

SECTION 2.3

ENERGY AND THE ENVIRONMENT

INTRODUCTION

All New Yorkers use energy to heat, cool, and light our homes and offices. Appliances and equipment need electricity, and cars, trucks, and off-road equipment run on petroleum or other fossil fuels. Even the technologies we use to produce and refine energy need energy to operate. All of these sectors of energy production and use result in impacts on the environment.

This issue report examines recent trends in air and water quality, and summarizes some of the programs created to identify and mitigate the impacts energy generation and use have on the environment. Some of these programs address the environmental impacts from cars, trucks, and other mobile sources. New York is a recognized leader in developing new strategies to reduce emissions from transportation sources. For example, the State has adopted the most stringent emission standards in the nation for new motor vehicles, developed and implemented an innovative program to detect high polluting vehicles and ensure they are repaired, and pioneered efforts to supply cleaner-burning fuels to the State's motorists.

New York has also developed other innovative programs aimed at reducing air emissions from stationary sources of pollution, such as power plants and factories. In an effort to reduce the impacts of power generation on the State's forests and aquatic resources, New York implemented the most stringent air pollution control requirements in the nation for electric generating facilities. Factories, boilers, and other stationary sources are also subject to stringent controls.

This report will also examine the impacts of energy generation on water quality and aquatic life. Many older power plants using antiquated cooling technologies use vast quantities of water, negatively impacting water bodies and causing increased mortality in fish and other aquatic organisms. New power plants sited and built in New York will be required to use cooling technologies that use considerably less water, and take steps to minimize impacts on marine life.

Finally, this issue report will discuss new efforts to understand how environmental impacts from energy generation and use affect different socio-economic

groups in the State. New facilities will need to consider such “environmental justice” impacts before they can be sited.

TRENDS IN NEW YORK STATE AIR QUALITY

The 1990 amendments to the federal Clean Air Act requires states to monitor ambient levels of six pollutants in the atmosphere. These contaminants, called “criteria pollutants,” include lead, sulfur dioxide, nitrogen dioxide, carbon monoxide, and particulate matter measuring less than 10 microns in diameter (PM₁₀).

The New York State Department of Environmental Conservation (DEC) operates an extensive network of air quality monitors designed to provide accurate information about ambient air quality in New York. This network, which is designed, sited, and maintained to meet strict federal guidelines, provides the data necessary to determine whether air quality in the State meets the National Ambient Air Quality Standard (NAAQS) for the six criteria pollutants. The allowable concentrations for each of these pollutants is established by the U.S. Environmental Protection Agency (U.S. EPA) as required by the federal Clean Air Act. The criteria pollutants are regulated because health experts and scientists have identified them as posing a large threat to public health and the environment. Going beyond these federal requirements, New York also monitors ambient concentrations of 39 toxic volatile organic compounds (VOCs). In addition to being toxic to humans, many of these VOCs are also precursors to ground-level ozone (smog), and measuring for them can often provide data as to the source of the pollution.

For the purposes of air quality compliance monitoring, the State is divided into two main regions: the downstate region, consisting of New York City, Long Island, and Westchester, Rockland, Putnam, and lower Orange Counties; and the upstate region, consisting of the remainder of the State. All regions of New York have attained the NAAQS for lead, sulfur dioxide, and nitrogen oxide. Portions of New York have been found to be in non-compliance with the standards for carbon monoxide, ozone, and PM₁₀, although U.S. EPA recently announced that the entire State is now in compliance with the standard for carbon monoxide.

The following is a description of the NAAQS for each of the five criteria pollutants, and number of days from 1996 to 2000 that the standard was violated for each of the two regions. Air quality data for 2001 is available on DEC’s website at www.dec.state.ny.us.

1. Carbon Monoxide. NAAQS - 1 hour: 35 ppm; 8 hour: 9 ppm. Upstate - no violations during time period. Downstate - no violations during time period.
2. Lead. NAAQS - quarterly average: 1.5 $\mu\text{g}/\text{m}^3$. Upstate - no violations during time period. Downstate - no violations during time period.
3. Nitrogen Dioxide. NAAQS - annual average: 0.05 ppm. Upstate - no violations during time period. Downstate - no violations during time period.
4. PM₁₀. NAAQS - 24 hours: 150 $\mu\text{g}/\text{m}^3$; annual average 50 $\mu\text{g}/\text{m}^3$. Upstate - no violations during time period. Downstate - no violations during time period.
5. Sulfur Dioxide. NAAQS - 3 hour: 0.5 ppm; 24 hour: 0.14 ppm. Upstate - no violations during time period. Downstate - no violations during time period.

U.S. EPA proposed a new NAAQS for particulate matter measuring less than 2.5 microns in diameter (PM_{2.5}) in 2000. Since that time, an industry organization has challenged U.S. EPA's statutory authority to create the new standard, and a federal court asked for more information supporting the new NAAQS. On March 26, 2002, the court issued a decision finding that the new standards for particulates are neither arbitrary nor capricious, and U.S. EPA is moving forward to implement the new standards. Federal law requires that three years worth of monitoring data be collected before a given region can be designated as being in compliance or non-compliance with a NAAQS. Since monitoring has not been completed for three years, no region of the State has yet been designated as being in violation of the standard for annual averages. The NAAQS for PM_{2.5} is as follows:

24 hours - 65 $\mu\text{g}/\text{m}^3$; annual (average over 3 years) - 15 $\mu\text{g}/\text{m}^3$. Data collected to date in New York is as follows: Upstate - no values > 65 $\mu\text{g}/\text{m}^3$; one site > 15 $\mu\text{g}/\text{m}^3$ annual average in 2000. Downstate - One value > 65 $\mu\text{g}/\text{m}^3$; seven sites > 15 $\mu\text{g}/\text{m}^3$ annual average in 2000.

