowances to Energy Efficiency and Clean Energy Technologies.

The Program is designed to allocate most of the emissions allowances to the EE & CET Account (the “EE & CET Allocation”). The EE & CET Allocation will be administered by NYSERDA and allowances in the account will be sold in a transparent allowance auction or auctions. This will better achieve the emissions reduction goals of the Program by promoting or rewarding investments in energy efficiency, renewable or non-

carbon-emitting technologies, innovative carbon emissions abatement technologies with significant carbon reduction potential, and/or the administration of the Program. NYSERDA currently administers similar energy efficiency and clean energy technology programs, and the addition of the EE & CET Allocation, should be readily accomplished. The EE & CET Allocation will increase the emissions reduction benefits of the Program while simultaneously reducing impacts on consumers.

The Department and NYSERDA propose to auction almost 100 percent of the allowances to ensure that the full value of the cap-and-trade program inures to the consumers who pay for the Program while at the same time allows for the rapid distribution of allowances into the marketplace where generators subject to the Program may purchase them. In support of these goals, the auctions will be carried out to achieve, but will not be limited to the following objectives: achieving fully transparent and efficient pricing of allowances; promoting a liquid allowance market by making entry and trading as easy and low-cost as possible; being open to participation by the categories of bidders determined by NYSERDA or its designee in consultation with the Auction Advisory Committee which meet the minimum financial requirements; monitoring for and guard against the exercise of market power and market manipulation; being held as frequently as is needed to achieve design objectives; avoiding interference with existing allowance markets; aligning well with wholesale energy and capacity markets; and not acting as a barrier to efficient investment in relatively clean existing or new electricity generating sources.

NYSERDA's New York CO<sub>2</sub> Allowance Auction regulation found at 21 NYCRR 507 establishes the rules for conducting auctions of CO<sub>2</sub> allowances to be administered by NYSERDA or its designee as part of the New York CO<sub>2</sub> Budget Trading Program.

New York has agreed to participate in uniform regional auctions for the allowances that it will be

offering for sale. As part of the regional auction process, New York has agreed to specific design elements of the auction. These include: reserve price, auction structure and format, allowance sale schedule, participation, unsold allowances, notice of auctions, monitoring, and auction results.

The Reserve Price represents the price below which no allowances will be sold at the auction. Its use is important for mitigating the potential for auction prices to clear significantly below current market prices, due to tacit or explicit collusion, weak competition, or to maintain a minimum rate of progress in reducing emissions below business as usual. Setting a Reserve Price can be accomplished in a variety of ways, including mechanisms that are, or are not, directly linked to current market prices.

Two primary objectives were considered in determining how to implement the Reserve Price. The first reflects the regulatory objective of the Program to drive emissions reductions in the capped sector below which would have otherwise occurred, while the second draws on observations of market transactions in order to protect auctions against the impacts of collusive behavior and weak competition. In order to protect the auctions from manipulation and to meet the Program's regulatory objectives, a hybrid reserve price mechanism was developed.

The hybrid reserve price mechanism includes two components: 1) a Minimum Reserve Price (MRP) of \$1.86 (adjusted for the Consumer Price Index); and 2) a Current Market Reserve Price (CMRP) that is 80 percent of the Current Market Price of a CO<sub>2</sub> Allowance for the particular allowance vintage year. The reserve price for each auction will be the higher of the Minimum Reserve Price or Current Market Reserve Price.

The first component of the hybrid reserve price mechanism, the Minimum Reserve Price of \$1.86, was established based on the ICF International's Integrated Planning Model. Some of the critical program impacts

evaluated with the model include CO<sub>2</sub> emission reductions achieved, projected CO<sub>2</sub> allowance prices, and projected impacts on electricity prices. According to the model, the projected CO<sub>2</sub> allowance price under the selected RGGI program design is \$2.32/ton (2009 dollars) at the beginning of the Program in 2009. Because the modeled value of \$2.32 is the expected Current Market Price for the first auction, it was determined that \$1.86, or 80 percent of the modeled value of \$2.32, will be Minimum Reserve Price. Taking into account the inherent variability associated with any complex electricity system modeling activity, a conservative value for the Minimum Reserve Price is used. This price will approximate the value of a CO<sub>2</sub> allowance at the first auction while at the same time promote achievement of the goals of the Program.

The second component of the hybrid reserve price mechanism, the Current Market Reserve Price, is 80 percent of the Current Market Price of a CO<sub>2</sub> Allowance for the particular allowance vintage year. A volume-weighted average of market transactions will be used to produce an estimate of the Current Market Price as defined in Part 242. Because both the quantity and price of any transferred allowances in the EATS system must be reported to the Department, these reported transactions should accurately reflect the Current Market Price of a CO<sub>2</sub> allowance. Additional reputable sources of information may also be used to determine the Current Market Price including, but not limited to, public indices of the current value of a CO<sub>2</sub> allowances, and previous auction results.

