4.0 CONTROL MEASURES

This chapter discusses the particulate matter related control measures implemented, or expected to be implemented in New Jersey, in the Northeast/Mid-Atlantic Regions, and nationally. As discussed in detail in Chapter 1, oxides of nitrogen (NO_x) and sulfur dioxide (SO_2), in addition to direct fine particulate matter ($PM_{2.5}$), are the precursors of concern for $PM_{2.5}$ SIP-related activity. This chapter focuses on those measures designed to decrease one or more of these pollutants specifically. This section explains the terminology related to control measures used throughout Chapter 5 (the $PM_{2.5}$ attainment demonstration chapter); provides a summary of how the control measures were identified; and gives a brief synopsis of each control measure considered in Chapter 5. A summary of the identified control measures is shown in Table 4.1. The benefits from the implementation of these measures, and the benefit calculations, are discussed in the State's attainment demonstration in Chapter 5. Note that this chapter only provides a discussion of control measures not included in the baseline (2002) emission inventory. Existing controls, such as the New Jersey inspection and maintenance (I/M) program for gasoline vehicles prior to the initiation of mandatory on-board diagnostic inspections and pre-2002 reasonably available control technology (RACT) rules are not included in this chapter. Those controls are included in the 2002 baseline inventory. In addition to addressing $PM_{2.5}$ emissions, the measures discussed in this chapter are also expected to have an impact on controlling regional haze, the primary constituent of which is $PM_{2.5}$.

Table 4.1: $PM_{2.5}$ Control Measures[1]

Control Measures	Sector
Pre-2002 measures with additional benefits achieved Post-2002 - On the Books	
New Jersey	
NO_x Budget Program (SIP Call)	Point
Nonattainment New Source Review (NNSR)	Point
Federal	
Residential Woodstove NSPS	Area
Tier 1 Vehicle Program	Onroad
National Low Emission Vehicle Program (NLEV)	Onroad
Tier 2 Vehicle Program/Low Sulfur Fuels	Onroad
Heavy Duty Diesel Vehicle (HDDV) Defeat Device Settlement	Onroad
Heavy Duty Diesel Vehicle (HDDV) Engine Standards	Onroad
Nonroad Diesel Engines	Nonroad
Large Industrial Spark-Ignition Engines Over 19 kilowatts (kW)	Nonroad
Recreational Vehicles (includes snowmobiles, off-highway motorcycles and all-terrain vehicles)	Nonroad
Diesel Marine Engines over 37 kW	Nonroad
Phase 2 Standards for Small Spark-Ignition Handheld Engines at or below 19 kW	Nonroad

[1] Table 4.1 includes measures that address Direct $PM_{2.5}$ emissions and the $PM_{2.5}$ precursors, SO_2, and NO_x, only

Control Measures	Sector
Phase 2 Standards for New Nonroad Spark-Ignition Nonhandheld Engines at or below 19 kW	Nonroad
Post-2002 measures - On the Books	
New Jersey Measures Done Through a Regional Effort	
NO_x RACT rule 2006 (includes distributed generation and certain boilers)	Point and Area
New Jersey Heavy Duty Diesel Rules Including "Not-To-Exceed" (NTE) Requirements	Onroad
New Jersey Only Measures	
On-Board Diagnostics (OBD) - (I/M) Program for Gasoline Vehicles	Onroad
Federal	
USEPA MACT Standards including Industrial Boiler/Process Heater MACT[a]	Point
Acid Rain	Point
Clean Air Interstate Rule (CAIR)	Point
Refinery Enforcement Initiative	Point
Post-2002 Measures- Beyond on the Way	
New Jersey Measures Done Through a Regional Effort	
Asphalt Production Plants Rule	Point
Glass Manufacturing	Point
Industrial/Commercial/Institutional (ICI) Boiler Rule Changes (for certain categories)[b]	Point
Certain Refinery Operations	Point
High Electric Demand Day (HEDD) Program	Point
New Jersey Only Measures	
Fugitive Dust at Stationary Sources	Point and Area
#6 Fuel Oil-Fired Boilers	Point
Stationary Diesel Engines	Point
Case by Case NO_x Emission Limit Determinations (FSELs/AELs)	Point
Municipal Waste Combustor Rule Changes[c]	Point
Refineries – Process Heaters and Boilers	Point
New Jersey Low Emission Vehicle (LEV) Program	Onroad
Diesel Idling Rule Changes	Onroad
Diesel Smoke Rule Changes	Onroad
Federal	
New Nonroad Engine Standards	Nonroad
Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder	Nonroad
Federal Clean Air Interstate Rule (CAIR) Program – Phase I 2010 SO_2 Cap	Point
Energy Conservation Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings and New Federal Low-Rise Residential Buildings	Area

Control Measures	Sector
Additional 2009 Benefits[d]	
NO_x RACT Rule 2006 for certain boilers – additional credit	Point
Certain Categories of ICI Boilers – additional credit	Point
Smoke Management	Area
Low Sulfur Distillate and Residual Fuel Strategies	Point and Area
Ports	Nonroad
Onroad Motor Vehicle Control Programs (Fleet turnover 2010)	Onroad
Nonroad Motor Vehicle Control Programs (Fleet turnover 2010)	Nonroad

Notes: a. This control measure has both NO_x and VOC emission reduction benefits.
b. Some categories have 2009 compliance dates; remainder have 2012 compliance dates.
c. This control measure has both NO_x and $PM_{2.5}$ emission reduction benefits.
d. These measures are above and beyond what went into the modeling.

4.1 Terminology

On The Books (OTB) – "On the Books (OTB)" control measures (State or Federal) are control measures that were a) adopted before 2002, but have implementation dates after 2002, or obtain additional benefits after 2002, due to turnover of products, equipment, or vehicles (the benefits from these measures are not included in the State's 2002 base year emissions inventory); or b) adopted and implemented after 2002. An example of an OTB measure for New Jersey is the NO_x Budget Program, which went into effect May 1, 1999; a lower NO_x emission cap was required effective May 1, 2003.

Beyond On The Way (BOTW) – These control measures (state, regional, or Federal) are proposed by New Jersey as part of the effort to reach attainment by April 5, 2010.[2]

4.2 On the Books Controls

The following section provides descriptions of the New Jersey and Federal OTB measures that are included in the State's attainment demonstration.

4.2.1 New Jersey

Pre-2002 with benefits achieved Post-2002 – On the books

New Jersey NO_x Budget Program (SIP Call): On September 27, 1994, the Ozone Transport Commission (OTC) agreed to develop a regional program to achieve significant reductions in NO_x emissions from large combustion sources. This program called for the establishment of a NO_x cap and trade program, as well as the establishment of an emissions cap or "budget" for all affected sources that in total must not be exceeded during each control period, beginning in 1999. The NO_x SIP Call is a similar regional

[2] According to USEPA guidance, areas that have an attainment date of no later than April 5, 2010 must implement the emission reductions needed for attainment no later than 2009. Source: USEPA. Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS, United States Environmental Protection Agency, October 2005.

NO_x reduction measure designed by the USEPA, in part, as a result of the Ozone Transport Assessment Group's (OTAG) final recommendation report addressing ozone transport over the Eastern United States.[3] New Jersey adopted its NO_x Budget Program[4] in 1998. The base emission budget of 17,340 tons of NO_x was established for the years 1999-2002. This was approximately 65 percent less than 1990 emission levels and was termed Phase II. In 2003, the NO_x SIP Call replaced Phase III of the OTC's program with a reduction of the base emission budget to 8,200 tons. The NO_x SIP Call also expanded the geographical area beyond the Ozone Transport Region to the south and the west. The NO_x SIP Call will continue through the ozone season of 2008, at which point it will be superseded by the Clean Air Interstate Rule (CAIR). The NO_x Budget Program covers primarily electric generating units (EGUs) and some non-EGUs. The equipment covered by the NO_x Budget Program include fossil fuel fired indirect heat exchangers with a maximum rated heat input capacity of at least 250 million British thermal units (MMBtu) per hour and electric generating units with a rated output of at least 15 megawatts (MW). The USEPA approved the State's NO_x SIP Call program on May 22, 2001.[5]

Nonattainment New Source Review (NNSR): The Clean Air Act (CAA), 42 U.S.C. § 7503, requires new or modified major sources to install the Lowest Achievable Emission Rate (LAER) control equipment and obtain greater than one for one emission offsets in order to locate in a nonattainment area. Thus, the NNSR program provides for continual emission reductions to help improve the air quality in the nonattainment area and further downwind. In New Jersey, any significant new, reconstructed, or modified significant source is also required to install state of the art (SOTA) control technology (similar to Best Available Control Technology (BACT) or LAER for major sources). SOTA, which is a minor NSR program, also results in reductions in the actual emissions from the facilities. New Jersey's SOTA requirements, denominated in the New Jersey Air Pollution Control Act as "advances in the art of air pollution control," mandate BACT or LAER, as appropriate, if the equipment or control apparatus is subject to Prevention of Significant Deterioration (PSD) or Nonattainment New Source Review (NNSR) regulations.[6]

Post 2002 – On the books

New Jersey Measures Done Through a Regional Effort

NO_x RACT Rule 2006 (includes distributed generation and certain boilers): The NJDEP adopted amendments to N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from NO_x, on September 8, 2005. The amendments were based on the OTC's March 6, 2001 model rules to control NO_x emissions tied to shortfall measures. The OTC model rules were created as the result of the agreement formally set forth in a "Memorandum of

[3] USEPA. 1998 Ozone Transport Assessment Group (OTAG) Final Report. United States Environmental Protection Agency, Ozone Transport Assessment Group. Accessed from: http://www.epa.gov/ttn/naaqs/ozone/rto/otag/finalrpt/.
[4] N.J.A.C. 7:27-31
[5] 66 Fed. Reg. 28063-66 (May 22, 2001)
[6] New Jersey's Air Pollution Control Act (1954).

Understanding Among the States of the Ozone Transport Commission Regarding the Development of Specific Control Measures to Support Attainment and Maintenance of the Ozone National Ambient Air Quality Standards" (MOU), which was approved by the OTC on June 1, 2000. Specifically, the New Jersey amendments apply to owners and operators of certain stationary sources of NO_x emissions, including industrial/commercial/institutional (ICI) boilers, combustion turbines, and reciprocating engines. Owners and operators of such sources are required to achieve the emission limit specified in the rules or to comply instead with alternative requirements, such as an emission averaging plan, an alternative maximum allowable emission rate or a plan for phased compliance (repowering or use of innovative technology). The amendments also regulate distributed generation[7] of electricity, consistent with the OTC recommendation in its March 28, 2001 "Resolution of the States of the Ozone Transport Commission Concerning the Creation of incentives for Additional Distributed Generation of Electric Power." The USEPA issued final approval of the New Jersey SIP revision, including these rule amendments on July 31, 2007.[8] The rules became effective August 30, 2007.

New Jersey Heavy Duty Diesel Rules, Including "Not-To-Exceed" (NTE) Requirements

The NJDEP adopted new rules and amendments on October 28, 2001 to N.J.A.C. 7:27-26 that added requirements for new heavy-duty diesel vehicles (HDDVs) equipped with model year 2005 and newer heavy-duty diesel engines (HDDEs) sold in New Jersey. Specifically, the rulemaking required these new HDDEs to be certified as meeting California's HDDE requirements. These requirements include both the federal emission standards applicable to all model year 2004 and newer HDDEs, plus a number of testing procedures which the USEPA required for model year 2007 and newer HDDEs. The NTE test procedure is so called because it is used to demonstrate that an engine does not exceed, under a wide variety of operating conditions, an emissions cap of 1.25 times the Federal Test Procedure emission standard. For this reason, the California requirements are often referred to as the NTE requirements. California promulgated these NTE requirements to address a temporal gap of two years between the end of the requirements set forth in the consent decrees entered into by seven major HDDE manufacturers and the effective date of equivalent federal testing requirements. It was anticipated that the adoption of the NTE requirements by states regulating the majority of HDDEs sold in the United States would encourage and provide incentive for engine manufacturers to produce only engines meeting the NTE requirements.