In addition to the existing NAAQS for ozone, which measures concentrations of the pollutant over a one-hour period, U.S. EPA recently proposed a new eight-hour ozone standard. Scientists felt that the eight-hour standard would provide better information about long-term exposure to the contaminant. As with the new standard for PM_{2.5}, the new ozone NAAQS was challenged by an industry organization and remanded by a federal court back to U.S. EPA for additional supporting information. The March 2002 court decision also found the new standards for ozone are neither arbitrary nor capricious. DEC has installed the equipment needed to monitor both the one-hour and eight-hour

ozone standards. The NAAQS for ozone is as follows: 1 hour - 0.12 ppm; 8 hour - 0.08 ppm (average of fourth highest daily value for past three years). Table 1 indicates the number of days ozone levels exceeded the standard.

Table 1. Ozone Level Exceedance in New York (Number of Days)

Date	Downstate		Upstate	
	8 Hour	1 Hour	8 Hour	1 Hour
1996	15	3	14	2
1997	25	9	15	0
1998	19	3	28	0
1999	27	9	28	5
2000	11	1	9	0
2001 (Jan. 1 - Aug. 13)	13	4	23	3

With the litigation surrounding the creation of the eight hour ozone and PM_{2.5} now resolved, New York will be working with the U.S. EPA to determine which areas of the State fail to meet the new standards. Once these designations have been made, New York will develop State Implementation Plans to bring these areas into attainment.

RECENT AIR QUALITY IMPROVEMENT PROGRAMS

New York has established itself as a national leader in the development and implementation of programs to reduce air pollutant emissions into the atmosphere. These include a number of approaches to reducing air pollution, including emissions testing for light and heavy-duty vehicles, adoption of the California Low Emission Vehicle standards for new cars and trucks, clean fuels, and advanced technologies to reduce soot emissions from trucks. The State has implemented a number of control strategies for stationary sources like power plants and factories to reduce acid rain and ground-level smog. In addition, strategies to reduce emissions of greenhouse gases are being developed by the Governor's Greenhouse Gas Task Force.

California Low Emission Vehicle Program

Although many people often identify air pollution as coming from factories and power plants, automobiles and other motor vehicles are significant contributors of

pollution. In the greater New York City area, these mobile sources account for about half of the emissions of volatile organic compounds and nitrogen oxides, and virtually all of the carbon monoxide emitted into the air.

In recognition of the large contribution of mobile sources to air pollution, the 1970 federal Clean Air Act authorized the U.S. EPA to create emission standards for new cars and light trucks. Prior to this, there were no restrictions on the emissions motor vehicles could release into the atmosphere with the exception of vehicles sold in California, which had implemented its own new vehicle standards in the early 1960's. As a result, the Clean Air Act allowed California to continue to set its own emission standards, but prohibited other states from creating their own. Amendments to the Clean Air Act passed in 1977 allowed other states the option of using the federal standards or opting into the California program. In 1993, New York became the first state in the nation to adopt the more stringent California standards.

As emissions control technologies have matured, California has continued to increase the stringency of its standards and recently implemented a second round of its Low Emission Vehicle program, referred to as LEV II. New York has since followed suit, formally adopting the LEV II program in 2000 and implementing the California standards for medium-duty vehicles weighing up to 14,000 pounds. In this manner, new vehicle sales of Sport Utility Vehicles in New York are now covered by the more stringent standards. Because most of these vehicles are built on truck-based platforms, many were exempt from emission standards for passenger cars. This is no longer the case.

Diesel Particulate Filters

Although light-duty cars make up the majority of vehicles on the road, trucks, buses and other heavy-duty vehicles are also significant contributors to air pollution. Because most of these vehicles are powered by diesel engines, the contaminants they release are different from those that are emitted by gasoline-powered cars and light trucks. For instance, diesel-powered vehicles tend to be high emitters of fine particulates. The New York City metropolitan area boasts one of the largest mass transit systems in the world. Along with subways and commuter trains, this system includes over 4,000 transit buses. Although mass transit results in lower total emissions than single-occupant vehicles, the fine particulate and soot emissions from diesel-powered buses are a considerable source of air pollution. In an effort to address this pollution, the New York Metropolitan Transportation Authority (MTA), working in conjunction with the DEC, developed and now uses a new generation of technology, called Diesel Particulate Filters,

which has been demonstrated to make diesel-powered buses as clean as those powered by alternative fuels such as compressed natural gas. Initial testing of this technology, conducted on four transit buses in service in New York City, and at a Canadian emissions laboratory in Ottawa, Ontario, is so promising that MTA has committed to using filters on its entire diesel-powered fleet. Although alternative fuel technology is beginning to make in-roads into the heavy-duty vehicle market, it is clear that diesel engines will dominate this sector for the foreseeable future. The New York project was the first of its kind in the nation to demonstrate that significant emission reductions can be achieved from diesel trucks and buses. As a result, a number of cities and states across the country are implementing their own programs patterned on the New York model.

