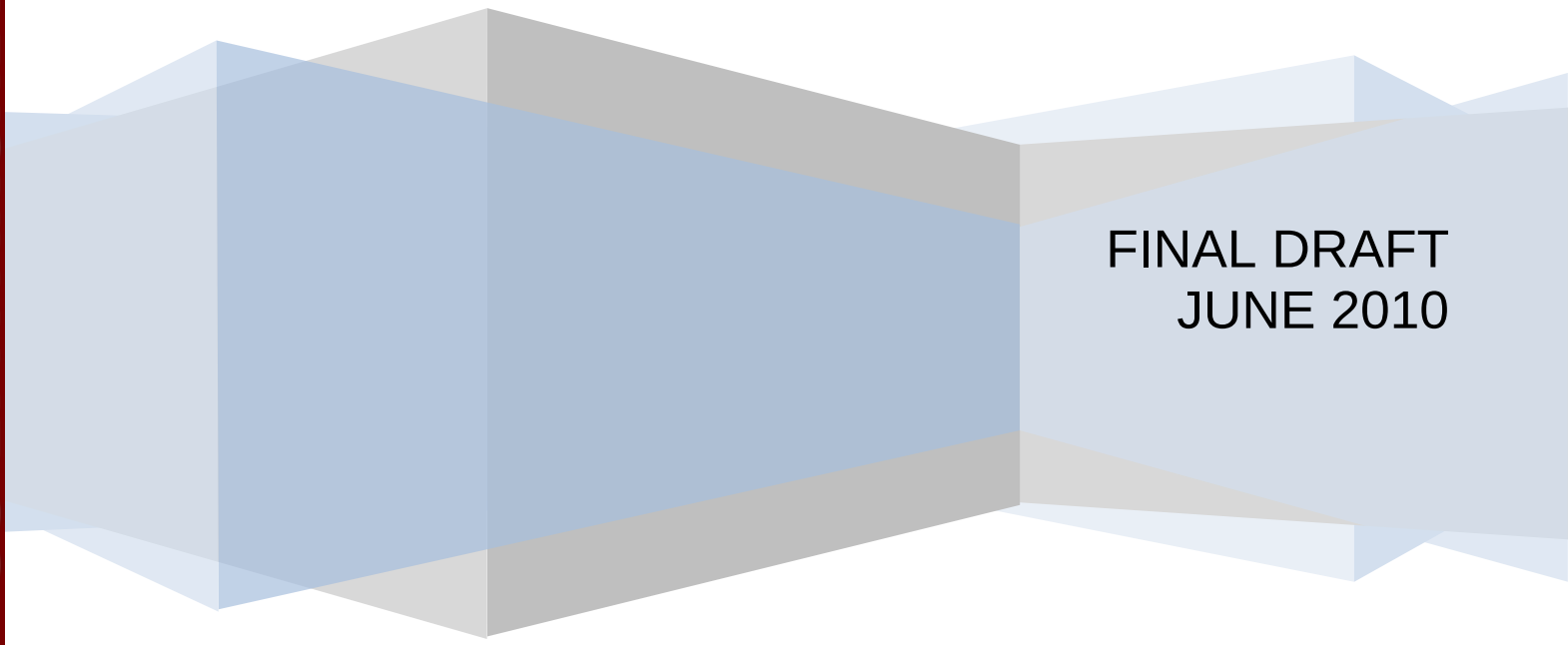
NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

AIR QUALITY MANAGEMENT PLAN

DIVISION OF AIR RESOURCES



FINAL DRAFT
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Executive Summary

From the 1984 Acid Deposition Reduction Act and the 1996 Environmental Bond Act, to the 2009 Regional Greenhouse Gas Initiative, New York State has historically been and continues to be a leader in environmental stewardship by fostering policies that greatly improve environmental and public health.

All of the initiatives undertaken by the New York State Department of Environmental Conservation (DEC) affect air pollutants such as sulfur dioxide (SO_2), oxides of nitrogen (NO_x), carbon dioxide (CO_2), particulate matter (PM) and mercury (Hg). These programs have varying effects on environmental and public health, climate and ecosystem recovery. Understanding how various energy and emission control technologies impact emissions for a broad range of pollutants; and understanding their effects on public health, the environment, and the economy, is critically important to achieve maximum benefits and to avoid unintended consequences.

The DEC believes that a multi-pollutant planning approach that integrates air quality and climate goals is the future of air quality planning, and is the best action to take to meet the forthcoming multitude of federal and state environmental requirements. Consequently, the DEC has created this comprehensive air quality management plan (AQMP) that is multi-pollutant in nature with the intent that it provide for a more efficient and proactive pollution control process. This AQMP is one of the first of its kind to combine air quality and energy goals into one plan that includes potential emission control strategies that could most efficiently address the state's air quality goals as well as meet federal Clean Air Act requirements. Through extensive modeling and analysis of these emission control strategy options, the DEC has at its disposal a suite of control measures that can be considered from a policy perspective to address the DEC's priorities and air quality challenges.

Furthermore, the AQMP addresses attainment and maintenance of national ambient air quality standards (NAAQS), incorporates potential climate change mitigation strategies, reduction of air toxics, increased visibility, reduced acid deposition and considers Environmental Justice (EJ) concerns. As stated above, these priorities are addressed through a variety of potential control strategies that apply to the transportation, energy and residential/commercial/industrial sectors. In addition to taking a sector-based approach to addressing air pollution and climate change, the AQMP has a time dimension in that there are potential strategies that can reduce pollution now, as well as those that have the potential to benefit the environment decades into the future.

This AQMP is a dynamic document that is subject to frequent revisions due to the nature of the planning environment. Any discrepancies should be brought to the attention of the Division of Air Resources.

Acronyms and Abbreviations

AQMP	Air Quality Management Plan
CO_2	Carbon Dioxide
DEC	New York State Department of Environmental Conservation
EPA	United States Environmental Protection Agency
HAP	Hazardous Air Pollutant
NAAQS	National Ambient Air Quality Standard
NO_x	Oxides of Nitrogen
NYSERDA	New York State Energy Research and Development Authority
PM_{10}	Particulate Matter
$PM_{2.5}$	Fine Particulate Matter
POM	Polycyclic Organic Matter
SO_2	Sulfur Dioxide

Key components of the AQMP

The Department's air quality management plan addresses air quality concerns and goals such as nonattainment and maintenance of criteria pollutant national ambient air quality standards, sector-based emission control strategies, emission and risk reductions of Hazardous Air Pollutants (HAPs), climate change, regional haze and visibility. It also addresses other considerations such as environmental justice, land-use, transportation, energy and ecosystem health to the extent practicable.

In consideration of the Commissioner's priorities and the Department's mission, the initial scope of the project addresses the following pollutants, in alphabetical order, that most affect air quality in New York State:

- 1, 3-butadiene
- Acetaldehyde
- Acrolein
- Ammonia
- Benzene
- Carbon Dioxide and other "greenhouse" gases
- Carbon Monoxide
- Diesel Exhaust
- Fine Particulate Matter ($PM_{2.5}$)
- Formaldehyde
- Lead
- Mercury
- Nickel compounds
- Oxides of Nitrogen
- Ozone
- Particulate Matter (PM_{10})
- Polycyclic organic matter (POM)
- Sulfur Dioxide

In the future, the AQMP may be expanded to include additional pollutants.

The overall air quality in New York State has been continually improving over the last several decades. The addition of control requirements and the gradual replacement of older cars with new vehicles have significantly contributed to this improvement. However, indigenous source pollution as well as the transport of pollutants into the state continues to be an issue and the state continues to have areas that are in nonattainment for ozone and fine particulate matter.

Greenhouse Gases

Carbon Dioxide

Scientific evidence suggests that a warming climate poses a serious threat to New York's environmental resources and public health. Climate changes will have effects on air quality, water quality, fisheries, drinking water supplies, wetlands, forests, wildlife, and agriculture. Flooding from severe weather events and rising sea levels can damage communities and infrastructure in floodplains and along coastlines.

In 2005, 244.96 million tons of carbon dioxide (CO_2) and 819,252 tons methane were emitted in New York State. Carbon dioxide formed during fuel combustion accounts for the vast majority of greenhouse gas emissions in New York State, approximately 88.5 percent. The largest single source of emissions is transportation fuel combustion, representing more than 30 percent of the total. Burning fossil fuels for electric generation is also a major contributor of CO_2 to the atmosphere, and in New York, electric power plants emit approximately 25 percent of all CO_2 emissions. This means that reducing the amount of CO_2 emitted by power plants is a necessary piece of any solution to climate change. (Source: NYS Greenhouse Gas Emissions Inventory, NYSERDA, Draft dated May 22, 2007)

The Regional Greenhouse Gas Initiative, or RGGI, is a regional agreement to reduce greenhouse gas emissions from power plants. Under the RGGI agreement, the governors of 10 Northeastern and Mid-Atlantic States have committed to cap the amount of carbon dioxide that power plants are allowed to emit. State regulations will hold the allowed level constant through 2014, and then gradually reduce it. By 2019, the cap will be 10 percent lower than it initially was, and emissions are estimated to be 16 percent lower than they would be if the power plants had continued emitting on a business-as-usual basis.

The RGGI states have negotiated a regional CO_2 budget of approximately 188 million tons, and have apportioned it among themselves. New York's initial CO_2 budget will be approximately 64.3 million tons (before the 10 percent reduction is made).

Responsibility for implementing RGGI will be shared by three departments of New York State government: the Department, the Department of Public Service, and the Energy Research and Development Authority (NYSERDA). The Department and NYSERDA adopted 6 NYCRR Part 242 and 21 NYCRR Part 507 in the fall of 2008, respectively.

The Department has established New York's CO_2 Budget Trading Program through Part 242 while NYSERDA will administer the auction process by which the state will sell emissions allowances to the power plants through Part 507, CO_2 Allowance Auction Program. Under this rule, proceeds from sale of the allowances will fund projects and programs for energy efficiency and clean renewable energy.

Criteria pollutants

Ozone

Ground-level ozone, a primary ingredient in smog, is formed when volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) react chemically in the presence of sunlight. Knox

Oxides of nitrogen are a group of gases including nitric oxide (NO) and nitrogen dioxide (NO_2). NO_2 is a reddish-brown, highly reactive gas that is formed in the air through the oxidation of NO. When NO_2 reacts with other chemicals in the atmosphere, it not only results in the formation of ozone, but it also forms particulate matter (PM), haze and acid rain. Sources of NO and NO_2 include motor vehicle exhaust (including both gasoline-fueled vehicles and diesel-fueled vehicles), the burning of coal, oil or natural gas, and industrial processes such as welding, electroplating and dynamite blasting. Transportation is considered a mainly localized contributor of NO_X, while stationary source fuel combustion has transport impacts, making it more of a regional issue.

Although most NO_x is emitted as NO, it is readily converted to NO_2 in the atmosphere. In the home, gas stoves and heaters produce substantial amounts of nitrogen dioxide. As much of the NO_x in the air is emitted by motor vehicles, concentrations tend to peak during the morning and afternoon rush hours. Also, due in part to poorer local dispersion conditions caused by light winds and other weather conditions that are more prevalent in the colder months of the year, NO_x concentrations tend to be higher in the winter than the summer.

VOCs are chemicals that evaporate (or volatilize) when they are exposed to air. They are called organic because they contain carbon. Some VOC compounds are highly reactive with a short atmospheric lifespan, while others can have a very long lifespan. The short-lived compounds contribute substantially to atmospheric photochemical reactions and thus the formation of ozone.

VOCs are used in the manufacture of, or are present in, many products used daily in both homes and businesses. Some products, such as gasoline, actually are VOCs. VOCs are used as fuels (gasoline and heating oil) and are components of many common household items such as polishes, paints, cosmetics, perfumes and cleansers. They are also used in industry as degreasers and solvents, and in dry cleaning. VOCs are present in many fabrics and furnishings, construction materials, adhesives and paints. In offices, VOCs can be found in correction fluid, magic markers, paper, rubber bands, invisible tape and other products. The names of many VOCs may be familiar: carbon tetrachloride, trichloroethene (TCE), tetrachloroethene (PCE), trichloroethane (TCA), benzene and toluene. Because of their widespread historical use, and past lack of stringent disposal requirements, they are in our air, soil, and water in varying concentrations. Human-made VOCs are primarily emitted into the air by motor vehicle exhaust, industrial processes and from the evaporation of solvents, oil-based paints and gasoline from gas pumps and motor vehicles.

Ozone pollution is a concern during the summer months when the weather conditions needed to form ground-level ozone – sunshine and hot temperatures – normally occur. Ozone is unhealthy to breathe, especially for people with respiratory diseases and for children, the elderly and adults who are active outdoors. Symptoms include reduced lung function and chest pain, and can lead to respiratory diseases such as bronchitis or asthma.

Emissions from point, area, non-road mobile, on-road mobile and biogenic source sectors contribute to the ozone non-attainment problem. Emissions data from point sources, including electricity generating units, is obtained directly from Title V major sources via required annual emission statement surveys. Emissions from all other sources are estimated using EPA approved methodologies. Area sources collectively represent individual stationary sources that have not been identified as specific point sources. Examples of area source categories include architectural coatings, dry cleaning and ethylene oxide sterilizers. The on-road component includes emissions from all motorized vehicles operated on public roadways. The non-road component includes emissions from motorized vehicles and equipment that are not typically operated on public roadways (e.g. locomotive, construction equipment, aircraft, marine vessels, recreational equipment and lawn and garden equipment). Biogenic emissions are naturally occurring emissions from vegetation and nitric oxide (NO) and carbon monoxide (CO) emissions from soils.

All sectors will be evaluated for potential additional control measures as part of the development of the air quality management plan.

The evolution of severe ozone episodes in the eastern United States often begins with the movement of a large high pressure area from the Midwest to the middle or southern Atlantic states, where it assimilates into and becomes an extension of the Atlantic (Bermuda) high pressure system. During its movement east, the air mass accumulates air pollutants emitted by large coal-fired power plants and other sources located outside the Ozone Transport Region. As the air mass passes over the eastern United States, sources within the Ozone Transport Region contribute to the air pollution burden. These expansive weather systems favor the formation of ozone by creating a vast area of clear skies and high temperatures. These two prerequisites for abundant ozone formation are further compounded by a circulation pattern favorable for pollution transport over large distances. In the worst cases, the high pressure systems stall over the eastern United States for days, creating ozone episodes of strong intensity and long duration.

