

***Environmental Impact and Regulation
of Energy Systems Issue Brief
New York State Energy Plan 2009***

December 2009

1 Overview

This Issue Brief summarizes the State’s environmental regulatory policies related to the energy sector, describes the implementation of those policies and discusses the impact of environmental regulation on New York’s production and use of energy.¹ Building upon the environmental management programs already in place, this Issue Brief contains recommendations to reduce energy consumption and minimize the environmental footprint of energy choices in order to combat climate change, reduce exposure to pollutants and build sustainable communities while supporting New York’s economy.

Governor Paterson’s Executive Order establishing the State Energy Plan acknowledged that energy production and use affects the health of New Yorkers and the environment, that society must still produce and use energy in order to function and wisely required that the State prepare a 10-year plan that will meet the multiple objectives of protecting the environment and public health while providing for adequate and reliable energy systems.

National and state environmental laws and regulations have been developed over several decades to prevent or minimize impacts to the environment from all forms of pollution, including air emissions, ground and surface water discharges, and the placement of compounds and substances on and under the ground. Environmental laws and regulations are the tools used by governments to minimize the impacts of built systems on human health and the environment. Although such tools have not been developed specifically for the energy sector, the energy sector is one of many sectors that are managed with these tools.

Energy conservation and efficiency programs minimize potential adverse impacts and are an essential component of a comprehensive, synergistic approach to reducing energy demand while meeting energy needs. New local sources of clean energy, targeted modernization of supply-side infrastructure, and renewable energy can greatly reduce greenhouse gas (GHG) emissions and other pollutants, and are an important component in meeting the State’s economic and energy needs. However, these technologies should be developed and deployed so as to avoid or minimize adverse impacts on the natural environment.

Climate change is one of the most significant energy-related, environmental matters facing the State, the nation and the world. For this reason, the Climate Change Issue Brief discusses the broad range of impacts associated with GHG emissions as well as climate issues. The energy-related emissions portion of this Issue Brief will primarily deal with pollutants other than GHGs.

New York’s rigorous environmental management is designed to position New York as a leader in creating and maintaining a healthy and safe environment in which people, ecology and industry can flourish.

¹ A list of the key environmental laws, regulations, policies, and initiatives that State entities follow in regulating the development and use of the various segments of the energy system is included in Appendix A.

2 Environmental Management of the Energy System

2.1 Overview

The combustion of fossil fuels introduces air pollutants into New York from a variety of sources. Some pollutants are transported into the State from upwind states and countries. Within the State, air pollution is created by the electric sector, the transportation sector, and the industrial, commercial, institutional, and residential sector heating and cooling needs.

New York's environment suffers from the effects of acid rain and nitrogen and mercury deposition caused in part by emissions from the electric and industrial sectors. Power plants in the eastern United States and Canada are the largest source of the emissions that cause acid rain: nitrogen oxides (NO_x) and sulfur dioxide (SO₂). Nationally, power plants emit roughly 20 percent of the NO_x and 66 percent of the SO₂ emissions. New York's power plants are responsible for about 13 percent of the NO_x and 52 percent of the SO₂ emissions in the State, requiring regional collaborations/initiatives.² The Adirondacks are the among the most acid deposition sensitive areas in North America. In addition, the Catskill Mountains and Alleghany and Hudson Highlands have experienced adverse environmental impacts from acid rain.³ Nitrogen deposition contributes to eutrophication⁴ of water bodies, including the Long Island Sound, and in soils, increases plant vulnerability to pathogens and alters plant species composition.⁵

Emissions from coal-fired plants are the largest source of mercury found in the waters of New York. The 10 coal-fired power plants in New York contribute to this pollution as do air-borne emissions from out-of-state sources located upwind of New York. Because elevated levels of mercury and other contaminants pose an adverse health risk, the Department of Health (DOH) regularly issues advisories regarding the consumption of sportfish by the general population. DOH has recommended that infants, children under the age of 15, and women of child-bearing age not consume sportfish from certain water bodies in New York.⁶

2.2 Air Quality Matters

As shown in Appendix A, the Department of Environmental Conservation (DEC) has a primary charge to develop and implement plans to reach and maintain attainment with the National Ambient Air Quality Standards (NAAQS). DEC carries out this charge by developing emission inventories, promulgating

² DEC. *New York State Implementation Plan for PM_{2.5} (Annual NAAQS), Draft Proposal, p.5-1* April 2008.

³ Driscoll, C., et al. *Mercury Contamination in Forest and Freshwater Ecosystems in the Northeastern United States*. Bioscience 57(1). 2007. <http://www.hubbardbrookfoundation.org>

⁴ Eutrophication is characterized by an abundant accumulation of nutrients that support a dense growth of algae and other organisms, the decay of which depletes the shallow waters of oxygen during hot weather conditions.

⁵ A Partnership to Restore and Protect the Sound. *The Long Island Sound Study*. 2008. http://www.longislandsoundstudy.net/research/2009_needs_assessment%20final.pdf

⁶ DOH. Chemicals in Sportfish and Game: 2009-2010 Health Advisories. <http://www.health.state.ny.us/nysdoh/fish/docs/fish.pdf>

regulations and emission standards and enforcing such regulations and standards through permitting and inspection activities. Further, DEC maintains a monitoring network to collect real-time air quality data throughout the State in order to measure air quality and determine the effectiveness of its plans and to determine whether additional actions are necessary in order to comply with the NAAQS. As of 2008, certain areas of the State are still not in compliance with the NAAQS for fine particulate matter (PM_{2.5}) and ground-level ozone. Ozone is formed through complex photochemical reactions between NO_x and volatile organic compounds (VOCs). PM_{2.5} is either directly emitted or formed in the atmosphere as a result of emissions of NO_x, SO₂, organic carbon, and ammonia.

New York has been at the forefront of implementing programs to control air pollution for several decades. Most notably, New York was the first state to take action to reduce emissions that cause acid rain with the 1984 State Acid Deposition Control Act. This ground-breaking legislation showed the way for the acid rain provisions in the 1990 Clean Air Act Amendments. The 1990 Clean Air Act Amendments required a number of control strategies, but more needed to be done to address the continuing non-attainment of ozone, PM, and carbon monoxide NAAQS; the acid rain that still impacts the Adirondacks and other sensitive areas of the State; the visibility impairment obscuring the beautiful vistas of New York both rural and urban; and, the toxic air emissions that effect the health of all New Yorkers. New York has been a leading state in adopting air pollution control programs, including the California Low Emissions Vehicle standards, the Ozone Transport Commission (OTC) NO_x Budget Program that led to the U.S. Environmental Protection Agency (EPA) NO_x Budget Program, the State Acid Deposition Reduction Program that was the model for the Clean Air Interstate Rule, and the mercury reduction program for coal fired electric generating units.

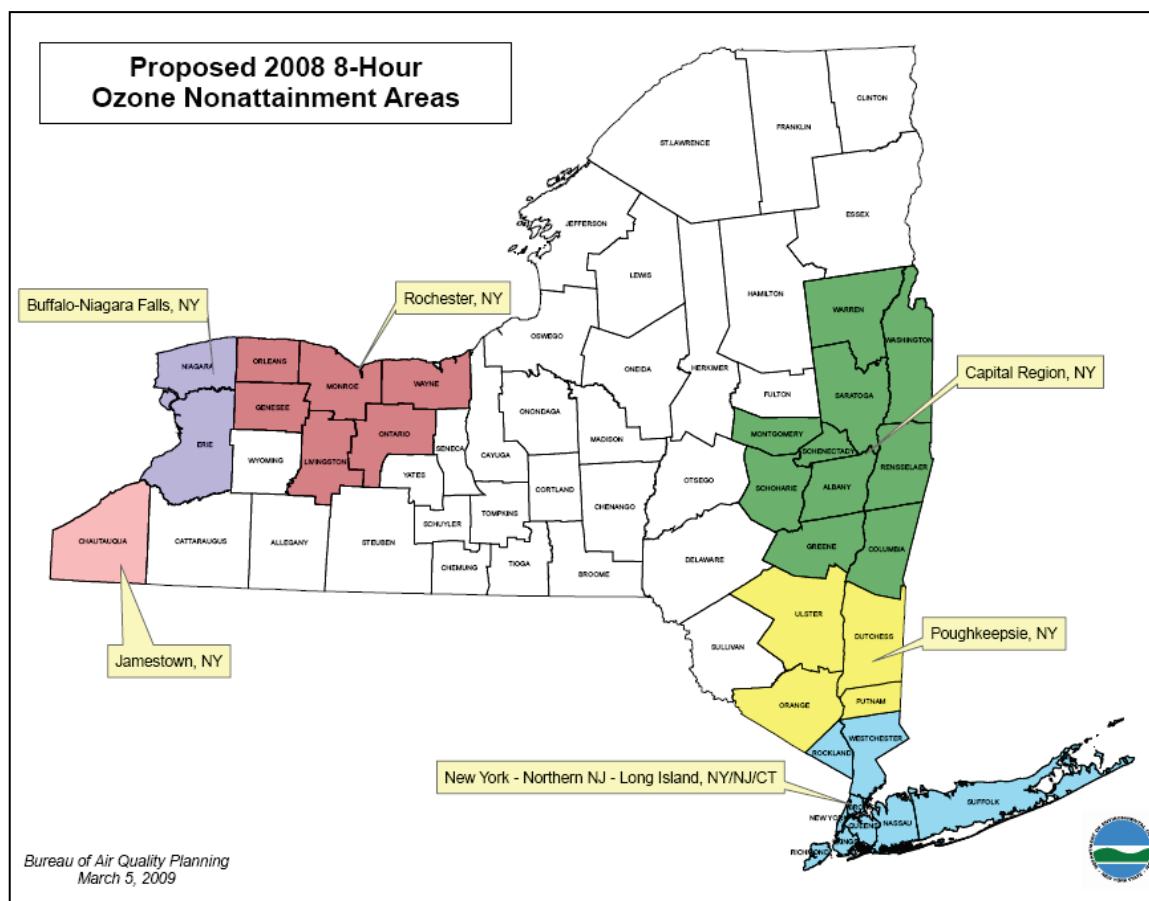
As a result of the above efforts, overall emissions of NO_x and SO₂ from fossil fuel fired power plants have been reduced substantially while keeping implementation costs low. SO₂ emissions have declined from 414,789 tons in 1990 to 107,211 tons in 2007, a reduction of 74 percent. NO_x emissions have been reduced from 120,138 tons in 1995 to 40,818 tons in 2007, a reduction of 66 percent. This was accomplished while fuel use increased by 23.5 percent since 1995. The mercury reduction program for coal fired power plants will result in an estimated reduction of 85 to 90 percent in mercury emissions from these sources when fully implemented in 2015.

Though substantial air quality improvement has been measured in the last 20 years as a result of air pollution control strategies, further reductions in New York and upwind areas throughout the eastern U.S. and Canada are needed to improve air quality for meeting the NAAQS and mitigate the impacts of acid rain and mercury deposition. New York is currently monitoring levels that exceed the NAAQS for ozone in Buffalo-Niagara Falls, Rochester, Jamestown, Albany-Schenectady-Troy-Saratoga, Poughkeepsie, and New York City metropolitan areas. In March 2009, the DEC recommended to EPA that these areas be designated non-attainment with the 2008 ozone NAAQS. Figure 1 is a map of the State with the recommended ozone non-attainment areas shown. The New York City metropolitan area air quality does not meet either the annual or the 24-hour NAAQS for PM_{2.5}. Further steps will be needed to bring New York into compliance with the new, more stringent ozone and PM NAAQS in the 2013-2014 timeframe.⁷

⁷ It should also be noted that the U.S. Courts of Appeals for the District of Columbia Circuit has remanded the annual PM_{2.5} NAAQS back to EPA for reconsideration. In its February 24, 2009 decision, the Appellate Court told EPA that it failed to adequately explain its decision not to revise the 15 µg/m³ annual NAAQS, “in view of the risks passed by short-term exposures and the evidence of morbidity resulting from long-term exposures.” In addition, the court decided that EPA did not indicate “how the standard will adequately reduce risks to the elderly or to those with certain heart or lung diseases...” If EPA were to reduce the annual PM_{2.5} NAAQS in its response to the remand, it is almost certain that additional measures will be required to attain this standard. Likewise, EPA has announced that it is reconsidering the ozone standard in response to a petition from environmental groups that it is not adequately protective.

In March 2009, the DEC sent recommendations on designations under the 2008 ozone NAAQS to EPA. DEC recommended that the New York City, Poughkeepsie, Capital District, Rochester, Buffalo-Niagara Falls, and Jamestown areas be designated non-attainment. The extent of the areas recommended as non-attainment is depicted in Figure 1.

Figure 1. Recommended 2008 8-Hour Ozone Non-Attainment Areas



Source: DEC, *Bureau of Air Quality Planning*. 2009

EPA and NYSERDA studies have found that increasing the tree canopy in the State’s major urban areas mitigates the heat island effect and also captures PM in leaves.^{8,9} Greater tree planting efforts are needed in other parts of the State, similar to the aggressive tree planting program New York City is undertaking with its PlaNYC and the “MillionTreesNYC” initiatives. Beyond tree planting, programs that promote green infrastructure and educate the public on the impacts of environmental pollution and human health from dirty sources of energy generation can help foster a move toward a clean energy future.