Low-Sulfur Fuels

One obstacle to utilizing Diesel Particulate Filters has been that the technology requires the use of ultra-low sulfur diesel fuel, which had not been readily available in the United States. Sulfur levels in such fuel is below 30 parts per million (ppm), compared to 500 ppm or more found in regular diesel fuel. Although such fuel is necessary to use the diesel particulate filters, there is evidence that lower sulfur levels provide some environmental benefits in standard diesel engines, as well. An arrangement was worked out for special delivery of the required fuel for the four-bus demonstration project, but much larger quantities were required before MTA's entire fleet could be converted to use the new technology. As a result of the State's action, refineries are now producing the low sulfur fuel in the quantities needed to supply MTA's entire fleet. The program has generated technical evidence to support U.S. EPA's efforts to reduce sulfur levels in diesel fuel and gasoline nationwide.

Status of Acid Deposition Initiative

Both the 1984 State Acid Deposition Control Act and the 1990 federal Clean Air Act included provisions intended to reduce the devastating impacts of acid deposition on New York's natural resources. Although tremendous progress has been made, there is still strong evidence that the problem of acid deposition has not yet been adequately addressed, especially in the sensitive forests and water bodies of the Adirondack Mountains. The National Acid Precipitation Assessment Program estimates that 24% of Adirondack Lakes are seriously acidic. A 1995 U.S. EPA study found that, even with the emission reductions required by the federal Clean Air Act, the number of acidic lakes in the Adirondacks will double by 2040 and that 100% of its rivers and streams will be too acidic to support life during spring snow melts. The report called for additional reductions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x) of 40 to 50%.

Because so much of the emissions that result in acid deposition come from power plants and other facilities located upwind from New York, the State has continued to lobby Congress to adopt legislation that would address the problem on a national level. New York has also taken steps to reduce emissions from sources located within the State.

The Acid Deposition Reduction Program (ADRP) announced by Governor Pataki in October of 1999, calls for two measures to reduce emissions that cause acid deposition. First, DEC must act to limit emissions of SO₂ from electricity generating units of 25 MW or more to a level that is 50% of the quantity of emissions (in tons) that would otherwise be allowed under the federal acid rain program established in Title IV of the federal Clean Air Act. Second, DEC must act to limit emissions of NO_x from electricity generating units during the non-ozone season (October 1 - April 30) to a level that corresponds to the emissions level allowed during the ozone season (May 1 - September 30).

DEC is promulgating regulations that would establish emissions “cap and trade” programs. These regulations are patterned after the existing ozone-season NO_x cap and trade program. DEC developed the program to comply with the federal NO_x control requirements and the State’s commitment to reduce NO_x emissions under a 1994 agreement among Northeastern states, referred to as the “Northeast Ozone Transport Commission NO_x Memorandum of Understanding.” Part 237 would implement a new NO_x cap and trade program that would operate throughout the year. As with the existing NO_x cap-and-trade program, the statewide NO_x emissions cap is calculated based on an average NO_x emissions limit of 0.15 lb/MMBtu. Each subject unit would be allocated NO_x allowances based on an allocation methodology crafted by DEC. Each allowance represents a limited authorization to emit one ton of NO_x during the non-ozone season. The number of tons of permissible emissions from each subject unit for a particular non-ozone season is limited to the number of allowances that the unit has in its “allowance tracking account” for that time period. As with Part 204, the allowance and emissions tracking systems for the regulatory program would be administered by U.S. EPA. The program will begin on October 1, 2004.

A new SO₂ cap and trade program would also apply year-round. The regulation would cover the same units that are subject to the federal acid rain program. The SO₂ emissions cap would be set at approximately 130,000 tons annually (about half of the number of federal SO₂ allowances annually allocated to the subject sources). As with the NO_x programs, the new SO₂ program would maintain the emissions cap by use of allowances that will be allocated pursuant to a methodology developed by DEC. U.S. EPA will administer the allowance and emissions tracking systems. The program will

take effect starting in January 2005 with implementation of 25% of the total emissions reduction for the program. Full implementation would be achieved by January 2008.

DEC issued preliminary drafts of the proposed regulations to representatives of the electricity generating industry on January 18, 2001. A stakeholders working group, with representation from the generating industry, the environmental community, and other interested parties, was created to develop the regulatory tools necessary to implement the ADRP. Some of the energy industry participants in this work have expressed concern about aspects of the program, including the potential for higher electricity costs. As a result, DEC and the New York State Energy Research and Development Authority (NYSERDA) have performed computer modeling to determine the impacts of the ADRP on generator fuel choices, capacity implications, and energy prices. This effort used the Market Assessment and Portfolio Strategies (MAPS) model, which determined that implementation of the ADRP will have some minimal impacts on the fuels used to generate electricity as well as its costs in certain regions of the State. The modeling found that some generators may switch from coal and oil to natural gas in order to meet the requirements of the ADRP, and that the program could result in an increase of wholesale energy prices by an average of 5.4% across the State. Higher increases are predicted on Long Island and in the Rochester area, although it is important to note that wholesale energy prices comprise only a portion of the retail electricity price and, therefore, retail prices would increase less.

Energy Efficiency and Renewable Set-Aside Component of NO_x Budget Trading Program

Established by the adoption of 6 NYCRR Part 204, the program provides incentives to implement electric end-use energy efficiency and renewable generation projects by allocating 3% or about 1,200 tons of New York's ozone-season NO_x allowance budget to eligible projects beginning in 2003. A pilot program under which 115 tons of NO_x allowances are available for end-use efficiency projects has been in place since 1999. Projects are certified as tradeable emission allowances that can be bought and sold on the open market.