On October 25, 2005, the NJDEP adopted new rules, rule amendments, recodifications and repeals of rule provisions to clarify and supplement the existing requirements for the sale, for use or registration in New Jersey, of certain HDDVs and HDDEs, model years 2007 and later. The rulemaking did not impose any new standards for model year 2007 and later HDDEs per se; rather, it served to clarify the finer points of the application of

[7] Distributed generation is a system composed of generation located near the energy consumer's site that may be integrated with the electric grid to provide multiple benefits on both sides of the utility meter. Source: CECA. Distributed Generation Facts, Consumer Energy Council of America, http://www.cecarf.org/Programs/DG/DGFacts.html.
[8] 72 Fed. Reg. 41626-41629 (July 31, 2007).

CARB-certification requirements to model year 2007 and beyond, since CARB's standards for those model years are significantly different from the NTE requirements and standards for model years 2005 and 2006, and were not discussed in the NJDEP's 2001 rulemaking. In addition, a prohibition of the practice known as "stockpiling" was added. Stockpiling is the practice of purchasing vehicles and/or engines earlier than necessary in order to avoid more stringent emission standards. Finally, the NJDEP added provisions that would, in the event that the provisions of the Federal 2007 rule are not in effect, require recordkeeping and reporting of the sale, for use in New Jersey, of model year and later HDDEs. The Federal 2007 rule was promulgated by the USEPA on January 18, 2001 to take effect for model year 2007.

New Jersey Only Measures

On-Board Diagnostics (I/M) Program for Gasoline Vehicles: A number of changes to New Jersey's I/M program for gasoline vehicles were implemented after 2002. The two program changes that materially impacted vehicle emissions were the extension for the new vehicle emission inspection from one inspection cycle (i.e., 2 years) to two inspection cycles (i.e., 4 years) and the initiation of mandatory on-board diagnostic (OBD) inspections for model year 1996 and newer vehicles. The OBD test largely replaced the dynamometer based Acceleration Simulation Mode (ASM5015) exhaust test for these newer vehicles. New Jersey submitted a Final SIP revision that contained the results of performance standard modeling for these I/M program changes on November 27, 2002.[9] The USEPA subsequently approved this SIP revision.[10]

4.2.2 Federal

Pre-2002 with benefits achieved Post 2002 – On the books

Residential Woodstove New Source Performance Standards (NSPS): The USEPA New Source Performance emission standards for new wood burning stoves[11] and fireplace inserts were implemented in 1992. These standards are 7.5 grams of particulate matter per hour for non-catalytic controlled units and 4.1 grams of particulate matter per hour for catalytic controlled units. There are no control requirements for fireplace inserts or wood stove units manufactured prior to 1992, and these units emit from 30 to 70 grams of particulate matter per hour. The USEPA indicates that they do not have any plans to update the NSPS anytime soon. Instead, the USEPA is choosing to focus on voluntary wood stove change-out programs, rather than new standards.

[9] NJDEP. Enhanced Inspection and Maintenance (I/M) Program for the State of New Jersey Revised Performance Standard Modeling SIP Revision. New Jersey Department of Environmental Protection. November 27, 2002. Available at http://www.state.nj.us/dep/baqp/sip/4year/4yrexempt_fin.doc.
[10] 68 Fed. Reg. 7704-06 (February 18, 2003).
[11] A wood burning stove is defined as a free standing enclosed wood-burning unit, vented to the atmosphere, and designed to provide heat to a home. In contrast, a fireplace insert is defined as a self-enclosed unit that sits within a masonry structure, vented to the atmosphere, that is not designed as a primary heating source for a home. The USEPA emission standards do not cover masonry-constructed fireplaces without fireplace inserts, but these unique fireplaces are thought to account for a very small segment of the wood burning conducted in the New Jersey.

Tier 1 Vehicle Program: Pursuant to 42 U.S.C. §7521, the USEPA promulgated regulations which revised the tailpipe standards of the Federal Motor Vehicle Control Program (FMVCP) for light duty vehicles and light duty trucks.[12] These standards, known as Tier 1, were implemented in phases beginning with the 1994 model year. The Tier 1 standards encompassed pollutants previously regulated (that is, carbon monoxide, nitrogen oxides, and particulate matter), as well as the addition of non-methane hydrocarbons (NMHC). The standards themselves are a function of vehicle class, pollutant, useful life, engine cycle, and fuel. The Tier 1 rulemaking also established new intermediate and full useful life[13] levels for air pollution control devices on light-duty vehicles and light-duty trucks, as well as new vehicle weight classes. The regulation affected petroleum and methanol-fueled motor vehicles.

National Low Emission Vehicle Program (NLEV): The NLEV[14] program required automobile manufacturers to meet more stringent new car standards, starting with the 1999 model year in the OTC states and starting with the 2001 model year in the remainder of the nation, except for California. New Jersey participated in the NLEV program for the model year 2006, after which New Jersey came under the Federal Tier 2 program. New Jersey subsequently adopted the Low Emission Vehicle II (LEV II) program, which becomes effective for vehicles delivered for sale in New Jersey on and after January 1, 2009.

Tier 2 Vehicle Program/Low Sulfur Fuels: On February 10, 2000, the USEPA promulgated rules for its comprehensive Tier 2/Low Sulfur Gasoline program.[15] These regulations are designed to treat a vehicle and its fuel as a system, resulting in multiple efforts to reduce highway source emissions. In addition to requiring new tailpipe emissions standards for all passenger vehicles, sport utility vehicles (SUVs), minivans, vans and pick-up trucks, the USEPA simultaneously promulgated regulations to lower the sulfur standard in gasoline. These regulations phased in between 2004 and 2007.

Heavy Duty Diesel Vehicle (HDDV) Defeat Device Settlement: On October 22, 1998, the U.S. Department of Justice and the USEPA announced a settlement with seven major diesel engine manufacturers to resolve claims that they installed computer software on 1993 through 1998 model year heavy-duty diesel engines which was designed to disengage the engine's emission control system during highway driving.[16] The settlement, involving Caterpillar, Inc., Cummins Engine Company, Detroit Diesel Corporation, Mack Trucks, Inc., Navistar International Transportation Corporation, Renault Vehicles Industries, S.A., and Volvo Truck Corporation, included an $83.4 million total penalty. The settlement also required the manufacturers to offer software updates (chip reflash) at no cost to the truck owners at the time of engine rebuild.

[12] 56 Fed. Reg. 25724 (June 5, 1991).
[13] Useful life is the number of years that the vehicle is expected to be in use.
[14] For more information on NLEV, see USEPA website at http://www.epa.gov/otaq/lev-nlev.htm.
[15] 65 Fed. Reg. 6698-746 (February 10, 2000).
[16] For more information, see USEPA's web page on Heavy Duty Diesel Engine Consent Decree Documents at www.epa.gov/Compliance/resources/cases/civil/caa/diesel/condec.html.

Heavy Duty Diesel Vehicle (HDDV) Engine Standards[17]: On July 31, 2000, the USEPA issued a final rule for the first phase of its two-part strategy to significantly reduce harmful diesel emissions from heavy-duty trucks and buses. This rule finalized new diesel engine standards beginning in 2004, for all diesel vehicles over 8,500 pounds. Additional diesel standards and test procedures in this final rule began in 2007. This new rule required heavy-duty gasoline engines to meet new, more stringent standards starting no later than the 2005 model year. According to the USEPA, these new standards require gasoline trucks to emit 78 percent less NO_x and hydrocarbons, and diesel trucks to emit 40 percent less NO_x and hydrocarbons, than current models. The second phase of the program required cleaner diesel fuels and cleaner engines, reducing air pollution from trucks and buses by another 90 percent. The USEPA issued the final rule, to take effect in 2006-2007 on January 18, 2001.[18]

Nonroad Diesel Engines: In June 1994, the USEPA promulgated regulations to control volatile organic compounds (VOCs), NO_x and carbon monoxide (CO) emissions from diesel-powered compression ignition engines at or greater than 50 horsepower (hp), i.e., bulldozers.[19] These Tier 1 standards phased in from 1996 to 2000. In October 1998, the United States Environmental Protection Agency (USEPA) promulgated regulations to control VOC, NO_x and carbon monoxide emissions from diesel-powered compression ignition engines for all engine sizes.[20] This rule includes Tier 1 standards for engines under 50 horsepower (hp) (i.e., lawn tractors), Tier 2 standards for all engine sizes, and more stringent Tier 3 standards for engines rated over 50 hp. The new Tier 3 standards are expected to lead to control technologies similar to those that will be used by manufacturers of highway heavy-duty engines to comply with the 2004 highway engines standards.[21] The new Tier 1 standards were phased in between the years 1999 and 2000, Tier 2 standards between 2001 and 2006, and Tier 3 between 2006 and 2008.

Large Industrial Spark-Ignition Engines over 19 kilowatts: Spark-ignition nonroad engines are mostly powered by liquefied petroleum gas, with others operating on gasoline or compressed natural gas. These engines are used in commercial and industrial applications, including forklifts, electric generators, airport baggage transport vehicles, and a variety of farm and construction applications.

In September 2002, the USEPA adopted new standards to regulate these engines.[22] The emission standards are two-tiered. The Tier 1 standards, which started in 2004, are based on a simple laboratory measurement using steady-state procedures. The Tier 2 standards, starting in 2007, are based on transient testing in the laboratory, which ensures that the engines will control emissions when they operate under changing speeds and loads in the different kinds of equipment.

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[17] For more information, see the USEPA's Office of Transportation and Air Quality web site at http://www.epa.gov/otaq/hd-hwy.htm.
[18] 66 Fed. Reg. 5002-50 (January 18, 2001).
[19] 59 Fed. Reg. 31306 (June 17, 1994).
[20] 63 Fed. Reg. 56968-7023 (October 23, 1998).
[21] USEPA. Regulatory Announcement: New Emission Standards for Nonroad Diesel Engines. United States Environmental Protection Agency Office of Mobile Sources, EPA420-F-98-034, August 1998.
[22] 67 Fed. Reg. 68242-447 (November 8, 2002).

Also included is an option for manufacturers to certify their engines to different emission levels to reflect the fact that decreasing NO_x emissions tend to increase carbon monoxide emissions (and vice versa). In addition to these exhaust-emission controls, manufacturers must take steps starting in 2007 to reduce evaporative emissions, such as using pressurized fuel tanks. Tier 2 engines are also required to have engine diagnostic capabilities that alert the operator to malfunctions in the engine's emission-control system. The rule also includes special standards to allow for measuring emissions without removing engines from equipment.

Recreational Vehicles: Recreational vehicles include snowmobiles, off-highway motorcycles, and all-terrain-vehicles (ATVs). In September 2002, the USEPA adopted new standards to regulate nonroad recreational engines and vehicles.[23] The standards that affect $PM_{2.5}$ emissions are presented in Table 4.2. As shown by this table, only the new standards for off-highway motorcycles and ATVs will reduce NO_x, a $PM_{2.5}$ precursor.