⁸ Hudischewskyj, A. B., and S. G. Douglas. J.R. Lundgren. Meteorological and air quality modeling to further examine the effects of urban heat island mitigation measures on several cities in the northeastern U.S. 2001

⁹ Rosenzweig, C., et al. *Mitigating New York City’s Heat Island with Urban Forestry, Living Proofs, and Light Surfaces*. 2006. <http://www.giss.nasa.gov/research/news/20060130/103341.pdf>

In the following sections, sources that affect the State's air quality are discussed along with the ways by which DEC monitors and regulates these sources. Future regulatory strategies that could affect DEC's plans for bringing the State into attainment with the NAAQS are also briefly discussed.

2.2.1 Pollution Sources Upwind of New York State

New York has been instrumental in reducing transported air pollution in the eastern U.S. This has been accomplished through multi-state efforts under the auspices of the OTC and the Ozone Transport Assessment Group as well as the numerous lawsuits filed under the new source review provisions of the Clean Air Act. These actions have largely resulted in emission reductions from large coal-fired power plants in the eastern U.S. More emission reductions can be expected from these sources in the coming years as controls are scheduled to be in place through the middle of the next decade. All of these measures have resulted in substantial emissions reductions and significant improvement in air quality and still more is expected.

EPA promulgated the Clean Air Interstate Rule (CAIR) to address emissions from central station power plants located in the eastern U.S., including New York. DEC adopted regulations to implement the federal program. In 2008, the U.S. Circuit Court of Appeals for the District of Columbia determined CAIR to be unlawful and remanded the rule to EPA to address issues raised by the Court, notably the ability of EPA to utilize a multi-state trading program to address interstate transport of air pollution. While EPA addresses the Court's concerns, the rule remains in effect. DEC is working with EPA, Congress, and upwind states to address the Court's decision and improve upon the provisions that were incorporated into CAIR.

2.2.2 Transportation Sector

Transportation is a major source of air pollutant emissions. As a percentage of emissions from all sources in New York, on-road transportation sources are responsible for approximately 25 percent of VOC emissions, 66 percent of NO_x emissions, 90 percent of carbon monoxide (CO) emissions, 17 percent of PM_{2.5} emissions,¹⁰ and 31 percent of carbon dioxide (CO₂) emissions.¹¹ DEC has addressed emissions from the transportation sector by promulgating a series of regulations to adopt California emissions standards, implement emissions inspection programs, regulate fuels, and address emission control technologies where appropriate.

Even though state and federal regulations have significantly reduced emissions from the transportation sector, more needs to be done to achieve the State's multiple objectives: (1) to reach full compliance with the NAAQS; (2) to reduce mobile source air toxics; and (3) to address climate change. The benefits of cleaner vehicles have been offset by the continual increase in total vehicle miles traveled (VMT). Thus, VMT reduction or stabilization is an essential element of reducing emission of all pollutants from the transportation sector. See the Transportation Issue Brief for a complete discussion of VMT.

¹⁰ VOC, NO_x and CO values are available from the Department of Environmental Conservation (DEC). *Emission Inventories*. <http://www.dec.ny.gov/chemical/37026.html>. PM_{2.5} values are contained in the current version of the *New York State Implementation Plan for PM_{2.5} (Annual NAAQS) Attainment Demonstration for the New York Metropolitan Area*, which is available upon request from DEC.

¹¹ NYSERDA. *New York State Greenhouse Gas Emissions Inventory and Forecasts for the 2009 State Energy Plan*. Draft dated June 25, 2009.

2.2.3 Utility Sector (Electricity Generation)

DEC regulates emissions from central station plants that generate electricity transmitted through the transmission and distribution system to an end-user, and distributed generation (DG) sources that generate electricity exclusively for the facility where the source is located. In developing regulations, DEC considers the impact on the electricity grid, including issues pertaining to reliability. The age of some central station plants and certain components of the transmission and distribution systems contribute to environmental concerns. For example, many of the peaking turbines in New York City and Long Island are approximately 40 years old. These sources tend to operate on high electric demand days, contributing to ozone concentrations that exceed NAAQS.

In order to reduce emissions effectively from the electricity generation sector, DEC looks at the system broadly to optimize its strategies. For instance, high electric demand days (HEDD) frequently coincide with air quality problems and public health alerts during the ozone season so shaving peak demand can have positive environmental results. To reduce HEDD emissions to levels required to meet the ozone NAAQS, DEC is assessing the reliability and economic effects of revisions to its regulations to reduce NO_x emissions from central station power plants (base load, load following and peaking units) using the reasonably available control technology requirements of the Clean Air Act.¹² It is also developing regulations to address DG units that are called upon during peak demand periods to reduce demand on the grid.¹³ Since all of these generation resources work in concert to provide a reliable electricity system and all of these resources are generally called upon on days when ozone levels are greatest, emission reductions from each of the generation sources will likely be needed to attain the ozone NAAQS.

Upgrades to the transmission and distribution system can reduce reliance on high pollutant emitting peaking units during HEDD periods in New York City. From a health and environmental perspective, the benefits of these upgrades will be greatest in the summer when HEDD generally correspond to contraventions of the ozone NAAQS in the New York City metropolitan area. A significant benefit to upgrading the transmission and distribution system would be to reduce the dispatch of peak generation sources which lack emissions controls and are among the most inefficient generation sources in the State. Additional information on enhancing the transmission and distribution system can be found in the Electricity Assessment: Resources and Markets and Siting New Energy Infrastructure and Energy Infrastructure Issue Briefs.

Central Station Power Plants and Regional Haze

Central station power plants that burn fossil fuels emit NO_x, SO₂ and PM, which are major contributors to PM_{2.5} pollution levels and visibility impairment.

EPA recently promulgated the Regional Haze Rule setting forth a plan to reduce regional haze in federal national parks of a certain size, or “Class I areas,” across the U.S. Because they emit these pollutants in high quantities, central station power plants are a major focus of the program.

DEC has developed a regulation for the installation of Best Available Retrofit Technology (BART) on stationary sources. These sources are predominantly central station power plants, though other source categories are affected as well, such as cement plants and pulp/paper mills. This regulation will target emitting sources built between 1962 and 1977 that are not controlled under other programs, such as New

¹² 6 NYCRR Part 227-2.

¹³ 6 NYCRR Part 222.

Source Review (NSR). The regulation will require analysis of pollution control equipment at eligible facilities that have contributed visibility-impairing pollutants to downwind federal Class I areas.

Because of the easy transportability of these visibility-impairing pollutants, states are working within Regional Planning Organizations (RPOs) to devise coordinated methods for improving the haze problem. BART is one method that the Mid-Atlantic/Northeast Visibility Union (MANE-VU) RPO will use to alleviate the regional haze problem by 2064. The first phase of this goal also includes a low-sulfur fuel oil strategy and investigation of SO₂ and NO_x controls on major central station power plants not regulated under the BART program. In this long-term endeavor to restore landscapes to their natural visibility conditions, it is likely that these energy-producing facilities will continue to be analyzed for possible further emission reductions.

Distributed Generation Sources

Some DG sources are used as combined heat and power (CHP) applications that recover a portion of the energy normally emitted into the atmosphere to provide heat and/or hot water for the facility. DEC currently regulates NO_x emissions from existing DG sources located at Title V facilities through permitting requirements and emission standards codified in 6 NYCRR 227-2. Sources with output ratings greater than 150 kW in severe ozone non-attainment areas, e.g., New York City and Long Island, must obtain a permit. The permitting threshold for sources located outside of the severe ozone non-attainment areas is 300 kW. NO_x emissions from DG and CHP sources that are not subject to existing emission regulations or new source review requirements should be brought under regulatory control for sources with an output rating as low as 50 kW. DEC is drafting regulations to reduce emissions from these sources.

Ultimately, as clean distributed generation is expanded and becomes a much greater portion of the energy supply available in New York City, Long Island and other non-attainment areas, benefits to air quality and human health will occur. Programs that promote the expansion of solar photovoltaic (solar-PV) to generate electricity on warm sunny days and that create the greater use of Smart Grid and advanced metering may help to significantly foster such clean DG.

2.2.4 Residential, Commercial, and Industrial Sectors

In general, the emission limit and permitting requirements for combustion sources used by the commercial and industrial sectors are similar to those requirements that apply to the utility sector.

In contrast, the residential sector is only subject to limited permitting requirements. The sector is regulated through limits on the sulfur content of oil or coal, PM emission standards for indoor wood stoves, and DEC has developed proposed PM emission standards for outdoor wood boilers. However, given that there are more than a million home furnaces that emit pollutants, this topic is relevant to the discussion found in the Climate Change and Health Issue Briefs.

2.2.5 Energy Efficiency and Renewable Energy

Reducing energy use is the best way to reduce the impacts of energy systems on the environment. It creates no adverse environmental impacts and is something each citizen can practice. Conservation and efficiency are the cornerstones of a sustainable energy policy. Further, these efforts can help rebuild our economy, fight global warming and protect our environment while meeting our energy needs. These efforts are discussed further in the Energy Efficiency Assessment.

New York's environmental goals are served by increasing the use of clean renewable energy while being mindful to avoid or minimize ecological harm. Renewable energy technologies, including hydroelectric, wind, biomass, and solar power generation, have fewer negative environmental impacts than fossil fuel-based generation. Capturing landfill gas and biomass from wastewater treatment plants and agriculture waste, and using them to produce heat and electricity, reduces the potential for releases of greenhouse gases and adds to the overall pool of energy generation. Certain renewable energy generation, like hydroelectric, can have impacts to water resources. As described in the Environmental Impacts and Regulation Issues Brief, a comprehensive assessment of potential impacts from various technologies can help direct advancement of preferable technologies and considerations for weighing projects. For additional insights on New York's use of renewable energy resources, see the Renewable Energy and Electricity Resources Assessments and the Energy Infrastructure Issue Brief.

2.3 Climate Change: The Regional Greenhouse Gas Initiative

One of the most significant impacts to the environment from the energy system is the production of GHGs emitted to the atmosphere from the combustion of fossil fuels. Scientists believe these gases have accelerated warming of the Earth, which in turn has many negative ecological and economical consequences for the sustainability of life. The Climate Change Issue Brief includes a comprehensive discussion of climate change and appropriate responsive steps associated with the energy system.

The Climate Change Issue Brief also discusses the Regional Greenhouse Gas Initiative (RGGI), a cooperative effort among New York, Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, Rhode Island, and Vermont, to stabilize and then reduce human-caused emissions of CO₂ from electric power generators in an economically efficient manner. New York and the nine other RGGI states designed the first market-based, mandatory cap-and-trade program in the U.S. The RGGI Program is designed to stabilize, or "cap," CO₂ emissions from power plants through 2014, then reduce such emissions by 10 percent by 2019.

2.4 Water Quality, Ecological and Open Space Issues related to the Energy System

Energy use, including facility construction, production and transmission can have adverse impacts on natural resources and the State's open space resources. Ecological impacts may occur at each step, the severity, duration and reversibility of which varies by energy source. As detailed in Appendix A, the Environmental Conservation Law (ECL) provides the basis for DEC assessment, evaluation and permitting of activities related to ecological impacts from construction, operation, transmission, and storage of energy. The State Constitution and the ECL provide the basis for the protection of New York's open space resources. With appropriate avoidance or mitigation measures, electric generation can have minimal environmental impact. The State has achieved great success in ensuring the development of cleaner energy projects while reducing impacts from existing projects and preventing negative impacts from new projects. The following discussion considers the impacts from construction and operation of energy facilities. Ecological and water quality impacts at the resource extraction phase, e.g., coal mining, or the energy consumption phase are not considered.

2.4.1 Thermal Power

In New York, thermal power projects are among the State's largest water users.¹⁴ Nuclear and coal-fired thermal power projects use steam as the prime mover for energy generation. Water is heated to create steam to spin a turbine which drives an electrical generator. The steam is then cooled, condenses back to water and is re-circulated. Large volumes of water are used to cool the condensers in the cooling process and then this "cooling water" is discharged back to the water body. Under 6 NYCRR 704.5, the location, design, construction and capacity of the cooling water intake structure must reflect the best technology available to minimize adverse environmental impact, namely, the impingement and entrainment of aquatic organisms by the facility. As a consequence of using large amounts of water, fish and other aquatic life may be drawn into and become impinged on the intake screens which keep debris in the water from entering the plant, or, in the absence of mitigation measures, may be passed through the screen into the station's condenser cooling system in a process called "entrainment." Entrainment usually results in 100 percent mortality to eggs and larvae; entrained juvenile and small fish are also damaged and killed in large numbers.¹⁵ The discharge of heated cooling water back to the water body can also have adverse impacts on aquatic life. This thermal pollution can kill fish directly, affect fish behavior and facilitate the growth of nuisance species.