One transport mechanism that has fairly recently been discovered and can play a key role in moving pollution long distances is the nocturnal low level jet stream. This low level jet is a regional scale phenomenon of higher wind speeds that often forms during ozone events a few hundred meters above the ground just above the stable nocturnal boundary layer. It can convey air pollution several hundreds of miles overnight from the southwest to the northeast, directly in line with the major population centers of the Northeast Corridor stretching from Washington, D.C. to Boston, Massachusetts. The

nocturnal low level jet extends the entire length of the corridor from Virginia to Maine, and has been observed as far south as Georgia. It can thus be a transport mechanism for bringing ozone and other air pollutants into the Ozone Transport Region from outside the region, as well as move locally formed air pollution from one part of the Ozone Transport Region to another.

Other transport mechanisms occur over smaller scales. These include land, sea, mountain, and valley breezes that can selectively affect relatively local areas. They play a vital role in drawing ozone-laden air into some areas, such as coastal Maine, that are far removed from major emission source regions.

With the knowledge of the different transport scales into and within the Ozone Transport Region, a conceptual picture of bad ozone days emerges. After sunset, the ground cools faster than the air above it, creating a nocturnal temperature inversion. This stable boundary layer extends from the ground to only a few hundred meters in altitude. Above this layer, a nocturnal low level jet can form with higher velocity winds relative to the surrounding air. It forms from the fairly abrupt removal of frictional forces induced by the ground that would otherwise slow the wind. Absent this friction, winds at this height are free to accelerate, forming the nocturnal low level jet. Ozone above the stable nocturnal inversion layer is likewise cut off from the ground, and thus it is not subject to removal on surfaces or chemical destruction from low level emissions. Ozone in high concentrations can be entrained in the nocturnal low level jet and transported several hundred kilometers downwind overnight. The next morning as the sun heats the Earth's surface, the nocturnal boundary layer begins to break up, and the ozone transported overnight mixes down to the surface where concentrations rise rapidly, partly from mixing and partly from ozone generated locally. By the afternoon, abundant sunshine combined with warm temperatures promotes additional photochemical production of ozone from local emissions. As a result, ozone concentrations reach their maximum levels through the combined effects of local and transported pollution. Ozone moving over water is, like ozone aloft, isolated from destructive forces. When ozone gets transported into coastal regions by bay, lake, and sea breezes arising from afternoon temperature contrasts between the land and water, it can arrive highly concentrated.

During severe ozone episodes associated with high pressure systems, these multiple transport features are embedded within a large ozone reservoir arriving from source regions to the south and west of the Ozone Transport Region. Thus a severe ozone episode can contain elements of long range air pollution transport from outside the Ozone Transport Region, regional scale transport within the Ozone Transport Region from channeled flows in nocturnal low level jets, and local transport along coastal shores due to bay, lake, and sea breezes.

In New York, the New York State counties south of the Mid-Hudson area are separated by the Hudson Highlands, which are a range of hills whose southern edge runs roughly along the Orange/Rockland and Putnam/Westchester county lines. Although it is a relatively small mountain range, it is situated such that it serves as a boundary between the coastal plain climate regime and the inland climate regime. The Highlands tend to

inhibit low-level air flow from the coastal plain into the Mid-Hudson area. Local sea breeze circulations, which are common during the ozone season, occasionally extend as far inland as the Highlands, but rarely cross the Highlands into the Mid-Hudson area. Local sea breeze circulations, which are common during the ozone season, occasionally extend as far inland as the Highlands, but rarely cross the Highlands into the Mid-Hudson region. Additionally, a weather feature known as the lee trough, (the most common feature associated with high ozone events in southeastern New York), tends to set up near New York City. The trough forms during periods of northwesterly wind flow aloft and is "dragged" off the terrain a bit in the NW flow (more or less depending on the strength of the flow). In these weather situations, the high ozone band, along with the sea-breeze front, stretches along and south of the trough line. When this occurs, the Lower Hudson Valley Region is in a westerly or west-northwesterly surface wind flow (coming from a relatively sparsely populated area with lower emissions) and ozone values tend to be lower compared with the New York City area, where the west-southwesterly surface wind flow ahead of the trough brings in air from areas with higher ozone concentrations and higher emissions of ozone precursors.

Existing Stationary Source Measures (pre-February 8, 2008)

This section summarizes the ongoing mobile source and stationary source control measures that have been enacted in the past to minimize emissions of NO_x and VOCs. Many of these control measures were developed and implemented after the April 30, 2004 ozone designations. Part D of Title I of the CAA requires that these measures be implemented and display reasonable further progress as the area strives to reach attainment. These past commitments continue indefinitely, unless replaced by an equivalent or stricter emission reduction strategy. All effective Division of Air Resources regulations for air pollution control can be found on the Department's website located at http://www.dec.ny.gov/regs/2492.html .

- 6 NYCRR Part 204: NO_x Budget Trading Program
- 6 NYCRR Part 205: Architectural and Industrial Maintenance (AIM) Coating
- 6 NYCRR Part 208: Landfill Gas Collection and Control Systems for Certain Municipal Solid Waste Landfills
- 6 NYCRR Part 212: General Process Emission Sources
- 6 NYCRR Part 217: Motor Vehicle Emissions
- 6 NYCRR Part 218: Emission Standards for Motor Vehicles and Motor Vehicle Engines
- 6 NYCRR Part 220: Portland Cement Plants (Single Source SIP Revision)
- 6 NYCRR Part 225: Fuel Consumption and Use - Gasoline (*Subpart 3*)
- 6 NYCRR Part 226: Solvent Metal Cleaning
- 6 NYCRR Part 227: Stationary Combustion Installations
- 6 NYCRR Part 228: Surface Coating Processes
- 6 NYCRR Part 229: Petroleum and Volatile Organic Liquid Storage and Transfer
- 6 NYCRR Part 230: Gasoline Dispensing Sites and Transport Vehicles
- 6 NYCRR Part 231: New Source Review for New and Modified Facilities

- 6 NYCRR Part 233: Pharmaceutical and Cosmetic Manufacturing Processes
- 6 NYCRR Part 234: Graphic Arts
- 6 NYCRR Part 235: Consumer Products

New Stationary Source Measures (post-February 8, 2008)

- 6 NYCRR Part 200: General Provisions (Incorporation of Federal MACT Rules)
- 6 NYCRR Part 212: General Process Emission Sources (Asphalt Paving Production)
- 6 NYCRR Part 220: Portland Cement Plants (*Subpart 1*)
- 6 NYCRR Part 220: Glass Manufacturing (*Subpart 2*)
- 6 NYCRR Part 222: Distributed Generation
- 6 NYCRR Part 227: NO_x RACT (*Subpart 2*)
- 6 NYCRR Part 227: ICI Boilers RACT (*Subpart 3*)
- 6 NYCRR Part 228: Adhesives and Sealants
- 6 NYCRR Part 234: Graphic Arts
- 6 NYCRR Part 235: Consumer Products
- 6 NYCRR Part 241: Asphalt Formulation
- 6 NYCRR Part 243: CAIR NO_x Ozone Season Trading Program
- 6 NYCRR Part 244: CAIR NO_x Annual Trading Program
- 6 NYCRR Part 245: CAIR SO_2 Trading Program

New Mobile Source Measures (post-February 8, 2008)

Low Emission Vehicles (LEV)

Section 177 of the CAA permits states to adopt new motor vehicle emissions standards that are identical to California's. New York has exercised this option in 6 NYCRR Part 218, “Emission Standards for Motor Vehicles and Motor Vehicle Engines,” which incorporates California's emissions standards for light-duty vehicles.

The LEV regulations provide flexibility to auto manufacturers by allowing them to certify their vehicle models to one of several different emissions standards. These consist of several different tiers of increasingly stringent LEV emission standards to which a manufacturer may certify a vehicle, including LEV, ultra-low-emission vehicle (ULEV), super-ultra low-emission vehicle (SULEV), and zero-emission vehicle (ZEV). The different standards are intended to provide flexibility to manufacturers in meeting program requirements. However, manufacturers must demonstrate that the overall fleet for each model year meets the specified NMOG standard for that year. These requirements are progressively lower with each model year.

Personal Watercraft

New York adopted California's emissions standards for personal watercraft in 2003. These standards reduce emissions of hydrocarbons, NOx and PM beyond the levels achieved by federal standards. This is accomplished by imposing lower emission certification levels beginning with model year 2006 and which become increasingly stringent. In addition, the personal watercraft engine program includes test procedures for new and in-use engines, which guarantees compliance with the standards, establishes an environmental label program and extends emission warranty requirements.

Manufacturers of personal watercraft engines can choose the standard among which they wish to certify their engines as long as the emissions of their entire product line meet the corporate average requirement. CARB's average requirement declines through the 2008 model year. On a sales and kW-weighted basis, manufacturers' engine production must, on average, comply with requirements set in the rule. There is, however, an upper bound limit on higher emission engines. This federal emission limit (FEL) cap is necessary to encourage manufacturers to abandon conventional high emitting carbureted two stroke technology, thereby reducing individual exposure to extremely high polluting engines.

A spark ignition marine engine manufacturer may exchange emission credits with another manufacturer. Traded credits expire if they are not used in averaging within three model years following the model year in which they were generated.

At the end of the model year, the manufacturer must have a net positive or zero emission credit balance to be in compliance. In addition, each engine family must comply with its certification FEL. Emission credits may not be used to offset an engine family's emissions that exceed its applicable FEL, or to remedy nonconformity determined by Production Line Testing (PLT), Selective Enforcement Audit (SEA), or a recall.

At the start of each model year, the engine manufacturer will begin to randomly select engines from the end of the assembly line from each engine family for PLT at a rate of one percent in accordance with CARB's June 14, 2000 "Final Regulation Order."

The Personal Watercraft program also provides for in use compliance testing, recalls, and warranty statements, as well as the use of permanent and temporary (i.e., hang tags) emission control labels for spark ignition marine engines which have been certified to the emission standards.

NYMA I/M Programs (NYVIP and NYTEST)

In the downstate NYMA, which consists of New York City, Nassau, Suffolk, Rockland and Westchester counties, a high enhanced I/M emissions test is required annually and with any change of vehicle ownership. The emissions inspection is completed in conjunction with a safety inspection. Depending on vehicle model year, a NYTEST tailpipe emission test or a NYVIP on-board diagnostics (OBD II) check is required.

Vehicles that are 25 model years old and newer up to model year 1995, with a gross vehicle weight (GVW) of 8,500 pounds or less, go through a series of procedures which check for tailpipe emissions (NYTEST), anti-tampering visual checks, and gas cap leaks. The visual inspections require an expanded anti-tampering check of a vehicle's air pollution control components including the catalytic converter, positive crankcase ventilation (PCV) system, exhaust gas recirculation (EGR) valve, thermostatic air cleaner (TAC), air injection system, evaporative emission control system, and fuel inlet restrictor. NYTEST test standards (cutpoints) are based on a sliding scale such that older vehicles will have more lenient standards than newer vehicles. OBD checks (NYVIP) are completed on model year 1996 and newer vehicles along with the anti-tampering visual inspection of the air pollution control devices. The OBD check detects a malfunction through the vehicle's computer system of the air pollution control devices through NYVIP.

On March 27, 1996, the Department submitted “New York State Implementation Plan - Enhanced Motor Vehicle Inspection/Maintenance Program” to outline the NYTEST tailpipe testing I/M program in NYMA. On May 7, 2001, EPA approved a SIP revision that demonstrated the effectiveness of the NYMA decentralized testing I/M network and approved New York's alternate tailpipe test, NYTEST. Final cutpoints for the NYTEST program were implemented on April 1, 2003. In March 2006, the Department submitted "New York State Implementation Plan - New York Vehicle Inspection Program (NYVIP)" to outline the statewide OBD-based NYVIP I/M program. On February 21, 2007, EPA approved this SIP revision.

New York implements it's I/M programs through 6 NYCRR Part 217, “Motor Vehicle Enhanced Inspection and Maintenance Program Requirements,” and Title 15 NYCRR Part 79, “Motor Vehicle Inspection Regulations,” to comply with EPA regulations and to improve performance of its I/M program. The intended effect of this action is to maintain consistency between the state-adopted rules and the federally-approved SIP, and to apply a control strategy that will result in emission reductions that will help achieve attainment of the NAAQS for ozone.

Federal Diesel Fuel (with State Backstop)

New York State's motor vehicle diesel fuel program is identical to the EPA motor vehicle diesel fuel regulations, which treat diesel engine systems and fuels as a system. The EPA motor vehicle diesel fuel regulation is an integral part of EPA regulations establishing new emission standards that will begin to take effect in model year 2007 and will apply to heavy-duty highway engines and vehicles greater than 8,500 pounds GVWR. New York adopted California regulations that are numerically identical. These standards are based on the use of high efficiency catalytic exhaust emission control devices or comparably effective advanced technologies.

In addition to setting emission limits for PM, the requirements establish standards for NO_x and non-methane hydrocarbons (NMHC) of 0.20 grams per brake horsepower-hr (g/bhp-hr) and 0.14 g/bhp-hr, respectively. The NO_x and NMHC standards will be phased in between 2007 and 2010 for diesel engines. The phase-in will be on a percent-of-sales basis from 2007 into 2010. Gasoline engines will also be subject to these standards, with a phase-in provision that requires 50 percent compliance in the 2008 model year and 100 percent compliance in the 2009 model year. Flexibility provisions to assist the transition to the new standards are included that will provide an incentive for the early introduction of clean technologies. They will also provide for flexibility in adapting new technologies and existing engine-based technologies.

Because many control devices are damaged by sulfur, it is necessary to reduce the level of sulfur in motor vehicle diesel fuel by 97 percent, to 15 ppm. This rule provides for production of 15 ppm motor vehicle diesel fuel beginning on June 1, 2006. The rule is effective at downstream locations (such as terminals) on July 15, 2006, and at retail locations and wholesale purchaser-consumer facilities on October 15, 2006.

Federal Non-Highway Diesel Fuel and Heavy Duty Diesel On-Road Requirements

The Department's non-road program, based on the application of the federal rules, will reduce emissions NO_x and PM from non-road diesel engines by combining engine and fuel controls as a system to obtain emission reductions. Overall, a 90 percent reduction in emissions from these engines is expected.