It was decided that 80 percent of the Current Market Price, will be used because it is far enough below the Current Market Price to account for reasonable and conservative short-term variation in allowance prices. (As a frame of reference, the Virginia NO<sub>x</sub> auction set its reserve price by taking 85-90 percent of the Current Market Price.)

Due to a low likelihood of viable secondary market data at the start of the Program, the first auction of current and future year allowances of the Program will both have a reserve price of \$1.86. Furthermore, if prior to any auction it is determined that no viable secondary market exists from which to determine the Current Market Price, the Department reserves the right to retain the Minimum Reserve Price.

In an effort to be as transparent as possible, The Department and the Authority will disclose the Reserve Price before every auction. An undisclosed reserve price would force bidders to guess the Reserve Price, increasing the likelihood of rejected bids.

Since insufficient demand for allowances and/or the utilization of a reserve price could result in unsold allowances, the Department considered several options for the disposition of unsold allowances from auctions. The first option considered was rolling all unsold allowances into the next auction(s) based on a pre-determined schedule; the second was to create a “contingency reserve” where States would not re-release unsold allowances until an auction closes above a (relatively high) specified price level. Once this condition is met, the contingency reserve allowances would be sold in the next quarterly auction. Other options that were considered include the retirement of unsold allowances and any combination of the aforementioned options.

In general, the retirement of allowances would tend to cause an increase in auction clearing prices because firms would strive to prevent allowances from being retired. The price impact will be more dramatic if unsold allowances are retired after each auction as opposed to retiring them at the end of the control period because of the induced temporal urgency felt by auction participants. Immediate retirement of allowances after each auction will undermine the intent of the temporal flexibility mechanisms incorporated into the Program, namely, three-year compliance periods and unlimited allowance banking.

In an effort to balance the desires of the flexibility mechanisms in the Program and to let the market work as efficiently as possible, all unsold allowances will be available for sale in auctions where the reserve price in effect is greater than the Minimum Reserve Price. Since unsold allowances may exist at the end of the first control period, the Department will decide whether to retire any unsold allowances from the first control period or to roll these allowances into auctions during the second control period.

### Value of CO<sub>2</sub> Allowances

In New York's deregulated electricity market, the value of emissions allowances are passed on as operating costs to the consumers of electricity whether the generators receive the allowances for free or pay for them.<sup>40</sup> This is true because the emissions allowance represents a commodity of value that must be consumed in order to operate the power plant. A plant operator will include the value of the allowances needed to operate in its electricity price because the value represents the opportunity cost of using the allowances to operate rather than selling the allowances on the market. Given this dynamic, allocating allowances to generators at no cost is not cost effective. Furthermore, the cost of the Program does not increase if the generators are required to purchase the allowances, because the generator incorporates the same dollar value of the allowance in its bid to supply electricity whether the allowance was obtained at no cost or through purchase on the open market. The EE & CET Allocation recognizes this economic reality and aims to avoid the inequity that occurs when consumers are required to pay for the emissions allowance as part of the cost of electricity even though the generators were given the allowance at no charge. Instead, the EE & CET Allocation ensures that the value of the allowances is used to promote the emissions reduction goals of the program through cost-effective energy efficiency and clean energy technologies, while simultaneously reducing the cost of the Program to

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<sup>40</sup> "Allocation of CO<sub>2</sub> Emissions Allowances in the Regional Greenhouse Gas Initiative Cap-and-Trade Program", Dallas Burtraw, Karen L. Palmer and Danny Kahn, June 2005.

consumers.<sup>41</sup>

## Allowance Set-Asides

The Department will also include a voluntary renewable energy market and long term contract set-aside allocation. Accordingly, the Department shall allocate 700,000 and 1,500,000 tons to the voluntary renewable energy market and long term contract set-aside accounts, respectively, from the CO<sub>2</sub> Budget Trading Program annual base budget.

A voluntary renewable energy purchase is a purchase of electricity from renewable energy generation or from renewable energy attribute credits by a retail electricity customer on a voluntary basis. Renewable energy includes electricity generated from biomass, wind, solar thermal, photovoltaic, geothermal, hydroelectric facilities certified by the Low Impact Hydropower Institute, wave and tidal action, and fuel cells powered by renewable fuels. The renewable energy generation or renewable energy attribute credits related to such purchases may not be used by the generator or purchaser to meet any regulatory mandate, such as an RPS.

The 700,000 ton voluntary renewable energy market set-aside was calculated using information from the renewable energy market as it relates to the Renewable Portfolio Standard with allowance for some market growth. The Department will monitor this set-aside to determine if any adjustments may be needed once the program is in operation.

The Department will retire CO<sub>2</sub> allowances in the voluntary renewable energy market set-aside account in an amount up to the number of tons requested by a voluntary renewable energy purchase applicant as

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<sup>41</sup> Analyses conducted by NYSERDA for the Department demonstrate that investments in energy efficiency have the effect of reducing electricity demand and the overall cost of the Program. <http://www.rggi.org/documents.htm>.

demonstrated to the satisfaction of the Department.