Environmental impacts to aquatic life can be significantly reduced or eliminated through the use of closed-cycle evaporative or dry cooling systems, in which recycling greatly reduces water use. Conversion of older plants to closed-cycle cooling to mitigate significant impacts may also be used where appropriate, but can result in some lost energy production. Additional technological interventions are not always more expensive; some mitigation measures, like variable speed pumps, fish return systems, and chlorine minimization measures have actually saved money and improved plant efficiency.¹⁶ New York was also the first state to successfully employ new technologies to substantially reduce fish mortality while permitting once-through cooling to continue without de-rating plant generation.¹⁷

2.4.2 Atmospheric Deposition from Coal Fired Power Facilities

Atmospheric deposition of mercury and salts of nitrogen and sulfur from coal-fired power generating stations has caused significant impacts to water quality, soil chemistry, and organisms in forested areas such as the Catskill and Adirondack mountains. Acid deposition has impaired water bodies so that they are not able to support aquatic life.¹⁸ Deposition of NO_x and SO₂ in soils affects the growth and species composition of forests and can cause the loss of high altitude plant species. Mercury has accumulated in fish in most lakes in the Catskill and Adirondack mountains, causing higher mercury concentrations than

¹⁴ Hutson, S. et al. *Estimated Use of Water in the United States in 2000: USGS Circular 1268*. 2005. <http://pubs.usgs.gov/circ/2004/circ1268/htdocs/text-pt.html>

¹⁵ EPA. *EPA-821-R-02-003: Technical Development Document for the Proposed Section 316(B) Phase II Existing Facilities Rule*. 2002. <http://www.epa.gov/nscep>

¹⁶ Oliver, J.A., Samotyj, M.J., Shakarian, Y., Vinitsky, Y. *Adjustable-Speed Drives for Thermal Power Plant Boiler Feed Pumps. Russian and American Experience*. Electric Machines and Drives Conference Record. 1997.

¹⁷ The former Mirant Lovett Generating Station in Stony Point, New York used a Gunderboom Marine Life Exclusion System to filter the volume of cooling water drawn into the plant. This fine mesh filter barrier was successful in significantly reducing impingement and entrainment while allowing the facility to operate its once-through cooling system.

¹⁸ Acid deposition decreases the pH of surface water and increases the concentration of aluminum. As surface waters become acidic, species of zooplankton, mayflies and fish begin to disappear because they can no longer reproduce or survive. Concentrations of aluminum may increase to toxic levels, resulting in uninhabitable lakes and streams.

is found in fish from other parts of the State.¹⁹ The Northeast Regional Mercury Total Maximum Daily Load identified mercury from atmospheric deposition as the primary cause of water body impairment, resulting in concentrations of mercury in fish.²⁰

Mercury is a powerful neurotoxin that causes developmental and reproductive problems in wildlife. Mercury accumulates in wildlife tissue with the highest concentrations found in the tissues of top level predators, resulting in significant harm to exposed species. Extensive research on common loons (*Gavia immer*) shows a direct correlation between mercury concentrations and adult reproductive failure and developmental problems in chicks that result in death. More recent research has shown mercury accumulation in spiders and other insects, leading to the realization that high-altitude insectivorous bird species such as the rare Bicknell's thrush (*Catharus bicknelli*) are also subject to mercury bioaccumulation and its biological effects. Because the majority of mercury deposited in New York comes from coal plant emissions from energy facilities upwind of the State, strong national and regional mercury emission standards are essential to reduce out-of-state generation of mercury and acid deposition. Controls on in-state production will further reduce deposition locally as well as downwind of New York.

2.4.3 Hydropower

In New York, there are currently more than 106 hydroelectric projects, greater than 5 MW, that are licensed by the Federal Energy Regulatory Commission (FERC) and 61 projects, less than 5 MW, that have FERC Exemptions.²¹ FERC relicenses projects once every 30 to 50 years. Since relicensing is governed by federal regulations, state laws are generally preempted, except that DEC must issue a Water Quality Certificate (WQC) to the license applicant.²² This certificate contains conditions to ensure that water quality standards are met for all classified uses of a water body, including protecting aquatic resources.

The manner in which a hydroelectric project is operated can dramatically affect fish and wildlife resources. In particular, hydroelectric dams fragment rivers and stream systems, preventing upstream and downstream movement of fish and aquatic organisms and fragmenting riparian habitat for semi-aquatic organisms. DEC has been a national leader in promoting the conditioning FERC licenses and issuing WQCs to restore water quality and minimize associated environmental impacts without causing significant energy losses. This has been accomplished through:

- Restoring adequate base flows in rivers within project operating limitations thereby facilitating navigation and dampening the impact of fluctuating water levels on aquatic organisms, vegetation and wetlands.
- Restoring minimum river flows and fish passage flows in main stem reaches that are bypassed by penstocks or power canals, thereby eliminating water quality violations and restoring an acceptable, though impacted, aquatic ecosystem.

¹⁹ Simonin, H., J. Loukmas, L. Skinner, and K. Roy. *Strategic Monitoring of Mercury in New York State Fish*. 2008. <http://www.nyserda.org/programs/environment/emep/finalreports.asp>

²⁰ New England Interstate Water Pollution Control Commission et al. *Northeast Regional Mercury Total Maximum Daily Load*. 2007. <http://www.mass.gov/dep/water/resources/mertmdl.pdf>

²¹ FERC. *Hydropower*. 2009. <http://www.ferc.gov/industries/hydropower.asp>

²² 33 USC §1341, Section 401 of the Clean Water Act.

- Reducing impoundment fluctuations to acceptable levels, especially during fish spawning seasons. Generally, projects are required to operate in “run of river” mode where the outflow equals the instantaneous inflow.
- Reducing fish impingement and entrainment mortality through appropriately sized trash racks and fish bypass systems.

The Department of State (DOS) also reviews applications to FERC for both new applications and relicensing proposals for consistency with the policies of the New York State Coastal Management Program (CMP) and, where applicable, those of approved Local Waterfront Revitalization Programs (LWRP). The consistency review focuses on ensuring that the routing and construction techniques avoid or minimize disturbance of coastal resources and coastal dependent uses.

Finally, Article XIV of the State Constitution prevents the siting of new hydropower facilities on Forest Preserve, certain reforestation and wildlife management areas, and the State Nature and Historical Preserve. The Wild, Scenic, and Recreational Rivers Act²³ prevents the construction of hydropower facilities on designated rivers. Development of hydropower facilities on these lands requires appropriate constitutional or statutory amendments.

2.4.4 Hydrokinetic Energy Production

Hydrokinetic energy is an emerging renewable power source that harnesses energy from tides, waves and currents by using underwater turbines. Its potential impacts are largely unknown, but relate to the potential for fish and other aquatic life to be killed or injured by rotating turbine blades. Because of difficulties associated with visual monitoring, the impacts of underwater turbines may need to be assessed in controlled laboratory experiments. Impacts to be examined include: blade strikes from rotating blades, blade avoidance by larger fish, blade avoidance by juvenile forage fish that could result in behavioral changes that make them more vulnerable as prey, and the ability of fish to navigate a field of turbines at elevated current speeds, e.g., spring flow event. Hydrokinetic energy projects are under the jurisdiction of FERC and therefore, like conventional hydropower, are subject to a WQC. As discussed in the Renewable Energy Assessment, as of April 2009, there are nine proposed hydrokinetic projects in State waterways that had been issued preliminary permits by FERC, including two in the East River. The proposed installed capacity for these projects totaled more than 650 MW. There are currently no hydrokinetic projects in the State that have been granted a FERC license.²⁴ Because they require a permit from FERC, hydrokinetic projects must also be reviewed by DOS for consistency with the CMP and any applicable LWRPs.

2.4.5 Transmission and Pipeline Infrastructure

The State’s energy system includes transmission of energy over electric transmission lines and through natural gas pipelines and refined petroleum product pipelines. Construction and operation of energy

²³ ECL Article 15, Title 27.

²⁴ The two East River projects are the 500 kW to 2 MW Astoria Project, developed by Oceana Energy, and 5 MW Roosevelt Island Title Energy (RITE) Project, developed by Verdant Power. In June 2009, Oceana Energy filed a Notice of Intent to submit an application for a pilot license to FERC. Verdant Power installed the company’s first full-scale hydrokinetic turbine in 2006 and submitted an application for a FERC pilot license in November 2008. The company is currently preparing for the Phase 3 Build-Out portion of the RITE Project, for which it plans to build a 30-turbine 1 MW installation in the river’s east channel. Verdant Power is eventually planning to install an additional 2-4 MW of capacity in the river’s west channel. Verdant Power. *The RITE Project, East River – New York, NY*. 2009. <http://www.verdantpower.com/what-initiative>

transmission facilities can result in direct disturbance to wetlands, streams and other water bodies, protected State lands and other terrestrial habitats, e.g. forest fragmentation. In addition to clearing and loss of habitat, construction may result in storm water runoff, siltation of streams and destruction of wetland vegetation. Maintenance of rights-of-way involves periodic clearing of vegetation, use of herbicides and installation of permanent infrastructure and access roads, sometimes in sensitive environments. Pipelines constructed across State lands protected by the State Constitution or the ECL require authorizing amendments, with the exception that current law allows pipelines to cross certain State lands if the oil and gas is being produced from those lands. Unless authorizing amendments are acquired, these restrictions can result in greater environmental impacts by causing pipeline routes to be lengthened or rerouted through more sensitive environments.

Pipeline installation projects must obtain DEC's authorization to discharge storm water, including a requirement to prepare a Storm Water Pollution Prevention Plan that details construction erosion and sediment controls and post-construction storm water controls and maintenance. Where the provisions of a WQC apply, DEC can also impose conditions guaranteeing that water quality standards are protected, including associated fish and wildlife species and their habitat.

Where transmission lines are governed by proceedings convened before the Public Service Commission (PSC), wetland disturbance and stream protection standards can be incorporated into construction and operation conditions imposed through the Public Service Law (PSL) with the goal of avoiding or minimizing impacts. Depending on the classification of the wetland in question, disturbances that cannot be avoided or minimized must be mitigated, generally by a habitat restoration project near the site of construction. Scenic and ecological sensitive areas such as the Adirondack and Catskill Parks could be particularly impacted by the siting of new transmission lines if such facilities were constructed in these areas. The siting of new transmission line corridors through State-owned lands within the Parks would require a constitutional amendment, which is a time-consuming process with an unpredictable outcome. Outside the parks, transmission corridors being considered on State-owned lands may require either a constitutional amendment or a statutory change, depending on the location and classification of the lands in question.

Endangered, threatened and special concern species habitats may also be affected by transmission facility construction. Project sponsors may be required to obtain a special permit that allows temporary disturbance of habitat during construction. Likewise, the existence of rare or endangered plants or rare ecosystems may require environmental assessment studies prior to approval of a project to determine expected impacts and appropriate avoidance or mitigation measures. As with pipelines, WQC conditions may also protect water quality and associated fish and wildlife.

Transmission and pipeline infrastructure projects that are located in or affect the State's coastal area must be reviewed by the DOS for consistency with the policies of the State Coastal Management Program and any applicable LWRPs. Likewise, projects proposed to be located in or which might affect constitutionally and legislatively protected public lands must be reviewed by the DEC.²⁵

²⁵ Issues pertaining to the siting of electric transmission and natural gas pipelines are addressed in Siting New Energy Infrastructure Brief.

2.4.6 Wind Energy Production at Commercial Wind Farms

New York's wind resources have the potential to provide approximately 8,000 MW of clean energy.²⁶ Environmental impacts from new wind energy development are largely related to habitat disturbance or destruction during construction of turbines and transmission lines, and potential mortality of birds and bats from collisions with the tower and blades of the turbines.

As a general rule, developers of large wind energy projects are required to prepare an environmental impact statement under the State Environmental Quality Review Act (SEQRA), typically administered by a local municipal lead agency. DEC provides technical advice and recommendations to the lead agencies regarding potential ecological impacts. DEC's primary authority for wind energy project construction is through environmental regulatory programs regarding freshwater wetlands and streams; the underlying policies, powers, and duties of DEC and its Commissioner are to protect fish and wildlife and their habitats.

Endangered species regulations are also applicable to wind energy development where species, or their habitat, may be disturbed or eliminated during construction or through operation of the project. DEC has issued guidelines to help wind energy developers evaluate the potential for any negative effects to bird and bat resources during construction or operation of the project.

New wind turbines and associated transmission lines may not be constructed on lands protected by Article XIV of the State Constitution or the ECL without appropriate constitutional or statutory amendments.

2.4.7 Undersea Cables/Pipelines and Offshore Wind Turbines

Many energy projects require cable or pipeline construction that must traverse near-shore and shallow-water areas that serve as spawning, nursery and critical habitats for a wide range of marine organisms. The installation of offshore wind turbines that require underwater placement of tower structures and interconnection cables is likely to give rise to ecological considerations analogous to land-based wind turbines. Research is needed to evaluate post-construction recovery of shallow water areas in these projects' footprints, especially where unfilled or incompletely filled trenches may result in changes in sediment type. Research is also needed to assess changes in benthic communities related to on-bottom structures that support energy facilities.²⁷

The potential effects of the construction and operation of pipelines and other structures on lobster and their habitat is of concern, including the effects of noise, temperature changes and vibration of pipelines. In particular, the location and timing of lobster nearshore/offshore movements may be affected if lobsters do not readily migrate through trenched bottom habitats.