Table 4.2: Summary of Emission Standards for Recreational Vehicles

Vehicle	Model year	Emission standards		Phase-in
		HC*+NO_x g/km	CO g/km	
Off-highway Motorcycle	2006	2.0	25.0	50%
	2007 and later	2.0	25.0	100%
ATV	2006	1.5	35.0	50%
	2007 and later	1.5	35.0	100%

*HC = Hydrocarbon

Federal Compression Ignition Marine Engine Regulations (Commercial Marine Engines):[24,25] In 1999, the USEPA promulgated regulations for commercial marine diesel engines over 37 kilowatts (kW), including engines with per cylinder displacement up to 30 liters.[26] This rule established VOC and NO_x emission standards, starting in 2004, for new engines with per cylinder displacement up to 2.5 liters. This rule also established standards in 2007 for engines with per cylinder displacement between 2.5 and 30 liters.[27] The engines covered by this rule are divided into two categories: Category 1: rated power at or above 37 kW - specific displacement of less than 5 liters per cylinder. These engines are primarily found in fast ferries. Category 2: rated power at or above 37 kW -

[23] 67 Fed. Reg. 68242-447 (November 8, 2002).
[24] For more information, see the USEPA's regulatory announcement on Emission Standards for New Commercial Marine Diesel Engines at http://www.epa.gov/otaq/regs/nonroad/marine/ci/fr/f99043.pdf.
[25] The USEPA has not finalized Tier 2 standards for Category 3 commercial marine engines. The USEPA will promulgate final Tier 2 standards for Category 3 engines on or before December 17, 2009. ("Category 3" means relating to a marine engine with a specific engine displacement greater than or equal to 30 liters per cylinder). Source: 40 C.F.R. §§ 94.1, 94.8; 72 Fed. Reg. 20948-52 (April 27, 2007).
[26] 64 Fed. Reg. 73300-73 (December 29, 1999).
[27] USEPA. Technical Highlights: Organization of Gasoline and Diesel Marine Engine Emission Standards. United States Environmental Protection Agency Office of Mobile Sources, EPA420-F-99-046. December 1999.

specific displacement greater than or equal to 5, but less than 30, liters per cylinder. These engines are primarily found in tug and towboats.

Federal Small Spark Ignition Engine Regulations: In July 1995, the USEPA promulgated the first phase of its regulations to control emissions from new nonroad spark ignition engines.[28] This regulation established VOC and carbon monoxide emission standards for all model year 1997[29] and newer nonroad spark ignition engines that have a gross power output at or below 19 kilowatts. These engines are used principally in lawn and garden equipment, including, but not limited to, lawn mowers, leaf blowers, trimmers, chainsaws, and generators. In March 1999, the USEPA promulgated Phase 2 regulations to control emissions from new nonroad spark ignition engines.[30] These regulations established tighter VOC and NO_x standards for non-handheld equipment such as lawn mowers and commercial turf equipment. The new standards were phased in between the years 2001 and 2007. In March 2000, the USEPA promulgated additional Phase 2 regulations to control emissions from new nonroad spark ignition engines.[31] This regulation established tighter VOC, NO_x, and carbon monoxide standards for handheld equipment such as string trimmers (i.e., weed whackers), leaf blowers and chainsaws. The new standards were phased in between the years 2002 to 2007.

Post 2002 – Federal On the Books

Industrial Boiler/Process Heater MACT: On September 13, 2004, the USEPA established a Maximum Achievable Control Technology (MACT) that applies to industrial, commercial, and institutional units firing solid fuel (coal, wood, waste, biomass) which have a design capacity greater than 10 MMBtu/hr and are located at a major source of hazardous air pollutants (HAPs).[32] See the discussion on HAPs under USEPA MACT Standards. This rule was subsequently vacated by the courts, triggering the Section 112(j) provisions of the Clean Air Act. NJDEP is participating in the National Association of Clean Air Agencies' (NACAA) efforts to develop MACT guidance for use by states and expects to do case-by-case MACT in 2009.

Acid Rain: Title IV of the Clean Air Act set a goal of reducing annual SO2 emissions by 10 million tons below 1980 levels. To achieve these reductions, the law required a two-phase tightening of the restrictions placed on fossil fuel-fired power plants. Phase I began in 1995, and affected 263 units at 110 mostly coal-burning electric utility plants located in 21 eastern and mid-western states. An additional 182 units joined Phase I of the program as substitution or compensating units, bringing the total of Phase I affected units to 445. Phase II, which began in the year 2000, tightened the annual emissions limits imposed on these large, higher emitting plants and also set restrictions on smaller, cleaner plants fired by coal, oil, and gas, encompassing over 2,000 units in all. The

[28] 60 Fed. Reg. 34582-657 (July 3, 1995).
[29] Ibid; Model year 1997 is defined as "The 1997 model year will run from January 2, 1996 to December 31, 1997."
[30] 64 Fed. Reg. 15208-55 (March 30, 1999).
[31] 65 Fed. Reg. 24268-314 (April 25, 2000).
[32] 69 Fed. Reg. 55218-86 (September 13, 2004).

program affects existing utility units serving generators with an output capacity of greater than 25 megawatts and all new utility units.

The Clean Air Act also called for a two million ton reduction in NO_x emissions by the year 2000. This has been superseded with the more stringent NO_x caps in CAIR, discussed below.

The Acid Rain Program utilizes an allowance trading system where affected utility units are allocated allowances based on their historic fuel consumption and a specific emissions rate. Each allowance permits a unit to emit one ton of SO2 during or after a specified year. For each ton of SO_2 emitted in a given year, one allowance is retired, that is, it can no longer be used. Allowances may be bought, sold, or banked. Anyone may acquire allowances and participate in the trading system. However, regardless of the number of allowances a source holds, it may not emit at levels that would violate Federal or state limits set under Title I of the Clean Air Act to protect public health including limits set by SIPs, such as this SIP. During Phase II of the program (now in effect), the Clean Air Act set a ceiling (or cap) of 8.95 million SO_2 allowances for total annual allowance allocations to utilities.

Clean Air Interstate Rule (CAIR): CAIR is the USEPA's attempt to address the interstate transport of ozone and fine particulate precursors by requiring emission reductions of SO_2 and NO_x. The CAIR expects to obtain these reductions from large electric generating units (EGUs greater than 25 MW) through three cap-and-trade programs: ozone season NO_x, annual NO_x and annual SO_2. The CAIR ozone season NO_x cap and trade program essentially replaces the NO_x Budget Program with lower caps and an expanded geographical region to the south and west of the NO_x SIP Call region. The CAIR also creates new annual NO_x and SO_2 cap and trade programs. The annual NO_x trading program is modeled after the NO_x Budget Program, expanded for the entire year. New Jersey adopted the new rules for the CAIR NO_x Trading Program on July 16, 2007, and the USEPA approved these rules on October 1, 2007.[33] The new CAIR rules will allow New Jersey to allocate NO_x allowances to New Jersey sources beginning 2009.

New Jersey did not take any action on the SO_2 trading program. There is no allocation of SO_2 allowances for CAIR, but instead, CAIR uses the SO_2 allowances allocated under the Acid Rain Program. CAIR reduces the SO_2 emissions from the Acid Rain Phase II level by applying increased retirement ratios to the Acid Rain SO_2 allowances. Under the CAIR, pre-2010 vintage SO_2 allowances are worth 1.0 ton of SO_2 emission; 2010-2014 vintage SO_2 allowances are worth 0.5 ton of SO_2 emissions; and post-2014 vintage SO_2 allowances are worth 0.35 ton of SO_2 emissions. This effectively reduces SO_2 emissions further below the Title IV level without creating a new currency.

Refinery Enforcement Initiative: The USEPA and various state and local agencies have negotiated Consent Decrees with the major refineries to elicit emission reductions from five major refinery processes. The processes are Fluid Catalytic Cracking Units (FCCUs) and Fluid Coking Units (FCUs), Process Heaters and Boilers, Flare Gas Recovery, Leak

[33] 72 Fed. Reg. 55666-72 (October 1, 2007).

Detection and Repair (LDAR), and Benzene/Wastewater. The New Jersey refineries with settlements as of March 2008 include Sunoco, Conoco Phillips, Valero, and Citgo Asphalt Refining Company.

For FCCUs/FCUs, the Consent Decree control requirements generally require the installation of wet gas scrubbers for SO_2 control, and selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR), or other measures to reduce NO_x emissions.

For process boilers/heaters, the control requirements for SO_2 emissions generally require the elimination of burning solids/liquid fuels. For NO_x emissions, the control requirements generally apply to units greater than 40 MMBtu per hour capacity or larger. In many cases, the Consent Decrees establish NO_x emission reduction objectives across a number of refineries that are owned by the same firm. Therefore, the companies decide which individual boilers/heaters to control as well as the control techniques to apply. (NJDEP plans to resume reductions at New Jersey refineries in its refinery rules, which are under development).

The Consent Decrees also included enhanced leak detection and repair programs (e.g., reducing the defined leak concentration) and other VOC requirements. The settlements are expected to produce additional SO_2, NO_x, and VOC emissions reductions for flare gas recovery and wastewater operations. While the Consent Decrees have various phase-in dates, significant emission reductions are expected prior to the summer of 2009.

4.3 Beyond On The Way Controls

The following sections discuss how beyond on the way (BOTW) measures (both regional initiatives and state only) were identified and provides descriptions of the BOTW measures included in the State's attainment demonstration.

4.3.1 Identifying Measures

New Jersey participated in a wide variety of processes aimed at identifying viable control measures that could be implemented to help the State reach its $PM_{2.5}$ attainment goals. The following section briefly discusses those processes, and the measures identified as viable through those processes that the State is moving forward to propose.

4.3.1.1 Regional Activities

New Jersey is an active member of four regional organizations, each with a unique focus with respect to either geographic area, air pollution concern or both. These organizations include:

The Ozone Transport Commission (OTC), a multi-state organization created under the Clean Air Act to advise the USEPA on ozone transport issues and develop and implement regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic regions.

Mid-Atlantic Regional Air Management Association (MARAMA), a non-profit association of ten state and local air pollution control agencies whose mission is to strengthen the skills and capabilities of member agencies and to help them work together to prevent and reduce air pollution in the Mid-Atlantic Region.

Northeast States for Coordinated Air Use Management (NESCAUM), a nonprofit association of air quality agencies in the Northeast designed to provide scientific, technical, analytical, and policy support to the air quality programs of the eight Northeast states.

The Mid-Atlantic/Northeast Visibility Union (MANE-VU), which was formed by the Mid-Atlantic and Northeastern states, tribes, and Federal agencies to coordinate regional haze planning activities for the region.

All of these organizations had an active role in the technical support work associated with this proposed SIP revision. MANE-VU supported the regional inventory work that was utilized in the regional attainment modeling effort (see Chapter 5) and was responsible for coordinating the Regional Haze effort, which resulted in control measures that will yield $PM_{2.5}$ reduction benefits (see Section 4.3.1.4). The efforts of the OTC and MARAMA identified control measures that would result in reductions of ozone, $PM_{2.5}$, and regional haze. The ozone control measures identified by these processes are expected to result in $PM_{2.5}$ and regional haze benefits due to either shared precursors (NO_x) or tangent reduction benefits (controls would also result in direct $PM_{2.5}$ and/or SO_2 emission reductions). NESCAUM focused on control measures more closely linked with $PM_{2.5}$ and regional haze reductions (mainly low sulfur fuel for industrial, commercial and residential facilities). The efforts of these regional organizations are summarized in the following sections.

4.3.1.2 Ozone Transport Commission (OTC)

New Jersey worked with other jurisdictions in the Ozone Transport Region to explore reasonable control measures for potentially significant emission reductions. To accomplish this, the OTC staff and member jurisdictions formed workgroups to: 1) review mobile, point, and area source categories, 2) identify candidate source categories, and 3) consider potential control strategies for those source categories to reduce NO_x, VOC, and SO_2 emissions.

Each OTC workgroup focused on a different sector (mobile/point/area) and compiled a list of viable control measures from sources published by the USEPA and various regional associations, OTC member state-specific control strategies already in place, and emission control initiatives from states outside the Ozone Transport Region, such as California. Then using 2002 emission inventories as the base year, the workgroups determined projected 2009 emission reductions based on currently existing controls, including Federal rules, adoption of previous OTC model rules by member jurisdictions, enforcement settlements, and other state-specific control measures, and estimated growth of inventories. Based on the review of the list of control measures and the emission

inventories, the workgroups developed a preliminary list[34] of candidate control measures thought to be most effective in reducing emission levels throughout the Ozone Transport Region.

