The State of New Jersey
Department of Environmental Protection

Proposed State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standards

2008 75 ppb 8-Hour Ozone Attainment Demonstration Northern New Jersey-New York-Connecticut Nonattainment Area,

2008 75 ppb and 2015 70 ppb 8-Hour Ozone Reasonably Available Control Technology (RACT) Determinations and Nonattainment New Source Review (NNSR) Program Compliance Certifications

and

2017 Periodic Emissions Inventory

May 2021

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***NOTE:** These Appendices are only available electronically

ACRONYMS AND ABBREVIATIONS

ACO	Administrative Consent Order
ACT	Alternative Control Technique
AEL	Alternative Emission Limit
AERR	Air Emission Reporting Requirements
AMCC	Aftermarket Catalytic Converter
As	Arsenic
BACT	Best Available Control Technology
BART	Best Available Retrofit Technology
BEIS	Biogenic Emission Inventory System
CAA	Clean Air Act
CAMD	Clean Air Markets Division
CASTNET	Clean Air Status and Trends Network
CCTM	CMAQ Chemical-Transport Model
CDD	Clean Data Determination
CEM	Continuous Emission Monitoring
CENSARA	Central States Air Resources Agencies
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Model
CO	Carbon Monoxide
CONUS	Continental/Contiguous United States
Cr	Chromium
CSAPR	Cross-State Air Pollution Rule
CTG	Control Technique Guideline
DG/DR	Distributed Generation/Demand Response
DV	Design Value
EAC	Early Action Compact
EE	Exceptional Event
EEA	Energy Emergency Alert
EGU	Electric Generating Unit
EV	Electric Vehicle
FERC	Federal Energy Regulatory Commission
FCCU	Fluid Catalytic Cracking Unit
FCU	Fluid Cooking Unit
Fed. Reg.	Federal Register
FIP	Federal Implementation Plan
FMVCP	Federal Motor Vehicle Control Program
FRM	Federal Reference Method
FSEL	Facility-Specific Emission Limit
GEOS	Goddard Earth Observing System
HC	Hydrocarbon
HCl	Hydrogen Chloride
HEDD	High Electric Demand Day
HF	Hydrogen Fluoride
Hg	Mercury
hp	horsepower
ICI	Industrial, Commercial and Institutional
IM	Inspection and Maintenance
IMO	International Maritime Organization
kW	Kilowatt
LADCO/MWRPO	Lake Michigan Air Directors Consortium/ Midwest Regional Planning Organization
LAER	Lowest Achievable Emission Rate

ACRONYMS AND ABBREVIATIONS

lbs.	Pounds
LDAR	Leak Detection and Repair
LEV	Low Emission Vehicle
MACT	Maximum Available Control Technology
MANE-VU	Mid-Atlantic Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association
MARPOL	International Convention for the Prevention of Pollution from ships
MATS	Mercury and Air Toxics Standards
MCIP	Meteorology-Chemistry Interface Processor
MMBtu	Million British Thermal Units
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NACAA	National Association of Clean Air Agencies
NEI	National Emission Inventory
NESCAUM	Northeast States for Coordinated Air Use Management
NESHAP	National Emission Standard for Hazardous Air Pollutants
Ni	Nickel
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJLEV	New Jersey Low Emission Vehicle Program
N.J.R.	New Jersey Register
NJTPA	North Jersey Transportation Planning Authority
NLEV	National Low Emission Vehicle Program
NMOG	Non-Methane Organic Gas
NNSR	Nonattainment New Source Review
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
NYSDEC	New York Department of Environmental Conservation
OBD	On-Board Diagnostics
OTC	Ozone Transport Commission
OTR	Ozone Transport Region
PFC	Portable Fuel Container
PM2.5	Fine Particulate Matter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
PSEG	Public Service Electric and Gas Company
RACM	Reasonably Available Control Measure
RACT	Reasonably Available Control Technology
RFF	Relative Response Factor
RFP	Reasonable Further Progress
RICE	Reciprocating Internal Combustion Engine
ROP	Rate of Progress
RVP	Reid Vapor Pressure
RWC	Residential Wood Combustion
SESARM	Southeastern States Air Resource Managers