The non-road standards apply to diesel engines that are used in construction, agricultural, industrial, and airport equipment, and set emission standards for different sizes of non-road engines. Standards vary by engine size with implementation dates ranging from 2008 - 2014. Mobile engines greater than 750 horsepower will have one additional year of flexibility to meet their emission standards. These emission standards will not apply to diesel engines used in locomotives and marine vessels, which are

being addressed by an EPA rulemaking proposed April 3, 2007. Fuel requirements for these engines have been promulgated with the non-road standards.

Integral to the new provisions are the new fuel requirements that will reduce the allowable levels of sulfur in fuel used in non-road diesel engines, locomotives, and marine vessels. The current sulfur levels will be reduced from about 3,000 ppm to 15 ppm, which is a reduction of greater than 99 percent. This reduction will take place in two phases. In the first, beginning in 2007, fuel sulfur levels in non-road diesel fuel will be limited to a maximum of 500 ppm. This includes the use of the fuel in locomotive and marine applications. Beginning in 2010, sulfur levels in most non-road diesel fuel will be reduced to 15 ppm. Locomotive and marine diesel fuel will be restricted to this level in 2012.

$PM_{2.5}/PM_{10}$

The direct emission of particulate matter, especially fine particulate matter (particles with a diameter less than 2.5 microns in size), sulfur dioxide, and nitrogen oxides are the primary contributors to the exceedance of the particulate matter air quality standards. Particulate matter can be emitted directly from sources, or be comprised in part of nitrate and sulfate particles formed through atmospheric reactions involving nitrogen oxides, sulfur dioxide, VOCs, windblown dust, and ammonia. These constituents are capable of being transported great distances while in the atmosphere. Due to this, sources may contribute to PM nonattainment far downwind of their location requiring a regional solution.

There are a myriad of sources of particulate matter, ranging from stationary and mobile sources, to small area and biogenic sources. The greatest contributor to particulate emissions is combustion, which occurs in many forms at power plants, in cars, through the use of heavy construction equipment, and in home heating. To reduce pollution, a comprehensive program must be developed and implemented that is able to account for the contributions from these source types.

All sectors will be evaluated for potential additional control measures as part of the development of the air quality management plan.

The Federal Reference Method (FRM) data collected across the New York metropolitan area over the past seven years suggest that PM2.5 levels are generally higher in the core urban areas compared to the surrounding suburban counties. While this is a rather short time period, it appears that $PM_{2.5}$ levels have been decreasing across the entire metropolitan area since the early 2000's. It appears that emissions control programs that target precursors will be needed to further reduce $PM_{2.5}$ levels across the metropolitan area.

Particulate Matter Measures

Existing Measures

- 6 NYCRR Part 215: Open Burning
- Federal Locomotive Engines and Marine Compression-Ignition Engines

New or Revised Measures

- 6 NYCRR Part 227: Stationary Combustion Installations

Sulfur

Existing Measures

- 6 NYCRR Part 225: Fuel Consumption and Use
- Federal Clean Air Act Title IV – Acid Rain Program
- Federal Low-Sulfur Fuels
- Federal CAIR Program

New or Revised Measures

- 6 NYCRR Part 225: Fuel Consumption and Use
- Federal CAIR Replacement Rule

Nitrogen Oxides

Existing Measures

- 6 NYCRR Part 210: Emissions and Labeling Requirements for Personal Watercraft Engines
- 6 NYCRR Part 217: Motor Vehicle Emissions
- 6 NYCRR Part 218: Emission Standards for Motor Vehicles and Motor Vehicle Engines
- Federal Large Industrial Spark-Ignition Engines over 19kW and Recreational Vehicles
- Federal Diesel Fuel
- Federal Small Spark-Ignition Engines
- Federal Nonroad Diesel Engines
- Federal ICI Boiler MACT
- Federal CAIR Program

New or Revised Nitrogen Oxide Measures

- 6 NYCRR Part 212: General Process Emission Sources
- 6 NYCRR Subpart 220-1: Portland Cement Plants
- 6 NYCRR Subpart 220-2: Glass Manufacturing
- 6 NYCRR Part 227: Stationary Combustion Installations
- 6 NYCRR Part 231: New Source Review for New and Modified Facilities
- Federal CAIR Replacement Rule

Carbon Monoxide

New York State is in attainment of the Carbon Monoxide NAAQS. A maintenance plan for the New York City Metropolitan area has been approved by EPA, and will be included in the Air Quality Management Plan as an appendix.

Air Toxics

New York State's need to reduce hazardous air pollutant (HAP) emissions statewide is driven by the following agency and national goals:

- The Department's commissioner priorities' for the agency, including 6NYCRR Part 212, and

- The Clean Air Act (CAA), including 40 CFR Part 63, the National Emission Standards for Hazardous Air Pollutants program (NESHAPs) and §112(k) of the CAA, Integrated Urban Air Toxics Strategy. HAPs represent a subset of the numerous air toxics emitted to the ambient air.

As stated above, New York's AQMP will focus on the following urban Hazardous Air Pollutants (HAPs) emitted from both stationary and mobile sources: acetaldehyde, acrolein, benzene, 1, 3-butadiene, formaldehyde, mercury, nickel compounds and polycyclic organic matter (POM). Diesel exhaust was not listed as a §112(k) HAP but was estimated in NATA. The AQMP will put particular emphasis on highly exposed individuals, such localized communities of high concentrations and specific population subgroups (e.g., children, the elderly, and low-income communities).

Based upon EPA's 1999 National-scale Air Toxics Assessment (NATA), benzene is the most significant air toxic for which cancer risk could be estimated. The estimated air concentrations for benzene contributed 25 percent of the average individual cancer risk identified. The 1999 national emissions inventory reports the following key sources for benzene: on road (49%) and non-road mobile sources (19%), and open burning, prescribed fires and wildfires (14%). Residential heating from wood combustion accounts for approximately 6% of the total benzene emissions.

In New York State, the primary benzene emissions are also on-road and off-road mobile sources. Benzene is also emitted during the fueling of gasoline bulk storage tanks and the fueling of vehicles. Several HAPs are present in gasoline and are emitted to the air when gasoline evaporates or passes through the engine as unburned fuel. A significant amount of automotive air toxics come from the incomplete combustion of compounds in gasoline, such as toluene and xylene, both that are chemically similar to benzene. Formaldehyde, acetaldehyde, diesel exhaust particulate matter POM, and 1, 3-butadiene are not present in fuel but are by-products of incomplete combustion. Formaldehyde and acetaldehyde are also formed through a secondary process when other mobile source pollutants undergo chemical reactions in the atmosphere.

The statewide monitored annual average for benzene in 2007 was 0.91 ug/m3, which is 7.0 times (0.91/0.13) the annual guideline concentration as reported in the 2007 AGC/SGC tables of DAR-1. The average measured concentration in New York City's seven metropolitan sites for 2006 was 1.2 ug/m3 or 9.2 times the AGC for benzene. A targeted goal of 75% reduction in benzene emissions statewide would equate to an overall emission level of 0.22 ug/m3.

The statewide monitored 2007 annual average for 1,3 –butadiene was 0.12 ug/m3 , this is 3.5 times (0.12/0.033) the annual guideline concentration as reported in the 2007 AGC/SGC tables of DAR-1. The average measured concentration in New York City's seven metropolitan sites for 2006 is 0.14 ug/m3 or 4 times the AGC for 1, 3 –butadiene emissions.

In EPA's assessment, the 1999 NATA reports that acrolein contributes 91 percent of the nationwide average non-cancer hazard index. Based on the national emissions inventory, the key sources for acrolein are open burning, prescribed fires and wildfires (61%), on road (14%) and non-road (11%) mobile sources.

POM and fine particles are a component of diesel exhaust. Diesel exhaust is described by EPA under NATA as:

Diesel Particulate Matter (PM) is a mixture of particles that is a component of diesel exhaust. EPA lists diesel exhaust as a mobile source air toxic due to the cancer and non-cancer health effects associated with exposure to whole diesel exhaust. EPA believes that exposure to whole diesel exhaust is best described, as many researchers have done over the years, by diesel particulate concentrations.

In 1998, nickel compounds were identified as pollutants of concern from the firing of oil in the §112(n) Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units, Final Report to Congress. This finding was overturned in 2004 and subsequently remanded by the District Courts. Nickel should be identified as a pollutant of concern for the multi-pollutant study SIP and emissions of nickel from sources should be addressed.

Nickel compounds have been identified as a major concern in the burning of fuel oil. 1999 NATA estimates a range in urban counties of 0.009 to 0.060 ug/m3. The current AGC for nickel is 0.0042 ug/m3 based upon carcinogenic health effects. Monitored 2000 speciated $PM_{2.5}$ data reports the nickel component at 0.01 to 0.06 ug/m3 at urban sites.

Mercury

In lieu of accepting the model rule requirements of the federal Clean Air Mercury Rule, the Department incorporated 6 NYCRR Part 246 of Title 6 of the New York Codes, Rules and Regulations entitled "Mercury Reduction Program for Coal-Fired Electric Utility Steam Generating Units", into the Mercury State Plan.

Part 246 will achieve a ninety percent reduction in mercury emissions from the coal-fired electricity generating units covered by the federal Clean Air Mercury Rule in two phases.

Phase One of Part 246 imposes facility-wide mercury emission limitations based upon the state mercury budget distributed to New York State by the United States Environmental Protection Agency. The facility-wide emission limitations will be in effect from 2010 to 2014.

Phase Two of Part 246 establishes a unit-based emission limit of 0.6 pounds per trillion British Thermal Units on a 30-day rolling average basis for each applicable unit starting in 2015.

The New York Section 111(d) State Plan for the Implementation of Coal-Fired Electric Steam Generating Unit Mercury Emission Guidelines will be included in the Air Quality Management Plan as an appendix.

Additional controls may be considered as a result of the analytical phase of the air quality management plan development.

Lead

With the phasing-out of leaded gasoline and lead-based paints, lead emissions within the United States have decreased dramatically since 1980. Despite this progress, recent research on the effects of lead on the nervous system (with associated IQ losses and behavioral issues), cardiovascular system, and immune system, implied that a much more stringent standard was necessary. EPA responded to this evidence on October 15, 2008 by strengthening the NAAQS from 1.5 µg/m3 to 0.15 µg/m3, as measured over a rolling three-month period.

There are no nonattainment areas within New York State under the old standard of 1.5 µg/m3. The Department was required to submit its designation recommendations for

the revised standard to EPA by October 15, 2009. Based on the currently available monitoring data, the Department requested that all areas of New York State be declared as either attainment or attainment/unclassifiable. In December 2009, EPA released a proposed revision to the lead monitoring requirements associated with the revised standard. The Department will install monitors as deemed by EPA's final monitoring requirements to help ensure compliance with the NAAQS.

Visibility

Regional haze is a persistent issue across the country. The northeast, in particular, has seen reductions in visibility of up to 83 percent from natural conditions. Because the pollutants that cause visibility impairment (primarily SO_2, PM_{10}, and NO_x) are easily transported great distances, the EPA presented a regional solution to the problem. On July 1, 1999, EPA released its final Regional Haze Rule, which contained the goal of reaching natural visibility conditions by 2064. The regional approach presented within this rule means that many states, including those which do not contain Federal Class I areas, must participate in haze reduction efforts.

The Department has submitted its Regional Haze State Implementation Plan to EPA on March 15, 2010. New York State, although containing no Class I areas, is a member of the Mid-Atlantic/Northeast Visibility Union Regional Planning Organization (MANE-VU RPO). As a state which significantly contributes to the regional haze problem in downwind Class I areas within MANE-VU, the Department has made certain commitments to reduce emissions of these visibility-impairing pollutants. Among these commitments is the implementation of Best Available Retrofit Technology (BART) controls for certain older stationary sources; a 90 percent or greater reduction in SO_2 emissions from the highest-polluting electric generating unit sources in the state; and the implementation of a low-sulfur fuel oil strategy. Aside from the visibility improvement that is expected within Class I areas; these measures should result in visibility, acid rain, ozone, and PM benefits within New York State as well.

Acid Deposition

Acid deposition is largely a result of the SO_2, NO_x, and ammonia (NH^3) emissions from power plants and other stationary sources burning fossil fuels (coal, oil, natural gas, etc.), as well as from vehicle emissions. Sulfuric and nitric acid are formed in the atmosphere, and return through wet deposition (commonly referred to as acid rain) or dry deposition. Such deposition affects forest and aquatic ecosystems, visibility, and human health.

While many areas of New York State are not sensitive to acidity because of limestone deposits or soils which neutralize the acid, the Adirondacks, Catskills, Hudson Highlands, Rensselaer Plateau and parts of Long Island are particularly sensitive to acid deposition. The soil and bedrock in these areas are not able to counteract the acid in the rain and snow.

New York monitors and tests for acid deposition through the New York State Atmospheric Deposition Monitoring Network, which was designed in 1985 to carry out requirements of the State Acid Deposition Control Act (SADCA). The monitoring network collects and analyzes precipitation parameters (pH, Sulfate, Nitrate, Calcium, Magnesium, etc) to assess the effectiveness of sulfur control policy and other strategies aimed at reducing the effects of acid rain.

The network's objectives are:

- Provide a consistent, quality-assured, long-term acid deposition database.
- Measure acid deposition in sensitive receptor areas.
- Measure acid deposition in urban and upwind areas.
- Use these data to perform spatial and temporal analyses of acid deposition, its precursors, and its effects.
- Track the effectiveness of programs to reduce acid deposition precursor emissions.

The monitoring network consists of about 20 sites located throughout the state, in both rural and urban areas. Rainfall measurements are automatically recorded, but for other parameters, samples are collected manually from each site and then transported to our laboratory for analysis. Instrumentation is unavailable to automate the deposition sampling and analysis of pH, conductivity, cation concentrations and anion concentrations.

The Department is presently monitoring acid deposition. Sample collection began in June, 1986, with 12 sites, but these data are not considered valid due to shakedown. The official start-up for the network is January 1, 1987. Sites were added in 1987, 1988, 1989, 1990, 1991, 1994, 2001, and 2004. The Department will try to continue to expand the network until the design target of 25 sites is reached. The schedule depends upon budget provisions.