From this preliminary list, the OTC workgroups developed white papers, summarizing key facts about the relevant control alternatives. The white papers provided information, such as descriptions of source categories and candidate control measures, 2002 base year emissions, 2009 projected emissions after implementation, preliminary cost estimates, current federal and state regulations, methods of implementation, applicability and geographic impact. Some of the papers reflected inter-regional efforts, such as those by the MARAMA for refineries, by the NESCAUM for heating oil, and by the super-regional discussions with the Midwest Regional Planning Organization (MWRPO) regarding Industrial, Commercial and Institutional (ICI) boilers and Electric Generating Units (EGUs). Using a scale of recommendations from one (definitely recommended) to five (not recommended), the member jurisdictions ranked the relative importance of the source categories and control strategies based on a qualitative assessment of the information presented in the white papers. After consideration of the estimated costs and magnitude of reductions potentially achievable for the selected emission sources, the OTC member jurisdictions identified reasonable control measures for a variety of source categories. Both during and after the ranking process, the OTC received written comments from stakeholders, held public meetings, and interfaced with impacted industries to better understand the source categories and how to regulate them effectively. The final list of source categories recommended by OTC for member jurisdictions to consider for emission reductions are presented in Table 4.3.

The OTC efforts focused on VOC and NO_x reductions for the purpose of reducing ozone. New Jersey evaluated the control measures identified by the OTC for NO_x measures that would have a $PM_{2.5}$ reduction benefit. Although the OTC efforts did not have a primary focus on control strategies for direct $PM_{2.5}$, New Jersey evaluated related direct $PM_{2.5}$ reduction strategies through its Reasonably Available Control Technology (RACT) and Reasonably Available Control Measures (RACM) analyses discussed in Sections 4.3.1.5.3 and 4.3.1.5.4, respectively.

[34] To review the preliminary list of OTC-identified control measures that were further evaluated for potential emission reductions, see the OTC web site at http://www.otcair.org/document.asp?fview=Report.

Table 4.3: Final OTC Control Measure Source Categories[35, 36]

Sector	Source Category
Area	Adhesives, Sealants, Adhesive Primers, and Sealant Primers (Industrial)
Area	Cutback and Emulsified Asphalt Paving
Area	Consumer Products
Area	Portable Fuel Containers
Point	Asphalt Production Plants
Point	ICI Boilers 100 MMBtu/hour or greater
Area and Point	ICI Boilers <100 MMBtu/hour
Point	Glass Furnaces
Point	Cement Plants
Onroad Mobile	Diesel Truck Chip Reflash
Onroad Mobile	Regional Fuel based on Reformulated Gasoline Options

The shaded categories in Table 4.3 are the OTC measures that have a $PM_{2.5}$ precursor reduction benefit. NESCAUM developed a model rule for diesel chip reflash for state use, which was included in the OTC's final Technical Support Document. New Jersey is still evaluating this program and seeks comments on how to best achieve the federal emission limits. For three of the OTC measures (adhesives and sealant, consumer products and portable fuel containers), the OTC drafted model rules which NJDEP is using to achieve VOC emission benefits. For the remaining measures shown in Table 4.3, the OTC developed emission limits and rule specification guidance. The OTC member states signed a Memorandum of Understanding (MOU) (Appendix A1) that addresses emissions associated with high electrical demand days (HEDD) to compliment already existing and future cap-and-trade programs with respect to electrical generation. This regional HEDD program will address the peak load emissions from the electrical generation sector on a daily basis.

New Jersey and other OTC member jurisdictions have resolved to pursue necessary and appropriate rulemakings to implement the emission reduction percentages, emission rates or technologies for the categories listed in Table 4.3 that are consistent with guidelines found in OTC Resolution 06-02 adopted on June 7, 2006, and amended on November 15, 2006, found in Appendix A2, as well as the High Electrical Demand Days MOU found in Appendix A1. The NJDEP expects to implement most measures that are not already adopted starting May 1, 2009 or later. A brief summary of all the OTC-identified control measures that have a $PM_{2.5}$ emission reduction benefit is included in the following subsection. For more information about the OTC control measure identification process, or the control measures identified for implementation through this process, please see Appendix A3.

[35] Measures that are shaded are expected to have a NO_x emission reduction benefit in New Jersey.
[36] The following programs that are listed in Table 4.3 are not discussed in New Jersey's proposed SIP document: 1) Regional Fuel based on Reformulated Gasoline Options is not discussed because there is already a mandatory program required by Section 211(k) of the Clean Air Act in New Jersey. 2) Cement Plants are not discussed because there are no cement plants in New Jersey. 3) Diesel Chip Reflash is not discussed because the OTC states, including New Jersey, are considering possible actions to increase the number of chip reflash installations of HDDVs in the Northeast.

OTC Identified Beyond on the Way (BOTW) Measures:

Asphalt Production: The NJDEP plans to propose amendments to its rules at N.J.A.C. 7:27-19.9 in order to lower NO_x emissions from asphalt production facilities. The proposed amendments, based on an OTC model rule, would pursue control measures to achieve at least a 35 percent reduction of NO_x emissions from asphalt production plants from current levels, with the inclusion of emission limits based on type of fuel combusted and implementation of Best Management Practices (BMP) requirements. The OTC guidance is based on emission rates and percent reductions typically achieved from the installation of low NO_x burners (LNB) and flue gas recirculation (FGR) to reduce NO_x emissions from asphalt plants. A low NO_x burner reduces NO_x by staged combustion. In flue gas recirculation, the flue gas is used to assist in cooling the combustion temperature, which in turn reduces the NO_x generated. The implementation of Best Management Practices would allow for substantial reductions in fuel consumption and corresponding reductions in the products of combustion, including NO_x. Best Management Practices include annual combustor tune-ups, effective stockpile management to reduce aggregate moisture content, lowering mix temperature, and other maintenance and operational best practices. For more details on this future rulemaking, see Appendix A3.

Glass Manufacturing: New Jersey plans to propose amendments to its current glass manufacturing rules at N.J.A.C. 7:27-19.10. The proposed amendments, based on OTC guidance, would revise the NO_x emission rates to reduce emissions consistent with the installation of oxy-fuel firing, or equivalent measures, at the time of the next furnace re-build. Although several alternative NO_x control technologies exist, including combustion modifications (low NO_x burners, oxy-fuel firing, oxygen-enriched air staging), process modifications (fuel switching, batch preheat, electric boost), and post combustion modifications (fuel reburn, SNCR, SCR), oxyfiring is considered the most effective because it not only reduces NO_x emissions by as much as 85 percent, but also reduces energy consumption, increases production rates by 10-15 percent, and improves glass quality by reducing defects. In addition, oxyfiring is demonstrated technology for the glass industry. Of New Jersey's 25 glass manufacturing furnaces, five are already equipped with oxy-fuel firing and nine are electric. For more details on this future rulemaking, see Appendix A3.

Industrial/Commercial/Institutional (ICI) Boiler Rule Changes (for certain categories)[37]: ICI boilers combust fuel to produce heat and process steam for a variety of applications, including chemical, metals, paper, petroleum, and food production industries, and for space heating in office buildings, hotels, apartment buildings, hospitals, and universities. Industrial boilers are generally smaller than boilers in the electric power industry, and typically have heat inputs in the 10-250 MMBtu/hr range; however, industrial boilers can be as large as 1,000 MMBtu/hr or smaller than 1 MMBtu/hr. Most commercial and institutional boilers have a heat input less than 100 MMBtu/hr. In New Jersey, 70 percent of the population is smaller than 50 MMBtu/hr.

[37] Some categories have 2009 compliance dates; remainder have 2012 compliance dates.

Currently, New Jersey ICI boilers are regulated according to size, fuel and boiler type. New Jersey's existing NO_x limits generally apply only to ICI boilers at least 50 MMBtu/hr located at major sources (i.e., point sources). ICI boilers at minor sources (i.e., area sources) are not subject to the maximum allowable emission rates, but are required to adjust the combustion process annually in boilers as small as 5 MMBtu/hr, effective as of 2010.

New Jersey plans to propose amendments to its current ICI boiler rules at N.J.A.C. 7:27-19.7. The proposed amendments would revise the NO_x emission limits for both point and area source ICI boilers. Under the proposed amendments, owners and operators of any ICI boilers as small as 25 MMBtu/hr would be required to achieve emission limits specified in the rules. For more details on this future rulemaking, see Appendix A3**.**

4.3.1.3 Mid-Atlantic Regional Air Management Association (MARAMA)

The MARAMA states concentrated their efforts on identifying and analyzing emissions from all petroleum refinery processes to help states with refineries develop their SIPs for ozone, fine particles, and regional haze. The MARAMA Refinery Technical Oversight Committee (TOC), assisted by MACTEC Federal Programs, Inc., evaluated emissions and existing requirements for certain sources found at fourteen (14) petroleum refineries in the MARAMA area. Based on that preliminary review, the TOC selected catalytic and thermal cracking units, boilers and process heaters, flares, equipment leaks, wastewater treatment, storage tanks and sulfur recovery plants for further consideration.

MARAMA evaluated emissions, existing requirements, including recent Consent Decrees from 10 of the 14 identified refineries, available control technology options, and typical installation costs for each category. As a result of this study, MARAMA, assisted by MACTEC Federal Programs, Inc., developed three Model Rules for fluid catalytic cracking units, flares and enhanced monitoring of equipment leaks at petroleum refineries. As part of its 8-hour ozone RACT committal SIP, the State of New Jersey expects to propose new rules based in part on MARAMA's model rules.[38] New Jersey expects that the NO_x, SO_2, PM, and VOC reductions from these measures will also result in $PM_{2.5}$ reduction benefits.

A brief summary of all the MARAMA-identified control measures is included in the following subsections. For more information about the MARAMA control measure identification process, or the control measures identified for implementation through this process, please see Appendix A4.

<u>MARAMA-Identified Beyond on the Way (BOTW) Measures</u>:

<u>Refineries - Fluid Catalytic Cracking Units (FCCUs)</u>: Catalytic cracking units convert middle distillate, gas oil and residuum into primarily gasoline, jet and diesel fuels by using a series of processing steps that literally "crack" large, heavy molecules into smaller, lighter ones. Heat and catalyst are used to convert the heavier oils to lighter

[38] The MARAMA model rules are posted at http://www.marama.org for public review.

products. With fluid catalytic cracking, a fluidized catalyst is used in the cracking process. Fluid catalytic cracking unit systems are the most widely used cracking process in the MARAMA region and are the largest air contaminant emission sources at the refinery. New Jersey has four gasoline-producing refineries with fluid catalytic cracking units. These refineries are major facilities with Title V Operating Permits, and all emit large quantities of criteria pollutants (SO_2, NO_x, VOCs, carbon monoxide and coarse particulate matter (PM_{10})) as well as HAPs. New Jersey currently regulates NO_x emissions from fluid catalytic cracking units at N.J.A.C. 7:27-19.13.

MARAMA's model rule for FCCUs, which will be the basis for New Jersey's refinery rule proposal, includes emissions limits for particulate matter, SO_2, NO_x, and carbon monoxide. The MARAMA Technical Oversight Committee chose to recommend the most stringent limits in recent Consent Decrees or rules in other jurisdictions. Feasible control technologies are summarized in Table 2-6 of their Final Report.

Refineries – Flares: Petroleum refinery flares are intended to be last-resort control devices used to safely dispose of flammable waste gases from emergency process upsets, as well as during start-up, shutdown and turnaround operations. The combustion of these gases can emit large quantities of NO_x, SO_2, and carbon monoxide into the atmosphere and are believed to be underestimated. New Jersey currently regulates VOC emissions from refinery flares at N.J.A.C. 7:27-16.13.