NO_x allowances are accredited at the rate of 0.0015 lb per kWh, or one ton per 1,333,333 kWh reduced during the five-month ozone season. This rate approximates the heat input-based rate of 0.15 lb per MMBtu used to allocate the Ozone Transport Region NO_x Budget among individual states from the 2003 control period forward. Certifiable

kWh reductions from energy efficiency projects are based on the International Performance Measurement and Verification Protocol (IPMVP), developed jointly by the U.S. Department of Energy (U.S. DOE) and a consortium of public and private organizations for the purpose of establishing the industry standard for measuring and evaluating the outcome of investments in energy efficiency.

The Set-Aside Program recognizes that emission reductions needed to meet air quality objectives can be achieved by implementing end-use electric energy efficiency measures and renewable energy projects as well as by installing control devices on fossil fuel-fired electricity generation sources. Ancillary environmental benefits of the program include year-round reductions of NO_x emissions, thereby contributing to reducing acid deposition in the sensitive receptor areas of the Adirondacks, as well as reducing eutrophication (*i.e.* nutrient-loading) of water bodies such as the Long Island Sound. Furthermore, energy efficiency measures and renewable energy projects contribute to reducing emissions of carbon dioxide, the primary greenhouse gas, thereby providing long-term climate change benefits. New York's Energy Efficiency and Renewable Set-Aside program is one of the first of its kind in the nation. This is another example of the State's innovative approach to improving energy efficiency and reducing the environmental impacts of energy production. NYSERDA will develop a plan to improve industry awareness and participation to ensure that the full benefits of the program are realized.

Status of Governor's Greenhouse Gas Task Force

In June 2001, Governor Pataki announced the formation of a Greenhouse Gas (GHG) Task Force comprised of representatives from the business community, environmental organizations, State government, and universities. The GHG Task Force is charged with advising the Governor on specific actions and policies to achieve major GHG reductions across all sectors of the State's economy, and to position New York as a national leader in addressing these issues.

The GHG Task Force was formed in direct response to the national and international policy concern that increasing concentrations of carbon dioxide and other GHGs are causing long-term changes in global climate by trapping more of the sun's heat within the atmosphere. Increasing average global temperatures and severity of weather patterns over the next century could cause the world's oceans to rise, damage forests and other ecosystems, disrupt agriculture, and increase health risks, posing risks to large numbers of inhabitants and businesses, as well as to infrastructure such as roads and bridges.

The GHG Task Force has convened several times since its inception, and is working toward its objectives through five sector-specific Working Groups: electricity generation, buildings and industry, transportation, agriculture and forestry, and emissions trading. Preliminary recommendations for actions and policies from each Working Group have been vetted by the Task Force and are included in “Energy Plan Findings and Recommendations” (Section 1.2). Recommended actions include establishing a statewide target for GHG emission reductions relative to 1990 levels, promoting renewable energy resources, optimizing use of combined heat and power, improving the mass transit infrastructure, developing an indigenous bio-fuel industry, developing programs to encourage more efficient use of oil and natural gas at customer sites, and establishing a GHG registry to document baseline emissions and voluntary emissions reductions for participating customers. The GHG Task Force work will result in a Final Report, to be completed by Summer 2002.

GREEN BUILDING TAX CREDIT PROGRAM

A Green Building Tax Credit was enacted in Chapter 63 of the Laws of 2000 that provides tax credits to building owners and tenants of eligible buildings and tenant spaces that meet certain "green" standards which, among other things, increase energy efficiency, improve indoor air quality, and reduce the environmental impacts of large commercial and residential buildings in New York. The State is the first in the nation to implement a tax incentive program for the construction of environmentally-friendly green buildings. New York provides up to \$25 million in tax breaks for green buildings that meet requirements for energy efficiency, indoor air quality, and use of recycled materials and wood resulting from sustainable forestry practices. Regulations have been proposed to implement the program, which were crafted with input from the DEC, the Departments of Health (DOH), Tax and Finance, and NYSERDA, as well as experts in the building trades, real estate, and environmental communities. The program has become the model for other states and nations interested in ways to promote green buildings.

METHYL TERTIARY BUTYL ETHER (MTBE)

Methyl tertiary butyl ether (MTBE) was approved by U.S. EPA for use in gasoline in 1979 as an additive to boost the octane rating of motor fuel as it required phasing out of earlier octane enhancers, such as tetra-ethyl lead and benzene. In the mid 1980s it was discovered that adding oxygen to motor fuel promoted more complete combustion and reduced pollutant emissions. Early programs in Colorado and elsewhere reported

approximately 10% reductions in carbon monoxide emissions, as well as reductions in VOCs. As a result of these early programs, the 1990 amendments to the federal Clean Air Act required the use of "reformulated gasoline" (RFG) in areas that failed to comply with national ambient air quality standards for ozone specifying, among other things, that the fuel be 2% oxygen by weight.

Fuel providers had two primary options to meet the oxygen requirement: ethanol, an alcohol made primarily from corn and other biomass, and MTBE, generally made from natural gas. During the 1970s, the federal government and many states (including New York) conducted pilot programs to evaluate the potential of ethanol to extend fuel supplies. New York's program, like most others, ended in failure due to the tendency of ethanol to dissolve fuel lines and gasket materials, and because its use resulted in significantly higher emissions of VOCs through increased evaporation of the fuel. Auto makers have since employed new materials that eliminate the fuel line and gasket corrosion, but the volatility problem of ethanol remains.