The Department has responded to the Acid Deposition problem by promulgating a number of regulations that effectively reduce emissions of these pollutants. This includes the implementation of budget trading programs for SO_2 (6 NYCRR Part 238) and NO_x (6 NYCRR Part 204 during the ozone season; 6 NYCRR Part 237 during the non-ozone season). Parts 237 and 238 are collectively referred to as the Acid Deposition Reduction Program (ADRP). EPA also adopted the Clean Air Interstate Rule (CAIR) in 2005, applicable to all states east of the Rocky Mountains. New York State has adopted three emissions cap-and-trade rules in response to CAIR. They are:

(1) 6 NYCRR Part 243 establishes the CAIR NO_x Ozone Season Trading Program;
(2) 6 NYCRR Part 244 establishes the CAIR NO_x Annual Trading Program; and
(3) 6 NYCRR Part 245 establishes the CAIR SO_2 Trading Program.

Acid Rain data collected through 2004 are continuing a "slightly" decreasing trend for both SO4 concentration and deposition. The concentration and deposition downward trend is not as evident for NO3- and NH4+. Data show slight pH improvements. The trends in acid deposition data are similar to the emissions trends. Acid Deposition annual reports through 2007 are available at http://www.dec.ny.gov/chemical/41319.html.

Only by the continued collection and analysis of acid deposition will it be possible to verify that improvements are occurring due to the reductions of SO_2 and NO_x legislated in the 1990 CAAA and ADRP.

More information on the Department's Acid Deposition program can be found at http://www.dec.ny.gov/chemical/283.html .

Environmental Justice (EJ)

New York State's Department of Environmental Conservation has been on the forefront of addressing EJ concerns, beginning with the creation of an EJ Office in 1999, a short time after the 1994 Federal Executive Order1. NYSDEC's EJ Office incorporated EJ concerns in the permitting process by creating a Commissioner Policy in 2003.

More recently, in June 2008, an EJ Taskforce was created to further address EJ concerns and expand the scope of EJ considerations to other State agencies. Five working groups were created, each tasked with developing action items to address EJ from the working group's area of expertise. NYSDEC's Division of Air Resources staff was involved in the creation of agency action items for the Air Quality Workgroup. The workgroup began by identifying existing state activities implemented to address air quality concerns in EJ communities. The focus of the workgroup's efforts was to identify new strategies for further air quality improvements in EJ communities. The Taskforce has developed policy goals and action plans for the participating agencies and authorities to implement strategies to reduce and prevent environmental burdens in low income and minority communities that have been disproportionately impacted by pollution.

Although many existing state programs and proposed action items were developed by the workgroup, only those with a potential linkage to the AQMP are discussed below.

[1] President Clinton's Executive Order 12898 signed February 11, 1994, entitled: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Existing State EJ Programs

Commissioner Policy – 29 (CP-29) Environmental Justice and Permitting

The policy provides guidance for incorporating environmental justice concerns into the NYSDEC's environmental permit review process and NYSDEC's application of the State Environmental Quality Review Act. The policy also incorporates EJ concerns into some aspects of the NYSDEC's enforcement program, grants program and public participation provisions. The policy is written to assist NYSDEC staff, the regulated community and the public in understanding the requirements and review process.

The policy amends the NYSDEC environmental permit process by identifying potential EJ areas; providing information on EJ to applicants with proposed projects in those communities; enhancing public participation requirements for proposed projects in those communities; establishing requirements for projects in potential EJ areas with the potential for at least one significant adverse environmental impact; and providing alternative dispute resolution opportunities to allow communities and project sponsors to resolve issues of concern to the community.

Environmental Public Health Tracking (EPHT)

EPHT is a program developed by the Centers for Disease Control and Prevention (CDC) to coordinate data on exposures and disease outcomes. The goal of the program is to protect communities by providing information to federal, state, and local agencies which would allow for the coordinated review of health outcomes and environmental exposures. In 2006, the CDC funded New York State Department of Health to work with NYSDEC to develop a State tracking program. This program focuses on building better environmental and health information database systems which will allow for the review of environmental and health data for patterns and trends. Exploring these trends also helps the state to improve the types of data collected, how data are managed, and how data can be shared with other agencies and data users. Such analysis of patterns and trends in environmental health can direct future research, public health interventions or other activities that might prevent or control environmentally-related health problems.

Green Building Initiative

This initiative encourages the development of green, sustainable, affordable housing by including incentives in the Division of Housing and Community Renewal (DHCR) Unified Funding process. Developers who meet the state's green building criteria gain a significant advantage in the competitive application process. New York's green building criteria include many Smart Growth principles such as siting projects near existing development, infrastructure and public transit to encourage more walkable communities. In addition, this initiative encourages the redevelopment of brownfield sites and the use of building materials and practices that promote a healthy living environment. A Green

Building Criteria Reference Manual is available on the New York DHCR website to educate and assist developers in creating sustainable and healthier housing.

Energy Efficiency Initiative

This initiative encourages developers to incorporate energy efficiency measures into both new construction and rehabilitation of affordable housing projects by including incentives in the DHCR Unified Funding process. Applicants who participate in NYSERDA's Multifamily Building Performance Program or New York ENERGY STAR program, or who can demonstrate that their project can meet comparable energy efficiency standards, qualify for this initiative. The goal of the initiative is to insure that affordable housing funded through DHCR's capital programs achieves a minimum of 20 percent energy efficiency over those projects not constructed to these standards.

Stop Smoking Trucks NYSDEC Initiative

On October 31, 2008, NYSDEC launched a long-term enforcement action to reduce the health risks associated with smoking and idling diesel trucks and buses throughout New York City (NYC), especially in communities that have been disproportionately impacted by pollution. The effort is being led by NYSDEC's Office of Environmental Justice, working with NYSDEC's Law Enforcement Office and the Division of Air Resources. The City of New York is joining NYSDEC in this enforcement action. A joint state-city pilot enforcement effort in November and December 2007 in East Harlem — a neighborhood with high asthma rates and heavy truck traffic — found that thousands of diesel trucks were in violation. This one-time pilot effort served as the basis for a long-term plan to continue the enforcement action.

Every month the NYSDEC will implement a police pullover operation in one of the five NYC boroughs and issue tickets to diesel trucks that are violating mobile source regulations, particularly in environmental justice communities. The smoking truck enforcement will also focus on areas of congregating idling trucks and buses. The long-term enforcement plan will focus on areas where heavy truck traffic enters or exits a neighborhood, such as on bridges and feeder streets, or in areas where diesel trucks park and idle, such as wholesale markets, waste disposal facilities and transportation hubs.

In addition to the implementation of this plan in New York City, on Earth Day 2009, the NYSDEC took similar enforcement actions in urban areas throughout the state. The statewide action will be continued, targeting EJ areas.

In June 2009, NYSDEC rolled out a pilot project to broaden its idling mitigation efforts by creating, "I-Watch Teams," to assist the community in identifying areas of congregating idling trucks and buses, and in informing the trucking and bus operators of their legal responsibilities. The teams consisting of community volunteers watch and report idling trucks and determine patterns of idling or queuing of trucks. The

information gathered will be reported to NYSDEC or to a particular fleet owner for review.

Proposed EJ programs by Division of Air Resources

Programs reducing mobile source emissions

NYSDEC will recommend a partnership be developed with other agencies such as NYSERDA, NYSDOT, and Metropolitan Transit Authority (MTA) to create a job training program for retrofitting vehicles with emission control devices

Programs reducing stationary source emissions

1. In August 2008, NYSDEC Commissioner Pete Grannis unveiled the new Pollution Prevention Institute (NYSP2I). The Institute, housed at the Rochester Institute of Technology, is a research and development center that will design and test green manufacturing methods and provide technical support to businesses for pollution reduction measures that will help make them more competitive. The mission of NYSP2I is to make New York State more sustainable for workers, the public, the environment, and the economy through reductions in toxic chemical use, emission releases and waste generation. Additionally, the Institute promotes the efficient use of raw materials, energy and water. NYSDEC staff has been involved since the inception of this institute and will continue to be involved in the development of pollution reduction measures and advocate for the implementation of those technologies in EJ communities.

2. The NYSDEC Division of Air Resources Environmental Justice "Supplemental Inspection" initiatives have primarily focused on inspections of NYC dry cleaners and Long Island dry cleaners, a street-by-street review of small sources in the East Harlem area of Manhattan, and a review of major streets in the City of Syracuse. Expanding upon the Stop Smoking and Idling Trucks and Buses initiative and Supplemental Inspection initiative, the NYSDEC Office of Environmental Justice will investigate the possibility of implementing a systematic enforcement program for small stationary sources in EJ communities.

3. NYSDEC will review and recommend a New Source Review (NSR)-type program for minor sources--not subject to NSR. This minor source NSR program could consider requiring Best Available Control Technology (BACT) across the state. NYSDEC has developed a Reasonably Available Control Technology (RACT) program that requires controls for existing sources. RACT is a retrofit program that is applicable to major sources and a small subset of minor sources. NYSDEC may be able develop a RACT program for additional minor sources that will assist in improving air quality statewide and in non-attainment areas and EJ communities. Additionally, the state could consider creating programs that

provide incentives to reduce toxic chemical use and promote the efficient use of raw materials, energy and water. In addition to incentives, this program could suggest ways that businesses and individuals could replace repair or maintain equipment to increase efficiency and reduce energy usage.

4. NYSDEC has recommended extending the Environmental Results Program (ERP) to other facility sectors such as auto salvage, photo processors, animal feedlots and gas stations. This program promotes self-auditing and reporting for specific facility sectors. In return, payable penalties for non-compliance are reduced or eliminated.

Revisions to air permitting

Proposed revisions to Part 201

NYSDEC has three distinct permit levels based on the potential level of emissions. Current revisions to 6 NYCRR Part 201 will be discussed for each permit level and changes proposed to trivial or insignificant activities.

1. Title V: The proposed revisions will enhance the information obtained on a permit application. Specifically, stack height and diameter, exit temperature, velocity and flow rate of exhaust gases, distance to property line, etc. will be required to be associated with each process at the facility. While this information is required under the current regulations, stack parameter information has not been required to be associated with individual processes. This will allow the department to apply a refined approach to evaluate potential impacts, particularly of air toxic contaminants.

2. State Facility Permits: Changes to the state facility permit applications would include a requirement to provide detailed facility information (such as location of emission points, emission stack height and diameter, exit temperature, velocity and flow rate of exhaust gases). This information could be used to model emissions from all emission points and allow the department to determine compliance with applicable State and Federal requirements.

3. Minor Facility Permits: The department is proposing to expand the list of small facilities which would be required to obtain a registration and previously did not complete any type of permitting. For example, dry cleaners using specific solvents for cleaning would be required to obtain a registration. Facilities completing a registration would be required to provide the department with more information such as a list of all emission sources at the facility and a description of the emission source processes and products. The proposed changes will require an expanded list of air toxic releases to include all regulated air pollutants whereas previously the facility only reported air releases of HAPs. The changes proposed would require the facility to provide sufficient detail in the permit for the department to determine applicable State and Federal requirements.

The department has developed a list of Priority State Hazardous Air Pollutants (P-SHAPS) and emission thresholds based on the toxicity of each HAP. The P-SHAP list is comprised of chemicals that represent a public health concern at low emission rates. The list was identified by selecting urban air toxics (identified in CAA Section 112(k)) and/or those that have been assigned a High Toxicity classification under Guidelines for the Control of Toxic Ambient Air Contaminants (DAR-1). If a facility emits a P-SHAP above the designated threshold, then it would be required to obtain a higher level permit where greater oversight is applied. The development of a defined P-SHAP list will enable NYSDEC to develop effective air toxics management strategies for urban areas and EJ communities by providing a good baseline of HAPs emissions information.

Proposed revisions to Part 212

Because the science of risk assessment and the approaches used to identify toxic problems are constantly evolving, NYSDEC is in the process of revising Part 212. NYSDEC accepted delegation of all federal requirements regulating air toxics under the National Emission Standards for Hazardous Air Pollutants (NESHAPs) program.

1. State Hazardous Air Pollutants (SHAPs)

   Federal regulations control emissions of hazardous air pollutants (HAPS) which are toxic air pollutants defined in the Clean Air Act Amendments. The Department recognizes that there are other air toxics not defined in the HAPs list that need to be regulated based on toxicological data and actual source modeling assessments. Therefore, the Department is proposing a mechanism to identify other air toxics and create a State Hazardous Air Pollutants (SHAP) list. As more research is conducted on existing or new air toxics and toxicological concerns are identified, additional air toxics may be identified that warrant inclusion on the SHAP list.

2. Registration Sources and Part 212 Implementation

   The Department is proposing a standardized process to evaluate facility impacts for air toxics from Registration sources (discussed earlier in Part 201 information). Currently, the issuance of a Registration focuses on the mass emission rate of criteria pollutants and HAPs and not on the toxicity of the individual HAP. The changes to the proposed Part 201 will require a facility-wide evaluation of HAP emissions at the time of issuance of a Registration. Those sources unable to meet the limitations for obtaining a Registration will be issued a State Facility Permit. State Facility and Title V permits will be subject to the Part 212 subsection pertaining to air toxics.

3. Facility-wide assessment

Title V and State Facility Permits

The Department is proposing a standardized process to evaluate facility impacts and implementation of air pollution controls that would be utilized in a consistent manner by all staff in the regional offices. The air pollution control approach will be based upon a facility-wide assessment of the air quality impact from all applicable process sources at a facility, as opposed to the current practice which is an evaluation based on each individual emission point.

Commissioner's Six Priorities as of April 11, 2008

Connect New Yorkers to Nature

Under this priority area, NYDEC will continue to promote environmental education and outdoor experiences. The Department will increase participation in hiking, camping, fishing, bird watching, hunting, and trapping, and seek to provide state-of-the-art facilities and opportunities for high-quality outdoor experiences. The Department will make a special effort to preserve and provide access to waters and green space close to where people live and work, and reach out to underserved populations. The Department's efforts to connect New Yorkers to nature will be conducted with the goal of providing access, increasing environmental literacy, enhancing public health and quality of life, and building a next generation of New Yorkers who see the value in environmental conservation.

Promote a Toxic-Free Future

The NYDEC's specific regulatory functions fall within its larger mission of protecting human health and the environment. Fulfilling that broad mandate means promoting safer, greener ways of doing business and of living. The key to reducing waste and creating a toxic free future rests on reducing or eliminating the use of toxic chemicals and reducing energy, water and other resources throughout a product's life cycle.