ACRONYMS AND ABBREVIATIONS

SCR	Selective Catalytic Reduction
SJPC	South Jersey Port Corporation
SMOKE	Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer
SNCR	Selective Non-Catalytic Reduction
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SOTA	State of the Art
TCM	Transportation Control Measure
TMA	Transportation Management Association
tpd	tons per day
tpy	tons per year
TSD	Technical Support Document
USC	United States Code
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WOE	Weight of Evidence
WRF	Weather Research and Forecasting
ZEV	Zero Emission Vehicle

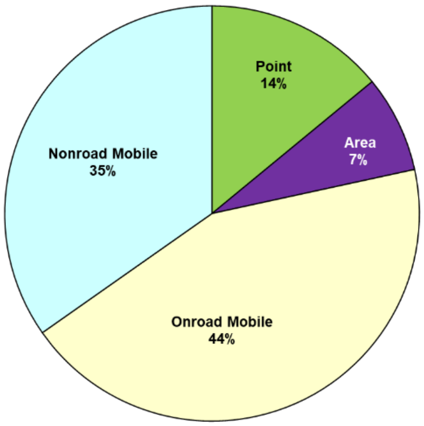
EXECUTIVE SUMMARY

The purpose of this State Implementation Plan (SIP) revision is to address the requirements of the Clean Air Act (CAA) regarding New Jersey's plan for attaining the 2008, 75 ppb 8-hour ozone National Ambient Air Quality Standard (NAAQS) in its Northern New Jersey multi-state nonattainment area by its attainment date of July 20, 2021. This nonattainment area was reclassified from moderate to serious by the United States Environmental Protection Agency (USEPA) effective on September 23, 2019. Although attainment for the entire area has not been demonstrated, New Jersey has satisfied its contributions toward attainment of the 75 ppb ozone NAAQS and has met its obligations for the achievement of Reasonable Further Progress (RFP). This SIP revision includes a comprehensive Reasonably Available Control Technology (RACT) analysis to address both the 2008 75 ppb NAAQS and the 2015 70 ppb NAAQS and the 2017 inventory that will be the base year inventory for RFP for the 2015 70 ppb 8-hour ozone NAAQS. This SIP Revision also addresses the requirements for New Jersey's Nonattainment New Source Review (NNSR) permitting program and includes the required NNSR program compliance certification for both the 2008 75 ppb NAAQS and the 2015 70 ppb NAAQS.

Despite New Jersey's success in meeting its obligations, ozone continues to be the most pervasive air quality challenge in the New York-Northern New Jersey-Long Island Nonattainment Area (hereafter referred to as the Northern New Jersey-New York-Connecticut or Northern NJ-NY-CT Nonattainment Area). Although all of New Jersey's monitors are measuring below the 2008 75 ppb ozone standard, five monitors in Connecticut continue to be in noncompliance with the 75 ppb ozone standard based on 2019 design values, and four of those monitors are in noncompliance based on 2020 preliminary design values. The monitors above the standard in Connecticut are along the downwind side of the Long Island Sound and are significantly affected by emissions from the New York metropolitan area, a bay breeze effect and the I-95 corridor. Demonstration of New Jersey's accomplishments can be seen in the monitoring data as the New York monitors downwind of New Jersey but upwind of the noncompliant Connecticut monitors, are in compliance with the standard.

This SIP revision demonstrates that New Jersey has made great strides in reducing its ozone levels, including its contribution to downwind ozone concentrations. New Jersey has implemented several significant control measures to reduce ozone precursors, nitrogen dioxide (NO_x) and volatile organic compounds (VOCs), including measures that are more stringent than other states within its nonattainment area, including those regulating power generation. These measures are of significant importance for ozone reduction as peak power generation occurs on hot summer days when elevated ozone concentrations typically occur. Although New Jersey has done its share to address ozone, attainment of the standard is not dependent on local reduction measures alone.