The other primary option to meet the oxygen requirement is MTBE. MTBE has several chemical properties that make it an excellent fuel additive, including its relatively low toxicity (compared to lead or benzene), its octane enhancing ability, and its relatively low volatility. Unfortunately, it also has some unique hydro-geologic properties that make it a threat to groundwater. It is highly soluble in water, so that if spilled it tends to migrate further and be more difficult to remediate than the other gasoline additives. It also has a strong turpentine-like smell that makes it easy to taste and smell at low concentrations [levels below 50 parts per billion (ppb)].

DEC recently finalized an ambient water quality guidance value of 10 ppb for MTBE, the lowest allowable concentration in the nation. Prior to this action, DEC used DOH's unspecified organic contaminant drinking water value of 50 ppb as a clean up goal. It is anticipated that DOH will shortly finalize similar standards for drinking water. In February 2000, DEC evaluated the extent of MTBE contamination in New York and found that of 5,262 spills, 1,706 (32%) were identified to have MTBE impacts to groundwater. In addition, 866 private wells and 47 public water supplies were found to be impacted by MTBE. These numbers have continued to climb over the ensuing year, and it is clear that MTBE poses a severe threat to New York's groundwater and drinking water.

Because of these impacts, several Northeast states and California have taken steps to reduce the harmful effects of MTBE. States including New York have enacted legislative phase-outs of MTBE. New York's action will take effect in 2004. In addition,

several states (including Maine and California) have requested U.S. EPA to waive the oxygenate requirement as provided for in Clean Air Act. U.S. EPA recently notified California that it will not approve the oxygenate waiver. Because California (like New York) has a pending ban on MTBE, and no other readily available additive has been tested and determined to be acceptable, U.S. EPA's decision effectively becomes a mandate for the use of ethanol to meet the oxygenate requirement.

Use of ethanol, however, raises new concerns such as the potential for higher VOC emissions. Also, there is currently little if any ethanol production capacity in the Northeast. Ethanol is hydroscopic, absorbing moisture from the air, thus making it difficult to ship gasoline containing ethanol via pipeline. As a result, ethanol would most likely have to be trucked separately from production sites and blended at gasoline distribution centers. Additionally, it is unlikely that the national ethanol production capacity exists to replace MTBE any time soon. MTBE accounts for approximately 10-12% of the fuel supply in greater New York City. There is currently insufficient ethanol production capacity in the Northeast to replace the portion of the fuel supply currently made up of MTBE.

Removing MTBE from gasoline and replacing it with ethanol could have several negative effects. Ethanol has unique characteristics of its own that could have impacts on water and air quality. Ethanol co-mingled with gasoline may be as difficult to remove from groundwater as MTBE, and it has been found to cause damage to the structures used to contain spills at fuel storage and distribution facilities. As mentioned previously, ethanol has been shown to dissolve gaskets and hoses in older cars, and may cause similar problems in off-road equipment like lawnmowers, chain saws, and older outboard engines.

From an air quality perspective, substitution of ethanol for MTBE will most likely result in increased evaporative emissions from fuel tanks. Fuel companies are already seeking permission to raise the volatility of gasoline to allow for the use of ethanol. Along with its role as a source of oxygen, MTBE also increases the octane rating of fuels. Additives used to replace the octane lost with the elimination of MTBE could potentially increase the toxicity of fuels.

If ethanol were used in New York as a substitute for MTBE to comply with the 2%-by-weight oxygen requirement of federal reformulated gasoline, it is likely that ethanol would be used at about 5.7% by volume to comply with the requirement. The Energy Policy Act of 1992 includes provisions granting a partial excise tax exemption for ethanol used in gasoline. The excise tax exemption is 54 cents per gallon (cpg) of

ethanol, which translates to 5.4 cpg for 10% by volume blends and 3.08 cpg for 5.7% by volume blends.

New York State uses roughly 350,000,000 gallons of MTBE annually. Because ethanol has a higher oxygen content than MTBE it would take about 180,000,000 gallons of ethanol to replace the MTBE. Substitution of ethanol for MTBE in New York would, therefore, result in over \$100,000,000 a year in losses to New York's contribution to the Highway Trust Fund.

ENVIRONMENTAL JUSTICE ISSUES

Environmental Justice (EJ) is meant to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. In order to effect fair treatment and meaningful involvement of all people, environmental justice efforts focus on under-served communities and seek to address adverse environmental effects that bear disproportionately on minority and low-income populations.

On October 4, 1999, in response to the concerns raised by parties interested in environmental justice, DEC announced a new program to address environmental justice concerns and ensure community participation in the State's environmental permitting process. DEC named an Environmental Justice Coordinator to oversee the Office of Environmental Justice and develop the DEC's Environmental Justice Program, and created two staff positions in the Division of Environmental Permits. DEC also established the New York State Environmental Justice Advisory Group ("Advisory Group") comprised of representatives from State, local and federal government, community groups, environmental groups, and the regulated community. The Advisory Group, chaired by the Environmental Justice Coordinator, was asked to develop recommendations for an environmental justice permit policy and recommend elements for an effective environmental justice program.

On January 2, 2002, the Advisory Group submitted a report to DEC containing its recommendations for creating an effective environmental justice program. The report: *Recommendations for the New York State Department of Environmental Conservation Environmental Justice Program* focuses on the environmental permit process and is intended to ensure DEC's programs are open and responsive to environmental justice concerns. Additional recommendations for the environmental justice program are also included in the report. DEC is reviewing the report and public comments received on the

report to determine appropriate legislative, regulatory, and policy changes that might be implemented. DEC is currently drafting a Commissioner's policy on environmental justice and DEC permitting. Once finalized, the policy will better enable DEC to address environmental justice concerns through permitting.