Accomplishing this involves both pollution prevention – addressing toxics and waste at their source--by choosing alternative practices, redesigning products, and adopting new manufacturing processes, and by maximizing materials recovery through product stewardship, remanufacturing, and recycling. New York believes that government has a pivotal role to play in every aspect of this transformative approach. It can invest in green chemistry and green technology, practice green purchasing, mandate safer technologies and products, provide technical assistance, and influence consumer choice through education and outreach.
Prevention, however, is an evolving goal. Toxic chemicals are still a part of commerce, and unnecessary waste remains a challenge. Because of this, vigilant "end-of-the-pipe" controls and waste management will continue to play a fundamental role in the Department's mission – protecting human health and the environment and ensuring a level playing field for green vendors. The Department has a long and effective history of addressing pollution in all media – air, water, soil, and sediment – and these flagship programs will remain central to our mission.

Safeguard New York's Unique Natural Assets

Conserving and protecting New York's unique natural assets is at the core of the Department's mission. New York's exceptional natural resources include the coasts of Long Island, the Hudson River, the Adirondack and Catskill Forest Preserve, the Finger Lakes and the Great Lakes, the Tug Hill Plateau, and the Niagara River Escarpment. Our natural resources encompass the watersheds that provide abundant and clean water, the wetlands that provide habitat and prevent flooding, and the natural heritage and beauty that brings tourism and enhances our quality of life. New York State has a long history of protecting these valuable natural assets. The Department is directly responsible for more than four million acres of land and is charged with ensuring the sound stewardship of over 15 million acres of privately owned forest lands. New York's quality of life stems, in part, from the quality of its water which is maintained by healthy coasts, watersheds, wetlands, marine ecosystems and infrastructure, including flood control and wastewater treatment infrastructure.
Under this priority, the Department will strive to conserve and restore watersheds; apply state-of-the-art management techniques including ecosystem-based management; ensure sufficient water management infrastructure; promote sound land use and planning; add unique and valuable ecosystems to the Forest Preserve; and protect endangered species, biodiversity, and unique ecosystems.

Work for Environmental Justice

Environmental Justice is the fair treatment 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. To achieve environmental justice, the Department must ensure that all communities enjoy the same degree of protection from environmental and public health threats and equal access to the decision-making process. Fostering environmental justice in New York requires a range of activities that both reduce environmental burdens and target benefits to underserved populations or areas struggling with disproportionate burdens.
In recognition of the importance of environmental justice, the Department has an Office of Environmental Justice as well as a Commissioner's Policy on Environmental Justice. The Office added new staff in 2009 and formed a Department-wide network of professionals who will focus on a re-invigorated effort to integrate EJ principles into all NYDEC activities.

Combat Climate Change

Human-induced climate change has been called the most pressing environmental issue of our time. Tackling this global problem requires new policies to reduce emissions and changes to the way we plan, operate, and fund environmental protection programs. Climate change must be considered in our approach to natural resource stewardship

and efforts to ensure adequate environmental infrastructure for New York's future. It requires new partnerships to share knowledge and develop effective policies to reduce GHGs and adapt to unavoidable impacts. In short, the Department needs to apply a climate change lens to the full range of activities, such as planning, permitting, rulemaking, grants, wildlife management, enforcement, and public outreach and education. This priority involves initiatives to reduce GHG emissions from large source categories; encourage low-carbon design technologies; elevate climate change awareness, research, and adaptation ability; foster carbon sequestration and sustainable forestry; and lead other state agencies in our collective efforts to reduce emissions and adapt to changes in the climate.

There is ample evidence of our leadership in the climate change arena. The Department developed regulations for the first-in-the-nation power plant carbon cap with an allowance auction; has adopted California's GHG standards for new motor vehicles; has joined the Climate Registry; is a steering committee member of the International Carbon Action Partnership; is active in the Governor's Renewable Energy Task Force; and has formed an interagency workgroup on carbon capture and sequestration. The Department is also exploring policies to incorporate GHG assessments into environmental reviews and to address the various sources of significant GHG emissions.

Foster Green and Healthy Communities

New York's Department of Environmental Conservation's job is to foster the green and healthy communities that we need for New York's future. Its remediation programs allow cities and towns to clean up and safely redevelop contaminated land — a key component of Smart Growth. Its air program works towards a future where every New Yorker breathes air that consistently meets health-based standards. The Department partners with municipalities to increase recycling and to reduce and safely manage waste, and its minerals program works to ensure that mining activities do not pose risks to people and communities. The Department has programs to protect open space, promote urban forestry, preserve wetlands and to help communities maintain green spaces and streetscapes. Its water programs help prevent pollution of rivers and streams and reduce the risks from flooding. Through its unique role in implementing the State Environmental Quality Review Act, the Department has overall responsibility to protect and enhance the human environment, including existing community or neighborhood character. Moreover, certain environmental goals —reducing non-point water pollution and reducing GHG emissions — clearly require that New York develop smarter, utilizing new models of community design and transportation efficiency. When the Department achieves success in these programs, it is achieving more than meeting its obligations under the law; it is helping municipalities improve their quality of life. Under this priority, the Department will continue to build even better programs, and work with cities and towns to help them create the green and healthy communities that make New York a great place to live.

New York State Air Quality

The overall air quality in New York State has been continually improving over the last several decades. The addition of control requirements and the gradual replacement of older cars with new vehicles have significantly contributed to this improvement. However, indigenous source pollution, as well as the transport of pollutants into the state, continues to be an issue and the state continues to have areas that are in nonattainment for ozone and fine particulate matter.

The Clean Air Act requires EPA to set National Ambient Air Quality Standards ground-level ozone and five other criteria pollutants. The Clean Air Act established two types of national air quality standards for ground-level ozone.

- **Primary standards** set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly.
- **Secondary standards** set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings.

The Clean Air Act requires EPA to review the latest scientific information and standards every five years. Before new standards are established, policy decisions undergo rigorous review by the scientific community, industry, public interest groups, the general public and the Clean Air Scientific Advisory Committee (CASAC).

National Ambient Air Quality Standards for Ground-level Ozone

	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Ozone	0.075 ppm (2008 std)	8-hour [1]	Same as Primary	
	0.08 ppm (1997 std)	8-hour [2]	Same as Primary	
	0.12 ppm	1-hour [3]	Same as Primary	

1 To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)

2 (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

(c) EPA is in the process of reconsidering these standards (set in March 2008).

3 (a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").

(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.

Currently in New York State, there are only non-attainment areas for ozone and particulate matter.

2008 8-Hour Ozone Non-attainment Areas (0.08 parts per million (ppm) NAAQS)

- Designations deferred

1997 8-Hour Ozone Non-attainment Areas (0.08 parts per million (ppm) NAAQS)

- New York-Northern New Jersey-Long Island, NY-NJ-CT Area (Moderate – Requested re-classification to serious on April 4, 2008)(Clean Data Request submitted to EPA on June 14, 2010)
  - Bronx, Kings (Brooklyn), Nassau, New York (Manhattan), Queens, Richmond (Staten Island), Rockland, Suffolk and Westchester Counties

- Poughkeepsie, NY Area (Moderate) (Clean Data Area approved by EPA on December 7, 2009 (74 FR 63993))
  - Dutchess, Orange and Putnam Counties

- Jefferson County, NY Area (Clean Data Area approved by EPA on March 25, 2008 (73 FR 15672))
  - Jefferson County

- Albany-Schenectady-Troy, NY Area (Clean Data Area approved by EPA on March 25, 2008 (73 FR 15672))
  - Albany, Greene, Montgomery, Rensselaer, Saratoga, Schenectady and Schoharie Counties

- Buffalo-Niagara Falls, NY Area (Subpart 1) (Clean Data Area approved by EPA on December 7, 2009 (74 FR 63993))
  - Erie and Niagara Counties

- Essex County, NY Area (Subpart 1) (Clean Data Area approved by EPA on December 7, 2009 (74 FR 63993))
  - The portion of Whiteface Mountain above 1900 feet in elevation

- Jamestown, NY Area (Subpart 1) (Clean Data Area approved by EPA on December 7, 2009 (74 FR 63993))
  - Chautauqua County

- Rochester, NY Area (Clean Data Area approved by EPA on March 25, 2008 (73 FR 15672)
  - Genesee, Livingston, Monroe, Ontario, Orleans and Wayne Counties

1-Hour Ozone Non-attainment Areas (0.12 ppm)

- New York-Northern New Jersey-Long Island, NY-NJ-CT Area (Severe)
  - Bronx, Kings (Brooklyn), Nassau, New York (Manhattan), Queens, Richmond (Staten Island), Southern Orange (including Towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick & Woodbury), Suffolk, Rockland and Westchester Counties.

- Poughkeepsie, NY Area (Moderate) (Clean Data Area approved by EPA on December 7, 2009 (74 FR 63993))
  - Dutchess, Northern Orange (excluding Towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick & Woodbury) and Putnam Counties.

- Albany-Schenectady-Troy, NY Area (Clean Data Area approved by EPA on March 25, 2008 (73 FR 15672))
  - Albany, Greene, Montgomery, Rensselaer, Saratoga, and Schenectady Counties.

- Buffalo-Niagara Falls, NY Area (Clean Data Area approved by EPA on March 25, 2008 (73 FR 15672))
  - Erie and Niagara Counties

- Jefferson County, NY Area (Clean Data Area approved by EPA on March 25, 2008 (73 FR 15672))
  - Jefferson County

- Essex County, NY Area (Clean Data Area approved by EPA on March 25, 2008 (73 FR 15672))
  - The portion of Whiteface Mountain above 4500 feet in elevation.

On January 6, 2010, EPA proposed to strengthen the NAAQS for ground-level ozone (75 FR 2938, January 19, 2010). The proposed revisions are based on scientific evidence about ozone and its effects on people and the environment. EPA is proposing to strengthen the 8-hour "primary" ozone standard, designed to protect public health, to a level within the range of 0.060-0.070 parts per million (ppm). EPA is also proposing to establish a distinct cumulative, seasonal "secondary" standard, designed to protect sensitive vegetation and ecosystems, including forests, parks, wildlife refuges and wilderness areas. EPA is proposing to set the level of the secondary standard within the range of 7-15 ppm-hours. The ozone standards set in 2008 were not as protective as recommended by EPA's panel of science advisors, the Clean Air Scientific Advisory Committee (CASAC). The proposed standards are consistent with CASAC's recommendations. EPA is expected to issue final standards by August 31, 2010.

The nation's air quality standards for particulate matter were first established in 1971 and were not significantly revised until 1987, when EPA changed the indicator of the standards to regulate inhalable particles smaller than, or equal to, 10 micrometers in diameter (that's about 1/4 the size of a single grain of table salt).

Ten years later, after a lengthy review, EPA revised the PM standards, setting separate standards for fine particles ($PM_{2.5}$) based on their link to serious health problems ranging from increased symptoms, hospital admissions and emergency room visits for people with heart and lung disease, to premature death in people with heart or lung disease.

The 1997 standards also retained but slightly revised standards for PM_{10} which were intended to regulate "inhalable coarse particles" that ranged from 2.5 to 10 micrometers in diameter. PM_{10} measurements, however, contain both fine and coarse particles.

EPA revised the air quality standards for particle pollution in 2006. The 2006 standards tighten the 24-hour fine particle standard from the current level of 65 micrograms per cubic meter (µg/m3) to 35 µg/m3, and retain the current annual fine particle standard at 15 µg/m3. The Agency decided to retain the existing 24-hour PM_{10} standard of 150 µg/m3. The Agency revoked the annual PM_{10} standard, because available evidence does not suggest a link between long-term exposure to PM_{10} and health problems.

National Ambient Air Quality Standards for Particle Pollution			
Pollutant	**Primary Stds.**	**Averaging Times**	**Secondary Stds.**
Particulate Matter (PM_{10})	Revoked (1)	Annual (1) (Arithmatic Mean)	
	150 µg/m^3	24-hour (2)	Same as Primary
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual (3) (Arithmatic Mean)	Same as Primary
	35 µg/m^3	24-hour (4)	Same as Primary

Units of measure for the standards are micrograms per cubic meter of air (µg/m^3).

(1) - Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).

(2) - Not to be exceeded more than once per year on average over 3 years.

(3) - To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.

(4) - To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006).

$PM_{2.5}$ Non-attainment Areas

- New York-Northern New Jersey-Long Island, NY-NJ-CT-PA Area
  - Bronx, Kings (Brooklyn), New York (Manhattan), Queens, Richmond (Staten Island), Nassau, Suffolk, Westchester, Rockland and Orange Counties).

The New York-Northern New Jersey-Long Island area has been designated as nonattainment for both the 1997 annual $PM_{2.5}$ NAAQS (15 mg/m^3) and the 2006 24-hour $PM_{2.5}$ standard (35 mg/m^3).

On December 17, 2004, EPA promulgated designations for the 1997 annual $PM_{2.5}$ NAAQS, which became effective on April 5, 2005. The final $PM_{2.5}$ designations were based upon air quality data for calendar years 2001 through 2003. The Department submitted its SIP for the annual $PM_{2.5}$ NAAQS on October 27, 2009. On June 9, 2010, in light of 2007-2009 annual design values that are below the 15 mg/m^3 NAAQS, the Department petitioned EPA to make a binding determination that the New York State portion of the New York-N. New Jersey-Long Island nonattainment area has attained the 1997 annual $PM_{2.5}$ standard. EPA is currently reviewing the Department's clean data petition.

On October 8, 2009, EPA promulgated designations for the 2006 24-hour $PM_{2.5}$ NAAQS, which became effective on December 14, 2009. These 24-hour $PM_{2.5}$ designations were based on air quality data for calendar years 2006 through 2008. The Department is obligated to submit a SIP for the New York portion of the New York-Northern New Jersey-Long Island nonattainment area by December, 2014.

PM_{10} Non-attainment Areas

- New York County

Carbon Monoxide Maintenance Area

New York State is in attainment of the Carbon Monoxide NAAQS. A maintenance plan for the New York City Metropolitan area has been approved by EPA.

New York State Environmental Goals

Department staff considered the Commissioner's current overarching environmental issue priorities as well as specific program goals established through the Clean Air Act, executive orders, statutes and regulations. From these goals, a set of environmental targets were identified. The goals and targets originally identified in 2008 are listed below and organized by the Commissioner's priorities. Some updates may be necessary.