Figure ES-1:
2017 New Jersey Nitrogen Oxide Emissions
Tons Per Summer Day



The transport of ozone from sources upwind of the nonattainment area continues to contribute significantly to the poor ozone air quality in the Northern NJ-NY-CT nonattainment area, particularly at monitors located in Connecticut. The Cross State Air Pollution Rule (CSAPR) Update was only a partial remedy for addressing ozone transport and does not provide the necessary reductions for the Northern NJ-NY-CT Nonattainment Area to attain by July 20, 2021. The recent Revised Cross State Air Pollution Rule also does little to remedy the transport contributions to nonattainment in the Northern NJ-NY-CT nonattainment area by the statutory attainment deadline.

Additionally, the largest source sector contributing to NO_x emissions within the nonattainment area and the region continues to be mobile sources. States are limited in their authority to address these emissions and have relied on Federal measures to achieve significant emission reductions from this sector. Based on 2017 inventory data for New Jersey, mobile source emissions make up approximately 79 percent of the summer NO_x emissions, compared to stationary source emissions (point and area combined), which are only 21 percent. See Figure ES-1.

New Jersey's Trends and Control Measures

New Jersey's NO_x and VOC emissions have decreased significantly. Between 1990 and 2017, emissions are estimated to have decreased approximately 78 percent for NO_x and 69 percent for VOCs. Between 2011 and 2017, emissions are estimated to have decreased by approximately 42 percent for NO_x and 23 percent for VOCs.

A significant decreasing trend has also been shown in 8-hour ozone air quality monitoring design values in New Jersey of approximately 42 percent from 1988 to 2019 and 14 percent from 2011 to 2019. New Jersey's ozone design values had significant decreases ranging from two to 14 ppb at its monitors in the Northern NJ-NY-CT nonattainment area from 2011 to 2019. The New York monitors directly downwind of New Jersey have also shown significant decreases from 2011 to 2019 monitoring data ranging from one to 12 ppb.

These decreasing trends in emissions and monitoring values demonstrate the effectiveness of New Jersey's rules. New Jersey has met Reasonably Available Control Measures (RACM) and Reasonably Available Control Technology (RACT) requirements and has gone beyond RACM and RACT by adopting control measures more stringent than Federal rules, Control Technique Guidelines (CTGs) and neighboring state rules, especially those of most importance that address NO_x on high ozone days, thereby setting the standard for what modern RACT should be. These rules often considered a cost effectiveness more than $10,000 per ton, which is much higher than nearby states and the Revised CSAPR Update proposal's meager cost effectiveness of $1,400 per ton. Specific New Jersey's rules include:

- Power Plants: New Jersey has enforceable short-term performance standards for NO_x and VOC emissions from power plants (or Electric Generating Units (EGUs)) that are among the most stringent and effective air pollution control regulations in the country. Unlike the federal Revised CSAPR Update rule and other states' programs, New Jersey does not allow unit averaging or seasonal averaging for compliance. New Jersey has taken the lead by adopting measures to address emissions from EGUs that operate on High Electric Demand Days (HEDDs) when ozone concentrations tend to be elevated.

These sources are critically important contributors to episodes of elevated ozone in the Northern NJ-NY-CT Nonattainment Area.

- Distributed Generation/Demand Response (DG/DR): New Jersey's rules for stationary reciprocating internal combustion engines (RICE) do not allow the use of uncontrolled engines for the purpose of distributed electric generation or demand response in non-emergency situations. However, in some states these engines are uncontrolled and used to assist the electric grid during high electric demand periods. Like HEDD EGUs, many of these engines are operating on hot summer days, which usually coincide with the high ozone days.

- Municipal Waste Combustors: New Jersey has implemented measures to control NO_x emissions from Municipal Waste Combustors. New Jersey has taken significant actions to address these important sources while the USEPA and other nearby states, including upwind states that significantly contribute to ozone nonattainment, have not.

- Mobile Source Controls: New Jersey has addressed emissions from mobile sources to the extent that state action is not pre-empted by the Clean Air Act. New Jersey has adopted a Low Emission Vehicle Program (NJLEV) addressing motor vehicle emissions based on the standards used by the State of California to ensure that the lowest emitting vehicles available in the nation are sold in New Jersey including zero emission vehicle standards. Other states have not made the same commitment. New Jersey also has some of the most stringent rules in the country for vehicle idling and heavy-duty vehicle inspection and maintenance using on-board diagnostics (OBD) technology.