The Department developed the 1,500,000 ton long term contract set-aside based on actual emissions available to the Department for long term contract holders. The long term contract set-aside was created to provide allocations to CO<sub>2</sub> budget sources that can demonstrate, to the Department's satisfaction, that the long term contract was entered into prior to March 2006, that purchasing of allowances at auction or in the secondary market leads to substantial financial hardship, and that the CO<sub>2</sub> budget source's primary fuel is natural gas or the CO<sub>2</sub> budget source's CO<sub>2</sub> emission rate is no higher than 1100 lbs/MWhr.

Allowances awards under this set-aside will be limited to be the lesser of the CO<sub>2</sub> budget source's actual emission rate included in the application and 1100 lbs/MWhr. Allowances from this set-aside can only be used for compliance by the long term contract applicant and any allowances remaining at the end of an allocation year will be subtracted from the amount to be awarded for the next allocation year.

#### Summary of Needs and Benefits

New York's climate is already changing, in part as a result of emissions coming from burning fossil fuels to generate electricity. Reducing emissions will reduce the risk and magnitude of future changes in climate. The Program will reduce the emissions from New York power plants that cause and contribute to global climate change, while at the same time promote energy efficiency and clean renewable energy in the State. The offsets component of the Program will promote projects that improve New York's environment in other ways while reducing GHG gas emissions. The EE & CET Allocation will ensure that electricity consumers in a deregulated market receive the maximum benefits from the program at the least possible cost.

## COSTS

### Introduction

The Department sought input from NYSERDA and the New York State Department of Public Service (DPS) with respect to the costs and other impacts associated with compliance with the Program. The analysis provided by NYSERDA includes modeling of the electricity sector showing the impacts of RGGI. ICF International (ICF) was contracted by NYSERDA to perform the modeling analysis. ICF utilized the Integrated Planning Model (IPM®), a nationally recognized modeling tool that is used by EPA, state energy and environmental agencies, and private sector firms such as utilities and generation companies. The Department also analyzed the costs associated with state and local governments' compliance with the Program and considered analysis of the impacts the Program may have on the New York economy.<sup>42</sup>

### Costs to the Regulated Sources and the Public

The modeling analysis and review process was coordinated by NYSERDA staff, working closely with the Department and DPS staff, as well as staff from each regional Independent System Operator (ISO, a federally regulated regional organization which coordinates, controls and monitors the operation of the electrical power system of a particular state or region) staff and the RGGI Staff Working Group, consisting of energy and environmental representatives from all of the states participating in the Program.

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<sup>42</sup> "REMI Impacts for RGGI Policies based on the Std REF & Hi-Emission REF," by the Economic Development Research Group, dated November 17, 2005.

To estimate the potential impacts of the Program, IPM® was used to compare a future with the Program (Program Case) to a BAU Case that projects what the electricity system would look like if the Program were not implemented. The modeling assumptions and input data were developed through an extensive stakeholder process with representatives from the electricity generation sector, business and industry, environmental advocates and consumer interest groups. Modeling results were presented to stakeholders for review and comment throughout the process of developing the RGGI proposal.

Assumptions and sources of input data are specified in detail in the “Assumption Development Document: Regional Greenhouse Gas Initiative Analysis.”<sup>43</sup> Key assumptions and data include regional electricity demand, load shapes, transmission system capacities and limits, generation unit level operation and maintenance costs and performance characteristics, fuel prices, new capacity and emission control technology costs and performance characteristics, zonal reliability requirements, reserve margins, RPS requirements, national and state environmental regulations, and financial market assumptions. All estimates are based on 2003 dollars. Regional electricity demand growth projections, transmission capacities and limits, and near-term expected infrastructure additions/retirements were provided by the regional ISOs. Long range Henry Hub natural gas prices, based on forecast data from Energy and Environmental Analysis, Inc. were projected to be approximately \$7/MMBtu (constant 2003 dollars).

Building new coal-fired and nuclear plants were precluded as an economic choice to meet projected capacity shortfalls within the RGGI region. However, a 600 MW Integrated Gasification Combined Cycle (IGCC) coal plant with 50 percent carbon capture capability was assumed to be operational in upstate New York by 2018 in response to the State’s Advanced Clean Coal Power Plant Initiative. New nuclear units were also precluded outside the RGGI region. A national 3-pollutant policy (SO<sub>2</sub>, NO<sub>x</sub> and mercury) that

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<sup>43</sup> The modeling assumptions document and the tabular results for each modeling run are located at <http://www.rggi.org/documents.htm>.

approximates the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR) is assumed as well as the achievement of RPS in individual states.

Under the BAU Case, generation from new gas-fired combined cycle units is projected to supply most of the growing electricity demand. Electric generation from gas-fired plants in New York is projected to approximately double from 36,307 Gigawatt hours (GWh) in 2006 to 64,934 GWh in 2021. (However, note that as recently as 1999, New York's gas-fired generation reached as high as 46,000 GWh.) Generation from new renewable resources (primarily wind units) is projected to increase significantly in response to RPS requirements. While nuclear generation is projected to increase by about two percent between 2006 and 2021 due to capacity up-rates at existing plants, generation from coal-fired plants is projected to increase by about 17 percent between 2015 and 2018 with the addition of the new proposed IGCC plant. Finally, generation from existing oil/gas steam units is projected to decrease over time, as a result of displacement by lower-cost electricity from new gas-fired units.