Major electric generating facilities regulated under Article X of the Public Service Law require permits issued by DEC, including air pollution control permits and State Pollutant Discharge Elimination System (SPDES) permits. Permits authorized by delegation for sources subject to the federal requirements of prevention of significant deterioration (PSD) are subject to a review process under federal regulations and will continue to undergo an environmental justice analysis consistent with United States Environmental Protection Agency (U.S. EPA) policy and guidance. Additional DEC permits required for Article X facilities will be subject to DEC's environmental justice policy, consistent with the provisions of the policy. DEC should continue to address environmental justice issues and incorporate environmental justice concepts into a variety of DEC programs.

CLEAN WATER/CLEAN AIR BOND ACT UPDATE

The Clean Water/Clean Air Bond Act authorizes \$230 million for projects to improve the State's air quality. These funds support programs that use innovative and modern technologies to provide the State's citizens with a healthier and cleaner environment. This portion of the Bond Act provides funding for the following program categories related to energy use: the Clean Air for Schools Program; Clean Transportation projects, which includes funding for clean-fueled buses and vehicles; and other air quality improvement projects. As of September 1, 2001, \$224 million has been appropriated from the Bond Act for air quality improvement projects, with more than \$175 million committed to specific air quality initiatives.

Clean Air for Schools Program

The Clean Air for Schools Program, administered by the New York Power Authority (NYPA), is making dramatic progress to ensure that New York's children have a clean and healthy environment in which to learn and grow. The Bond Act authorizes \$125 million for this program to replace aging coal-fired furnaces at public schools with modern boilers that use cleaner-burning fuels.

Through September 1, 2001, \$117 million has been appropriated and fully committed to projects at 74 schools in New York City, Buffalo, and Long Island. The

projects are producing real and measurable benefits in the air quality of these schools and surrounding neighborhoods. As a result, emissions of air pollutants, such as sulfur dioxide, nitrogen oxide, and particulate matter have been significantly reduced, and students, teachers, and community residents are breathing cleaner air. This program has resulted in eliminating use of coal-fired boilers in school buildings, and largely reducing pollutants. NYPA estimates that the project has reduced air pollutants by 31,000 tons annually, including 30,400 tons of carbon dioxide.

Clean-Fueled Bus Program

The Bond Act also supports the State's Clean-Fueled Bus Program, which has had tremendous benefits for the State's environment and economy. The Program, administered by NYSERDA, has assisted municipalities and transportation authorities in replacing dirty diesel-powered buses with buses using cleaner energy sources, while also promoting the manufacture of clean technologies in New York. Under the Program, Bond Act funds are awarded for up to 100% of the incremental cost of a clean-fueled bus, infrastructure related to refueling or recharging clean-fueled buses, and any required depot conversions. Clean-fueled buses are defined as motor vehicles with a seating capacity of 15 or more passengers that are used for transportation on public highways, and are powered by compressed natural gas, propane, methanol, hydrogen, ethanol, or electricity, including electricity from solar energy. Eligible applicants include municipalities, school districts, State agencies, and public authorities.

Four rounds of funding have been awarded to date, which have resulted in the purchase of 300 buses powered by compressed natural gas, 67 hybrid electric buses, and 11 battery electric buses. NYSERDA estimates that these buses will result in reductions of 10,000 tons of NO_x, 560 tons of particulate matter, and 1.3 million tons of carbon dioxide over the lifetime of the buses.

Projects are selected for Bond Act funding by NYSERDA after a competitive application process. Priority is given to projects that: result in the greatest emissions reduction per dollar invested; are located in areas where air quality improvements are needed; provide the greatest economic benefits to the State; leverage additional funding from the applicant or other sources; support emerging technologies; and, are consistent with other clean-fuel vehicles activities. As of September 1, 2001, \$16 million in Bond Act funding has been committed to the purchase of 376 clean-fueled buses for operation in New York City, Long Island, Onondaga County, the City of Rochester, and the City of Ithaca, as well as funding for two fueling infrastructure projects in New York City. The buses being purchased include a combination of electric, hybrid-electric diesel, and

compressed natural gas.

State Clean-Fueled Vehicles Program

Funding from the Bond Act also supports the State Clean-Fueled Vehicles Program. The Program, administered by the Office of General Services (OGS), is a coordinated effort to assist New York State agencies, public authorities, and the State University of New York in acquiring and using alternative fueled vehicles. OGS also serves as the Chair of the Clean-Fueled Vehicles Council, a working group of State agencies and authorities that guides the State's efforts to acquire clean-fueled vehicles and develop the fueling infrastructure to support the vehicles.

Through September 1, 2001, \$16 million was appropriated from the Bond Act for the State Clean-Fueled Vehicles Program. The program finances the incremental costs associated with the State's acquisition of clean-fueled vehicles, as well as costs for related refueling and recharging facilities. To date, State agencies have acquired or committed to purchase nearly 1,000 electric and alternative fueled vehicles for use in their daily operations. A number of agencies have received funding from the Bond Act under this program, including: the Departments of Transportation, Motor Vehicles, and Correctional Services; DEC; OGS; Office of Mental Health; Thruway Authority; Olympic Regional Development Authority; and the State University of New York (SUNY) campuses at Albany and Buffalo.