Modeling Studies Confirm That Emissions From New Jersey Sources Do Not Significantly Contribute to the Remaining Nonattainment Area Ozone Levels

The results of recent ozone source apportionment modeling and zero-out ozone sensitivity modeling demonstrate that New Jersey actions by themselves, regardless of stringency, are insufficient to achieve attainment levels of ozone in the nonattainment area.

According to the 2023 Ozone Transport Commission (OTC) ozone source apportionment modeling,[1] using the OTC 2011 12km SIP modeling platform, New Jersey's overall contribution to ozone nonattainment in New York and Connecticut (~9ppb) is only about half of New York's contribution, and on par with Pennsylvania's contribution. Within each states' total contribution, New Jersey's mobile sector dominates at 70%, compared to New York's mobile sector at 60% and Pennsylvania's mobile sector at only 40%. Regarding EGUs, New Jersey's EGU sector contributes the lowest at 5%, compared to New York's EGUs at 10% and Pennsylvania's EGUs at 20%. The portions of each states' total contribution from the combined point and area sectors are for New Jersey at just 30%, New York at 40%, and Pennsylvania at 45%. It is important to emphasize that the modeling indicates that, not only is New Jersey not a large contributor to nonattainment of ozone in the Northern NJ-NY-CT Nonattainment Area in terms of ppb ozone, but most of the New Jersey contribution is also from mobile sources. States must primarily rely on Federal actions to address mobile source emissions because states are preempted from implementing most types of emission controls.

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[1] "Ozone Transport Committee/Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document," dated October 18, 2018.
https://otcair.org/upload/Documents/Reports/OTC%20MANE-VU%202011%20Based%20Modeling%20Platform%20Support%20Document%20October%202018%20-%20Final.pdf

The NJDEP conducted a zero-out ozone air quality model run for an emissions scenario that assumes a shut down all New Jersey point and area source NO_x and VOC emissions in 2023 (i.e., those sectors for which New Jersey has more authority to regulate.) Modeling results indicated that even if all emissions from New Jersey point and area sources were eliminated, this would only result in a maximum of 0.70 ppb ozone reduction at any monitor within the Northern NJ-NY-CT nonattainment area. This confirms that New Jersey has met its obligation for addressing attainment of the 75 ppb ozone NAAQS in the Northern NJ-NY-CT nonattainment area.

Additional New Control Measures to Address Ozone Nonattainment

RACM

New Jersey is in the process of preparing the following rules to address NO_x and VOCs.

- Aftermarket Catalytic Converters: The rule will reduce NO_x emissions from light-duty, gasoline-fueled vehicles in need of a replacement catalytic converter that is no longer under warranty by incorporating an Ozone Transport Commission (OTC) model rule that prohibits the sale or installation of any aftermarket catalytic converter unless it is certified via a CARB Executive Order or is an original equipment manufacturer (OEM) converter. It is anticipated that the NO_x reductions from this rule will be about three tons per day.

- Architectural and Industrial Maintenance Coatings: The rules will control VOC emissions from architectural and industrial maintenance coatings by incorporating amendments that are based on the 2011OTC model rule. The proposed rules will lower the VOC content for several coating categories. It is anticipated that the VOC reductions from this rule will be about six tons per day.

- Consumer Products: The rules will control VOC emissions from consumer products by incorporating amendments that are based upon the 2010 and 2012 OTC model rules. The proposed rules will incorporate VOC limits for several new categories of products and will lower the VOC limits for several existing categories of products. It is anticipated that the VOC reductions from this rule will be about five tons per day.

Clean Energy

New Jersey is a national leader in reducing emissions from the electric power sector. In addition to its adopted air pollution rules regulating the power sector, in recent years New Jersey has implemented several measures that will increase renewable energy, thereby resulting in further reductions in ozone precursor emissions from the New Jersey electric power sector. These measures include:

- Offshore Wind Goals: Governor Murphy signed two Executive Orders[2,3] that directed all New Jersey state agencies with responsibilities under the Offshore Wind Economic Development Act to fully implement it. The Orders also established goals to increase New Jersey's offshore wind power to 7,500 megawatts by 2035.