Undersea pipelines and cables and offshore wind turbines within New York's coastal area, or affecting the coastal area, are reviewed by the DOS for consistency with the policies of the State Coastal Management Program and approved LWRPs, if applicable.

²⁶ LaCapra Associates and Sustainable Energy Advantage, LLC. *New York Renewable Portfolio Standard Cost Study Update: Main Tier Target and Resources*. 2008.

²⁷ Species that occupy the region that include the bottom of a lake, sea, or ocean, and the littoral and supralittoral zones of the shore.

2.4.8 Oil and Gas Exploration and Production

Exploration and production of oil and gas can result in water quality and ecological impacts; with proper planning and mitigation efforts these impacts can be avoided or minimized. The use of large volumes of water required for hydrofracturing wells drilled in the Marcellus Shale has the potential for degradation of water bodies through reduction in flows, out of basin water transfers, and contravention of water quality standards during water withdrawals. Proper treatment and disposal of flowback fluids associated with large volume hydrofracturing also raises water quality concerns which must be addressed adequately by permitting agencies.

2.4.9 Biofuels and Biomass Energy Production

The use of sustainable biomass for energy production can reduce fossil fuel use and, therefore, reduce the release of carbon into the atmosphere. Wood is a traditional biofuel that has been used for centuries for heating and cooking. Pollution from wood smoke is being reduced through increased regulation of wood burning and technological advancements in wood boilers and the use of wood pellets; these measures also have the potential to increase the efficiency of wood as a fuel. Woody biomass projects that rely on sustainable harvesting can create positive environmental benefits by ensuring the continuation of forest land uses that sequester carbon and protect air and water quality and wildlife habitat. However, some wood harvesting practices may affect habitats due to road construction and clear cutting techniques. With proper planning and mitigation efforts, these impacts can be minimized.

At the same time, there is increased focus on other biomass crops, such as willow and switch grass, as renewable fuels. Whereas the management of forests and forest wood products is an age-old science that has been harmonized with forest species habitat management, the growing and harvesting of these other crops may result in a monoculture of marginal habitat. In addition, acres of native vegetation critical for wildlife habitats are being removed in order to grow biomass crops. To the extent that proposals for biomass production are in or near wetlands, wildlife management areas, important bird conservation areas or habitats of endangered or threatened species, they will be subject to rules and regulations as are other energy producers.

2.5 Oil and Gas Exploration & Production, Underground Gas Storage and Deep Geothermal Wells

Exploration for and production of oil and gas in New York has increased substantially in recent years in terms of wells drilled and natural gas produced. Natural gas production hit a record 55.2 billion cubic feet in 2006.²⁸ The oil and gas industry in New York is deploying advanced well drilling and completion technology to unlock additional natural gas reserves in unconventional reservoirs, including the Utica and Marcellus Shales. Shale development will likely take place in previously unexplored areas, which may create challenges for authorizing oil and gas well siting and development and for installing production infrastructure. The DEC and regional river basin commissions will evaluate potential impacts during the well permitting process. For economic reasons, it is expected that new natural gas wells targeting the Marcellus Shale will be initially sited and drilled near existing infrastructure such as the Millennium Pipeline. DEC administers regulations and a permitting program to mitigate, to the greatest extent possible, any potential environmental impact of oil and gas well drilling and well production. DEC also protects the mineral rights of mineral owners and ensures that oil and gas reserves are developed so that a

²⁸ DEC. *Oil, Gas and Mineral Resources Annual Report*. 2008. <http://www.dec.ny.gov/pubs/36033.html>

greater ultimate recovery can be achieved. This is accomplished through well spacing and integrating affected mineral rights owners into a spacing unit resulting in each owner receiving his proportionate share of well proceeds.

DEC also issues permits for underground natural gas storage fields used to meet peak-day and seasonal surges in natural gas demand, and permits for underground liquefied petroleum gas storage fields which serve the needs of off-pipeline customers.

The concept of siting a compressed air energy storage (CAES) project and storing compressed air in subsurface salt caverns for peak load electricity generation has been studied for over a decade but no such project has ever been proposed in the State. If such a project were proposed, DEC would have regulatory authority over all wells associated with construction. A well drilling permit is also required for geothermal wells drilled deeper than 500 feet. These wells, also known as geoexchange wells, are drilled to supplement high efficiency heating and cooling systems in Leadership in Energy and Environmental Design (LEED) buildings or green certified buildings and homes.²⁹

Each well drilling permit application submitted to the DEC is subject to an environmental review pursuant to SEQRA. A Final Generic Environmental Impact Statement (FGEIS) has been completed for well drilling permit applications that sets forth potential environmental impacts and prescribes practices and procedures to mitigate those impacts. The FGEIS satisfies SEQRA regarding permit issuance in the majority of well drilling applications. Proposed projects that contemplate actions outside the scope of review for the FGEIS may require a site-specific Supplemental Environmental Impact Statement (EIS). Also, a need for additional DEC permits at a specific site may require additional environmental reviews. DEC's draft Supplemental Generic EIS (SGEIS), released in September 2009, focuses on well drilling permits for horizontal wells requiring high volume hydraulic fracturing for exploitation in the Marcellus shale and other low permeability gas reservoirs in the State. The draft SGEIS proposes the following mitigation measures for the protection of surface and groundwaters:

- Prior to site disturbance (for a new well pad) or spud (for an existing pad), the well operator must sample and test residential water wells within 1,000 feet of the well pad as described by the SGEIS, and provide results to the property owner and the county health department.
- Ongoing water well monitoring and testing must continue as described by the draft SGEIS until one year after hydraulic fracturing at the last well on the pad.
- Authorization under the DEC's Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-06-002) (MSGP) must be obtained prior to any disturbance at the site.
- Special construction requirements for any reserve pit, drilling pit or mud pit on the well pad which will be used for more than one well.
- Additional site maintenance requirements for multi-well pads including a requirement that fluid be removed from any on-site pit prior to any 45-day gap in use and the pit must be inspected by a Department inspector prior to resumed use. If the well pad is in a primary or principal aquifer area or within the boundaries of an unfiltered water supply, pit fluids must be removed immediately if operations are suspended and the site will be left unattended.

²⁹ Note that currently more than 42 permitted deep geothermal wells are operating in Manhattan.

- Completion and submittal to the DEC of a “Pre-Frac Checklist And Certification” at least 48 hours prior to conducting hydraulic fracturing operations.
- Steel tanks are required for flowback water handling and containment on the well pad.
- Transport of all waste fluids by vehicle must be undertaken by a waste transporter with an approved 6 NYCRR Part 364 permit including the use of a “Drilling and Production Waste Tracking Form” by the waste generator, transporter and receiving facility.

The draft SGEIS indicates that the sourcing of the large quantities of water required to conduct the anticipated hydraulic fracturing operations will be reviewed for potential impacts by the DEC and the regional river basin commissions. As mentioned in the above listing, the draft SGEIS includes measures for the proper handling, containment and ultimate disposal of flowback waters recovered from a well after the hydraulic fracturing process is completed. All flowback waters must be contained on the site and removed in compliance with the fluid disposal plan approved by the DEC in accordance with 6 NYCRR 554.1(c)(1) and any applicable conditions of the well permit. In addition to the above described water protection measures, the draft SGEIS requires that the following site-specific plans be prepared by the well operator: (1) visual impacts mitigation plan; (2) noise impacts mitigation plan; (3) greenhouse gas emissions impacts mitigation plan; and (4) invasive species mitigation plan.

DEC requires well plugging permits for all regulated wells once a well reaches the end of its useful life. Financial security provided by a well owner is required and held by the Department for the regulated well’s life. The security is released only after DEC staff verify that the well was properly plugged and the surface remediated in accordance with State regulations. Proper plugging and abandonment, while important for environmental reasons at all wells, is also important to preserve oil and gas reservoir integrity for future development. For example, proper plugging and remediation of all old wells within a field proposed for carbon dioxide capture and storage (CCS) is an essential prerequisite for effective subsurface containment of injected carbon dioxide.

2.6 Solid and Hazardous Waste Management

DEC regulates the siting, design, operation, and permitting of energy projects that use solid waste as the primary energy source under 6 NYCRR Part 360, Solid Waste Management Facilities. Municipal waste combustors (MWCs) and landfill-gas-to-energy projects represent the two major regulated solid waste activities that are currently developing energy from waste.³⁰ Emerging technologies, such as plasma arc, biogasification and digestion, with the potential to use solid waste as a fuel source, would also be covered under these regulations. DEC’s beneficial use provisions cover the use of alternate solid waste fuels in traditional energy producing units, such as industrial boilers and power generating facilities.

DEC also regulates hazardous waste generated by energy development and use. Some hazardous waste facilities that burn hazardous waste for fuel are subject to specific siting and permit requirements. Furthermore, DEC’s regulations govern transport of low-level radioactive waste materials generated by energy development and use. Lastly, residues from energy production are governed under the solid and hazardous waste regulations; however certain energy production wastes and by-products are excluded from regulation. For example, at this time, fly ash waste, bottom ash waste, slag waste, and flue gas

³⁰ Specific air permitting regulations include Part 208, Landfill Gas Collection & Control Systems For Certain Municipal Solid Waste Landfills, for landfill gas to energy projects and Subpart 219-2, Municipal and Private Solid Waste Incineration Facilities for MWCs.

emission control waste generated primarily from the combustion of coal or other fossil fuels are specifically exempt from EPA and DEC hazardous waste regulations. In addition, coal combustion bottom ash, fly ash, and gas scrubbing products are not considered a solid waste when beneficially used in accordance with the DEC's solid waste regulations.

2.6.1 Municipal Waste Combustors and Landfill Gas-to-Energy Projects

Municipal waste combustion and landfilling are the primary alternatives for managing the solid waste that remains after implementing reduction, reuse, and recycling strategies.

Modern Municipal Waste Combustors (MWCs) produce energy by combusting municipal solid waste in specially designed furnaces equipped with modern pollution control equipment. Strict emission standards are applicable to all active MWCs in New York. A MWC can offer both electricity and steam as off-takes, e.g., approximately 650 kWh per ton of solid waste combusted in a modern facility. These can be exported for consumer use while also supplying electricity for the MWC's own operational needs. In addition, ferrous and/or nonferrous metals can be recovered from the ash residue.

Most MWCs in New York State are required to monitor: NO_x; SO₂; CO; Total Hydrocarbons; PM; HCl; Hg; Dioxins/Furans; PCB; PAH; Formaldehyde; Hexavalent Chromium; Total Fluorides; Various metals (Arsenic, Be, Cd, total Chromium, Cu, Pb, Mn, Ni, Vanadium, and Zinc); and Ammonia. A variety of pollution control technologies are used by modern MWCs to significantly reduce the gases and particulate matter (PM_{2.5}) emitted into the air, including:

- Combustion Controls: to minimize the formation of organics.
- Urea or Ammonia Injection: control NO_x emissions.
- Carbon Injection: to reduce mercury emissions.
- Scrubbers: to neutralize acid gases through use of a liquid spray.
- Fabric Filters: to remove very tiny ash particles, down to submicron size, including heavy metals such as lead, cadmium, chromium, etc., attached to the particulates.

In addition to achieving the EPA standards for Maximum Achievable Control Technology (MACT), as part of the State Environmental Quality Review process, the DEC requires a MWC to prepare a Health Risk Assessment (HRA). An HRA includes a description of the project, the air contaminants that will be modeled, the basis and documentation for emission factors, the air dispersion model that will be used, human exposure pathways to be evaluated, and the public health guidelines that will be referenced. The HRA is used to determine if the project will have any adverse effects on public health that need to be mitigated. Once constructed, the facility is required to conduct emissions tests which are used by the Department to determine if the actual emission rates exceed the values used in the HRA. Once commercial operations are underway, a MWC is required to perform daily continuous emissions monitoring for NO_x, SO₂, CO, CO₂, and O₂, as well as annual air emissions tests to ensure that the facility is operating within environmentally protective parameters.

Ten MWCs currently operate in New York. In 2007, these facilities processed almost four million tons of solid waste, produced about two million MWh of electricity, and recovered about 90,000 tons of metal.³¹ Two of the plants provided about 1.5 million tons of steam for direct use off-site. DEC anticipates receiving an application for a unit that will process up to an additional 0.4 million tons per year and

³¹ DEC. *Active Waste-To-Energy Facility: Annual/Quarterly Report*.
http://www.dec.ny.gov/docs/materials_minerals_pdf/wtesumrpt.pdf

generate an additional 29 MW. In 2007, approximately 11.3 million tons of municipal solid waste that was produced in New York was disposed of in landfills or exported out-of-state.

Some energy recovery can also be achieved from solid waste landfill gas. This is generated by anaerobically degrading organic municipal solid waste, which contains about 50 percent methane (CH₄), the primary component of natural gas, about 50 percent CO₂, and a small amount of non-methane organic compounds. Landfill gas-to-energy projects control the migration of explosive gases, reduce methane emissions, and can produce electricity or low BTU pipeline quality gas.