Net imports of electricity into New York are projected to decrease from approximately 21,000 GWh in 2006 to approximately 10,000 GWh in 2021. Underlying the projected decrease in net imports to New York is the increasing reliance on generation from new gas-fired units in neighboring Mid-Atlantic States. Generally, electricity flows from one region to another because of price differentials between those regions. As gas-fired generation increasingly sets market-clearing electricity prices in neighboring states, their electricity prices increasingly approach those of New York, where electricity prices are already largely determined by gas-fired generation.

CO<sub>2</sub> emissions in the BAU Case are projected to increase from approximately 52.9 million tons in 2006 to about 58.6 million tons in 2021. This increase is due primarily to the addition of new gas-fired power plants

to meet projected load growth, but also includes the emissions from the new IGCC coal plant. There are several factors that contribute to the result showing that BAU emissions from the model in 2006 are lower than actual CO<sub>2</sub> emissions reported to both the EPA and the Department over the period 2000 through 2004. The first is the use of total on-site emissions from cogeneration. Actual emissions reports to EPA and the Department are inclusive of on-site emissions while the modeling analysis reflects only the emissions associated with the electricity provided to the grid. A second contributing factor is an upward bias in emissions recorded by continuous emissions monitoring systems as reported to EPA.<sup>44</sup> As a result, it is expected that emissions reported to EPA are on the order of two to 10 percent higher than actual emissions. In contrast, the modeling analysis was based on carbon emissions factors that are not subject to systematic errors in measurement. Lastly, significant changes to the electricity sector also contribute to the difference between BAU emissions and 2000 to 2004 actual emissions. These include the addition of new natural gas-fired combined cycle capacity and new renewable resources as well as the updating of existing nuclear units.

Several assumptions were made to project the impacts of the Program in the Program Case. The Program was applied to electricity generators 25 MW and larger in nine northeastern and mid-Atlantic states including New York, Maine, New Hampshire, Vermont, Connecticut, New Jersey, Massachusetts, Rhode Island and Delaware. For modeling purposes, the proposed initial CO<sub>2</sub> cap is assumed to be “current” emission levels. The initial cap level, stabilizing emissions at current levels, is implemented in 2009 through 2015. From 2015 until 2019, the cap is reduced linearly so that emission levels in 2019 are capped at 10 percent below current levels. The Program Case allows a limited number of emissions offsets to be purchased by affected generators and used for compliance. The Program Case assumes that all RGGI states extend current annual levels of public benefit expenditures on end-use energy efficiency programs through 2025. Further, the public benefit

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<sup>44</sup> Russel S. Berry and Jack C. Martin (RMB consulting and Research, Inc.) and Charles E. Dene (Electric Power Research Institute). “CEMS Analyzer Bias and Linearity Effects Study.” [rmb-consulting.com/newpaper/cable/cable.htm](http://rmb-consulting.com/newpaper/cable/cable.htm).

programs are assumed to continue to deliver annual electricity end-use reductions at the same incremental cost as reported in most recent years. This assumption results in regional electricity demand in each year being lower in the Program Case than in the BAU Case.

Several types of results between the Program Case and the BAU Case are compared including generation mix, net electricity imports, changes in generation capacity, CO<sub>2</sub> emissions, CO<sub>2</sub> allowance prices, and wholesale and retail electricity price impacts.

The generation mix in New York under the Program Case reflects the continuation of energy efficiency projects and the change in build mix. Electricity generation from gas-fired units in 2021 is about 10,600 GWh or 16 percent lower in the Program Case than in the BAU Case. Net imports into New York in 2021 are projected to be about 4,000 GWh or 40 percent higher in the Program Case than in the BAU Case. However, the projected imports in 2021 in the Program Case are about 7,000 GWh or 33 percent lower than BAU Case imports in 2006. The total electricity requirement (generation plus net imports) is lower in the Program Case by about 7,000 GWh (3.7 percent) in 2021, due to the higher level of end-use energy efficiency expenditures assumed in the Program Case.

Relative to the BAU Case, total capacity additions in the Program Case are 757 megawatts lower (10 percent) in 2015 and 918 megawatts lower (eight percent) in 2021. The block of avoided capacity additions due to RGGI is comprised almost entirely of gas-fired combined-cycle units.