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[2] Executive Order #8, January 31, 2018. https://nj.gov/infobank/eo/056murphy/pdf/EO-8.pdf
[3] Executive Order #92, November 21, 2019. https://nj.gov/infobank/eo/056murphy/pdf/EO-92.pdf

- Rejoining the Regional Greenhouse Gas Initiative (RGGI): RGGI is the first mandatory market-based program in the United States to reduce greenhouse gas emissions from the power sector. New Jersey's participation in RGGI is part of Governor Murphy's goal to achieve 100% clean energy by 2050. On June 17, 2019 New Jersey formally rejoined RGGI when the Department adopted two rules.[4] While GHG reductions are outside the scope of this SIP, it is clear that GHG reductions will have a co-benefit of NOx/VOC reductions.

- Clean Energy Act: On May 23, 2018 Governor Murphy signed the New Jersey Clean Energy Act (P.L.2018, c.17). The Act strengthened New Jersey's Renewable Portfolio Standard by requiring 35% renewable power by 2025 and 50% renewable power by 2030, It also requires energy efficiency measures to reduce electricity usage by 2% and natural gas usage by 0.75% and codifies goals for offshore wind and energy storage.

Electric Vehicles

In 2019, NJDEP awarded $24 million in grants to electrify garbage trucks, school buses, NJ TRANSIT buses, and port and airport equipment. Also, in 2019, the NJDEP joined the New Jersey Economic Development Authority and the New Jersey Board of Public Utilities in a Partnership to Plug-In Memorandum of Understanding, which helped dovetail each agency's efforts to electrify the transportation sector.

DEP's electric vehicle charging program, It Pay$ to Plug In, provides reimbursements for Level 1, Level 2, and limited DC fast charging infrastructure. This grant program offsets costs to purchase and install charging stations, which encourages the purchase of electric vehicles. One of the biggest obstacles to electric vehicle ownership is range anxiety, therefore funding electric vehicle charging stations at workplaces and around the state provides confidence that a charger is never too far away. Reimbursements vary depending on location type and the amount of charging ports installed. CMAQ funding for this program has been provided by all 3 Metropolitan Planning Organizations.

In 2020, NJDEP announced it will fund approximately $37.2 million worth of projects converting old diesel trucks, buses, port equipment, marine vessels, and trains to electric power. In addition, NJDEP will dedicate an additional $7.6 million for electric vehicle charging infrastructure, including fast chargers, throughout the state. This represents the remaining balance of the Volkswagen Mitigation Trust allocated to NJDEP.

On January 17, 2020 Governor Murphy signed landmark legislation that established goals and incentives for the increased use of plug-in electric vehicles in New Jersey. This legislation establishes New Jersey as a leader in attracting electric vehicles to the state thereby making significant contributions to the attainment of existing air pollution and energy goals. The Act, which took effect immediately, includes the following:

1. Goals: the following goals were established for the use of plug-in electric vehicles and the development of plug-in electric vehicle charging infrastructure (EVSE) in New Jersey:
   - At least 330,000 of the total number of registered light duty vehicles in the State shall be electric vehicles by December 31, 2025 and at least 2 million by end of 2035;
   - At least 85 percent of all new light duty vehicles sold or leased in the State shall be plug-in electric vehicles by December 31, 2040;

[4] The Carbon Dioxide Budget Trading Rule and the Global Warming Solutions Fund rule, June 17, 2019.

- By December 31, 2025, at least 400 DC Fast Chargers and 1,000 Level Two Chargers shall be available for public use in the State,
- By December 31, 2025, at least 15 percent of all multi-family residential properties in the State shall be equipped with EVSE for the routine charging of plug-in electric vehicles by residents, and this rises to 30 percent by December 31, 2030.

2. State Purchases: requires the purchases of electric buses by New Jersey Transit and light-duty plug-in electric vehicles by State departments.

3. Financial Incentives: financial incentives for the purchase of plug-in electric vehicles are not less than $30 million in disbursements each year for 10 years. Eligible vehicles must have a price (MSRP) below $55,000.

4. Consumer Education: a program was established to provide a program to educate consumers about the availability and benefits of plug-in electric vehicles.