MARAMA's model rule for petroleum refinery flares, which will be the basis for New Jersey's refinery rule proposal, includes the control measures designed to reduce NO_x, SO_2, VOC, and carbon monoxide emissions. Specifically, the model rule includes requirements for the owner/operators of refinery flares to operate and maintain a flare gas recovery system, and to eliminate the flaring of routinely generated refinery fuel gases. Other items included in MARAMA's flare model rule include operational requirements, monitoring system requirements and guidelines for calculating flare emissions. Control technology options for flares are summarized in Table 4-5 of the Final Report.

4.3.1.4 Mid-Atlantic/Northeast Visibility Union (MANE-VU)

The MANE-VU was tasked with identifying reasonable control measures that would reduce emissions from within the MANE-VU region contributing to visibility impairment at Class I areas by 2018 or earlier. To accomplish this task, beginning in 2005, the MANE-VU reviewed a wide range of potential control measures to reduce emissions from sources contributing to visibility impairment in affected Class I areas, including a "master list" of some 900 potential control measures, originally developed for 8-hour ozone initiative by the OTC. From this extensive list, the MANE-VU developed an interim list of Regional Haze control measures, which for regional haze included: beyond-CAIR sulfate reductions from EGUs, low-sulfur heating oil (residential and commercial), ICI boilers (both coal and oil-fired), lime and cement kilns, residential wood combustion, and outdoor burning (including outdoor wood boilers).

The next step in the regional haze control measure selection process was to further refine the interim list. The beyond-CAIR EGU strategy continued to stay on the list since EGU sulfate emissions have, by far, the largest impact on visibility in the MANE-VU Class I areas. Likewise, a low-sulfur oil strategy, combining low-sulfur heating oil (residential and commercial) and the oil-fired ICI boiler sector control measures for #2, #4, and #6 residual oils, remained on the list after a NESCAUM-initiated conference with refiners and fuel-oil suppliers concluded that such a strategy could realistically be implemented. During MANE-VU's internal consultation meeting in March 2007, member states reviewed the updated interim list of control measures to make further refinements. At that time, states determined, for example, that there may be too few coal-fired ICI boilers in the MANE-VU states for that to be considered as a "regional" strategy, but that could be a sector pursued by individual states. They also determined that lime and cement kilns, of which there are few in the MANE-VU region, would likely be handled via state BART determination processes. Residential wood burning and outdoor wood boilers remain on the list for those states where localized visibility impacts may be of concern.

The Commissioners of the environmental agencies of the northeastern States with Class I areas met on June 7, 2007 and agreed on a Statement of Principles to guide the direction of the future consultation process for Regional Haze Planning that occurred during the summer of 2007. This Statement of Principles was designed to guide the consultation process, set forth the importance of Regional Haze long-range planning for all states, and highlighted the critical role that air pollutant transport plays in regional haze and interstate air pollution. The principles that New Jersey and the other MANE-VU States laid out in this document are included in Appendix A5.

The Commissioners of the MANE-VU States also agree upon certain long-range goals for the control of specific source categories within MANE-VU and agreed on certain specific targets to "ask" of other States outside of the MANE-VU planning region and to "ask" of the USEPA. These planning agreements are included in Appendix A6, and summarized in Table 4.4. New Jersey included these commitments in its first Regional Haze air quality planning document.[39]

Table 4.4: Summary of MANE-VU Planning Agreements

Controls Inside of the MANE-VU Region	Controls Outside of MANE-VU Region	National Controls (to "ask" of the USEPA)
Timely implementation of BART requirements	Timely implementation of BART requirements	The MANE-VU states and tribes request that the USEPA work with the eastern Regional Planning Organizations to develop a proposal for tightening the CAIR program to achieve an additional reduction in SO_2 by no later than 2018
A 90% or greater reduction in SO_2 emissions from EGUs	A 90% or greater reduction in SO_2 emissions from EGUs	
Ultra Low sulfur fuel strategy in the inner zone states	Application of reasonable controls on non-EGU sources	
Low sulfur fuel strategy in the outer zone states		

[39] New Jersey expects to propose its Regional Haze SIP by fall, 2008.

Controls Inside of the MANE-VU Region	Controls Outside of MANE-VU Region	National Controls (to "ask" of the USEPA)
Continued evaluation of other control measures, including energy efficiency, alternative clean fuels, and other measures to reduce SO_2 and NO_x emissions from all coal burning facilities by 2018, and new source performance standards for wood combustion	Continued evaluation of other control measures, including energy efficiency, alternative clean fuels, and other measures to reduce SO_2 and NO_x emissions from all coal burning facilities by 2018, and new source performance standards for wood combustion	

Although emission reduction benefits from the MANE-VU efforts will occur after the 1997 $PM_{2.5}$ NAAQS attainment date (April 5, 2010), the reductions will help the State attain the new 2006 24-hour $PM_{2.5}$ standard, as well as all the other $PM_{2.5}$-related air quality goals discussed in Chapter 1.

4.3.1.5 State Specific Efforts

In addition to New Jersey's participation in the regional control measure identification efforts, the State implemented its own outreach initiative, entitled "Reducing Air Pollution Together." "Reducing Air Pollution Together" was designed to gather control measure ideas and suggestions from the New Jersey public, regulated communities, and other interested parties. In addition, the NJDEP, as required by the Clean Air Act, completed its own internal RACT and Reasonably Available Control Measures (RACM) analyses, to identify viable controls for significant sources within the State. All of these efforts, as well as any control measures identified from them, are discussed in greater detail below.

4.3.1.5.1 New Jersey Workgroup Efforts

The NJDEP began a collaborative effort to discuss the air quality challenges facing New Jersey by hosting a public workshop on June 29, 2005. This workshop served to initiate a dialogue between the NJDEP and interested and affected parties about reducing emissions in order to improve air quality in New Jersey. Over 200 persons representing various industries, environmental and civic groups attended. As a result of the "Reducing Air Pollution Together" workshop, the following six air quality workgroups were formed and collaborated over several months to develop recommendations on how to reduce air emissions from their specific source categories:

- Diesel Initiatives
- Gasoline Cars and Trucks
- Homes and Restaurants
- Non-Automobile Gasoline Engines
- Stationary Combustion Sources
- Volatile Organic Compounds from Industrial Processes and Consumer Products

The workgroups identified potential control measures to reduce NO_x, VOC, $PM_{2.5}$, and SO_2 emissions for possible inclusion in the State's upcoming SIP revisions. Through the cooperative efforts of the NJDEP, federal agencies, industry, consultants, environmental groups, and other members of the regulated community, the workgroups evaluated available emission inventories, technical information and field data to develop lists of potential air emission control strategies related to their topic area. The criteria used by the workgroups to prioritize control measures included technical feasibility, economic feasibility, environmental benefits, and implementation feasibility. The air quality workgroups compiled their recommendations into reports that were submitted to the NJDEP for further consideration on October 31, 2005. The workgroups presented a summary of their recommendations to the NJDEP's Air Quality Management Team on November 14, 2005. This event was another opportunity for the NJDEP staff and workgroup members to discuss the workgroup recommendations.

The NJDEP's workgroup leaders and facilitators met with the NJDEP's Air Quality Management team to review the over 200 workgroup recommendations and identify those control strategies with significant potential emissions reductions. After culling that list down to 60 potential control measures, the NJDEP then generated white papers[40] for each measure. These white papers were posted on the NJDEP's website for public review and comment. The NJDEP made revisions to individual white paper where appropriate, based on comment and/or additional information. In addition, the NJDEP invited the public, representatives from local businesses, industry and environmental groups, and others to a follow-up workshop to discuss potential emission reduction strategies on May 17, 2006. The purpose of that workshop was for the NJDEP to provide an update on efforts during the past year to address air quality challenges facing New Jersey and to share preliminary regulatory and nonregulatory plans to reduce air emissions. Following the May 17, 2006 workshop, the public was asked to provide feedback on the workshop, and on the 60 white papers drafted by the NJDEP and discussed at the workshop.[41]

Many of the white paper measures are the same as those identified through the OTC and MARAMA efforts, and the State's own RACT and RACM analyses for both ozone and $PM_{2.5}$. The $PM_{2.5}$ RACT and RACM analyses are discussed in more detail in Sections 4.3.1.5.4 and 4.3.1.5.5, respectively.

4.3.1.5.2 New Jersey Board of Public Utilities (NJBPU) Energy Master Plan Efforts

On October 3, 2006, Governor Jon S. Corzine announced the commencement of an interagency planning process that will culminate in an energy master plan, a long-term energy vision for the state that plans for the state's energy needs through 2020.[42]

[40] A complete list of white papers, with links to the actual papers, can be found at www.nj.gov/dep/airworkgroups/docs/wp_summary_table_web.xls.
[41] Comments received on the white papers are posted at www.nj.gov/dep/airworkgroups/comments.html.
[42] State of New Jersey Office of the Governor. *Governor Corzine Announces Initial Phase of Energy Master Plan.* Available at http://www.nj.gov/governor/news/news/approved/20061003.html. October 3, 2006.

The Energy Master Plan will address three areas: security, safety, and reliability of prices of energy supply and services; economic impact of energy production, transportation, and end use; and environmental impact associated with the production of energy.[43] The main goal of the Energy Master Plan is to reduce projected energy use by 20% by 2020 and meet 20% of the State's electricity needs with Class 1 renewable energy sources by 2020.[44] Other goals of the Energy Master Plan are described below:

Goal 1: Secure, Safe, and Reasonably Priced Energy Supplies and Services – To provide safe, secure, reasonably priced energy supplies and services to New Jersey's commercial, industrial, transportation, and residential customers, while reducing dependence on traditional fossil fuels and fossil fuel generation, decreasing electric and natural gas transmission congestion, utilizing efficiency and renewable resources to supplement the State's energy resources, proactively planning for in-state electricity generation retirements, and reducing the demand for energy.[45]

Goal 2: Economic Growth and Development – To encourage and maintain economic growth prospects for the State by recognizing and fostering the multiple functions of energy in the economy.[46]

Goal 3: Environmental Protection and Impact – To promote the achievement of Federal and State environmental requirements and objectives in an effective and low-cost manner and, where possible, provide market-based incentives to achieve those goals.[47]

Public participation began October 2006, with a series of stakeholder meetings held throughout the state. That continued with the formation of External Working Groups for energy categories. More than 250 people have attended Energy Master Plan meetings, offered input and ideas, and joined the listserv. Additional opportunities for public comment will be available when the draft Energy Master Plan is released.

4.3.1.5.3 Reasonably Available Control Technology (RACT)

New Jersey's $PM_{2.5}$ reasonably available control technology (RACT) analysis was conducted pursuant to 42 U.S.C. § 7502(c)(1) (Section 172(c)(1) of the Clean Air Act), which requires states with nonattainment areas to submit State Implementation Plans (SIPs) implementing all reasonably available control measures (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) as expeditiously as practicable to attain the NAAQS.

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[43] State of New Jersey Office of the Governor. *Governor Corzine Announces Initial Phase of Energy Master Plan.* Available at http://www.nj.gov/governor/news/news/approved/20061003.html. October 3, 2006.
[44] State of New Jersey Energy Master Plan. *Energy Master Plan Goals*. Available at: http://www.nj.gov/emp/about/goals.html.
[45] Ibid.
[46] Ibid.
[47] Ibid.

New Jersey's proposed RACT analysis demonstrates that reductions of direct $PM_{2.5}$ emissions and its precursors, SO_2 and NO_x, from several major stationary source categories, including petroleum refineries, fugitive dust sources, municipal waste combustors, #6 fuel oil-fired boilers, and stationary diesel engines, are reasonable. New Jersey also intends to implement a long-term regional strategy to reduce the sulfur content of fuel oil consistent with the Mid-Atlantic/Northeast Visibility Union (MANE-VU) statement.[48]

New Jersey's full RACT analysis is included in Appendix A7.