Commissioner's Priority: Combat Climate Change

- Reduce greenhouse gas emissions
- Encourage low-carbon design technologies
- Elevate climate change awareness, research and adaptation ability
- Foster carbon sequestration and sustainable forestry
- Lead state agencies' efforts to tackle climate change

Air Program Response/Environmental Goals

- 2013: Achieve the Renewable Portfolio Standard goal of 25 percent of energy to be produced from renewable sources.
- 2015: Implement "45 by 15", a comprehensive plan where New York will meet 45 percent of its electricity needs through improved energy efficiency and clean renewable energy. In January 2009, Governor Paterson proposed increasing the Renewable Portfolio Standard from 25 percent to 30 percent and set a goal of decreasing electricity usage by 15 percent from forecasted levels by 2015.
- 2020: Achieve a 10 percent reduction in vehicle miles traveled.
- 2020: Achieve a 30 percent reduction in CO_2e emissions.
- 2050: Achieve an 80 percent reduction in CO_2e emissions.

Strategies under Consideration

- Increase the proportion of renewable electricity used by New Yorkers from the 2004 baseline of 19.3% to at least 25% by the year 2013 through increased use of:
  - wind
  - hydroelectric
  - solar
  - biofuels

- Continue the Systems Benefits Charge (SBC) to fund public policy initiatives not expected to be adequately addressed by New York's competitive electricity markets
    - The SBC programs are designed to serve the diverse needs of New York energy consumers from residential homeowners and tenants to manufacturing plants and commercial office buildings

- Implement recommendations of the Governor's Renewable Energy Task Force

- Develop and implement new energy efficiency programs in industry

- Develop and implement new energy efficiency programs in government

- Create new appliance efficiency standards
    - Require all new installations/sales to be Energy Star products
        - Electric: hot water, space heating, cooking, electricity
        - Gas: hot water, space heating, cooking
        - Oil: hot water, space heating
    - Market penetration of compact fluorescent light bulbs

- Set more rigorous energy building codes
    - Require all new commercial sector construction to be LEED Certified

- Demand side solar

- Transportation
    - Efficiency standards (baseline 25 mpg gasoline LDV, 12,000 VMT/year)
    - LDV Hybrid (37% fleet conversion @ 50 mpg)
    - LDV Gas -> Diesel (10% fleet conversion @ 37mpg)
    - HDV (6 mpg baseline +10% efficiency increase = 6.6 mpg)
    - Fuel/electric conservation (VMT reduction programs)
    - Subway system upgrades (electric efficiency increase on 2,900 MWh/year consumption @ 1092 lb CO_2/MWh NYS grid average)
    - Aluminum rail installation (3%)
    - Regenerative braking on all cars (25%)
    - Railcomm switch, 3rd rail heaters, insulator cleaning (8%)
    - Light rail extension
    - Car-share program
    - Subsidized public transportation
    - Diesel idle reduction (shore power, truck stop electrification)
    - Fuel Switching
    - Biodiesel (all "yellow grease" to produce biodiesel)
    - Corn-ethanol (E-85 blend at 50% gasoline consumption)
    - PHEV (60% fleet conversion, 90% electric miles)

- Power Generation
  - Coal conversion/repowering to oil, gas
  - Nuclear
  - Wind (max build-out at 10,000 MW installed capacity)
  - Solar
  - Solar thermal (offset electric, gas or oil emissions)
  - Absorption cooling
  - Hot water
  - Hydro
  - Biomass
  - Coal gasification

- Municipal Solid Waste
  - Recycling (all paper, glass and metal) (MSW= 30% paper, 20% glass/metals)
  - Composting (30% MSW stream)
  - Waste to energy (All landfill methane and anaerobic digestion at WWTT must reclaim energy)

- Forest Carbon Sequestration
  - Afforestation: grassland/cropland to forest
  - Forest management

- Soil Storage - No till practice: farming

- Transmission & Distribution
  - Upgrade 10,000 miles of high voltage lines
  - SF6 alternatives
  - Increased delivery efficiency (8% line loss down to 4%)
  - Advanced Aluminum lines (2%)
  - Improved transmission pathways (2%)
  - Super Conducting technologies (2%)

- Natural Gas line leakage - upgrade/replace compressor stations, seals, etc.

- Combined Heat & Power
  - Reduce space heating needs – electric/fossil fuel
  - Efficient power generation

- Cement Manufacture
  - Wet to dry rotary kiln conversion (~20% CO_2 reduction/ton clinker)
  - 2 of 3 kilns in NY are still Long Wet Rotary Kilns
  - Non-rotary kiln technology

Commissioner's Priority: Foster Green and Healthy Communities

- Use the Department's program areas to encourage smart growth
- Clean up contaminated land, especially in urban centers
- Attain and maintain all National Ambient Air Quality Standards

Air Program Response/Environmental Goals:

- 2010: Attain the 1997 0.08 ppm 8-hour ozone standard in the Poughkeepsie, NY; Buffalo – Niagara Falls, NY; and Jamestown, NY non-attainment areas (based on 2007-2009 ambient data).

- 2010: Attain the 15 ug/m3 annual $PM_{2.5}$ standard in the New York-N. New Jersey-Long Island, NY-NJ-CT-PA non-attainment area (based on 2007- 2009 ambient data).

- 2013: Attain the 1997 0.08 ppm 8-hour ozone standard in the New York – N. New Jersey – Long Island, NY-NJ-CT non-attainment area (based on 2010-2012 ambient data).

- 2013: Attain the 2008 0.075 ppm 8-hour ozone standard in the Albany-Schenectady-Troy, NY; Essex Co. (Whiteface Mountain), NY; Jefferson County, NY; Syracuse Area, NY; and Rochester, NY projected to be marginal non-attainment areas.

- 2014: Attain the new 2006 24-hour $PM_{2.5}$ NAAQS of 35 µg/m3 in the New York - N. New Jersey-Long Island, NY-NJ-CT-PA nonattainment area. (Approximate attainment date is March 18, and would incorporate 2011-2013 ambient data).

- 2016: Attain the 2008 0.075 ppm 8-hour ozone standard in the New York – N. New Jersey – Long Island, NY-NJ-CT; Poughkeepsie, NY; Buffalo – Niagara Falls, NY; and Jamestown, NY projected to be moderate non-attainment areas.

Strategies under Consideration:

- Asphalt Production NO_x Controls

    - The Department is proposing to revise its regulations to require NO_x controls consistent with the OTC guidelines for minor hot mix asphalt production plants. In addition to helping to attain the ozone NAAQS, this rule revision will result in a decrease of fine particulate matter ($PM_{2.5}$) formation from the operation of hot mix asphalt production plants during the non-ozone season, thus aiding in attainment of the $PM_{2.5}$ NAAQS.

- The addition of hot mix asphalt paving production requirements to current regulations is primarily for the benefit of the various ozone nonattainment areas throughout the state. Because most asphalt paving operations are performed during the summer months, NO_x emissions are more inclined to react with volatile organic compounds (VOCs) in the summer heat to form ground-level ozone. Reducing the NO_x emissions formed largely during the drying process at asphalt production plants will aid in reducing ambient ozone concentrations. This revision to the regulations will also prove important in contributing to the attainment of the revised 2008 8-hour ozone standard.

- During paving operations in the cooler months outside of the ozone season, NO_x emissions would be more likely to contribute to ambient particulate levels. These new asphalt paving production requirements are expected to be included in the $PM_{2.5}$ SIP for the downstate nonattainment area as a measure needed to help reach attainment by 2010.

- Consumer Products
  - Incorporate 11 new categories along with their respective VOC limits for the following: adhesive remover (including subcategories), anti-static (non-aerosol), electrical cleaner, electronic cleaner, fabric refresher, footwear or leather care, graffiti remover, hair styling products, shaving gel (the first tier VOC limit of seven percent), toilet/urinal care, and wood cleaner. The Department is not adopting the categories anti-static (aerosol) and the second tier Shaving Gel (VOC limit of four percent)
  - Revise the existing VOC limit for the contact adhesive product category and to include additional requirements for two previously regulated product categories: air fresheners and general purpose degreasers
  - Prohibit the use of three Toxic Air Contaminants (TACs), methylene chloride (MeCL), perchloroethylene (Perc), and trichloroethylene (TCE) in seven categories in the revised consumer products rule. The seven categories are as follows: 1) adhesive removers (including subcategories: floor or wall covering, gasket or thread locking, general purpose, and specialty), 2) contact adhesive, 3) electrical cleaners, 4) electronic cleaners, 5) footwear or leather products, 6) general purpose cleaners, and 7) graffiti removers. This prohibition will not apply to electrical cleaner products (energized electrical cleaner) used exclusively for cleaning energized equipment because of a safety issue if the TACs were banned from the category energized electrical cleaner
  - Prohibit para-dichlorobenzene (PDCB), which is a chlorinated benzene compound, in the categories solid air fresheners and toilet/urinal care products
  - Modify several existing definitions by expanding some of the product category definitions (for example: hair spray and hair styling product) to include additional products

- Exclude certain product definitions because those products have been included in their own separate category (for example: some solid air fresheners are now under the definition of toilet/urinal care product)
- Modify the existing definition of "deodorant" and to propose a new definition for "deodorant body spray." The revised definition of "deodorant" states that a deodorant is any product manufactured on or after January 1, 2009 that states on the product's container or packaging that it can be used on or applied to the human axilla to provide a scent and/or minimize odor. The new definition for "deodorant body spray" states that a product that falls under this category that was manufactured before January 1, 2009 and on or after January 1, 2009 with 20 percent or less fragrance would be a "personal fragrance product." A product manufactured on or after January 1, 2009 that falls under the category "deodorant body spray," is a "deodorant" if the product's container or packaging states that the product can be used on or applied to the human axilla

- Asphalt Paving

  - Revise the restrictions on the use of cutback asphalt products and establish a limit on the VOC content of asphalt paving for all classifications of asphalt. The reduction is consistent with a regional effort to reduce VOC emissions from asphalt paving, agreed upon through the Ozone Transport Commission (OTC).

- Distributed Generation
  - Establish NO_x emission limits for new and existing distributed generation (DG) sources, especially those sources not subject to Subpart 227-2
  - Emissions testing and record keeping requirements will be proposed
  - Limits on the number of existing DG sources that may be considered demand response sources will be proposed

- Stationary Combustion Installations

  - Sources with potential direct $PM_{2.5}$ emissions greater than 100tpy would be required to perform a case-by-case RACT analysis to determine the appropriateness of controls.

- New Source Review (no additional information available at this time).

  - The Department modified its regulations to comply with the 2002 Federal New Source Review (NSR) Rule as amended on December 21, 2007 and to correct deficiencies that EPA identified in regards to New York's existing Nonattainment New Source Review (NNSR) regulation. The 2002 Federal NSR Rule modified both the NNSR and Prevention of Significant Deterioration (PSD) regulations at 40 CFR 51.165 and 52.21, respectively, and requires states with State Implementation Plan (SIP) approved NSR

programs to revise their regulations in accordance with the 2002 Federal NSR Rule and submit the revisions to EPA for approval into the SIP. The Department's existing NNSR program at Part 231 is subject to this requirement. Another purpose of the recent rulemaking was to adopt a State PSD program for proposed new major facilities and major modifications to existing facilities located in attainment areas. Part 231 incorporates provisions from the federal PSD regulations in significant part with additional provisions to ensure enforceability of the rule and effective monitoring, recordkeeping and reporting.

  - The revisions to 6 NYCRR Part 231 were adopted by the Department on January 6, 2008.

- Develop outdoor wood boiler control measures
- Develop open burning control measures
- Promote a wood stove change-out program

Commissioner's Priority: Promote a Toxic-Free Future

- Reduce waste and use of toxics
- Promote green alternatives and technologies
- Enhance public access to information on toxics

Air Program Response/Environmental Goals:

- 2014: Achieve a statewide average of 50 percent reduction in emissions of diesel particulate matter, especially polycyclic organic matter (POM) formaldehyde, acetaldehyde, diesel particulate matter, and 1,3-butadiene. This should coincide with the 2014 24-hour $PM_{2.5}$ NAAQS of 35 ug/m3.
- 2014: Reduce ambient nickel concentrations associated with the burning of distillate and residual oil in downstate urban areas to coincide with the 2014 24-hour $PM_{2.5}$ NAAQS of 35 ug/m3 .
- 2015: Full implementation of 6NYCRR Part 246, Mercury Reduction Program for Coal-fired Electric Utility Steam Generating Units to help achieve regional wide Total Maximum Daily Load (TMDL) projections.
- 2016 Achieve a 75 percent reduction in benzene emissions statewide, equating to an overall statewide average monitored level of 0.2 ug/m3. This should coincide with the 2016 8-hour ozone standard of 0.075 ppm for moderate non-attainment areas.

Strategies under Consideration:

- Expand the reformulated gasoline (RFG) program to marginal ozone nonattainment areas
- Require the use of stage II gasoline dispensing devices state-wide/Use of enhanced Stage II compatible with ORVR
- Promulgate regulatory changes to diesel and gasoline fuel composition (e.g., such as reducing sulfur, benzene or other aromatic chemical compounds) region wide
- Explore the introduction of lower benzene and nickel concentration fuel alternatives to residential and commercial fuel firing (includes OWBs and other wood-burning technologies)
- Reduce VMT
- Explore alternative non-petroleum vehicle fuels that are less polluting than current gasoline and diesel fuels
- Identify geographical "low impact zones" where critical loads exceedences can be addressed most readily
- Develop TMDLs for mercury and other toxics
- DERA

Commissioner's Priority: Safeguard New York's Unique Natural Assets

- Conserve, protect and restore watersheds and coastal resources
- Protect biodiversity and unique ecosystems across New York

Air Program Response/Environmental Goals

- 2018: Make progress toward achieving critical loads at all areas that currently exceed critical loads for deposition of sulfur, nitrogen, and mercury

Strategies under Consideration:

- Identify geographical "low impact zones" where critical loads exceedences can be addressed most readily
- TMDL's (Mercury, toxics, etc.)
- CAIR (adopted)

Commissioner's Priority: Connect New Yorkers to Nature

- Preserve and provide access to green space close to where people live, work and play

Air Program Response/Environmental Goals:

- 2013: Promulgate and fully implement a Best Available Retrofit Technology (BART) regulation that addresses haze and other pollution for older stationary sources

- 2018: Meet regional haze reasonable progress goals as established through MANE-VU under the Clean Air Act

Strategies under Consideration:

- Best Available Retrofit Technology (BART) - Establish protocols for the implementation of pollution control technologies on older non-electric generating units

- CAIR (adopted)

- Low sulfur fuel adoption consistent with MANE-VU statements and goals

Energy Issues, Renewable Energy, Energy Efficiency

Oil, gas and solution salt mining wells are economically important in New York State with more than 75,000 wells drilled in the state since the late 1800's; about 14,000 of these are still active and new drilling continues. Extraction of oil and gas contributes half a billion dollars to the state's economy each year. Wells are also drilled in New York for underground gas storage, geothermal heating/cooling, stratigraphic exploration and brine disposal.