Depending on the age and ultimate size of a landfill, it may be economically feasible to extract energy from the landfill gas. One million tons of municipal solid waste (MSW) in a landfill can generate approximately 7,000 MWh of electricity per year for a number of years.³² The actual amount varies and depends on the landfill size and age, gas collection efficiency, “tightness” of the landfill liner systems, organic/inorganic waste proportions, electrical efficiency, and other factors. Landfill gas collection efficiency can range from 55 to 99 percent, depending upon the landfill’s design and operations.³³ Higher collection efficiencies are most often predicted for modern state-of-the-art landfills that have been designed and constructed from the ground up with liner systems and gas collection systems that were specifically designed and installed as early as possible in the landfill unit’s operating life.

Owners and operators of MSW landfills constructed or operated since November 8, 1987 with a design capacity of at least 2.5 million cubic meters and with non-methane organic compound (NMOC) emissions of at least 50 megagrams per year must comply with the requirements of 6 NYCRR Part 208 (Landfill Gas Collection and Control Systems for Certain Municipal Solid Waste Landfills). Owners and operators of these landfills must design, construct and operate a collection and control system if the calculated NMOC emission rate exceeds 50 megagrams per year and monitor methane concentrations at the landfill surface to ensure they do not exceed 500 parts per million. NMOCs are organic compounds that contain carbon, but methane is not considered an NMOC. NMOCs most commonly found in landfills include acrylonitrile, benzene, 1,1-dichloroethane, 1,2-cis dichloroethylene, dichloromethane, carbonyl sulfide, ethyl-benzene, hexane, methyl ethyl ketone, tetrachloroethylene, toluene, trichloroethylene, vinyl chloride, and xylenes. Although flaring is considered an acceptable control technology under Part 208, most owners/operators of large landfills opt for a landfill gas-to-energy project where they can obtain a timely and cost effective utility interconnection.

There are currently 20 landfill gas recovery facilities operating in New York. In 2007, these facilities produced approximately 0.4 million MWh of electricity. In addition, the Fresh Kills Landfill produced approximately 1.5 million cubic feet of low BTU/pipeline quality gas.

Solid waste “power producing” facilities need to interconnect with the local grid system through permission and approval by the NYISO and the regional electric utility company. While interconnection requirements have been standardized, interconnections still are approved on a case-by-case basis and have proven to be extremely time consuming and expensive to obtain. The interconnection costs have varied depending on the location of the project and the connecting utility and have been as high as \$3 million for

³² U.S. EPA Landfill Methane Outreach Program (LMOP). *An Overview of Landfill Gas Energy in the United States*. 2009. <http://www.epa.gov/lmop/docs/overview.pdf>

³³ SCS Engineers. *Current MSW Industry Position and State-of-the-Practice on LFG Collection Efficiency, Methane Oxidation, and Carbon Sequestration in Landfills*. 2007. http://www.scsengineers.com/Papers/FINAL_SWICS_GHG_White_Paper_07-11-08.pdf

a \$12 million landfill gas to energy project. Further discussions can be found in the Electricity Resource Assessment and the Energy Infrastructure Issues Brief.

DEC is currently developing a new Solid Waste Management Plan (SWMP) that will assess the State's solid waste management strategies, evaluate the solid waste management priorities, and determine how to maximize material and energy recovery and minimize waste. The draft SWMP will place a priority on reducing materials that end up as waste and will recommend a plan that may negate the need for any new disposal capacity. The SWMP will address the broader environmental implications of solid waste management alternatives, including global climate change, and include an analysis of the environmental and economic benefits of its recommendations to maximize material and energy recovery and reduce waste.

2.7 Bulk Storage of Liquid Fuels and Chemicals

Fossil fuels and fuel additives, added to improve the performance of fuel, are stored in tanks both aboveground and underground. Leaks and spills of both can happen due to human errors, equipment failures or acts of nature. Each year there are many leaks and spills attributable to storage tank systems that contaminate soil, groundwater, surface water, sediment, and the air, thereby raising the potential to adversely impact public health and environmental receptors. The most common exposure concern is the contamination of groundwater and surface water; the majority of New York's population obtains their drinking water from groundwater. In some cases, vapors from spills traveling through soils can create exposure concerns within buildings.

Each year, approximately 16,000 spills of all kinds are reported to New York State. These include spills of petroleum, chemicals, and other materials, e.g., wastewater. About 85 percent of all spills are associated with petroleum products, such as fuel oils, motor fuels, lubricating oils, and transformer/cable fluids. The most common form of petroleum spilled is No. 2 fuel oil used primarily for heating buildings (29 percent). In descending order, the next most frequently spilled types of petroleum include gasoline (10 percent), diesel fuel (9 percent), and waste oils (3 percent). These reflect the quantities stored and in use.

Most petroleum spills are associated with consumers, e.g., commercial/industrial facilities (29 percent), private dwellings (20 percent), and non-commercial/institutional facilities (8 percent). Spills from bulk storage facilities that can be considered part of the petroleum energy infrastructure are less frequent, e.g., major storage facilities (1 percent), gas stations (5 percent), and other non-major facilities (0.5 percent). Likewise, most transportation related spills are from consumers of petroleum products, e.g., commercial vehicles (11 percent), tank trucks (3 percent), and passenger vehicles (2 percent). The frequency of spills from pipelines and vessels is low.³⁴

DEC administers regulations that address these issues by setting standards for storage tank equipment to prevent leaks and spills, secondary containment systems to protect the environment from leaks and spills if they occur, and detection systems, which must meet requirements for inspections and equipment for leak detection to quickly discover problems that do occur. In addition to the State regulations, the Energy Policy Act of 2005 requires EPA and states receiving grant monies to follow a number of enhanced regulatory steps that have since been put into regulations that specifically pertain to the design and operation of certain underground storage tank systems.

³⁴ DEC, Division of Environmental Remediation. *Remedial Programs Annual Reports*. Multiple Years. <http://www.dec.ny.gov/cfm/xtapps/derexternal/index.cfm?pageid=1>

When spills occur, the spiller is required to promptly notify DEC and work on spill cleanup. The DEC oversees cleanups and undertakes the work when spillers cannot or will not do it themselves. Various laws, regulations, and guidance direct the completion of the cleanups to ensure that the public health and environmental concerns are addressed.

2.8 Liquefied Natural Gas

Natural gas can be taken off of the transmission and distribution pipelines and cryogenically liquefied and stored as liquefied natural gas (LNG) for periods of peak natural gas demand. However, since the late 1970s, the construction or operation of any new grid-connected, peak shaving LNG facilities has been prohibited unless DEC first issues a permit.

DEC is in the process of developing permitting regulations for the safe siting, construction, operation, and inspection of LNG facilities. Such permits may incorporate by reference existing nationally recognized standards.³⁵

LNG import facilities generally require a permit from FERC. If located within the State's coastal area, LNG facilities are reviewed by the DOS for their consistency with the policies of the CMP, and approved LWRPs, if applicable.

2.9 Energy Generation Projects in Adjacent States or Provinces

For decades, New York has taken actions to reduce air pollution, including most recently GHG emissions. Going forward, State energy decisions that may affect energy imports from out of State should assess and, if possible, quantify, the potential environmental ramifications of that generation on New York. For example, decisions regarding new transmission lines into the State from adjacent system operators could allow the flow of electricity generated from facilities emitting undesirable pollutants that could be transported into New York, or could negate GHG emission reductions achieved in-state. Such projects should be evaluated to determine whether the project is consistent with New York's clean energy and environmental goals. Appendix B summarizes potential environmental impacts and corresponding regulations and policies to energy system components as a quick reference.

³⁵ National Fire Protection Association. *Codes and Standards: NFPA 52 and 59A*. <http://www.nfpa.org/>

3 Economic Analysis of State/Federal Regional Environmental Initiatives

Energy production and use by New Yorkers typically comes at some cost to the environment. Energy companies use natural resources during generation, whether to generate the power itself, e.g., water for hydropower, as a repository for the wastes of generation, e.g., discharges to air or surface water, or simply as a byproduct of generation, e.g., mortality of fish and wildlife. The policies and procedures used by DEC to protect and conserve these natural resources result in a monetary cost to energy producers and transporters. While the cost to energy producers can be quantified in dollars and cents, the cost to the State's natural resources are not similarly quantifiable.

The natural resources of New York belong to the people of the State. DEC is entrusted with protecting and managing these resources to ensure their continued existence for future generations. Energy producers are the beneficiaries of New York's abundant natural resources, but they do not have an inherent right to use, and in some cases, exhaust the people's resources. Thus, the cost of compliance with regulatory requirements should be viewed as a necessary part of the business of energy generation.

3.1 Air Quality Matters

The environmental benefits resulting from air quality regulatory requirements include health-related benefits, reductions in acid and nitrogen deposition, and improved visibility. While direct environmental benefits resulting from these programs have not been quantified, much can be learned from the analyses of the recent EPA rulemakings for the revised PM and ozone NAAQS. For the PM NAAQS revision, EPA calculated a range of benefits for fully meeting the revised 24-hour PM_{2.5} standard, using estimates based on the opinion of outside experts, along with published scientific studies.³⁶

These calculations, based on national data, show that the revised PM standard will yield \$9 to \$76 billion a year nationwide in health and visibility benefits in 2020. For example, estimates based on an American Cancer Society Cancer Prevention study value the benefits of meeting the revised 24-hour PM_{2.5} standards at \$17 billion a year in 2020. The annual health benefits of meeting the revised 24-hour PM_{2.5} standards by 2020 include: 1,200 to 13,000 fewer premature deaths in people with heart or lung disease, 2,600 fewer cases of chronic bronchitis, 5,000 less nonfatal heart attacks, 1,630 fewer hospital admissions for cardiovascular or respiratory symptoms, 1,200 fewer emergency room visits for asthma, 7,300 fewer cases of acute bronchitis, 97,000 less cases of upper and lower respiratory symptoms, 51,000 fewer cases of aggravated asthma, a reduction of 350,000 days when people miss work or school, and two million fewer days when people must restrict their activities because of particle pollution-related symptoms. EPA estimates the cost of meeting the revised 24-hour PM_{2.5} standards at \$5.4 billion in 2020. This estimate

³⁶ EPA, Office of Air Quality Planning and Standards. *Regulatory Impact Analysis for the Review of the 2006 National Ambient Air Quality Standards for Particle Pollution*. 2006. <http://www.epa.gov/ttn/ecas/ria.html>. EPA interpreted the American Cancer Society study to derive these health-related estimates.

includes the costs of purchasing and installing controls for reducing pollution to meet the standard. Thus, benefits are estimated to exceed costs by a ratio of more than 3:1.

For the ozone NAAQS revision, EPA performed an illustrative analysis of the potential costs and human health benefits of meeting the revised standard.³⁷ After applying a baseline of controls of both national and regional measures, which included CAIR and federal motor vehicle programs, EPA estimated the additional emissions reductions that would be necessary for non-attainment in areas across the country to attain the ozone NAAQS. The costs for reducing emissions to meet the ozone NAAQS was estimated to be between \$5.5 and \$8.8 billion nationally.

EPA also estimated the national health benefits associated with meeting the ozone NAAQS in terms of fewer premature deaths, asthma and other respiratory illnesses,³⁸ and the total national annual value for these benefits were estimated to be between \$1.5 and \$22 billion.

The costs to ratepayers for utilities and generators to comply with existing and proposed rulemaking efforts by DEC are expected to be reduced as a result of the Energy Efficiency Portfolio Standard (EEPS) under development by PSC. The goal of that proceeding is to reduce electricity demand by 15 percent from the current projected demand in 2015. If successful, this proceeding will not only reduce energy costs for ratepayers in New York, it may also lower the costs of complying with environmental regulations.

3.2 Water Quality and Ecological Considerations

The primary regulatory costs for disturbance to habitat during construction of generation and transmission facilities are regulated in ECL Article 24 (Freshwater Wetland Act), ECL Article 25 (Tidal Wetlands Act), and Article 15 (Protection of Waters). These laws were enacted in the 1970s and thus the cost of avoiding, minimizing or mitigating wetland and stream habitat disturbance has long been incorporated as a cost of doing business.