4.3.1.5.4 Reasonably Available Control Measures (RACM) Analysis

A Reasonably Available Control Measure, or RACM, is defined by the USEPA as any potential control measure for application to point,[49] area, onroad, and nonroad emission source categories that meets the following criteria:

- The control measure is technologically feasible
- The control measure is economically feasible
- The control measure does not cause "substantial widespread and long-term adverse impacts"
- The control measure is not "absurd, unenforceable, or impracticable"
- The control measure can advance the attainment date by at least one year

New Jersey's 2007 $PM_{2.5}$ RACM analysis was conducted to fulfill the requirements of Section (c)(1) of the Clean Air Act. This analysis addressed the following $PM_{2.5}$ precursors: direct $PM_{2.5}$, SO_2, and NO_x. VOC and ammonia were not addressed, consistent with USEPA guidance.

A total of 628 potential non-transportation control measures[50] were compiled and reviewed to determine whether or not any of these measures could be considered a RACM that would advance the attainment date for the 1997 annual $PM_{2.5}$ NAAQS by at least one year. In order to advance the attainment date by one year, potential RACM measures would have to be implemented by 2008. After pre-screening, 61 potential non-

[48] MANE-VU. Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Course of Action within MANE-VU toward Assuring Reasonable Progress. Adopted June 20, 2007. This document is included in Appendix A6-1.

[49] RACM applies only to those point sources not already addressed as part of the Reasonably Available Control Technology (RACT) analysis. The USEPA's $PM_{2.5}$ Implementation Rule (72 Fed. Reg. 20585-667 (April 25, 2007)) considers RACT a part of RACM, and not an independent requirement, which is how RACT is considered in the Ozone Implementation Rule (70 Fed. Reg. 71611 - 71705). However, New Jersey determined to conduct these two analyses separately, consistent with how it addressed its RACT and RACM requirements for 8-hour ozone. New Jersey's separate RACT analysis for $PM_{2.5}$ is contained in Appendix A7.

[50] Transportation Control Measures, or TCMs, are transportation strategies specific to onroad mobile sources, which reduce emissions by reducing the number and/or length of vehicle trips and/or improve traffic flow.

transportation control measures (TCMs) were further evaluated using the RACM criteria. Seventeen (17) non-TCMs passed all RACM criteria, but would not be implemented by 2008.

The NJDOT conducted a separate $PM_{2.5}$ RACM analysis for TCMs. Twenty-six TCMs were identified and evaluated based on the RACM criteria. One TCM passed all RACM criteria, but would not be implemented by 2008.

It was determined that none of these 18 potential measures could be implemented by 2008. The RACM analysis did identify several promising measures that New Jersey will consider implementing at a later date, and confirmed other measures that New Jersey is already addressing.

New Jersey's full RACM analysis is included in Appendix A8.

4.3.1.5.5 Additional Measures

There are additional State measures that, while not identified specifically in any of the regional or state control measure initiatives, have been, or will be, implemented in time to provide quantitative $PM_{2.5}$ emission reductions prior to during 2009. The remainder of this section discusses these measures:

Diesel Idling Rule Changes: Since diesel engines are significant contributors of ozone and fine particulate precursors in the State of New Jersey, any efforts to control and reduce those emissions contribute to the State's attainment of the ozone and fine particulate matter NAAQS. On September 18, 2006, the NJDEP proposed amendments to the existing diesel idling rules.[51] The rules became effective July 25, 2007. These rules address the allowable idling duration for diesel-powered motor vehicles, and exemptions to that maximum idling limit. The changes reduce the allowable exemptions to a three-minute diesel idling standard. There were exemptions to the idling limit which allowed qualified vehicles to idle for an unlimited length of time under certain conditions. The revisions to the rule modify these exemptions to further limit idling in cold weather; limit the idling time for vehicles that transport people; clarify the idling rules regarding trucks waiting in line; clarify the type of vehicle which would be considered an "emergency motor vehicle", and the times which would be considered "an emergency situation"; eliminate the exemption for idling while a vehicle is in for repairs that do not require the engine to be engaged to complete; eliminate the exemption for idling while attaching or detaching a trailer, should it take longer than the allowed three consecutive minutes; and phase out the exemption for sleeper berths.

Diesel Smoke Rule Changes: Like the diesel idling efforts, the NJDEP requirements for the inspection and maintenance (I/M) of diesel vehicles are designed to reduce the emissions from diesel engines, which are significant contributors to ozone, $PM_{2.5}$ and its

[51] Control and Prohibition of Air Pollution from Diesel-Powered Motor Vehicles Air Administrative Procedures and Penalties Proposed Amendments: N.J.A.C. 7:27-14.1, 14.3, 7:27A-3.10(m)14. New Jersey Department of Environmental Protection. September 18, 2006.

precursors. The NJDEP is currently working to propose amendments to its existing diesel I/M rules to reduce the allowable smoke from heavy-duty diesel vehicles. Smoke opacity, which is used as a surrogate for particulate matter, is the degree to which a plume of smoke will obstruct transmission of visible light. Smoke opacity is used as an indicator for mal-maintenance.

Currently available technology allows diesel engines to emit smoke at rates much lower than the existing cutpoints, when operating in accordance with the manufacturers' specifications. Therefore, it is appropriate to revise the heavy-duty diesel vehicle inspection program standards to reflect the current diesel engine technology and ensure appropriate maintenance is performed. Although newer diesel-powered vehicles and equipment usually operate more cleanly and may contribute less to air quality problems than their predecessors, diesel-powered trucks and buses tend to remain in service for 20 years or more. Unless the excess emissions due to mal-maintenance or lack of repair are reduced, trucks and buses will continue to emit excess levels of exhaust particles and contribute to air pollution in the State for many years to come. Implementing stricter opacity cutpoints for diesel-powered vehicles will result in appropriate maintenance and reduce emissions.

Case-by-Case NO_x Limit Determinations (FSELs/AELs): Existing RACT rules set performance standards for many source categories. Major NO_x facilities with emission sources having a potential to emit more than 10 tons of NO_x per year where no previous NJDEP RACT limit has been established in the RACT Rules (N.J.A.C. 7:27-16 and N.J.A.C. 7:27-19), i.e., sources without performance standards, must apply to the NJDEP for a Facility-Specific Emission Limit (FSEL). When a performance standard exists and the source determines it is not reasonable, they apply to the NJDEP for an Alternative Emission Limit (AEL). FSELs and AELs are determined on a case-by-case basis.

Currently, New Jersey has about 40 of these case-by-case FSEL/AEL determinations for sources throughout the State. New Jersey's FSEL and AEL provisions for oxides of nitrogen are found at N.J.A.C. 7:27-19.13.

As part of its RACT analysis, the NJDEP reviewed all of its existing FSELs and AELs and found that many were approved as long ago as 1997. In many cases, control technologies have advanced sufficiently since that time, warranting the reevaluation of these case-by-case determinations. The NJDEP proposes to require all facilities with existing FSELs or AELs to either comply with the existing or revised RACT limits, where applicable, or demonstrate that a new FSEL/AEL is warranted. The NJDEP further proposes that the newly issued AELs will terminate after a certain number of years, requiring periodic re-evaluations and determinations, in an effort to keep these limits current until compliance with specific rule emission limits are achieved.

Municipal Waste Combustor Rule Changes: New Jersey has five resource recovery facilities (RRF) located in Essex, Union, Camden, Gloucester, and Warren Counties, respectively. There are 13 municipal waste combustors (MWC) at these five facilities. The NJDEP approved facility specific emission limits (FSELs) pursuant to N.J.A.C.

7:27-19.13 for each of these MWCs to meet the 1-hour ozone NAAQS, because these facilities qualified as major facilities (i.e., those facilities with the potential to emit more than 25 tons of NO_x per year containing a source operation that has the potential to emit greater than 10 tons per year) and the State did not establish specific RACT source requirements for MWCs. The USEPA has adopted Federal Plans for both large and small MWCs. New Jersey is the delegated state authorized to implement and enforce those plans, in accordance with Memoranda of Agreement (MOAs) between the State and the USEPA. The Federal standard for emissions of NO_x from MWCs, as reflected in the Federal rules dated May 10, 2006, and previous Federal plans, is 205 ppm.[52] Currently, all New Jersey MWCs are in compliance with the Federal standard.

As part of its ozone RACT analysis, the NJDEP reviewed the Municipal Waste Combustor FSELs and determined that, when equipped with selective non-catalytic reduction (SNCR), NO_x controls are capable of more NO_x reductions than are currently being achieved by some of the municipal solid waste facilities. The ozone RACT rulemaking proposal will eliminate the various MWC FSELs and set a more stringent source category NO_x emission limit, which will result in further NO_x emission reductions from this source category.

Refineries - Process Heaters and Boilers: Process heaters and boilers operating at petroleum refineries emit large amounts of NO_x, carbon monoxide, SO_2, and PM emissions. Boilers are designed to generate steam for use throughout the refinery, while process heaters burn fuels to transfer heat directly to process materials. Boilers and process heaters are similar in that they are indirect combustion devices that burn fuels such as natural gas, fuel oil, and refinery fuel gas. New Jersey currently regulates NO_x emissions from indirect heat exchangers at N.J.A.C. 7:27-19.7.

Available control technologies for controlling NO_x emissions from these units include Ultra Low NO_x Burners (LNB) and Selective Catalytic Reduction (SCR). These control technologies have been successfully applied to both types of equipment achieving emission reductions up to 90 percent. Recent enforcement settlements required some refineries to reduce NO_x emissions to 0.04 lbs NO_x/MMBtu. The NJDEP is proposing new amendments that would establish a new maximum allowable NO_x emission rate for boilers and process heaters combusting refinery fuel gas.

New Jersey Low Emission Vehicle Program: The NJDEP's Low Emission Vehicle (LEV) program (or Clean Car Program) rule was adopted on November 28, 2005, with an operative date of January 27, 2006.[53] The rule requires all new vehicles delivered for sale in New Jersey to be California certified for emissions beginning January 1, 2009. This rule also establishes a zero emission vehicle (ZEV) sales requirement for New Jersey and requires that each auto manufacturer's sales fleet in New Jersey meet a declining fleet average non-methane organic gas (NMOG) emission standard.

[52] 70 Fed. Reg. 75348-69 (May 10, 2006).
[53] 38 N.J.R. 497(b) (January 17, 2006).

The rule is designed, in part, to encourage auto manufacturers to offer the ultra-low emitting California certified models in New Jersey prior to the 2009 mandatory compliance start date. Auto manufacturers delivering such vehicles to New Jersey can earn ZEV credits that can be used by manufacturers to help transition into the mandatory requirements in 2009 and beyond. Currently, 36 models are certified to the Partial ZEV (PZEV) or Advanced Tech PZEV (ATPZEV) standard, which will generate such credits if sold in New Jersey. There are 23,493 vehicles that have either received or are currently receiving ZEV credits in New Jersey.

Distillate and Residual Fuel Strategies: Lowering the sulfur content in fuel oil is a part of the long-term strategy established by the MANE-VU states to reduce and prevent regional haze. The MANE-VU states in the inner zone (New Jersey, New York, Delaware and Pennsylvania) plan to reduce the sulfur content of distillate oil to 0.05 percent sulfur by weight (500 ppm) by no later than 2012, the sulfur content of No. 4 residual oil to 0.3 percent sulfur by weight by no later than 2012, the sulfur content of No. 6 residual oil to 0.3 to 0.5 percent sulfur by weight by no later than 2012, and to further reduce the sulfur content of distillate oil to 15 ppm by 2016. The MANE-VU states in the outer zone plan to reduce the sulfur content of distillate oil to 0.05 percent sulfur by weight by no later than 2014, the sulfur content of No. 4 residual oil to 0.25 to 0.5 percent sulfur by weight by no later than 2018, the sulfur content of No. 6 residual oil to no greater than 0.5 percent sulfur by weight by no later than 2018, and to further reduce the sulfur content of distillate oil to 15 ppm by 2018 (depending on supply availability).