Bond Act dollars are also being used to develop a comprehensive plan to provide conveniently-located fueling sites for the State agencies' clean-fueled vehicles. The first phase of the plan calls for construction of 30 new compressed natural gas fueling stations to supplement 52 existing stations across the State. The first site, located off of I-87 in Latham, Albany County, opened in the spring of 2000, and the second site, in Hudson Falls, Washington County, is also in operation. The remaining sites are expected to be operating soon. The second phase of the infrastructure plan includes establishing 18 high-volume compressed natural gas fueling stations that will be easily accessible and located in major metropolitan areas along high-profile travel corridors, including the State Thruway between Albany and New York City. Bond Act funding will also be used to address the need for other alternative fuels, and will include a network of electric vehicle charging sites.

Other Air Projects

The Bond Act provides up to \$20 million for projects that enhance the quality of

the State's environment and the State's air quality. To date, funding from this category has supported four programs. The newest program funded under this category is the Heavy-Duty Vehicles Inspection and Maintenance Program. Other programs supported include: the Ultra-Clean Power Generation Technologies Program, the Clean Diesel Vehicle Program, and the Vehicle Inspection and Maintenance assistance program.

Heavy-Duty Vehicles Inspection and Maintenance Program

In 1998, the State required emissions testing for heavy-duty diesel vehicles. The law requires that diesel-powered vehicles of 8,500 pounds or more be tested annually to determine if they meet federal emissions standards for particulates or smog. These new requirements will reduce pollution from diesel vehicles, improve air quality, and protect public health. To facilitate implementation of the new testing requirements, Bond Act funding has been committed for a Heavy-Duty Vehicle Inspection and Maintenance State Assistance Program. The Program, administered by the Environmental Facilities Corporation (EFC), will provide resources to eligible service station owners and other eligible participants toward the purchase of certified equipment to test emissions from heavy-duty diesel vehicles. Under the program, State assistance payments of \$1,000 to \$2,000 per project will be made available to eligible facilities throughout New York that perform heavy-duty vehicle emissions tests for the public and to municipalities that purchase equipment necessary to test emissions from heavy-duty diesel vehicles. To date, \$1.15 million in Bond Act funding has been set aside for this program.

Ultra-Clean Power Generation Technologies

A total of \$5.6 million in Bond Act funding has been awarded under this program for ultra-clean power generation technologies that demonstrate improvements to air quality. This competitive program, administered by the NYSERDA, has provided funding to projects that improve air quality by accelerating the widespread use of ultra-clean, innovative, and advanced power generation technologies. Projects must also provide air quality, energy, and economic benefits to New York.

Clean Diesel Vehicle Program

Under this program, administered by DEC, proposals were sought for projects to demonstrate technologies with the potential for reducing emissions from diesel-powered vehicles. A total of \$1 million was awarded to New York City Transit for a project to demonstrate a specific technology designed to reduce air pollutants from diesel-powered buses. Under the project, diesel buses operating in Manhattan and the Bronx are being

retrofitted with Continuously Regenerating Technology (CRT) devices. The device captures and burns pollutants before emission. This demonstration project will verify the emissions reduction benefits of the technology, as well as the durability of the technology on buses operated in a rigorous urban duty cycle. The project is also an important element of the Metropolitan Transportation Authority's (MTA) new capital plan. The unprecedented, multi-part plan ensures that MTA will have the cleanest bus fleet in the world. As part of the initiative, MTA will step up the purchase of clean-fueled buses, retrofit diesel buses, phase-out older and dirtier buses from its fleet, use low-sulfur fuels, and develop depots with alternative fueling capabilities. These strategies will significantly reduce emissions and greatly improve air quality.

Enhanced Vehicle Inspection and Maintenance Assistance Program

Funding has been provided from this portion of the Bond Act for grants to service station owners in New York City, as well as larger stations outside the City, that are participating in the State's Enhanced Vehicle Inspection and Maintenance Program. These facilities were not eligible for funding under the Small Business Environmental Compliance section of the Bond Act. EFC is administering this program which provides \$5,000 to eligible service stations toward the purchase of the required testing equipment. Through September 1, 2001, approximately \$6.2 million was provided to 1,250 participating service stations in New York City, Westchester, Nassau, and Suffolk Counties.

MITIGATING THE AQUATIC IMPACTS OF ELECTRIC GENERATION

Construction, operation, and maintenance of energy projects can produce negative environmental impacts on associated water bodies as well as other media such as air quality, terrestrial habitat, and wetlands. However, with appropriate mitigation measures, electric generation can have minimal environmental impacts. DEC has achieved great success in reducing the impacts of existing projects and preventing negative impacts from new projects while simultaneously ensuring the development of cleaner energy projects.

Steam-Electric Power

Most steam-electric projects use water to condense steam, although many new plants are using dry condenser (air) cooling, a form of closed-cycle cooling.

Environmental impacts to aquatic life can be significantly reduced or eliminated through the use of closed-cycle cooling where water use is greatly reduced by recycling. There are numerous examples of operating steam-electric plants of various sizes that have virtually no fish impact, as well as several recently permitted low-impact closed-cycle plants. Similar energy projects are either under consideration in hearings or in the application process.

Many older steam plants do not recycle water in closed-cycle systems, but rather use significant quantities of water to cool the steam condensers with once-through cooling systems. In fact, energy projects are among the largest water users in the State. As a consequence of using this amount of water, fish and other aquatic life may be drawn into the plants and be impinged on the intake screens (designed to keep debris in the water from entering the plant), or passed through the screen mesh and into the station (a process called entrainment). Entrainment usually results in 100% mortality to the eggs and larvae; small adult fish are also entrained. Impingement may damage or cause mortality to fish. Adverse impacts to aquatic life can also occur through the discharge of thermal pollution (heated cooling water) back to the lake or river. Thermal pollution can kill fish directly, block fish migrations, and cause the growth of nuisance species.