The Department's Division of Mineral Resources administers regulations and a permitting program to mitigate to the greatest extent possible any potential environmental impact of drilling and well operation. The Division strives to work cooperatively with all customers and stakeholders to achieve the mission of ensuring the environmentally sound, economic development of New York's non-renewable energy and mineral resources for the benefit of current and future generations.

By embracing renewable energy along with energy conservation practices, New Yorkers can significantly reduce dependency on foreign oil, create jobs, ensure a reliable energy supply, reduce air pollution and cut greenhouse gas emissions. New York State has great potential to generate power from renewable sources such as the sun, wind, water, and biomass (plant material and waste).

The 2002 New York State Energy Plan placed a priority on increased energy diversity and use of renewable energy sources. In 2004, New York State implemented a Renewable Portfolio Standard to promote the research, development and use of alternative energy. Under the current standard, the goal is to increase the proportion of renewable electricity used by New Yorkers from the 2004 baseline of 19.3% to at least 25% by the year 2013. Renewable energy sources include wind, hydroelectric, solar and biofuels.

Wind energy development is an important component of New York's clean renewable energy initiative as well as the state's ability to achieve the Renewable Portfolio Standard of 25% of energy to be produced from renewable sources by the year 2013.

In January 2009, Governor Paterson proposed increasing the Renewable Portfolio Standard from 25 percent to 30 percent and set a goal of decreasing electricity usage by 15 percent from forecasted levels by 2015.

Ecosystem Health

In the early 1970's, acid deposition was identified as a serious ecological threat to New York State's waters and forests. The primary emissions responsible for acid deposition are sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) from the combustion of fossil fuels which are transformed and transported downwind before they are deposited. Acid deposition is of particular concern to New York State because of important and sensitive ecosystems which lie immediately downwind of the largest mid-western utilities burning fossil fuels and emitting SO_2 and NO_x emissions in North America.

An ecosystem is considered sensitive to acid deposition when it lacks adequate soil buffering capacity to counter the acids deposited to it. While many areas of New York State are not sensitive to acidity because of limestone deposits or soils which neutralize the acid, the Adirondacks, Catskills, Hudson Highlands, Rensselaer Plateau and parts of Long Island are particularly sensitive to acid deposition. The soil and bedrock in these areas are not able to counteract the acid in the rain and snow.

In the Adirondack region, acidic deposition has affected hundreds of lakes and thousands of miles of headwater streams. The diversity of life in these acidic waters has been greatly reduced. Fish populations have been lost, and loons and otters have moved to other lakes where they can find food. Acid rain weakens the trees and causes them to be more susceptible to pest and disease. Some of our Adirondack Mountain tops are void of trees partly because of the exposure to lower pH from acid precipitation and clouds.

Acid deposition also damages building materials by eroding the ornamental facades, statuary and other vulnerable edifices that are an important part of our heritage. In addition to being the main ingredient in acid rain formation, SO_2 also leads to sulfate formation; acidic particles that can cause respiratory problems in humans.

Human Health Impacts

Environmental Public Health Tracking (EPHT) focuses on our ability to learn more about important patterns and trends in environmental health. By reviewing how hazards, exposures, and diseases change over time or across regions of the state, questions can be generated about whether those trends are meaningful. These questions, or their answers, may direct future research, public health interventions, or other activities that might prevent or control environmentally related health problems. Exploring these trends also might help us to improve the types of data collected, how data are managed and how we share data with other agencies and data users.

Both the New York State Department of Health (NYSDOH) and the Department are responsible for managing and developing environmental and public health information systems. NYSDOH is building a surveillance system that will provide data about environmental hazards, exposures and health effects throughout New York State over time. Methods are being developed that can be used to automate the secure exchange of data. The surveillance system will be used to examine environmental and health data sets and to identify unusual geographic patterns and time trends.

NYSDOH is conducting several projects that test our ability to link environmental and health data sets and to identify unusual geographic patterns, clusters, or trends over time. Some of these projects were designed to help address an important State Health Department goal: enhancing our capability to track the public health significance of environmental exposures (air pollution and drinking water contaminants) to children. With these projects, we hope to learn more about how to link environmental and health data to explore possible relationships between environmental hazards and health effects. What we learn will help to improve our ability to track other environmental exposures and possibly related health outcomes, and will also prompt additional investigations to explore the findings in more detail.

One part of the “Asthma and Air Quality” project explores trends for measured and estimated levels of air pollutants within air quality regions of NY State and childhood hospitalizations for asthma. The project also includes a series of epidemiological investigations examining the relationship between air pollution and asthma and other respiratory diseases. The investigations use different measures of air quality, such as 8-hour daily maximum ozone levels or daily average levels of small particulate matter. One investigation is examining the daily childhood hospital admissions in New York State and ozone levels for 1991-2001. Another investigation focuses on the chronic effects of ozone on the first hospital admission for respiratory disease for children born in New York State from 1995 through 1998. The studies use analytic and statistical methods that can take into account other factors, such as seasonal patterns, meteorological conditions, population density, or lag time between exposure and effect.

The October 2007 “New York State Asthma Surveillance Summary Report” concludes that in 2005, asthma affected over 1.1 million New York State (NYS) adults and 370,000 children. During 2003-2005, an average of 300 deaths per year occurred due to asthma

in NYS, which was lower compared to 2001-2003. This represented an age-adjusted rate of 15 deaths per one million residents. There was an average of approximately 42,400 asthma hospitalizations for NYS residents in 2003-2005, for an age related rate of 22 per 10,000 residents. This represents a 3 to 7 percent reduction compared to the 1999-2001 period. During 2003-2005, an average of 14,700 asthma hospitalizations was for NYS children between the ages of 0 to 14 years; the crude rate was 39 per 10,000 residents. Medicaid enrollees accounted for 45% and Medicare enrollees an additional 20% of all asthma hospitalizations.

The “Air Quality and Birth Outcomes” project is a series of epidemiological investigations of the relationship between air pollution and reproductive outcomes conducted in conjunction with the University at Albany School of Public Health. In one investigation, birth weight and prematurity among infants born in New York State between 1995 and 2001 are being examined in relation to levels of ozone and particulate matter of less than 10 microns. The study methods take into account other maternal factors that have been reported to be associated with low birth weight or prematurity, such as early prenatal care. Another investigation will focus on infant mortality and air pollution.

NYSDOH is also working with the US Centers of Disease Control and Prevention and EPA, as well as Maine and Wisconsin, on an EPHT project called PHASE (Public Health Air Surveillance Evaluation). Different approaches to characterizing air quality are being evaluated for how well they allow researchers to estimate individual exposures to ozone or particulate matter less than 2.5 microns. Each of the air quality characterizations have been temporally and spatially linked with hospitalization data for asthma and myocardial infarction, which is one form of cardiovascular disease, to better understand their strengths and limitations. Of particular interest is the usefulness of each method for conducting routine surveillance and epidemiological analyses. More in-depth investigation is planned for the relationship between air quality and hospitalization for myocardial infarction.

EPHT is a multidisciplinary partnership program. Teams have been formed that include epidemiologists, toxicologists, information technology specialists, environmental scientists, statisticians, educators, and others from NYSDOH, the Department, and the University at Albany's School of Public Health. CDC and other federal agencies such as the EPA are providing data, technical guidance, and assistance. These partnerships are vital to the success of the EPHT program.

A number of key people are also participating in a planning consortium that provides advice and recommendations about the design and execution of the EPHT program. This consortium includes individuals representing community and advocacy groups, as well as academics, and professionals with a wide range of experience and expertise. It has provided input on many of the technical aspects of the program. Members also provide advice on strategies for outreach and communication. (Source: http://www.health.state.ny.us/statistics/environmental/public_health_tracking/epht.htm)

Current Process for Implementing Air Quality Management

The process for promulgating regulations in New York State is governed by the State Administrative Procedure Act (SAPA), some specific statutory requirements, and by Executive Order #20, which requires review of proposed and revised rules by the Governor's Office of Regulatory Reform (GORR). The Department must file all regulations through the Department of State (DOS) prior to adoption. DOS is responsible for public notice of all proposed regulations in the weekly State Register, which contains notices of newly proposed rules and proposed revisions to existing rules, and later provides notice that a new or amended rule has been adopted.

The rulemaking process begins with approval from the executive office. A Rulemaking Initiation Memorandum (RIM) discusses the relevant issue, a discussion of the need for a regulatory response, and the Departments proposed action. Once the RIM has been approved by the Department's Commissioner, a scoping meeting is held with appropriate members of the Department and GORR in order to inform all involved parties of the proposed rule.

At this time, rule writing begins by drafting the actual written text, or Express Terms, of the new or revised rule. This represents what is eventually published under Title 6 of the New York Codes, Rules and Regulations (6 NYCRR). A number of support documents are drafted in conjunction with the Express Terms, to be submitted to GORR for review and approval. These documents, the contents of which are regulated by SAPA, include:

Regulatory Impact Statement (RIS) – A general overview of the regulation detailing, among other things, the statutory authority, need for and justification of the proposal, expected cost and recordkeeping/reporting impacts, and compliance schedule.

Regulatory Flexibility Analysis for Small Businesses and Local Governments (RFA) – Consideration of, and steps taken by the Department to minimize any negative impacts on small businesses (independently owned businesses wholly within New York State of 100 employees or fewer) or local governments. This includes an explanation of what opportunities were provided to these entities to participate in the rulemaking process.

Rural Area Flexibility Analysis (RAFA) – Defined as counties with populations of fewer than 200,000 people and towns in non-rural counties where population density is less than 150 people per square mile, this must state any impacts or requirements imposed upon rural areas. This must also express opportunities provided for rural citizens, businesses or organizations to participate in the rulemaking.

Job Impact Statement (JIS) – Necessary for all regulations affecting 100 or more jobs and employment opportunities, this document details the number and categories of jobs affected, regions of the state suffering a disproportionate impact, and measures taken to minimize any impact on jobs and employment opportunities.

Also drafted at this time are three documents required under the State Environmental Quality Review Act. These SEQR forms are submitted with the above support documents for review and approval by GORR:

Environmental Assessment Form (EAF) – A description of the proposed rule and evaluation of any land use and other short-term, long-term, or cumulative environmental impacts.

Coastal Assessment Form (CAF) – An analysis of what affects the rulemaking may have on the land or waters of New York State's coastal areas.

Determination of Significance – Submitted in the form of a Negative Declaration when no significant adverse environmental impacts are expected, or a Positive Declaration, when there is evidence that some harmful impacts may occur.

Once the above documents have been approved by GORR, a public hearing is to be held in order to provide an opportunity for the public to express concerns over the rulemaking. A Notice of Public Hearing must be published in the Environmental Notice Bulletin 30 days prior to the hearing. Such notice many also be published in newspapers local to the regulation's affected area. Public comments are gathered during the hearing and for a minimum of 5 days afterwards.

Once all comments have been received, the regulation and SAPA/SEQR documents are revised as needed, and a meeting is scheduled with the Environmental Board. Under the Environmental Conservation Law (ECL), approval must be granted by the Environmental Board for all regulations that establish environmental standards or criteria. After a technical briefing and presentation to the Environmental Board, approval is granted, and the regulation can be finalized. Internal approval from the Commissioner is granted through the signing of a Certificate of Adoption. A Notice of Adoption is published in the State Register, and the regulation becomes effective 30 days after filing with DOS.

Current and Future Stakeholders

- All Residents of New York State
- All Businesses in New York State
- New York State Department of Environmental Conservation
  - Division of Air Resources
  - Climate Change Office
  - Division of Solid and Hazardous Waste
  - Division of Water
  - Division of Lands and Forests
- Other New York State Departments
  - Transportation
  - Health
  - Agriculture and Markets
  - Public Service
  - Energy Research and Development Authority
  - Adirondack Park Agency
  - New York Power Authority (NYPA)
  - Long Island Power Authority (LIPA)
- Local Governments
  - County
  - City
- Metropolitan Planning Organizations

Technical Approach

The New England States for Coordinated Air Use Management (NESCAUM) and the Department are working collaboratively to develop and use analytical tools and to identify potential policy barriers to undertaking multi-pollutant planning.

The NESCAUM project entitled " Applying the Northeast Regional MPAF to New York", when complete, will have tailored and iteratively improved the inputs to the Multi-pollutant Policy Analysis Framework (MPAF), a regional scale integrated framework developed by NESCAUM. The improved framework will enable policy analysts at the Department to perform multi-pollutant assessments of various potential control strategies to simultaneously address multiple climate and air quality goals.

The framework integrates and makes use of several energy, economic, and air quality tools and databases, including: the Market Allocation (MARKAL), NE-MARKAL; Regional Economic Model, Inc (REMI); Sparse Matrix Operator Kernel Emissions (SMOKE) Modeling System; Community Multi-scale Air Quality (CMAQ) model; and the Environmental Benefits Mapping and Analysis (BenMAP) program.

Major Tasks

Integration of key regional public health, environmental, and economic targets for air quality and climate goals

Traditionally, New York has responded to air quality and climate concerns on a pollutant or program specific basis. New York recognizes the importance of moving to a more integrated, multi-pollutant approach.

The Department reviewed pending Clean Air Act requirements, state and regional environmental goals and targets, and major NYS energy efficiency (EE) and renewable energy (RE) policy initiatives affecting emissions. The targets include New York's State Implementation Plan (SIP) requirements for attaining the ozone and $PM_{2.5}$ NAAQS; climate action plans; regional haze reasonable progress goals; and critical loads for sensitive ecosystems for mercury and acid deposition. To date, emission reduction targets have been identified that will be used as indicators for a broad range of air quality goals. The goals, which have been identified earlier in this document, are represented in the analytic framework as a set of emission constraints that evolve over time to achieve the approximate reductions in NO_x, SO_2, Hg, CO_2, and primary fine particulate ($PM_{2.5}$) emissions needed to achieve the state's climate and air quality goals. This set of constraints conforms to existing state and federal requirements and deadlines.