The NJDEP is planning to propose to amend N.J.A.C. 7:27-9, Sulfur in Fuels, specifically section 9.2, which specifies sulfur content standards and maximum allowable sulfur dioxide emissions. The proposed amendments affect those who store, offer for sale, sell, deliver or exchange fuel for use in New Jersey, as well as the users of these fuels. The NJDEP is proposing changes to reduce the maximum allowable sulfur content in fuel and the maximum allowable SO_2 emissions from fuel combustion in order to reduce the emissions of SO_2 and other pollutants from the combustion of fuel in New Jersey.

Currently, maximum allowable sulfur levels in No. 2 and lighter fuel oil in New Jersey are either 2,000 parts per million (ppm) or 3,000 ppm. Maximum allowable sulfur levels in No. 4 fuel ranges from 3,000 ppm (0.3 percent) to 20,000 ppm (2.0 percent). Maximum allowable sulfur levels in No. 5 and No. 6 fuels also range from 3,000 to 20,000 ppm. The NJDEP is proposing to reduce the maximum allowable sulfur content of No. 2 and lighter fuel oil to 500 ppm (0.05 percent), then 15 ppm (0.0015 percent) statewide; reduce the maximum allowable sulfur content of No. 4 fuel oil to 3,000 ppm (0.3 percent) statewide; and reduce the maximum allowable sulfur content of No. 5, No. 6 and heavier fuel oils to 5,000 ppm (0.5 percent) in Zones 1, 2, 3 and 5 (the standard will remain 3,000 ppm (0.3 percent) in Zones 4 and 6).

Fleet Turnover: The turnover of the onroad fleet of cars and trucks will result in additional NO_x and PM emission benefits in 2009 and beyond because the new vehicles

have significantly lower emission standards than the vehicles they are replacing. The new vehicle emission standards are lower primarily because of a number of Federal rules such as the Tier 2 standards for automobiles and light trucks and the 2007 Heavy Duty Diesel standards for large diesel highway trucks. A number of post-2002 New Jersey rules also contribute to the fleet turnover emission benefits, such as the New Jersey Low Emission Vehicle (NJLEV) new vehicle program.

4.3.1.5.6 Federal

The Federal government plans to implement several measures that will provide quantitative emission reductions prior to the summer of 2009. The remainder of this section discusses these measures.

Small Offroad Engine Rule: On May 18, 2007, the USEPA proposed new rules that would set stricter standards for most lawn and garden equipment and small recreational watercraft.[54,55] Specifically, the proposal would establish new exhaust emission standards that manufacturers are expected to meet using catalytic converters in many types of small watercraft, lawn, and garden equipment. This proposed rule also includes fuel evaporative standards for all the types of equipment and watercraft covered in the rulemaking. The new standards would apply as early as 2011 for most lawn and garden equipment (under 25 horsepower) and 2009 for watercraft.

Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder: On March 14, 2008, the USEPA adopted more stringent exhaust emission standards for locomotives and marine diesel engines.[56] The standards include: tightening emission standards for existing locomotives when they are remanufactured; setting near-term engine-out emission standards (Tier 3 standards) for newly-built locomotives and marine diesel engines; and setting longer-term standards (Tier 4 standards) for newly-built locomotives and marine diesel engines that reflect the application of high-efficiency aftertreatment technology. The USEPA is also proposing provisions to eliminate emissions from unnecessary locomotive idling.

The standards for remanufactured locomotives will take effect as soon as certified remanufacture systems are available (as early as 2008). Tier 3 standards for newly-built locomotive and marine engines would phase in starting in 2009. Tier 4 standards for newly-built locomotives and marine diesel engines would phase in beginning in 2014 for marine diesel engines and 2015 for locomotives.

Energy Conservation Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings and New Federal Low-Rise Residential Buildings: The United States Department of Energy (USDOE) has developed standards for all new Federal commercial and high-rise multi-family residential (over three stories in height

[54] 72 Fed. Reg. 28098-146 (May 18, 2007).
[55] For more information about the proposal, visit USEPA's websites at Lawn and Garden http://www.epa.gov/otaq/equip-ld.htm for lawn and garden equipment and http://www.epa.gov/otaq/marinesi.htm for gasoline boats and personal watercraft.
[56] 73 Fed. Reg. 25097 (May 6, 2008).

above ground) buildings and all new low-rise residential buildings pursuant to the requirements of the Energy Conservation and Production Act (ECPA). The effective date of the rule is January 22, 2008. The rule establishes an energy efficiency baseline for new Federal commercial and multi-family high rise residential buildings based on referencing ASHRAE[57] Standard 90.1-2004 and the 2004 IECC.[58] The standards establish requirements for the structure and major systems of a building, and are mandatory for new Federal buildings. The rule establishes a requirement for new Federal buildings to achieve a level of energy efficiency 30 percent greater than that of the ANSI/ASHRAE/IESNA[59] or the 2004 IECC levels when life-cycle cost-effective. This rule is expected to reduce NO_x and SO_2 emissions.

4.3.1.5.7 Additional Actions

The State is also taking the following additional actions to reduce $PM_{2.5}$ emissions.

High Electrical Demand Days (HEDD) Program: In March 2007, following a year long process, six of the OTC states committed to pursue reductions in NO_x emissions from electrical generating units that primarily operate on high electrical demand days (HEDD) starting with the 2009 ozone season.[60] On these high electric demand days, increased power generation is needed, usually on short notice. In Connecticut, Delaware, Maryland and Pennsylvania, boilers and turbines that primarily run to follow electrical load needs supply HEDD power generation. In New Jersey and New York, combustion turbines primarily supply HEDD power generation. The majority of the HEDD units in the six states are not controlled and produce significant NO_x emissions on HEDDs. For example, on a typical summer day (June 4, 2005), NO_x emissions for the six states for all Electric Generating Units (EGUs) were 551 tons per day (tpd). On a HEDD (July 26, 2005), NO_x emissions were 1,349 tpd. Most of this increase in emissions is due to power production from uncontrolled HEDD units.

As part of the HEDD initiative, New Jersey plans to reduce NO_x emissions by 19.8 tpd on the nominal high electrical demand days. Specifically, power generators in New Jersey will be responsible for securing these reductions and will be required to submit a plan on how they will reduce NO_x. The generators will have flexibility in securing the 2009 reductions. New Jersey also plans to require that all HEDD units meet performance standards that reflect modern low NO_x technology by May 1, 2015.

Ports: The Port of New York/New Jersey is the largest port complex on the East Coast of North America. It is located at the hub of the most concentrated and affluent consumer market in the world, with immediate access to the most extensive interstate highway and rail networks in the region. The Port Authority directly oversees the operation of seven

[57] The American Society of Heating, Refrigerating and Air-Conditioning Engineers
[58] International Energy Conservation Code
[59] American National Standards Institute/ The American Society of Heating, Refrigerating and Air-Conditioning Engineers/ The Illuminating Engineering Society of North America
[60] Memorandum of Understanding Among the States of the Ozone Transport Commission Concerning the Incorporation of High Electrical Demand Day Emission Reduction Strategies into Ozone Attainment State Implementation Planning. Ozone Transport Commission, March 2, 2007.

privately owned cargo terminals in the New York-New Jersey region (landlord tenant relationship). Each year, more than 25 million tons of oceanborne general cargo moves through this port, including 4.5 million TEUs (twenty-foot equivalent container units) of containerized cargo. The Port Newark/Elizabeth-Port Authority Marine Terminal complex (NJ), the Port Authority Auto Marine Terminal (NJ), Brooklyn Piers and Red Hook Container Terminal (NY) and Howland Hook Marine Terminal (NY) handle most of the cargo. In addition, there are private operators, such as Global Marine Terminal and a number of marine terminals, operated by private bulk cargo operators. The Passenger Ship Terminal known as The New York Cruise Terminal is operated by P&O Ports North America for the City of New York.

Containerized cargo volumes in the Port of New York and New Jersey rose nearly 8 percent in 2006, to a new record high. The dollar value of all cargo moving through the port in 2006 exceeded $149 billion for the first time, up 13 percent from 2005. In the next 10 years, nearly $2 billion in infrastructure upgrades are planned for marine terminal facilities and for off-port roads and railways to improve the flow of cargo.

To minimize the impact that this tremendous growth has on our environment, the NJDEP Commissioner outlined the following action item in the document entitled "Priorities and Action Plan," January 2007. This goal is reiterated in the draft document entitled "Environmental Justice Priorities for the NJDEP – May 2007."

> "Target [NJ]DEP efforts to establish a coordinated effort on protecting the health of urban residents from environmental causes and ensure that [NJ]DEP's efforts to support economic growth and redevelopment in urban areas results in improved urban environmental health. Specifically, [NJ]DEP will coordinate its efforts at NJ's two major ports to deliver tangible environmental improvements."

The NJDEP is working closely with the Port Authority of NY/NJ, the USEPA Region 2, the South Jersey Port Corporation, and the Northeast Diesel Collaborative to explore additional diesel risk reduction strategies for the port area. Some possibilities include requiring cleaner fuel for oceangoing vessels while at dock or near the port; reducing idling emissions from ships and trains doing business at the port; and modernizing the drayage truck fleet that calls on the port.

At the South Jersey Port Corporation in Camden, New Jersey, several specific projects are underway at the terminals that they own and operate. First, as part of an enforcement settlement, $210,000 will be used to reduce diesel emissions on approximately 16 on and off road diesel vehicles owned by the Camden County Municipal Utilities Authority or its partner Camden Water, with the vehicle's primary usage within the Camden Waterfront South Area. Second, Clean Air Communities in partnership with NJDEP, the South Jersey Port Corporation, and others received a $250,000 grant from the USEPA titled "Community Action for a Renewed Environment." The grant will be used for diesel retrofits and to work with the project partners to: establish a forum for dialogue with local businesses; and undertake community campaigns, such as publishing an environmental justice toolkit for high school students and educating children about environmental

health. The NJDEP agreed to supplement the $250,000 grant with $500,000 from an enforcement settlement so that the South Jersey Port Corporation could undertake additional diesel emission reduction projects on the diesel equipment that they operate in Camden.

Open burning/Outdoor wood burning – Smoke Management Plans: New Jersey already has a regulation in place to control emissions from open burning at N.J.A.C. 7:27-2, Control and Prohibition of Open Burning,[61] and is considering changes to agricultural burning portion of these requirements. This source category is also addressed in the "Smoke Management" section of New Jersey's Regional Haze SIP (including the agricultural and forestry smoke management, prescribed burning, and agricultural management discussions in that SIP proposal).[62] One particulate control measure has already been implemented, namely to limit air pollution control permits to prevent open burning on days forecast to be of unhealthful air quality. This permit condition requires the permit holder to delay open burning until forecast meteorological conditions and air quality have improved so that forecasted unhealthful conditions for that day will not be made worse by this activity. Similarly, New Jersey is considering a seasonal home wood heating advisory program to further curtail wood smoke emissions, similar to the program adopted in Lane County, Oregon.[63] This program would advise homeowners when they could heat their homes with wood, according to the current air quality.

Change-out programs: Control measures might include wood stove and fireplace change-out programs, and lawn mower replacement programs. Financial incentives would be necessary to ensure a productive program. New Jersey would consider implementing a change-out program in the future if funds become available.

Control fugitive dust emissions: New Jersey has a control strategy in place for the control of stormwater runoff from streets under the New Jersey Municipal Stormwater Regulation program[64] that also has air quality benefits by the removal of fugitive dust. The strategy includes both mandated and voluntary street sweeping. Some streets are required to be swept monthly.