CO<sub>2</sub> emissions from New York generators are projected to be 5.1 million tons (8.7 percent) lower in 2021 for the Program Case as compared to the BAU Case. The initial cap level, which stabilizes emissions at current levels, is proposed to be implemented in 2009 through 2015. From 2015 until 2019, the cap is reduced

linearly so that emission levels in 2019 are capped at 10 percent below current levels. CO<sub>2</sub> emissions from the electricity sector are projected to remain approximately flat between 2006 and 2021, rather than decreasing, as might be suggested by the decreasing cap level over the last five years of this period. This result is expected because RGGI-affected sources are allowed to bank emission allowances in the early years of the policy for use in later years when the cap becomes more stringent. Further, a portion of the cap is projected to be achieved by the use of offsets based on emission reduction projects implemented in sectors outside the electricity sector. Through 2021, about 70 percent of the CO<sub>2</sub> emission reductions resulting from RGGI are projected to be achieved by on-system reductions by the electricity sector, while about 30 percent are projected to be achieved by purchasing emission offsets.

CO<sub>2</sub> allowance prices (the cost of complying with RGGI) are projected to increase from approximately \$2/ton in 2009 to about \$3.00/ton in 2015 and about \$4.45/ton in 2021. The availability of emissions offsets to meet a limited portion of the emission reduction requirement (as allowed by the Program) contributes significantly to maintaining CO<sub>2</sub> allowance prices below the \$7/ton offset expansion threshold specified.

Under the Program Case, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.04/MWh higher in 2015 and \$1.51/MWh higher in 2021, than the BAU Case. RGGI is projected to increase wholesale electricity prices by about 1.6 percent in 2015 and 2.4 percent in 2021. For a typical New York residential customer (using 750 kWh per month), the projected increase in wholesale electricity prices in 2015 (1.6 percent) translates into a monthly retail bill increase of about 0.7 percent or \$0.78. In 2021, the projected increase in wholesale electricity prices (2.4 percent) translates into a monthly residential retail bill increase of about 1.0 percent or \$1.13. For commercial customers, the projected retail price impact of RGGI is about 0.9 percent in 2015 and 1.2 percent in 2021. For industrial customers, the projected retail price

impact of RGGI is about 1.7 percent in 2015 and 2.4 percent in 2021.<sup>45</sup>

The analysis conducted by ICF did not identify any New York generation facilities as candidates for retirement due to the costs imposed by the Program. DPS, NYSERDA and the Department developed a two phase analysis to test that result. The analysis focused on generating units that are considered necessary to the reliable operation of New York State's bulk power system. The selection of those units was based on provisions in the New York State Reliability Council's reliability rules which require their operation under certain conditions.

The first phase of the analysis was performed by DPS using plant specific data, combined with zone-specific modeling output (i.e. projected kWh, energy prices, etc.) from IPM®. This assessment predicted that the Program would result in small decreases in net operating revenue for certain of the units being studied while others actually did better under a future with RGGI, and supported ICF's conclusion that the units would not retire. The second phase of the analysis conducted by DPS consisted of more detailed modeling with General Electric's MAPS model. The second phase analysis confirmed the results of the first phase analysis. In summary, the two-phase reliability analysis concluded that the Program would not adversely affect system reliability.

A macro-economic impact study of the Program was also conducted at the direction of the RGGI state agencies through the Massachusetts Division of Energy Resources to estimate the potential impact of the Program on the economies of participating states. The study used a computer model called the Regional

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<sup>45</sup> Average electricity prices from NYSERDA, 'Patterns and Trends' (December 2005). Regional Greenhouse Gas Initiative (RGGI): New York Electricity Sector Modeling Results, September 26, 2006, DRAFT.

Economic Models, Inc. (REMI) model.<sup>46</sup> The study concluded that the economic impacts of RGGI on the economies of the participating states, including New York, were very small and generally positive.

#### Costs to State and Local Governments

In addition to the costs identified for regulated parties and the public, state and local governments will incur costs. The Jamestown Board of Public Utilities (JBPU), a municipally owned utility, owns and operates the S.A. Carlson Generating Station (SACGS). Since the emissions monitoring at SACGS currently meets the monitoring provisions of the Program, no additional monitoring costs will be incurred.

Notwithstanding this, the JBPU will need to purchase allowances equal to the number of tons emitted. The Department limited the analysis of control costs to the purchase of allowances to comply with the Program and assumed the costs of allowances will be \$3 per ton for CO<sub>2</sub>.<sup>47</sup> To estimate total costs for SACGS under the Program, the Department reviewed 2002 through 2004 emissions from Jamestown's affected unit. The highest emissions from the affected unit during that time frame were approximately 41,772 tons. Purchasing allowances to cover emissions will result in estimated costs of approximately \$125,000 annually. These costs will eventually be passed on to the consumers of electricity from the JBPU.

The JBPU has a range of compliance options open to it and can utilize the flexibility inherent under the Program to comply. Since the Program has a three year control period with the compliance obligation at the end of the control period, the emission peaks associated with electricity generation will be averaged out and more long term planning options will be available to SACGS. In addition, the Program allows affected sources

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<sup>46</sup> REMI.

<sup>47</sup> Regional Greenhouse Gas Initiative (RGGI): New York Electricity Sector Modeling Results, September 26, 2006, DRAFT.

to offset up to 3.3 percent of their emissions utilizing reductions from emission categories outside of the regulated sector.