NJ PACT

In addition to the above legislation, Governor Murphy signed Executive Order Number 100 (EO 100) on January 27, 2020 that initiated a targeted regulatory reform effort that will modernize New Jersey environmental laws. EO 100 is referred to as Protecting Against Climate Threats (NJ PACT). NJ PACT will usher in systemic change, modernizing air quality and environmental land use regulations, that will enable governments, businesses and residents to effectively respond to current climate threats and reduce future climate damages.

As a national leader in environmental protection, over the next two years, the NJDEP will create a regulatory roadmap to reduce emissions, build resilience, and adapt to a changing climate. This includes the enactment of new air pollution regulations that achieve critically needed reductions in carbon dioxide and short-lived climate pollutants (e.g., methane and black carbon) including technology-forcing measures that pave the way for a clean-energy economy. A number of the new air pollution regulations promulgated pursuant to the NJ PACT to address carbon dioxide and SLCPs will also have the co-benefit of reductions of emissions of ozone precursors.

Other Transportation and Clean Air Initiatives

On April 17, 2020, the NJDEP, Board of Public Utilities (BPU) and Economic Development Authority (EDA) jointly released a strategic funding plan for investing the auction proceeds from the State's participation in the Regional Green House Gas Initiative (RGGI). New Jersey plans to invest an estimated $80 million each year in programs that reduce both greenhouse gas emissions and criteria pollutants. The funding plan indicates that the lion's share (75%) of this investment will be used for the clean and equitable transportation initiative. The goal of this initiative is to accelerate transportation electrification in the State, focusing on reducing emissions from transportation sources in communities disproportionately impacted by the effects of [5].

In addition, New Jersey is taking action in two areas that are important for future reductions in both GHGs and ozone precursor pollutants; the implementation of fuel cell technology and the promotion of ZEVs for medium/heavy duty vehicles.

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[5] https://nj.gov/rggi/docs/rggi-strategic-funding-plan.pdf

On June 19, 2020 Governor Murphy signed legislation that establishes a New Jersey Fuel Cell Task Force that will recommend a plan to increase the use of fuel cells in the State, the task force will issue a yearly report that will include any recommendations for legislative or regulatory action that are necessary to effectuate the plan[6].

On July 14, 2020 it was announced that New Jersey was one of 15 states and the District of Columbia to sign a memorandum of understanding (MOU)[7] . The MOU commits the signers to work collaboratively to advance and accelerate the market for electric medium- and heavy-duty vehicles. The goal is to ensure that 100 percent of all new medium- and heavy-duty vehicle sales be zero emission vehicles by 2050 with an interim target of 30 percent zero emission vehicle sales by 2030. A multi-state action plan will be developed to identify barriers and propose solutions to support widespread electrification of medium- and heavy-duty vehicles. The action plan will give consideration to the need for leveraging environmental and air quality benefits associated with adoption of the California Advanced Clean Trucks rule under Section 177 of the Clean Air Act.

Finally, on February 16, 2021, Governor Murphy announced an investment of more than $100 million in clean, equitable transportation projects that will improve air quality and reduce the effects of climate change while moving New Jersey towards 100 percent clean energy by 2050[8]. Leveraging proceeds from RGGI and the Volkswagen Mitigation Trust Funds will bring electrification programs, equitable mobility projects, and electric charging infrastructure to New Jersey's environmental justice communities.

The $100 million investment will fund the following projects:

- $9 million in grants for local government electrification projects that will help to improve air quality in environmental justice communities through the deployment of electric garbage and delivery trucks.
- $13 million in grants for low- and moderate-income communities to reduce emissions of air pollutants that affect children through the deployment of electric school buses and shuttle buses.
- $5 million in grants for equitable mobility projects that will bring electric vehicle ride hailing and charging stations to four more New Jersey towns and cities.
- $5 million in grants for deployment of fast charging infrastructure at 27 locations statewide.
- $36 million to reduce diesel and black carbon emissions in environmental justice communities by electrifying port, cargo handling, and other medium- and heavy-duty equipment in port and industrial areas.
- $15 million towards New Jersey Transit bus electrification.
- $15 million towards flex funding to further deploy additional funding to the listed initiatives.