New Jersey also has standards that reduce fugitive emissions from various sources such as tillage and construction. These standards have been adopted by NJDOT and New Jersey Department of Agriculture (NJDOA) under the "Soil Erosion and Sediment Control Standards: Standards for Dust Control."

[61] Available at http://www.state.nj.us/dep/aqm/Sub%2002%20v1994-06-20.pdf (Accessed November 19, 2007)
[62] The first regional haze air quality protection plan for New Jersey will be completed in 2008 (see Chapter 1 for further details).
[63] LRAPA. Public Education: Home Wood Heating Programs. Lane Regional Air Protection Agency (LRAPA). http://www.lrapa.org/public_education/home_wood_heating_programs/, accessed May 14, 2008.
[64] 2006 Annual Report summary on New Jersey's Stormwater Regulation program is available at http://www.state.nj.us/dep/dwq/pdf/2006msrpannualreportlong.pdf (Accessed November 19, 2007)

This source category has also been identified as a viable $PM_{2.5}$ RACT measure for certain facilities throughout the State and will be addressed by a new rule expected to be proposed in 2009, in accordance with the New Jersey Administrative Procedures Act (APA) (N.J.S.A. 52:14B-1 et. Seq.) and the Air Pollution Control Act (APCA) (N.J.S.A. 26:2C-1 et seq.). For more information, see the $PM_{2.5}$ RACT analysis in Appendix A7.

Energy conservation and "green building": New Jersey currently provides for rebates and other financial incentives to install energy-efficiency measures in a home. The New Jersey Department of Community Affairs (NJDCA) has minimum design standards for some appliances. The New Jersey Clean Energy Program (NJCEP) and the New Jersey Energy Master Plan (NJEMP) encourage energy conservation.

Train engines: As of January 1, 2008, New Jersey Transit (NJ Transit) has voluntarily implemented an "Idling Reduction Policy" to shut down their diesel passenger locomotives within one hour of stopping to reduce idling at train yards by 70 percent to 90 percent. NJ Transit has also agreed to move forward with a New Jersey Transportation Planning Authority (NJTPA) proposal to evaluate idling reduction technologies.

Truck Stop Electrification: On October 20, 2004, the first Electrified Truck Stop in New Jersey was opened at Paulsboro, New Jersey. The Truck stop has ninety-eight truck electrification bays equipped with IdleAire Service Modules. These modules mount on the cab's passenger window to provide heat, ventilation, air conditioning, power for the refrigeration unit and appliances as well as cable TV, telephone and Internet service. New Jersey encourages the use of this technology to reduce $PM_{2.5}$ emissions from diesel trucks. An electrified truck stop at the Vince Lombardi Rest Area in Ridgefield, Bergen County, New Jersey, is scheduled to begin construction within the next six months. New Jersey is considering other locations for electrification, as well.

Diesel Smoke Rule: New Jersey currently has opacity requirements for periodic and roadside inspections of emissions of diesel vehicles. New Jersey is in the process of updating and strengthening the existing smoke requirements and updating the Pass/Fail Standards for the periodic and roadside inspections.

Medium Duty Motor Vehicle Inspection: New Jersey is evaluating an inspection program for medium duty vehicles with a gross weight between 8,501 – 17,999 pounds. The inspection program would be a combination of OBD and Smoke opacity inspections, and would help control particulate emissions.

4.4 VOC Measures

The State is implementing several VOC control measures that were adopted as discussed in the 2007 8-hour Ozone Attainment Demonstration SIP.[65] Although the USEPA does

[65] NJDEP. State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard: 8-Hour Ozone Attainment Demonstration Proposal. June 15, 2007.

not consider VOC as a $PM_{2.5}$ precursor for SIP and conformity purposes, New Jersey anticipates a $PM_{2.5}$ benefit from the implementation of these measures. The proposed VOC measures are listed in Table 4.5.

Table 4.5: VOC Control Measures

Control Measures	Sector
Pre-2002 with benefits achieved Post-2002 - On the Books	
Federal	
Onboard Refueling Vapor Recovery (ORVR) beyond Stage II	Area/Onroad
Post-2002 - On the Books	
New Jersey Measures Done Through a Regional Effort[a]	
Consumer Products 2005	Area
Architectural Coatings 2005	Area
Portable Fuel Containers 2005	Area and Nonroad
Mobile Equipment Repair and Refinishing	Area
Solvent Cleaning	Point and Area
New Jersey Only Measures	
Stage I and Stage II (Gasoline Transfer Operations)	Area
Federal	
USEPA MACT Standards including Industrial Boiler/Process Heater MACT	Point
Post-2002 - Beyond on the Way	
New Jersey Measures Done Through a Regional Effort	
Consumer Products 2009 Amendments	Area
Portable Fuel Containers 2009 Amendments	Area and Nonroad
Asphalt Paving	Area
Adhesives and Sealants	Area and Point
Refineries – Fugitive Equipment Leaks	Area and Point
New Jersey Only Measures	
VOC Stationary Storage Tank Measures	Point and Area
USEPA CTGs (4 categories)	Point and Area
Additional 2009 Benefits	
Portable Fuel Containers – additional credit	Area

Note: a. The VOC measures include On the Way (OTW) measures. The six "shortfall" measures discussed in the definition of the OTB were developed by the Ozone Transport Commission (OTC) specifically to address United States Environmental Protection Agency (USEPA)-identified deficiencies in the 1-hour ozone attainment demonstrations of several OTC states. This terminology does not apply to New Jersey, as all of the OTC shortfall rules were adopted in New Jersey prior to the development of the modeling inventory.

4.5 Conclusions on Control Measures

The control measures discussed in this section make up the core of the State's proposed $PM_{2.5}$ attainment demonstration and contingency measures. The use of these measures in each of those proposed demonstrations, as well as how the benefits from the implementation of those measures were calculated, is discussed in Chapters 5 and 6, respectively. Many of the benefits were determined from the USEPA MOBILE6 model and the USEPA Nonroad model. Most of the control measure benefits (quantitatively) were included in the attainment modeling. Those that were not included in the attainment modeling are listed and discussed in Chapter 5.

There are a host of other measures that have been, or will be, implemented in and around New Jersey whose benefits cannot be accurately estimated or quantified. These measures are described in Chapter 5. These measures, while not quantified, are providing a benefit to the air quality in New Jersey, as well as its upwind states,[66] and increase the likelihood that the State will attain the $PM_{2.5}$ health standard by its attainment date of April 5, 2010.

Table 4.6 shows a summary of New Jersey's control measures and how they are being used to meet SIP requirements.

Table 4.6: $PM_{2.5}$ Control Measure Summary

Control Measures	Attainment 2009 Modeling[a]	Control Measures Not Captured in the 2009 Regional Modeling	Attainment (2009) Contingency
Pre-2002 with benefits achieved Post-2002 – On the Books New Jersey			
NO_x Budget Program (SIP Call)	X		
Nonattainment New Source Review (NNSR)		X	
Pre-2002 with benefits achieved Post-2002 – On the Books Federal			
Residential Woodstove NSPS	X		
Onboard Refueling Vapor Recovery (ORVR) beyond Stage II*	X		
Tier 1 Vehicle Program	X		
National Low Emission Vehicle Program (NLEV)	X		
Tier 2 Vehicle Program/Low Sulfur Fuels	X		

[66] Please see Chapter 8 for a discussion of the impact of New Jersey control measures on upwind states.

Control Measures	Attainment 2009 Modeling[a]	Control Measures Not Captured in the 2009 Regional Modeling	Attainment (2009) Contingency
Heavy Duty Diesel Vehicle (HDDV) Defeat Device Settlement	X		
Heavy Duty Diesel Vehicle (HDDV) Engine Standards	X		
Nonroad Diesel Engines	X		
Large Industrial Spark-Ignition Engines over 19 kW	X		
Recreational Vehicles (includes snowmobiles, off-highway motorcycles and all-terrain vehicles)	X		
Diesel Marine Engines over 37 kW	X		
Phase 2 Standards for Small Spark-Ignition Handheld Engines at or below 19 kW	X		
Phase 2 Standards for New Nonroad Spark-Ignition Nonhandheld Engines at or below 19 kW	X		
Post-2002 – On the Books New Jersey Measures Done Through a Regional Effort			
Consumer Products 2005*	X		
Architectural Coatings 2005*	X		
Portable Fuel Containers 2005*	X		
Mobile Equipment Repair and Refinishing*	X		
Solvent Cleaning*	X		
NO_x RACT Rule 2006 (includes distributed generation and certain boilers)	X		
New Jersey Heavy Duty Diesel Rules Including "Not-To-Exceed" (NTE) Requirements	X		
Post-2002 – On the Books New Jersey Only			
Stage I and Stage II (Gasoline Transfer Operations)*	X		
On-Board Diagnostics (OBD) – (I/M) Program for Gasoline Vehicles	X		
Post-2002 – On the Books Federal			
USEPA MACT Standards including Industrial Boiler/Process Heater MACT[b]	X		
Acid Rain	X		
Clean Air Interstate Rule (CAIR)	X		

Control Measures	Attainment 2009 Modeling[a]	Control Measures Not Captured in the 2009 Regional Modeling	Attainment (2009) Contingency
Refinery Enforcement Initiative	X		
Post-2002 – Beyond on the Way New Jersey Measures Done Through a Regional Effort			
Consumer Products 2009 Amendments*	X		
Portable Fuel Containers 2009 Amendments*	X		
Asphalt Paving*	X		
Adhesives and Sealants*	X		
Asphalt Production Plants Rule		X	X
Refineries – Fugitive Equipment Leaks*	X		
Glass Manufacturing		X	
Industrial/Commercial/Institutional (ICI) Boiler Rule Changes (for certain categories)[c]	X		
Certain Refinery Operations		X	X
High Electric Demand Day (HEDD) Program		X	
Post-2002 - Beyond on the Way New Jersey Only			
Fugitive Dust at Stationary Sources		X	
#6 Fuel Oil-Fired Boilers		X	
Stationary Diesel Engines		X	
VOC Stationary Storage Tank Measures*		X	
USEPA CTGs (4 categories)*		X	
Case by Case NO_x Emission Limit Determinations (FSELs/AELs)		X	
Municipal Waste Combustor Rule Changes[d]		X	X
New Jersey Low Emission Vehicle (LEV) Program	X		
Diesel Idling Rule Changes		X	X
Diesel Smoke Rule Changes		X	X
Post 2002 – Beyond on the Way Federal			
New Nonroad Engine Standards		X	
Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder		X	
Federal Clean Air Interstate Rule (CAIR) Program – Phase I 2010 SO_2 Cap			X

Control Measures	Attainment 2009 Modeling[a]	Control Measures Not Captured in the 2009 Regional Modeling	Attainment (2009) Contingency
Energy Conservation Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings and New Federal Low-Rise Residential Buildings		X	
Additional 2009 Benefits[e]			
Portable Fuel Containers - additional credit*		X	
NO_x RACT Rule 2006 for certain boilers - additional credit		X	X
Certain Categories of ICI Boilers - additional credit		X	X
Smoke Management		X	
Low Sulfur Distillate and Residual Fuel Strategies		X	
Ports		X	
Onroad Motor Vehicle Control Programs (Fleet turnover 2010)	X		X
Nonroad Motor Vehicle Control Programs (Fleet turnover 2010)	X		X

Notes: a. These are the measures that are needed for attainment.
b. This control measure has both NO_x and VOC emission reduction benefits.
c. Some categories have 2009 compliance dates; remainder have 2012 compliance dates.
d. This control measure has both NO_x and $PM_{2.5}$ emission reduction benefits.
e. These measures are above and beyond what went into the modeling.
Starred (*) measures are VOC measures