There also will be costs associated with the administration of the Program. First and foremost, the Department will incur costs associated with the implementation of the Program. The Department will review monitoring plans submitted to comply with the requirements of the Program and will also need to analyze data submitted to EPA to determine emissions and compliance obligations under the program. The Department will need sufficient staff to: review requests for early reduction allowances; submit allocation award requests to its agent to execute; modify permits and inspect the affected sources, including the continuous emission monitors; and analyze the Program to determine its efficacy.

It is estimated that between 10 and 15 people will be required to permit, inspect and administer the requirements of the Program across the State. To determine the net increase in cost to the Department associated with this requirement, the Department will first evaluate the programs that are already in place to determine what resource additions will be needed. Since all of the facilities impacted by the regulation are already required to obtain Title V permits pursuant to Part 201, the Program will require modifications to these existing permits but it is not anticipated that staff time will increase significantly. Further, all Title V facilities are currently required to have facility evaluations to determine compliance with all of the requirements in the permit. These annual evaluations currently look at compliance with reporting and monitoring requirements of Title IV and the requirements of Parts 227-3, 204, 237 and 238.

In addition to the traditional program activities associated with reviews, permitting, inspection and compliance, the Department will also need to administer the offset provisions in the Program. These provisions require the Department to review and approve consistency applications, and to monitor and verify reports submitted by offset project sponsors. The Department's administration of the offsets component of the Program

will be supported by the regulatory requirements that all consistency applications contain independent verification reports, completed by independent verifiers, which certify the adequacy of the documentation and the information provided. This same independent verification is required for all monitoring and verification reports submitted by project sponsors. The administrative aspects of the regulation and central office support for permitting and compliance activities will need to increase beyond current levels, but not significantly. Additional staff will be required to administer the offsets provisions of the regulations. The Department estimates that between five and eight person years (the full time equivalent of working 100 percent on a project for a full work year expressed as 220 days) will be required to implement all aspects of the Program at a cost of \$110,000 per person year or up to \$880,000 annually.

The Department will also need to reimburse its agent for its costs in administering the emission and allowance tracking and reporting system. Based on contractor costs associated with the administration of the Acid Deposition Reduction Program (ADRP) under Parts 237 and 238, the Department estimates that the capital start up costs for designing and implementing a regional system for tracking CO<sub>2</sub> allowance transactions will be between \$500,000 and \$950,000. The Department is currently contracting with an agent to administer the ADRP program and the annual operating costs for the administration of the emission and allowance tracking and reporting system under that program are approximately \$160,000. The Department estimates that administration of a regional system will be between \$150,000 and \$300,000.

In development of the ADRP system, the Department utilized a software package developed by EPA. The Department was able to leverage the investments made by EPA in this system to offset the costs for developing a tracking system on its own. The Department anticipates that further investment by EPA in that software, coupled with the Department's investment in its own system, will reduce capital start-up costs under the Program. These costs will be further mitigated by the regional nature of RGGI and the facts that the costs

associated with system development will be spread among all participating states. Depending on the extent to which the Department is able to rely on regional cooperation to achieve economies of scale, all costs associated with the Program may be reduced.

### LOCAL GOVERNMENT MANDATES

The JBPU, a municipally owned public utility, owns and operates the SACGS. There is one combined cycle turbine at the SACGS that is subject to the Program. No other additional record keeping, reporting, or other requirements will be imposed on local governments under this rulemaking.

### PAPERWORK

The owners and operators of each source subject to the Program and each unit at the source shall keep each of the following documents for a period of ten years from the date the document is created.

- 1) The account certificate of representation form.
- 2) All emissions monitoring information. CO<sub>2</sub> budget sources will be required to report emissions and allowance transfers via electronic means. This will minimize the paperwork burden on sources.
- 3) Copies of all reports, compliance certifications, and other submissions and all records made or required under the Program.
- 4) Copies of all documents used to complete a permit application and any other submission under the Program or to demonstrate compliance with the Program.
- 5) Copies of all documents used to complete a consistency application and monitoring and verification report to demonstrate compliance with the offset provisions of the Program.

- 6) Copies of all documents required as part of an auction application.

For each control period in which one or more units at a source are subject to the CO<sub>2</sub> budget emission limitation, the CO<sub>2</sub> authorized account representative of the source shall submit to the Department, a compliance certification report for each source covering all such units. This must be submitted by the March 1<sup>st</sup> following the relevant control for the units subject to the Program.

#### DUPLICATION

The emissions monitoring and reporting requirements of the Program are identical to those of the Title IV program and Part 237. This allows sources to utilize the emissions monitoring and reporting done for both programs to comply with the monitoring and reporting requirements of the Program.

#### ALTERNATIVES

The Department examined the alternative of an emission rate based program for CO<sub>2</sub> to the cap-and-trade structure of the Program that could conceivably be used to achieve equivalent emissions reductions. This alternative is a command-and-control regulatory structure which the Department concluded is less cost-effective and more difficult for sources to implement than the Program. The Department also determined that an emission rate program would be no more protective of the public health and the environment.

The following passage succinctly and accurately describes the basic distinctions between a market-based regulatory program like the Program and a command-and-control program like the alternative considered by the Department.