Costs of incorporating Best Technology Available (BTA) for cooling water intake structures at electric generating facilities arise from the requirements of the federal Clean Water Act, and will vary by station. Prior to publication of its regulations governing requirements for BTA, EPA did an economic analysis looking at costs across the industry.³⁹ The U.S. Supreme Court recently reviewed the question of whether EPA, and therefore the states, are permitted to use a cost/benefit analysis when imposing BTA

³⁷ EPA, Office of Air Quality Planning and Standards. *Regulatory Impact Analysis of the Proposed Revisions to the 2008 National Ambient Air Quality Standards for Ground-Level Ozone*. July 2007. <http://www.epa.gov/ttn/ecas/ria.html>

³⁸ According to U.S. EPA's regulatory impact analyses (2006, 2007), the 2020 benefits related to lower ozone by attaining the revised ozone NAAQS are up to 1,100 fewer premature deaths nationally, and the 2020 national PM co-benefits are a reduction of up to 2,400 annual deaths. The Harvard Six-City Study methodology yielded an estimate of 1,400 fewer premature deaths while the American Cancer Society methodology estimated 620 fewer premature deaths. For health benefits related to ozone exposures, EPA estimated 1,400 fewer hospital admissions for person less one year of age, 1,700 fewer hospital admissions for persons from ages 65 to 99, 1,200 fewer asthma related emergency room visits, 570,000 less school absences and 1,500,000 fewer minor restricted activity days. The PM co-benefits expected include 1,400 fewer cases of nonfatal myocardial infarction, 690 fewer asthma related emergency room visits, 1,200 less cases of acute bronchitis, 10,000 fewer incidences of lower respiratory symptoms (ages 8 to 12), 7,500 fewer incidences of upper respiratory symptoms (ages 7 to 14), 9,400 fewer occurrences of asthma exacerbation for asthmatic children ages 6 to 18, and 65,000 less missed work days.

³⁹ For new and existing facilities, this analysis can be found respectively at EPA. *New Facilities*. 2009. <http://www.epa.gov/waterscience/316b/phase1/economics/index.html> and EPA. *Large Existing Electric Generating Plants*. 2009. <http://www.epa.gov/waterscience/316b/phase2/econbenefits/final.htm>

requirements on large power plants. It concluded that the Clean Water Act permits, but does not require, EPA to perform a strict cost benefit analysis in determining BTA. The decision preserved EPA's and the states' discretion to determine how to reasonably factor costs into the BTA decision.

DEC is currently revising its regulations regarding endangered species to provide better protection for endangered, threatened and special concern species in New York and to clarify the process by which developers must evaluate and address the existence of endangered species or their habitat at an energy facility. The need to comply with any new or changed regulation could potentially and primarily affect permitting costs for wind energy facilities, transmission lines, and cables/pipelines. Prior to publication of any changes to the regulations, a regulatory impact assessment would need to be conducted to evaluate economic impact of the new regulations.

FERC requires an individual economic analysis for all hydroelectric projects applying for a license.⁴⁰ The analysis is specific to the viability of the project to operate under the constraints of its license including all environmental conditions but in particular for the protection of aquatic and other resources. Thus, the economic analysis of a DEC WQC is included in the studies required by FERC.

The requirements and policies of the Stormwater General Permit Program for Construction Activity have been in effect for 15 years and thus, the costs associated with implementing these standards have become part of normal business costs for the given energy industrial sector. There will be no new costs associated with these program requirements in the foreseeable future.

3.3 Open Space and Public Lands Considerations

There are also economic costs associated with constructing energy production and transmission facilities in a manner that minimizes impacts on valuable open space resources, as the design and location of such facilities may consequently require modification. Similarly, respecting constitutional and statutory restrictions on the use of State lands that were acquired for their open space values, e.g., watershed protection and public recreation, may prevent energy production and transmission facilities from being constructed in otherwise preferable locations and may require design modifications. Delaying the construction of such facilities until authorizing constitutional amendments or statutes can be adopted may also result in economic costs.

3.4 Oil and Gas Exploration and Production, Underground Gas Storage and Deep Geothermal Wells

Oil and gas exploration, development and production stimulate investment, create jobs, and generate revenues. Direct monetary gains are realized by operators and their employees, royalty owners, contractors and support industries. Local and State governments receive benefits from the property taxes levied on the industry, permit and fee revenues paid, and the overall development of their local regions.

The cost of doing business and the pace at which oil and gas exploration, development and production proceeds, is partially dependent upon DEC's oil and gas regulatory program, including the permitting of

⁴⁰ Black, R. B. McKenny, and R. Unsworth. *Economic Analysis for Hydropower Project Relicensing: Guidance and Alternative Methods*. 1998. <http://www.fws.gov/policy/hydroindex.htm>

new wells. DEC's goal in regulating the oil and gas industry is to ensure that development of New York's non-renewable energy is done in an environmentally sound manner for the benefit of current and future generations, and thus regulatory economic costs are imposed. DEC's regulatory requirements on the oil and gas industry add significant environmental protection consistent with the legislative mandates of New York's Oil, Gas and Solution Mining Law. While the costs of compliance with environmental regulation may appear high, the costs to society of not regulating are far greater. Because it is comparatively easy to calculate the direct monetary costs of regulation, these costs may be questioned when a corresponding monetary value is not assigned to the benefits of regulation. However, the intrinsic value of maintaining clean air, water and soil can be readily found in increased property values, decreased healthcare costs, increased recreational and tourist use, and improved production from forestry, fishery and agriculture.

3.5 Solid and Hazardous Waste Management

EPA and DEC's Division of Air Resources and Division of Solid and Hazardous Materials regulations for solid and hazardous waste management facilities (i.e., municipal waste combustors and landfill gas-to energy projects) that have the potential to produce energy have not substantially changed over the past 15 years. As such, the costs associated with implementing these regulations have become part of the everyday normal business costs for the given energy industrial sector. For the most part, there will be no new costs associated with these program requirements for the foreseeable future.

3.6 Bulk Storage of Liquid Fuels and Chemicals

The State's regulations for the bulk storage of liquid fuels and chemicals have not substantially changed since 1994 and, as such, the costs associated with implementing these regulations have become part of normal business costs for these owners. There will be new costs to implement the federal Energy Policy Act of 2005 requirements; however, those costs are not yet fully defined.

3.7 Liquefied Natural Gas

The State's regulations for the storage of LNG are still in development and, therefore, costs for compliance with the new requirements are still undefined.

4 APPENDIX A - Environmental Laws, Rules and Policies that Apply to Energy Systems

This Appendix lists the environmental laws, regulations, policies, and initiatives that State regulatory entities follow in regulating the development and use of energy. The New York State Environmental Conservation Law (ECL) is structured first as “Article(s)” followed by “Title” in the first subset.

4.1 Air Resources

United States Code 42 U.S.C. § 7401-7671q – Establishes Federal standards for air pollutants. Prevents significant deterioration in areas of the country where air quality meets Federal standards.

ECL Article 1 Section 1-0101 – This section declares that it is the policy of the State of New York to control air pollution in order to enhance the health, safety, and welfare of the people of the State and their overall economic and social well-being.

ECL Article 3 Section 3-0301 – This section gives the commissioner of the Department the power to, among other things, provide for prevention and abatement of all air pollution.

ECL Article 19:

Section 19-0103 – This section declares that it is the policy of the State of New York to maintain a reasonable degree of purity in the air resources of the State, and that codes, rules and regulations established under Article 19 should be clearly premised upon scientific knowledge of causes and effects.

Section 19-0105 – This section declares that the purpose of Article 19 is to safeguard air resources from pollution by both controlling existing air pollution and preventing new air pollution.

Section 19-0107 – This section broadly defines the terms “air contaminant” and “air pollution,” among others.

Section 19-0301 – This section declares that the Department has the power to promulgate regulations preventing, controlling, or prohibiting air pollution.

Section 19-0303 – This section proscribes the procedure for the adoption of any code, rule, or regulation pursuant to ECL Article 19, and sets forth various considerations that the Department must make in adopting such regulations.

Section 19-0305 – This section authorizes the Department to enforce the codes, rules or regulations established in accordance with ECL Article 19.

Section 19-0306 – This section requires the Department to establish operating requirements for municipal solid waste incinerators.

Section 19-0311 – This section sets forth the requirements for permits for sources subject to the federal Clean Air Act (42 U.S.C. § 7401 et seq.).

ECL Article 71 Sections 71-2103 and 71-2105 – These sections set forth the civil and criminal penalty structures for violations of ECL Article 19, or of any code, rule or regulation promulgated pursuant to ECL Article 19.

6 NYCRR Part 200 – General Provisions: This part contains general provisions and a listing of federal standards and requirements that have been delegated to New York by the US Environmental Protection Agency to include in permits issued by New York State.

6 NYCRR Part 201 – Permits and Certificates: This regulation applies to those terms and conditions which are subject to permitting, including applicability criteria, compliance, monitoring, recording, and reporting.

DEC Program Policy/Guidance Document Air Guide10 – Federal Enforceability of Information in Air Operating Permits

6 NYCRR Part 202 – Emissions Verifications: This Part establishes the general criteria for verifying emissions by means of emissions sampling, testing and associated analytical determinations, and sets forth the general requirements for submitting annual emission statements.

6 NYCRR Part 204 – NO_x Budget Trading Program: This Part establishes the monitoring, recordkeeping, and reporting requirements for facilities subject to the NO_x Budget Trading Program.

6 NYCRR Part 217 – Motor Vehicle Emissions

6 NYCRR Part 218 – Emission Standards for Motor Vehicles and Motor Vehicle Engines.

6 NYCRR Part 219 – Incinerators: This Part establishes emission limitations, permitting requirements, and operating requirements for incinerators.

DEC Program Policy/Guidance Documents 92 Air 32 – Application of Part 212 vs. Part 219 in terms of Burning Discrete Waste Streams.

6 NYCRR Part 223 – Petroleum Refineries

6 NYCRR Subpart 225-1 – Fuel Composition and Use - Sulfur Limitations: This Subpart limits the amount of sulfur in the fuel sold or used in each regulated area of New York State.

6 NYCRR Subpart 225-2 – Fuel Composition and Use - Waste Fuel: This Subpart defines the types of waste fuels that may be fired in New York State. Also, this Subpart sets the minimum permitting criteria for facilities that are eligible to fire these waste fuels.

6 NYCRR Subpart 225-3 – Fuel Consumption and Use – Gasoline

6 NYCRR Subpart 225-4 – Motor Vehicle Diesel Fuel

DEC Program Policy/Guidance Documents:

Air Guide 17 – Trade & Use of Waste Fuels for Energy Recovery Purposes

Air Guide 21 – Compliance Determinations for Part 225

Air Guide 24 – Fuel Mixture Provisions

93 Air 20 – Federal Oil Waste Regulations of 11/29/85

6 NYCRR Subpart 227-1 – Stationary Combustion Installations: This Subpart limits emissions of particulate matter, opacity, and sets the stack monitoring requirements from stationary combustion installations.

6 NYCRR Subpart 227-2 – Reasonably Available Control Technology (RACT) for Oxides of Nitrogen (NO_x): This Subpart limits emissions of NO_x, sets the stack monitoring requirements, and establishes recordkeeping and reporting requirements from stationary combustion installations.

DEC Program Policy/Guidance Documents:

Air Guide 2 – Exceptions to Particulate Emission Standards for Stationary Combustion Installations

Air Guide 7 – Permissible Particulate Emissions from Stationary Combustion Installations

Air Guide 20 – Economic & Technical Analysis for RACT

Air Guide 32 – Nitrogen in Fuel

Air Guide 33 – Small Boiler Tune-Up Requirements for NO_x RACT Compliance

Air Guide 40 – Part 227-2 Reporting Requirements

92 Air 9 – Corrections to Table 1 of Part 227

94 Air 43 – NO_x RACT Compliance Plans

94 Air 45 – Fuel Switching Option in NO_x RACT

94 Air 46 – Corrections to Part 227-2.3

94 Air 50 – NO_x RACT Compliance Testing

6 NYCRR Subpart 231-2 – Non-attainment New Source Review Requirements for Emission Units Subject to the Regulation on or After November 15, 1992: The provisions of this Subpart apply to new or modified major facilities. The contaminants of concern statewide are nitrogen oxides and volatile organic compounds since New York State is located in the ozone transport region, and because there are ozone non-attainment areas within the State. Also, particulate matter less than 10 microns in size (PM₁₀) is a non-attainment contaminant in Manhattan.

DEC Program Policy/Guidance Documents:

Air Guide 12 – Review of Major Sources

Air Guide 18 – Stationary Combustion Installations at Utilities & Major Industrial Facilities

Air Guide 26 – Guidelines on Modeling Procedures for Source Impact Analysis

95 Air 18 – GEP Stack Height Regulations

95 Air 52 – Interpretation of 231-2 on Emission Offset Source Locations and Net Air Quality Benefits

6 NYCRR Part 237 – Acid Deposition Reduction NO_x Budget Trading Program: This Part establishes the monitoring, recordkeeping, and reporting requirements for facilities subject to the NO_x budget trading program.

6 NYCRR Part 238 – Acid Deposition Reduction SO₂ Budget Trading Program: This Part establishes the monitoring, recordkeeping, and reporting requirements for facilities subject to the SO₂ budget trading program.

6 NYCRR Part 243 – CAIR NO_x Ozone Season Trading Program: This Part establishes the monitoring, recordkeeping, and reporting requirements for facilities subject to the NO_x ozone season trading program.

6 NYCRR Part 244 – CAIR NO_x Annual Trading Program: This Part establishes the monitoring, recordkeeping, and reporting requirements for facilities subject to the NO_x annual trading program.

6 NYCRR Part 245 – CAIR SO₂ Trading Program: This Part establishes the monitoring, recordkeeping, and reporting requirements for facilities subject to the SO₂ trading program.