Identification of key strategies for achieving air and climate program goals

The Department has identified and prioritized a comprehensive list of New York-specific policy approaches and control strategies to achieve the environmental goals described above. The model is only able to identify appropriate solutions and options to achieve environmental goals to the extent that these opportunities are represented accurately in the model. Our goal was to identify the multitude of policy approaches that are feasible for New York so that they were accurately incorporated into the model structure. They are:

- Power Generation Sector
  - 10,000 MW wind generation by 2029
  - 10% reduction in T&D losses
  - 15 x 15 beginning in 2011
  - RPS: 25% by 2013
  - 52% CO_2 Cap by 2030 w/conservation
  - 52% CO_2 Cap by 2030 w/o conservation

- Transportation Sector
  1. 10% of fleet diesel by 2020 (50% by 2030)
  2. 25% of fleet hybrid by 2025 (64% by 2030)
  3. 50% of fleet etOH by 2029
  4. 60% of fleet EV by 2029
  5. 13% less VMT demand by 2011
  6. LDV minimum efficiency 25 mpg by 2014
  7. 10% more efficient HDV
  8. 4+6
  9. 1+2+7

- Residential and Commercial Buildings; Industry (R/C/I)
  - 10% CHP for RES/COM heating by 2017
  - 100% Energy Star appliances by 2014
  - 10% Res. Water heat Solar Thermal
  - 500ppm distillate by 2015; 15ppm by 2016
  - NO_x Controls on Industrial Boilers

Representation of goals and strategies in the regional Multi-pollutant Policy Analysis Framework (MPAF) modeling system.

NESCAUM and the Department worked together to identify appropriate data. NESCAUM then refined and constrained the modeling framework so that it characterized technology options, costs, and associated emissions in a manner that enabled the various policy options and solutions to be identified by the NE-MARKAL model. All targets and programmatic conditions were translated into a set of input

constraints for the NE-MARKAL model, a key input for scenario analysis. NESCAUM then translated the strategies and approaches into appropriate representations within the NE-MARKAL model. This allowed us to tailor and improve a set of reference scenario assumptions served as an appropriate basis for policy analysis of control scenarios. The outcome of this exercise was a reference scenario that accurately reflects a plausible future for New York and the region (N.B.: This differs significantly from a forecast. The objective of this exercise is to enable policy analysis, not to forecast actual energy usage).

Analysis of solutions, trade-offs, and cross-sector interactions

NESCAUM then conducted a series of sector scenario analyses using the program options and strategies introduced to the NE-MARKAL model. The results of these analyses will inform clean air and energy policy decisions in New York State. MPAF generated least-cost solutions that achieve multi-pollutant targets as well as their environmental, public health, and welfare impacts. The analysis provides for a better understanding of potential trade-offs between strategies (e.g., greater penetration of diesel technologies may benefit climate at the expense of $PM_{2.5}$, or may satisfy both at greater expense). It was critically important that NESCAUM and the Department worked closely together as policy scenarios were run and input assumptions refined to more accurately reflect interaction between programs to ensure realistic model response.

Several emissions projection scenarios will then be mapped from the NE-MARKAL model into the air quality modeling and public health assessment frameworks (i.e., CMAQ and BenMAP) in order to estimate environmental and public health benefits. Investment patterns and fuel expenditures will be mapped from the NE-MARKAL model into a regional economic model (i.e., REMI™) to project economic impacts.

NE-MARKAL Model

As previously mentioned, a key tool for this project is the NE-MARKAL model. With it, we conducted different scenario analyses to reconcile the multiple strategies identified above with each other, taking into consideration cross-pollutant and cross-sectoral interactions and tradeoffs. This 12-state, regionally-representative, least-cost optimized linear programming model is designed to identify the least expensive technology evolution that satisfies the multiple policy and environmental constraints that are placed on the system. The model was constrained according to the environmental targets from and by the technology options that were made available to the model. Our goal was to ensure that all technology options that could potentially play a role in achieving any of the strategies were well characterized and available to the model. The model was then able to select from those options in order to create a future energy system for the Department that satisfies the projected demand. Department staff then reviewed the results and identified major sensitivities of the system, and made changes accordingly (i.e., to reflect political reality).

Now that reasonable alternative future technology evolution has been identified through NE-MARKAL, the resulting projections of emissions and costs (or savings) are currently being mapped into emissions pre-processing software (SMOKE) and a regional economic model (REMI™) for further analyses. Processed emissions data will allow for regional air quality simulations and the mapped economic inputs will allow for a broader macroeconomic analysis of the changes in energy-sector investments and potential fuel savings.

Proposed Scenario Analysis for the Project

Given that the framework assesses all strategies simultaneously, the analytical goal was to identify and probe the key factors to which the optimization is most sensitive. Creating scenarios around these key factors provided the greatest insight into the implications of alternative projections and will serve decision-makers as they consider policy recommendations in the future. For example, cost of fuel and rate of technology development are obviously key factors that will have a huge impact on the feasibility of various strategies. An additional factor that is likely to drive the choice of control measures is the level of desired greenhouse gas (GHG) reduction. The 30 percent carbon equivalent reduction identified for 2030 is very likely to be the binding constraint on the system that will drive technological change the most. We therefore recommended that three primary sets of scenarios be constructed. These scenarios will assess the implications of alternative technology deployment relative to an agreed-upon reference scenario that represents the "business as usual" approach to technology evolution. The three scenario groupings are as follows:

Moderate technology versus high technology deployment – in this set of scenarios, we examine the effects that advanced technology deployment will play in enabling a rapid reduction in carbon, criteria pollutant, and toxic emissions at a reasonable cost. A moderate technology case will include advanced technology deployment consistent with past historical practice. A high technology case will include more rapid introduction of key enabling technologies such as Nanosolar® printable solar cells or fuel-cell vehicles powered by hydrogen production facilities utilizing carbon sequestration.

Moderate fuel price versus high fuel price – in this set of scenarios, we look at the price sensitivity of the solutions with respect to the unknown future cost of oil, gas, and coal. It is likely that this scenario would be the driving influence on the previous set of scenarios. We may therefore opt to explore a combined set of "high fuel price/high technology deployment" and "low fuel price/low technology deployment" scenarios.

Carbon plus criteria pollutant constrained versus criteria pollutant constrained only – this set of scenarios examines the extent to which GHG targets alone are driving the degree of technology change and costs. By examining the system with and without the GHG constraint, we are able to examine the extent to which this factor is the key constraint on the system.

The Department ultimately chose the following meta-scenarios to model beyond NE-MARKAL:

- 52% x 2030
  - Explore the implications of achieving a 52 percent economy-wide CO_2 reduction by 2030 (relative to 1990 emissions)

- Combination Run
  - Combine 7 of the most effective sector-specific strategies into one scenario
    - 25% of fleet hybrid by 2025 (64% by 2030)
    - 25% of fleet EV by 2029
    - RPS: 30% by 2013
    - ELC Demand Reduction: No constraint for "Optimal" Conservation Technologies
    - 20% CHP for COM heating
    - 100% Energy Star appliances by 2020
    - 15ppm distillate by 2017

- Kitchen Sink Run
  - Include all policy levers from the sector-specific case analyses at reasonable levels; no carbon cap

- Fuel Price Sensitivity
  - Explore the robustness of the 52% reduction by 2030 scenario to the price of oil/natural gas/gasoline

- Technology Price Sensitivity
  - Explore the robustness of the 52% reduction by 2030 scenario to the price of renewable, EV, hybrids, efficient diesels and heat pumps

Next Steps after Employing Markal

Regional Air Quality and CMAQ

Once the data needs have been addressed, the scenarios have been defined, and the simulations conducted, results will then be mapped into the SMOKE emissions processing tool to feed EPA's CMAQ regional air quality model. This step allows for the potential strategies that constitute an air quality management plan to be examined from an environmental perspective. The goal of employing these strategies is to achieve target ambient concentrations of GHGs and criteria air pollutants (e.g., ozone, particulate matter), to achieve nutrient balance for acidifying agents, and to reduce toxic chemicals in the environment. The CMAQ model will be uses as the tool to demonstrate whether the environmental targets would be met, based on the NE-MARKAL projections. While it is recognized that future year ambient air quality

monitoring provides the ideal metric, given the scope of this project, success will be defined through a model demonstration that indicates that the environmental goals are achievable.

The initial mapping of various sectors of the NE-MARKAL model by state is important to quality assure the inventory assumptions. NESCAUM does not anticipate being able to simulate 100 percent of New York's emissions inventory, but it is anticipated that energy infrastructure included in the power generation, transportation, industrial, residential and commercial sectors will account for over 90% of many of the key pollutants. For those areas of the emissions inventory that are driven by energy technologies included in the model, there will is a projection tool to examine inventory changes over the coming 30 years.

The U.S. EPA's nine-region MARKAL model (US9r) is currently available and will be used to complement NESCAUM's NE-MARKAL framework for regions outside the geographical domain of the framework, but within the eastern U.S. CMAQ domain.

Simulations based on the reference scenario representations of a future time period (e.g., 2020 or 2029) will each be compared to at least one future policy scenario that represents the implementation of a suite of strategies. If the result of the annual simulation for these future years does not yield the necessary level of environmental protections, some iteration may be required to ensure that the final set of scenarios reflect political realities and achieve the bulk of emissions reductions necessary to meet the environmental targets. It is expected that some additional pollutant-specific strategies will be needed to fully meet the targets.

BenMAP

The ambient concentration data produced by the regional CMAQ platform described above will be used to drive the Environmental Benefits Mapping and Analysis Program (BenMAP), a Windows-based program developed jointly by the U.S. EPA and Abt Associates Inc. (USEPA, 2006b). BenMAP was created to estimate health impacts and associated economic values associated with changes in ambient air pollution. NESCAUM will use outputs from the CMAQ model to create air quality grids to estimate average exposure to particulate matter and ozone of people living in the northeast U.S. Included in the BenMAP package are databases of concentration-response functions and economic valuations of health impacts. By selecting appropriate health endpoints for the Northeast's population considered here and appropriate epidemiological studies (for incidence rates), NESCAUM can estimate improvements in mortality and morbidity for each endpoint by scenario. The health valuation functions available for different health endpoints within the tool will be used to derive a key regional economic feedback, described in the next section.

REMI™

NESCAUM will map the estimated public health benefits developed by BenMAP into the regional economic assessment by associating those benefits with appropriate economic sectors using the 12-state Regional Economic Models, Inc. (REMI™).2 This model will therefore link to the NE-MARKAL results to generate estimates of economic impacts to the region associated with implementing the various climate and air quality strategies. REMI Policy Insight® is a peer-reviewed model for evaluating the effects of policy initiatives and similar changes on the economies of local regions. NESCAUM will use REMI™ to generate estimates of changes in regional employment, income (i.e., gross state product), and output resulting from policies and/or other changes that we first evaluate using the MARKAL framework. It is important that policymakers are able to consider economic impacts, even when proposed measures have the potential to deliver clear, unequivocal climate and air quality benefits.

The REMI Policy Insight® model is a product developed by Regional Economic Models, Incorporated of Amherst, MA. NESCAUM retains a license to a 12-state version of REMI that depicts the regional economy of the six New England states and the six Mid-Atlantic states.

Summary of Technical Results

NE-MARKAL Modeling Results

The results from the NE-MARKAL model drive the subsequent modeling platform and thus the air quality (SMOKE, CMAQ), economic (REMI), and public health (BenMAP) results. The NE-MARKAL results are also the component that relates most directly to policy goals and implementation requirements since this is where energy producing, transforming, and consuming technologies – and the largest pollution sources – are most directly represented. This section provides an overview of reference scenario results followed by a description of sector-specific results and then overarching (meta) scenario results all in terms of technology deployment, emissions, and cost. The sector-specific simulations describe how various policies were represented in the model and model responses to the imposition of specific constraints intended to represent one or more policies. The meta-scenarios look at multi-sector simulations where multiple constraints are imposed under a variety of circumstances reflecting different plausible future circumstances (e.g. price or technology deployment sensitivities).

Reference Case Results

The reference case serves as a basis for comparison for all policy scenarios that have been analyzed. It is important to remember that NE-MARKAL is not appropriately used as a forecast tool and thus the reference case should not be considered a "prediction" of future events, absent major policy changes. Rather, the reference case has been developed as one of many plausible future outcomes of events that will be influenced by factors that are simulated within the framework.

While any simulation result is characterized by technology deployment, cost, and emissions, each simulation is shaped by the database used and the assumptions or constraints placed on the system. The database has been developed over many years from national, state, and local sources and is documented elsewhere. The assumptions that have been used for this New York State reference case will be described in detail in the forthcoming NESCAUM final report on the "Applying the Northeast Regional MPAF to New York" project.

To be completed July/August 2010

Sector-specific Analyses and Results

To be added July/August 2010

Meta-Scenario Analyses and Results

To be added July/August 2010

SMOKE Modeling Results

To be added July/August 2010

CMAQ Modeling Results

To be added July/August 2010

REMI Modeling Results

To be added July/August 2010

BenMAP Modeling Results

To be added July/August 2010

Conclusions from Technical Results

To be added July/August 2010

Potential Environmental Indicators

Environmental

- $PM_{2.5}$ and ozone NAAQS
- Resource efficiency (i.e., EE standards on appliances)
- Biodiversity
- Number of Ozone Alert days
- Energy consumption per capita
- Ecological indicators
- Regional Haze (i.e., measured deciview improvement)
- Air toxics
- mercury (deposition network, emissions inventory (EI))
- acetaldehyde (ambient concentrations, EI)
- acrolein (ambient concentrations, EI)
- benzene (ambient concentrations, fuel content, EI)
- formaldehyde (ambient concentrations, EI)
- nickel (ambient concentrations, EI)
- polycyclic organic matter
- Progress toward “20 by 20” goal (CO2)
- Progress toward RGGI target (CO2)

Quality of life

- Mobility of all segments of the population
- Commuting time
- Opportunities for outdoor activity
- Park space per capita
- Residences within walking distance of basic necessities
- Residences within walking distance of transit
- Status of urban tree canopy

Environmental Justice

- Health Indicators
    - Obesity
    - High blood pressure
- Ambient air concentrations + EI for specific air toxics of concern in EJ areas
- “Quality of life” indicators above focused on EJ areas

Evaluation

Difficulties Encountered During the 2-year Pilot Project

- Staffing limitations
- Clean Air Act SIP deadlines took precedence over AQMP deadlines
- Stakeholder collaboration on deadlines
- NEMARKAL is an energy model and provides limited air toxic inputs
- Cross-agency conflicts of interest
- Environmental Justice indicators are not easily incorporated into an AQMP

Glossary and Appendices

Under development