DEC has been, and continues to be, a national leader in finding ways to mitigate the impacts of these older plants without adverse impacts on power production. Some mitigation measures, like variable speed pumps, fish return systems, and chlorine minimization studies, have saved money and improved plant efficiency. New York was also the first to successfully employ new technologies to substantially reduce fish mortality while permitting once-through cooling to continue without de-rating plant generation. Examples are filter fabric aquatic life exclusion systems around intake pipes and high-power, high-frequency sonar repulsion system for alewives (herring). Conversion of older plants to closed-cycle cooling to mitigate significant impacts may also be used where appropriate. Under legislation signed into law by Governor Pataki in November 2001, applicants seeking an expedited, six-month approval process for modifying or siting of major electric generating facilities in New York must install air-cooled condensers or evaporative cooling water intake systems that use no more than 15 gallons of water per minute per megawatt of total plant generating capacity. Several pending applications for re-powering have proposed reducing aquatic impacts to 1% of current levels, while increasing energy output and nearly doubling energy production efficiency. Conversion of existing once-through plants to closed-cycle cooling is also possible, but will result in some lost energy production. For example, to produce a 95% reduction in water use and fish entrainment mortality using closed cycle cooling, a 1200-MW fossil-fueled plant might typically be de-rated 35 MW (2.9%) in the summer and 17

MW (1.4%) for the rest of the year.

Hydropower

The manner in which a hydroelectric project is operated can also dramatically affect fish and wildlife resources. DEC has been a national leader in getting projects licensed, re-licensed, or permitted through exemption, while restoring water quality and minimizing associated environmental impacts without causing significant energy losses. This has been accomplished through:

- Restoring adequate base flows in rivers within project operating limitations. This ensures navigation and dampens the impact to aquatic organisms, vegetation, and wetlands of pulsed generation that may be permitted.
- Restoring minimum river flows and fish passage flows in main stem reaches that are bypassed by penstocks or power canals. This eliminates water quality violations and restores an acceptable (though impacted) aquatic ecosystem.
- Reducing impoundment fluctuations to acceptable levels, especially during fish spawning seasons. Often more liberal fluctuations are permitted outside ecologically critical times.
- Reducing fish impingement and entrainment mortality through appropriately-sized trash racks and fish bypass systems. If trash rack replacement is necessary to protect fish it is often scheduled for a year when routine wear-and-tear replacement is scheduled. And fish bypass flows are often integrated with minimum flows required to maintain water quality standards.

New York has also been a leader in using the Federal Energy Regulatory Commission's (FERC) collaborative Alternate Licensing Process where the developer and stakeholders cooperate in a streamlined licensing process. It has been successfully used in re-licensing facilities on the Hudson River. Governor Pataki announced in October 2001 that NYPA had submitted its application to FERC for a new 50-year license to operate the 800 MW St. Lawrence-Franklin D. Roosevelt Power Project in Massena. The current license expires in 2003. The Governor said that the application, which was developed using the alternative licensing process, achieved "an unprecedented level of community support." The FERC license for the largest project in the State, NYPA's 2,400 MW Niagara Power Project on the Niagara River, expires in 2007. In March 2002, NYPA filed with FERC a Request to Use Alternate Licensing Procedures (ALP), designed to enhance public participation in the licensing.

FINDINGS AND CONCLUSIONS

- The generation and use of energy results in impacts on the environment, including the release of pollutants into the air and impacts on aquatic resources.
- Since the 1998 State Energy Plan was released, the State has made significant gains in reducing the environmental impacts associated with energy generation and consumption. Emission standards on new motor vehicles have been strengthened, as have the requirements on electricity generating plants and other stationary sources of air pollution. The impacts of energy generation on the State's aquatic resources are analyzed and addressed through existing regulatory programs. New electricity generating plants are required to use much less water than existing facilities, and the impacts on fish and other aquatic organisms must be minimized to the greatest extent possible.
- The State has become a national leader in developing new technologies to reduce emissions from diesel-powered trucks and buses, and has created a market for clean-burning low sulfur fuels. These programs will help ensure that New York, already one of the most energy-efficient states in the nation, produces and consumes energy with the lowest-possible impacts on the environment.
- New York has made great progress in meeting its air quality goals, currently meeting the National Ambient Air Quality Standards for five of the six federal criteria pollutants. The New York City metropolitan area has not yet attained the current National Ambient Air Quality Standard for ozone (one-hour), and is not likely to be designated as meeting the pending standards for ozone (eight-hour) or fine-particulates (PM_{2.5}). Meeting these standards will require additional emission reductions from all sectors.
- New York has adopted the most stringent tailpipe emission standards for new motor vehicles in the nation, and continues to develop new strategies to reduce emissions from mobile sources such as cars and trucks.
- The State has made significant progress in reducing emissions that cause acid deposition and will soon adopt stringent new standards on power plants to further reduce these emissions. Scientific data indicate that many water bodies and forested regions in the State are still adversely impacted by acidic deposition and that there is a need for additional national efforts to address these impacts.
- Public transportation has the potential to significantly reduce the impacts of energy used in the transportation sector, particularly through the decrease in single occupant vehicles on the State's roadways.
- MTBE, added to gasoline to meet federal oxygenate requirements, has negatively impacted surface and ground waters in New York and across the nation. The State has enacted a legislative ban on MTBE beginning in 2004.

- Environmental Justice has become a significant issue in the siting of new power plants and other facilities. The State is working to develop a comprehensive policy on how Environmental Justice issues will be addressed.