6 NYCRR Part 246 – Mercury Reduction Program for Coal-Fired Electric Utility Steam Generating Units: This Part limits emissions of mercury, sets the stack monitoring requirements, and establishes recordkeeping, and reporting requirements coal-fired electric utility steam generating units.

Other DEC Program Policy/Guidance Documents:

CP 33 – Assessing and Mitigating Impacts of Fine Particulate Matter Emissions (PM_{2.5})

DAR 3 – Alternative Fuels

4.2 Coastal Management

United States Code (“USC”) Title 16 §1451-1464 – Coastal Zone Management Act of 1972 – Establishes a policy to preserve, protect, develop, and where possible, restore and enhance the resources of the Nation’s coastal zone. Encourages and assists States in developing and implementing coastal zone management programs.

Article 42, Executive Law – Waterfront Revitalization of Coastal and Inland Waterways **19 NYCRR Chapter 13, Parts 600 to 605** – The Waterfront Revitalization of Coastal Areas and Inland Waterways established the CMP. The Act sets forth the State’s policies for the use and protection of coastal resources. The coastal policies are enforced through Article 42 and its implementing regulations. In addition, New York’s coastal policies are also enforced through other State statutes and regulations adopted by other State agencies pertaining to environmental protection, development and energy facilities.

4.3 Environmental Review

ECL Article 8 – State Environmental Quality Review Act

6 NYCRR Part 617 – Establishes a statewide regulatory framework for the environmental impact review of actions which are funded, approved or undertaken by State and local agencies. Energy projects that require a permit or other approval from a State or local agency would trigger the need for an environmental review under SEQR.

DEC Program Policy/Guidance Documents:

DEP-00-1 Assessing and Mitigating Noise Impacts - Presents noise impact assessment methods, examines the circumstances under which sound creates significant noise impacts, and identifies avoidance and mitigative measures to reduce or eliminate noise impacts.

DEP-00-2 Assessing and Mitigating Visual Impacts - Defines what visual and aesthetics impacts are, describes when a visual assessment is necessary and how to review a visual impact assessment, differentiates State and local concerns, and defines avoidance, mitigation and offset measures that eliminate, reduce or compensate for negative visual effects.

4.4 Fish & Wildlife Protection

United States Code:

Title 16 § 1531- 1543 Endangered Species Act of 1973 – Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Prohibits Federal action that jeopardizes the continued existence of endangered or threatened species. Requires consultation with U.S. Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries and a biological assessment when such species are present in an area affected by government activities.

Title 16 §1801-1803 Magnuson-Stevens Fishery Conservation and Management Act – Establishes regional fisheries councils that set fishing quotas and restrictions in U.S. waters. Requires Federal agencies to consult with NOAA Fisheries on all actions (authorized, funded, or undertaken) that might adversely affect essential fish habitat.

Title 16 §1361-1389, 1401-1407, 1538, 4107 Marine Mammal Protection Act of 1972 – Establishes a moratorium on the taking and importation of marine mammals. Prohibits harassing, hurting, capturing, collecting, or killing of marine mammals or attempting such actions. Requires permits for taking marine mammals. Requires consultations with FWS and NOAA Fisheries if impacts on marine mammals are possible.

Title 16 § 703-712 Migratory Bird Treaty Act – Implements various treaties for protecting migratory birds; the taking, killing, or possession of migratory birds is unlawful.

Environmental Conservation Law (ECL):

ECL Article 3 Title 3 Section 3-0301 – Sets forth the general functions, powers and duties of the department and the commissioner to protect the environment.

ECL Article 11 Title 5 – This title sets forth restrictions on uses and activities that are harmful to fish and wildlife.

6 NYCRR Part 182 – Provides for the protection of endangered and threatened species and species of special concern.

DEC Program Policy/Guidance Documents – Draft Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects - presents protocols for conducting ecological studies at proposed and existing wind energy projects.

ECL Article 15:

Title 3 – Powers and Duties- This title presents the powers and duties of the department and commissioner to protect waters of the state from pollution and despoliation.

Title 5 – Protection of Water- This title provides for the protection of streams and navigable waters, their natural resources and their function as fish and wildlife habitat.

Title 27 – Presents the Wild, Scenic and Recreational Rivers System Act

6 NYCRR Part 608 – Sets forth the standards for permitting activities in protected streams and navigable waters; provides for State issuance of a WQC pursuant to the Clean Water Act Section 401.

6 NYCRR Part 666 – Regulations for Administration and Management of the Wild, Scenic and Recreational Rivers System in New York State Excepting Private Land in the Adirondack Park.

DEC Program Policy/Guidance Documents – Guidance on Protection of Shorelines (AHP-01).

ECL Article 17 Title 3 – This title sets forth the jurisdiction, powers and duties of the department and the commissioner to protect the environment.

6 NYCRR Part 703.2 – This part sets forth narrative water quality standards for protecting water quality, including the requirement to maintain flowing water that supports the best uses of a classified stream.

6 NYCRR Part 704 – Governs thermal discharges and includes the standard for minimizing adverse impacts from cooling water intake structures.

ECL Article 24 – Freshwater Wetlands

6 NYCRR Part 663 – Provides the permit requirements for obtaining a permit for activities within or adjacent to a freshwater wetland.

DEC Program Policy/Guidance Documents – Guidelines for Compensatory Mitigation – provides framework for establishing required wetland mitigation for projects resulting in wetland disturbance.

ECL Article 25 – Tidal Wetlands

6 NYCRR Part 661 – Provides the permit requirements for obtaining a permit for activities within or adjacent to a tidal wetland.

4.5 Fuel Bulk Storage

Resource Conservation and Recovery Act (“RCRA”) Subtitle I – Federal Underground Storage Tanks (“UST”)

40 Code of Federal Regulations (“CFR”) 280 – Sets requirements for operation and maintenance of facilities and standards for upgrading existing systems and installation of new systems.

United States Code Title 49 § 601 – Natural Gas Pipelines and Safety Act of 1968 and Hazardous Liquid Pipeline Safety Act of 1979 – The Natural Gas Pipelines and Safety Act of 1968 authorizes the Department of Transportation to regulate pipeline transportation of natural (flammable, toxic, or corrosive) gas and other gases as well as the transportation and storage of liquefied natural gas (LNG). The Hazardous Liquid Pipeline Safety Act of 1979 authorizes the Department of Transportation to regulate pipeline transportation of hazardous liquids (crude oil, petroleum products, anhydrous ammonia, and carbon dioxide). Both of these Acts have been recoded as 49 U.S.C. Chapter 601.

ECL Article 17 Title 10 – Control of the Bulk Storage of Petroleum, which applies to underground and aboveground storage tanks [Petroleum Bulk Storage (“PBS”)].

6 NYCRR Parts 612-614 – Sets requirements for registration, handling and storage requirements, plus standards for new installations.

DEC Program Policy/Guidance Documents for PBS Program:

SPOTS #2, 1993 – Tightness Testing of Petroleum USTs

SPOTS #4, 1993 – Inventory Control Requirements at Underground Petroleum Storage Facilities

SPOTS #6, 1994 – Overfill/Spill Prevention Equipment for Petroleum Storage Tanks

TAB #7, 1998 – Underground Petroleum Piping Systems

SPOTS #10, 1994 – Secondary Containment Systems for Aboveground Storage Tanks

SPOTS #13, 1994 – Storage Regulations for Oxygenated Motor Fuels and Alternative Fuels

SPOTS #14, 1994 – Site Assessment at Bulk Storage Facilities

SPOTS #17, 1994 – Alternatives to Secondary Containment for Small Petroleum ASTs

DER-12 – Application Review Policy for PBS and CBS Registration Applications

DER-18 – Petroleum Bulk Storage - New Nonmetallic Underground Piping

ECL Article 12 – Navigation Law (“Oil Spill Prevention, Control and Compensation Act”) to regulate all oil terminals and transport vessels operating in the waters of NY [Major Oil Storage Facilities (“MOSF”)]

6 NYCRR Parts 610 – Set requirements for obtaining a license to operate and provides a reference to Parts 613 - 614 for technical requirements

DEC Program Policy/Guidance Documents for MOSF Program:

DER-11, 2007 – Procedures for Licensing Onshore Major Oil Storage Facilities

DER-17, draft – Guidelines for Inspecting and Certifying Secondary Containment Systems of Aboveground Petroleum Storage Tanks at Major Oil Storage Facilities

ECL Article 37 Title 1 – Pertains to the storage and release to the environment of substances hazardous or acutely hazardous to public health, safety or the environment.

ECL Article 40 – Hazardous Substance Bulk Storage Act

6NYCRR Parts 595-599 – Sets requirements for spill reporting, registration, listing of chemicals subject to the requirements, handling and storage requirements and standards for new installations.

DEC Program Policy/Guidance Documents:

DER-26, draft – How to Prepare a Spill Prevention Report

DER-12 – Application Review Policy for PBS and CBS Registration Applications

DER-16 – Five-Year Inspection of Plastic Tanks

Chapter 892 of the Laws of 1976 – Liquefied Natural Gas (LNG) - DEC must establish regulations for the safe siting and operation of LNG facilities. A statewide moratorium on the siting of new LNG facilities was lifted April 1, 1999 in all parts of the State outside New York City. DEC must promulgate regulations prior to any new LNG facilities being sited and operated in areas of NY State not impacted by the moratorium.

6 NYCRR Part 570 – Regulations are currently being drafted.

4.6 Oil & Gas Exploration and Production

United States Code --Title 33 § 1501-1524 – Deepwater Port Act of 1974 – Assigns responsibility to the Secretary of Transportation to license the construction and operation of all oil and natural gas deep water ports located beyond the U.S. territorial sea and off the U.S. coast.

Public Law 107-295 – Maritime Transportation Security Act of 2002 – Extends the Deepwater Port Act application to include facilities and operations related to natural gas.

Public Law 109-58 – Energy Policy Act of 2005 – Provides new oversight responsibilities, protocols, and incentives for energy infrastructure development. Includes provision for Marine Minerals Management Services (“MMS”) to oversee Alternative Energy Uses on the Outer Continental Shelf (“OCS”).

ECL Article 23 Titles 1 – 13, 19 – 21 – Oil, Gas and Solution Mining: Sets forth the statutory authority for spacing, drilling, producing and plugging oil and gas wells of any depth and geothermal wells greater than five hundred feet deep, and for the underground storage of hydrocarbons in reservoirs and salt caverns.

6NYCRR, Parts 550-559 Subchapter B – Contains mineral resources regulations which specify well permitting requirements, drilling practices, plugging and reporting.

DEC Program Policy/Guidance Document – DMN-1: Public Hearing Process for Oil and Gas Well Spacing and Compulsory Integration contains guidance for the initiation and conduct of public hearings for oil and gas well spacing and compulsory integration.

ECL Article 71 Title 13 – Enforcement of Article 23: Sets forth the statutory authority for actions related to enforcement, and specifies offenses and sanctions.

4.7 Permits – General Procedures

United States Code (“USC”) Title 42 § 4321- 4370e – National Environmental Policy Act of 1969 Requires Federal agencies to use a systematic approach when assessing environmental impacts of government activities. Proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts to the environment.

ECL Article 70 - Uniform Procedures Act, – Establishes procedures and time frames for Department of Environmental Conservation (“Department”) action on permit applications.

6 NYCRR Part 621 – informs applicants of the requirements for filing applications for DEC permits, notifies them of their due process rights, and establishes time frames for determining completeness, the need for a public hearing, and for final decision. It also requires opportunity for public notice and comment on permit applications.

4.8 Power Generation and Transmission

Public Service Law:

Article IV Section 68 – Approval of incorporation and franchises; Certificate. Requires that no gas corporation or electric corporation shall begin construction of a gas plant or electric plant without first having obtained permission from the Commission. This section also applies to alternative energy generating facilities, such as wind farms, above 80 megawatts of capacity.

Article VII – Siting of Major Utility Transmission Facilities - Requires that no person shall commence the preparation of a site for, or begin the construction of a major transmission facility (electric or natural gas) without having obtained a certificate of environmental compatibility and public need from the Commission.

Article VIII – Siting of Major Steam Electric Generating Facilities - Establishes the requirement that developers of major steam electric generating facilities apply for and receive a "Certificate of environmental compatibility and public need." There are two versions of Article VIII in the PSL. The first applies to facilities that submitted applications prior to 12/31/78. The second applies to facilities that filed before 12/31/88. At least one facility is subject to Article VIII.

Article X – Siting of Major Electric Generating Facilities - Establishes the criteria for the creation of a New York State Board on Electric Generation Siting and the Environment, and requires that no person shall commence the preparation of a site for, or begin the construction of a major electric generating facility without first having obtained a certificate of environmental compatibility and public need from the

siting board. This law expired on 1/1/03, but it applies to several facilities in the state, some of which have yet to be built.

Restrictions on the use of State lands:

Article XIV, Section 1 of the New York State Constitution – Prevents Forest Preserve lands (see ECL §9-0101[6]) from being “leased, sold, or exchanged” or from being “taken by any corporation, public or private;” prohibits the sale, removal or destruction of timber located thereon; and mandates that such lands “be forever kept as wild forest lands.”