Market-based instruments are regulations that encourage behavior through market signals rather than through explicit directives regarding pollution control levels or methods. These policy instruments, such as tradable permits or pollution charges, are often described as “harnessing market forces” because if they are well designed and implemented, they encourage firms (and/or individuals) to undertake pollution control efforts that are in their own interests and that collectively meet policy goals.

By way of contrast, conventional approaches to regulating the environment are often referred to as “command-and-control” regulations, since they allow relatively little flexibility in the means of achieving goals. Such regulations tend to force firms to take on similar shares of the pollution-control burden, regardless of the cost. Command-and-control regulations do this by setting uniform standards for firms, the most prevalent of which are technology-based and performance-based standards. Technology-based standards specify the method, and sometimes the actual equipment, that firms must use to comply with a particular regulation. A performance standard sets a uniform control target for firms, while allowing some latitude in how this target is met.

Holding all firms to the same target can be expensive and, in some circumstances, counterproductive. While standards may effectively limit emissions of pollutants, they typically exact relatively high costs in the process, by forcing some firms to resort to unduly expensive means of controlling pollution. Because the costs of controlling emissions may vary greatly among firms, and even among sources within the same firm, the appropriate technology in one situation may not be appropriate (cost-effective) in another. Thus, control costs can vary enormously due to a firm’s production design, physical configuration, age of its assets, or other factors.

Furthermore, command-and-control regulations tend to freeze the development of technologies that might otherwise result in greater levels of control. Little or no financial incentive exists for businesses to exceed their control targets, and both technology-based and performance-based standards discourage adoption of new technologies. A business that adopts a new technology may be “rewarded” by being held to a higher standard of performance and not given the opportunity to benefit financially from its investment, except to the extent that its competitors have even more difficulty reaching the new standard.<sup>48</sup>

With an emission rate based program, the Department would have to determine appropriate control requirements for each applicable source and enforce compliance with those requirements. The cost of complying with an emission rate program would be higher than with a trading program because the marginal cost for some sources to remove the last tons of CO<sub>2</sub> can be significant. A trading program allows sources with

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<sup>48</sup> ‘Experience with Market-Based Environmental Policy Instruments’, Robert N. Stavins, Resources for the Future, November 2001 (footnotes omitted), pp.1-2. See also ‘Air Pollution: Overview and Issues on Emissions Allowance Trading Programs’, U.S. General Accounting Office, GAO/T-RCED-97-183, July 9, 1997, p. 2.

high implementation costs to seek out other sources with low implementation costs and purchase excess allowances from those sources, thereby reducing the overall cost of control. Studies have shown that the use of a trading program can result in a savings of at least 25 percent.<sup>49</sup> An emission rate based program cannot impose a cumulative statewide emissions cap on mass emissions. Therefore, the Program would need to be initially designed with a sufficient safety margin to accommodate growth in the electricity generating industry so that estimated emissions from the entire industry sector might remain close to the goals of the Program over time. An emission rate based program must be continually evaluated to determine if the environmental goals of the Program are still being met. If the goals are exceeded then the emission rates in the Program would need to be adjusted. A trading program which caps emissions at a certain level provides assurances that the goals of the Program are met.

Another advantage of using a trading program, as proposed in the Program, is the utilization of the emission monitoring and reporting systems developed for the Title IV program, the NO<sub>x</sub> SIP Call and more recently in CAIR. New York utilized federal emissions monitoring and reporting in the ADRP, implemented as Parts 237 and 238, as well. This allows sources to use the emission monitoring and reporting systems already in operation. The Department will not need to establish an independent system to accept electronic emission reports and sources will not have to provide duplicative information. The Department will be required to establish an allowance tracking system for the Program; this system would be virtually identical to the system developed by the Department under Parts 237 and 238. Sources and the Department are already familiar with that system's operation which should ease the transition into the Program.

The Department also considered a number of variations of the emissions cap-and-trade construct that

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<sup>49</sup> 'An emerging market for the environment: A Guide to Emissions Trading', United Nations Environment Programme and United Nations Conference on Trade and Development, p.7.

could share many or most of the features of the Program as proposed. These alternatives included: (1) a New York only trading program; (2) allocating allowances to generators at no cost; and (3) applicability to smaller sources.

New York has demonstrated that a State only cap-and-trade program can be successful with the implementation of the ADRP. At the time of its conception there were no Federal actions and consensus could not be reached regionally regarding how to further reduce emissions of SO<sub>2</sub> and NO<sub>x</sub> from electric generating facilities. Conversely, for CO<sub>2</sub>, the lack of Federal action and limited state action prompted New York to evaluate the potential for national, regional and state-only programs to address GHG emissions from the electric generating sector. The continued lack of commitment on the Federal level resulted in the development of a regional strategy to reduce CO<sub>2</sub> emissions from the electric generating sector. While the Department has demonstrated that a State-only program can be successful, the commitment by seven States to implement a regional cap-and trade program resulted in the selection of a regional program. This choice will result in greater emission reductions, will increase the overall effectiveness of the Program, and will enhance the economic benefits to affected sources that result from a larger allowance market. Given the commitments and economic advantages to affected sources, the Department opted not to pursue a state-only trading program at this time.