Article XIV, Section 3 of the New York State Constitution – Reforestation lands in Forest Preserve Counties outside the boundaries of the Adirondack and Catskill Parks requires that lands acquired for the practice of forestry or wildlife management must be managed for those purposes, may not be “leased, sold or exchanged,” and may not be “taken by any corporation, public or private.”

ECL §3-0301(v) - Requires the Commissioner to “administer and manage non-Forest Preserve real property under DEC jurisdiction for the purpose of preserving, protecting, and enhancing the natural resource value for which the property was acquired or to which it is dedicated, employing all appropriate management activities.”

ECL §9-0107 – Provides that lands acquired by gift within Forest Preserve counties by gift for silvicultural research are dedicated for purposes of silvicultural research and experimentation in the science of forestry, including purposes incidental thereto.

ECL §9-0109 – Authorizes the Department to acquire structures or improvements in the Adirondack or Catskill parks listed or eligible to be listed on the State register of historic places including that amount of land on which such structures or improvements are located that is necessary for their maintenance and use and mandates that such lands be managed in a manner consistent with Article XIV, Section 2 or the State constitution.

ECL §9-0301 – Provides that all State lands in the Catskill and Adirondack Parks, except those within the town of Dannemora, shall be forever reserved and maintained for the free use of all the people

ECL §9-0303 – Contains a number of restrictions on the use of State lands under the Department’s jurisdiction, including:

Subdivision 1 – Except for silvicultural lands inside Forest Preserve counties, parks and reservation lands inside Forest Preserve counties, and reforestation lands outside of Forest Preserve counties, no person shall cut, remove, injure or destroy any trees or timber of other property thereon.

Subdivision 5 – Prohibits the lease, transfer or acceptance of any lease or transfer of lands or of any improvements thereon on Forest Preserve lands.

ECL §9-0307(2) – Authorizes the Department to consent to a transfer of jurisdiction to the Office of General Services over lands outside of the Adirondack and Catskill parks but within a Forest Preserve county where such parcels consist of not more than 100 contiguous acres which are entirely separated from any other portion of the Forest preserve and were not acquired or dedicated for the practice of forest or wildlife conservation. OGS is then authorized to dedicate the land to the practice of forest or wildlife conservation or for the use thereof for public recreational or other State purposes.

ECL §9-0501 – Requires the Department to manage reforestation areas outside the boundaries of the Adirondack and Catskill parks for reforestation purposes, specifying that such lands are to be “forever devoted to the planting, growth and harvesting of such trees as shall be deemed by the commissioner best suited for the lands to be reforested.”

ECL §11-2103(1) – Authorizes the Department to acquire lands, waters or lands and waters for the purpose of establishing and maintaining public hunting, trapping and fishing grounds, but does not authorize such lands, after acquisition, to be used for other purposes.

ECL §11-2103(2) – Authorizes the Department to receive property by gift or devise in the name of the People of the State for purposes of fish and wildlife management and may be improved or developed only for fish and wildlife management purposes.

ECL §15-1909 – Authorizes the Department to acquire land for drainage purposes; **ECL §15-02309** authorizes the Department to acquire property for the purposes of river improvement; and **ECL §16-0107** authorizes the Department to acquire property necessary for purposes connected with flood control projects. None of these statutes authorize such lands to be used for other purposes than the purposes for which they were acquired.

1960 EQBA, 1962 EQBA, 1972 EQBA, 1986 EQBA, and the Clean Air/Clean Water Bond Act – Each authorize the Department to use bond revenues to acquire land for specified purposes but do not authorize the use of such lands after acquisition for other purposes.

ECL §46-0107 – Authorizes the Department to dedicate land as part of the Albany Pine Bush Preserve but does not provide the Department to allow such land to be used for purposes inconsistent with the Preserve.

ECL §57-0117(2) – Authorizes the State to dedicate land within the Long Island Pine Barrens maritime reserve as part of the Long Island Pine Barrens Preserve, and mandates that land in the core preservation area which comes into the public domain shall be deemed to be dedicated into the Preserve. **ECL §57-0117(7)** provides that any publicly owned real property dedicated to the Preserve may be alienated only “by law enacted by two successive regular sessions of the legislature.”

New York State Constitution, Article XIV, Section 4 – Provides that lands dedicated into the State Nature Historical Preserve “shall be preserved and administered for the use and enjoyment of the people” and “may not be taken or otherwise disposed of except by law enacted by two successive regular sessions of the legislature.” **See also ECL §45-0115.**

Article 15 of Title 27 of the ECL – Established a Wild, Scenic and Recreational Rivers program on certain designated rivers of the State and significantly limits development within the corridors of these rivers. **See also 6 NYCRR Part 666.**

6 NYCRR §190.8(a) – Prohibits the use of State Forest Preserve land or any improvements thereon for private revenue or commercial purposes.

6 NYCRR §190.8(g) – Prohibits any person from defacing, removing, destroying or otherwise injuring in any manner whatsoever any tree, flower, shrub, fern, moss or other plant, rock, fossil or mineral found or growing on State land except under DEC permit.

6 NYCRR §190.11 – Provides that 6 NYCRR §190.0 - 190.11 (including 6 NYCRR §190.8(a), above) are applicable to persons using environmentally sensitive lands.

6 NYCRR §190.24 – Provides that “no person shall use any boat launching site or any adjacent waters within 100 feet from the shore of a boat launching or ramp area for any purpose other than hauling, launching or loading of boats.”

The Adirondack Park State Land Master Plan and the Catskill Park State Land Master Plan – Restrict the use of Forest Preserve lands within the two parks, prohibit nonconforming structures (such as transmission lines) and restrict the use of motor vehicles and motorized equipment.

Unit Management Plans – Also restrict the use of designated units of State land under DEC jurisdiction.

Deed restrictions – The State’s deeds sometimes include restrictions, imposed by the grantors, on the use of the land.

4.9 Regional Greenhouse Gas Initiative (RGGI)

To implement the Regional Greenhouse Gas Initiative (RGGI), DEC promulgated 6 NYCRR Part 242, CO₂ Budget Trading Program (the Program), and revised 6 NYCRR Part 200, General Provisions.

The statutory authority to promulgate Part 242 in the State derives primarily from the following:

ECL Sections 1-0101, 1-0303, 3-0301, 19-0103, 19-0105, 19-0107, 19-0301, 19-0303, 19-0305, 71-2103, 71-2105 – These sections set forth the State’s obligation to prevent and control air pollution.

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 – These sections set forth the State’s obligation to preserve and protect the other natural resources and public health in the State as it relates to climate change.

Energy Law Section 3-101 – This section provides 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.

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.

Public Authorities Law Sections 1850, 1851, 1854 and 1855 – These sections set forth 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.

6 NYCRR Part 200 – General provisions

6 NYCRR Part 242 – CO₂ Budget Trading Program

21 NYCRR Part 507 – CO₂ Allowance Auction Program (NYSERDA rule)

4.10 Shoreline Protection

United States Code Title 16 § 3501-3510 – Coastal Barrier Resources Act – Discourages coastal barrier island degradation by prohibiting direct or indirect Federal financial funds (including flood insurance) for development, except for emergency life-saving activities.

4.11 Solid & Hazardous Waste, Used Oil

ECL Article 23 Title 23 – Rerefining of Used Oil - sets forth the statutory requirements for programs to promote the environmentally sound collection & rerefining of used oil.

6 NYCRR Subpart 360-14 – Used Oil

6 NYCRR Subpart 374-2 – Standards for the Management of Used Oil

(These Subparts set forth the regulatory requirements for Used Oil Collection & Rerefining Facilities.)

ECL Article 27 Title 7 – Solid Waste Management and Recovery Facilities - sets forth the statutory requirements for collection, treatment and management of solid waste.

6 NYCRR Part 360 – Solid Waste Management Facilities covers the siting, design, operation, and permitting of energy projects that use solid waste as the primary energy source and management of solid wastes from energy projects.

ECL Article 27 Title 9 – Industrial Hazardous Waste Management sets forth the statutory requirements for regulating the management of hazardous waste (from its generation, storage, transportation, treatment and disposal).

6 NYCRR Part 370 Series (Parts 370-374 & 376) – Hazardous Waste Management Regulations sets forth the requirements for the management of hazardous waste generated by energy development and for facilities that burn hazardous waste for fuel.

ECL Article 27 Title 3 – Waste Transporter Permits – sets forth the statutory requirements for regulating the transportation of industrial-commercial waste.

6 NYCRR Part 364 – Waste Transporter permits – sets for the permit requirements for transporters of regulated waste.

ECL Article 27 Title 11 – Industrial Siting Hazardous Waste Facilities sets forth the Statutory requirements for locating treatment, storage, and disposal facilities for hazardous waste.

6 NYCRR Part 361 – Siting of Industrial Hazardous Waste Facilities: Sets for siting requirements for facilities that burn hazardous waste for fuel.

ECL Articles 1, 3, 17, 19, 27, 29, 37

6 NYCRR Part 380 – Prevention and Control of Environmental Pollution by Radioactive Materials: Establishes standards for protection against ionizing radiation resulting from the disposal and discharge of radioactive material to the environment.

6 NYCRR Part 381 – Transporters of Low-Level Radioactive Waste: Establishes transport permit standards for transporters of low-level radioactive waste (LLRW) and standards for generators and transporters relating to the use of the low-level radioactive waste manifest system and its recordkeeping requirements.

4.12 Water

United States Code (“USC”) Title 33 § 101 – 607 – Contains the federal laws relating to protection of the waters. See especially §316 (a) which sets forth the federal laws regarding thermal discharges.

40 Code of Federal Regulations (“CFR”) Parts 122, 123, 124, & 125 – Sets forth the federal regulations related to National Pollutant Discharge Elimination System (NPDES) permits. NPDES permits are the federal government’s general equivalent to New York’s State Pollutant Discharge Elimination System (SPDES). Storm water permits are specifically covered under 40 CFR 122.26, 122.28, 122.30 - .37, & 123.35.

DEC Program Policy – Water Quality Antidegradation Policy, dated May 7, 1970, revised September 9, 1985, relevant to 33 USC §101 (a)(2).

ECL Article 17 Title 7 & 8 – Pertain to water pollution control and enforcement. Section 0823 relates to power plant siting.

6 NYCRR Chapter X, Parts 701 - 704, 750-1 and -2 – Regulates water quality standards and SPDES permitting.

DEC Program Policy/Guidance Documents – Technical & Operational Guidance Series (TOGS) 1.2.1, 1.3.1 relate to the development of industrial and municipal wastewater treatment plant.

5 APPENDIX B - Energy System and Environmental Impacts

Component	Potential Environmental Impacts	Regulations/Policies
Wind Generation	Bird and bat mortality, wetland disturbance, stream crossings, stormwater.	Part 182, Part 617, Part 621, Part 663, Part 608, ECL Article 1, 3, 11, 17 Guidelines for Bird and Bat Studies, Guidelines for Compensatory Mitigation PSL Article IV Section 68
Nuclear Power	Thermal discharges & cooling water intake, minimum flow standards, SEQRA issues (aesthetics, plumes/visual).	Part 608, Part 704, Part 703.2, CWA Section 401, Part 182, ECL Article 1, 3, and 11, Part 621, Visual Impacts Policy? PSL Article IV Section 68
Fossil Fuel Power Plants	Impacts to air quality affecting human health, and flora/fauna. Thermal discharges & cooling water intake. Minimum flow standards, construction impacts.	PSL Article IV Section 68, PSL Article VII, *PSL Article VIII, *PSL Article X Part 200, 201,202, 204, 219, 237, 238, 243,244,245, 246, Subpart 231-2, Subparts 227-1&2, Many Air Guide policies Part 703.2, Part 704, Part 182, ECL Article 1, 3, and 11
Hydro-Power	Impacts to wetlands, surface stream environs, flora/fauna, fish passage, minimum flow.	Part 608, Part 703.2, Part 663, Part 666, CWA Section 401, ECL Article 1, 3, and 11, Guidelines on Compensatory Mitigation, Guidance on Protection of Shorelines
Transmission Utilities	Freshwater wetland disturbance, stream crossings, construction runoff, corridor maintenance.	Part 182, Part 608, Part 663, Part 666, CWA Section 401, Part 703, Part 704, ECL Article 1, 3, and 11, Guidance on Protection of Shorelines, Guidelines of Compensatory Mitigation
Bulk Fuel/Chemical Storage	Spills contaminating groundwater, soil, soil vapor and surface water/environments. Habitat contamination and remediation impacts.	RCRA-Subtitle I Parts 610, 612-614, Part 663, Part 608, Part 375, Part 703.2, Part 703.5, Guidance on Protection of Shorelines, Technical Guidance for Screening Contaminated Sediments
Liquefied Natural Gas (LNG)	Safe siting and operation of LNG facilities.	Part 570
Solid Waste	Safe operation and residue disposal, air impacts.	Part 360, Subpart 219-2 (MWC), Part 208(LFG)

* These laws have expired and only apply to a previously built plant.