The Department considered and rejected an allocation methodology for CO<sub>2</sub> Program allowances, which would have given allowances to generators at no cost. This could have been accomplished using a number of different specific approaches, including allocating allowances based on a source's output of electricity, or based on a source's heat input. Instead, the Department is proposing to create the EE & CET Allocation.

As discussed above, in New York's deregulated electricity market, the value of emissions allowances are passed on as operating costs to the consumers of electricity whether the electric generators receive the

allowances for free or pay for them.<sup>50</sup> This is true because the emissions allowance represents a commodity of value that must be consumed in order to operate the power plant. A plant operator will include the value of the allowances needed to operate in its electricity price because the value represents the opportunity cost of using the allowances to operate rather than selling the allowances on the market. Given this dynamic, allocating allowances to generators for free is neither cost effective nor good public policy. Furthermore, the cost of the Program does not increase if the generators are required to purchase the allowances, because the generator incorporates the same dollar value of the allowance in its bid to supply electricity whether the allowance was obtained at no cost or through purchase on the open market. The EE & CET Allocation recognizes this economic reality and aims to avoid the inequity that occurs when consumers are required to pay for the emissions allowance as part of the cost of electricity even though the generators were given the allowance at no charge. Instead, the EE & CET Allocation ensures that the value of the allowances is used to further the emissions reduction aims of the program through cost-effective energy efficiency and clean energy technologies, while simultaneously reducing the cost of the Program to consumers.<sup>51</sup>

The Department originally considered including all electricity generators of 15 megawatts in the Program but ultimately chose to limit the applicability under the Program to electric generators of 25 megawatts and larger. Since these smaller units (less than 25 megawatts) have a small impact on overall CO<sub>2</sub> emissions, the Department decided not to make them subject to the Program.

## FEDERAL STANDARDS

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<sup>50</sup> “Allocation of CO<sub>2</sub> Emissions Allowances in the Regional Greenhouse Gas Initiative Cap-and-Trade Program”, Dallas Burtraw, Karen L. Palmer and Danny Kahn, June 2005.

<sup>51</sup> Analyses conducted by NYSERDA for the Department demonstrate that investments in energy efficiency have the effect of reducing electricity demand and the overall cost of the Program. <http://www.rggi.org/documents.htm>.

The primary air contaminant from power plants that most greatly influences global climate change is CO<sub>2</sub>. Since the Industrial Revolution in the mid-19th century, human activities, particularly fossil fuel combustion and changes in land use patterns, have caused an unprecedented increase in GHG including CO<sub>2</sub>, the underlying cause of global climate change. There are currently no federal standards that limit CO<sub>2</sub> emissions from the electricity generating sector. The Program will reduce CO<sub>2</sub> emission from electric generating sources to 10 percent below current levels by 2019.

In response to the need to reduce GHG and the lack of a national program, the Department has determined that fossil fuel-fired electricity generators will have to reduce emissions of CO<sub>2</sub>. While these reductions may not solve the problem and national and international efforts are needed, the efforts being undertaken by the northeast states will slow the rate and magnitude of climate change and, thereby, reduce the risk of injury to the northeast states and their citizens and residents from climate change.

In order to obtain emission reductions from fossil fuel-fired electricity generating sources, the Department evaluated programmatic impacts on regulated sources and the State's electrical grid. After reviewing alternatives, the Department determined that a cap-and-trade program provided the most flexibility for obtaining the environmental goals. The cap assures that the State's emission reduction goals are met, while allowance trading provides flexibility for subject sources to choose the most cost effective method of complying with the program. These methods may include efficiency improvements, investments in new technologies, acquisition of allowances, or some combination of investment/improvement and allowances.

As an environmental leader, New York has participated in efforts to develop national emissions reduction programs for CO<sub>2</sub>. The Department recognizes the benefits of a national program and will continue to

participate on national and regional initiatives to encourage the development of such programs. In the event that a national market based trading program is developed, it will be rigorously reviewed for consistency and timing of the Program.

## COMPLIANCE SCHEDULE

The Program will require affected sources and units to comply with the emission limitations of the Program beginning with the first three year control period (2009, 2010 and 2011). In order to meet the necessary permit requirements, the authorized account representative of each CO<sub>2</sub> budget unit shall submit a complete application for a facility operating permit or a modification to an existing permit in accordance with the provisions of 6 NYCRR Parts 201 and 621.

Each year, the owners and operators of each source subject to the Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than the total tons of CO<sub>2</sub> emissions for the control period. A unit is subject to this requirement starting on the later of January 1, 2009 or date the unit commences operation.

For each control period in which a CO<sub>2</sub> budget source is subject to the Program, the CO<sub>2</sub> authorized account representative of the source must submit to the Department by the March 1<sup>st</sup> following the relevant control period, a compliance certification report for each source covering all such units.