Recommendations for Further Actions by the USEPA and Other States to Reach Attainment as Soon as Practicable

Attainment of the 2008 75 ppb ozone NAAQS in the Northern NJ-NY-CT Nonattainment Area is not projected to occur by July 20, 2021 because additional actions were not taken earlier by the

[6] Senate No. 762, State of New Jersey, 219th Legislature.
[7] https://ww2.arb.ca.gov/sites/default/files/2020-07/Multistate-Truck-ZEV-Governors-MOU-20200714.pdf

[8] https://nj.gov/governor/news/news/562021/approved/20210216a.shtml

USEPA and other states to address the interstate ozone transport issue. In 2016, the USEPA finalized the CSAPR Update rule to partially reduce the impact of upwind states' pollution on ozone nonattainment in downwind states. The USEPA acknowledged (and the court subsequently determined) that it fell short of providing the full remedy required by the "good neighbor" provision of CAA Section 110(a)(2)(D)(i)(I). Indeed, USEPA modeling predicted that with implementation of the CSAPR Update, the Northern NJ-NY-CT Nonattainment Area would not achieve attainment of the 75 ppb NAAQS until 2023 at the earliest, well beyond the deadline established by CAA Section 110(a)(2)(D). Considering that the CAA requires states to address their significant contribution to ozone nonattainment within three years of the promulgation of the standard, well ahead of the current 75 ppb attainment demonstration SIP submittal deadline for New Jersey's northern nonattainment area, the USEPA's partial solution to transport was insufficient to address the transport contribution to nonattainment by the moderate attainment deadline of July 2018 (2017 ozone season) as well as the current attainment deadline of July 2021 (2020 ozone season). The USEPA's failure to address the significant ozone contributions from upwind states means New Jersey cannot show attainment unless it over-controls its own sources to offset the pollution crossing into New Jersey. In response to the United States Court of Appeals for the District of Columbia Circuit's (D.C. Circuit) remand of the CSAPR Update in Wisconsin v. EPA on September 13, 2019, the USEPA issued a Revised CSAPR Update rule in the April 30, 2021 Federal Register[9]. This rule also is not sufficient to remedy the transport contributions to nonattainment in the Northern NJ-NY-CT nonattainment area by the attainment deadline.

The following are specific recommendations to achieve further reductions in the Northern NJ-NY-CT Nonattainment Area:

- Transport: USEPA should quickly adopt more stringent measures, addressing those significantly contributing States (>1% of the NAAQS) identified by USEPA's analysis of contributing States outside the non-attainment area (e.g., Illinois, Indiana, Michigan, Ohio, Pennsylvania, Virginia, and West Virginia), to transport that includes, but is not limited to:
  - Daily NO_x performance standards for EGUs, including distributed generation units, similar to those implemented in New Jersey.
  - A requirement that all installed NO_x controls on EGUs be fully operated at optimized control levels at all times, as required in New Jersey.

- Follow-Through on the Rules That Address Power Generation Emissions in New York: The New York metropolitan area is directly upwind of the controlling Connecticut monitors. On December 31, 2019 New York adopted a rule that addresses NO_x emissions from peaking combustion turbine EGUs. New York should strictly enforce the compliance dates of May 1, 2023 (100 ppm limit) and May 1, 2025 (25 ppm limit for gas and 42 ppm limit for oil).

  Also, New York recently adopted a regulation, 6 NYCRR Part 222, that establishes performance standards for distributed generation sources. On March 1, 2017, the implementation and enforcement of this rule was challenged and subsequently stayed. Rule 222 was approved on March 11, 2020 and will be implemented effective May 1, 2021. The implementation of this rule in New York and similar rules in upwind states will contribute to the attainment of the 75 ppb ozone standard in the Northern NJ-NY-CT Nonattainment Area. However, New Jersey's stationary generator rule is more stringent than New York's based on applicability thresholds, effective date of emissions limits, and

[9] 86 Fed. Reg. 23054 (April 30, 2021)

exemptions. New Jersey rules are also implemented statewide while New York's distributed generation rule is limited in scope to the New York Metropolitan area.

- New Jersey RACT Rules in Other States: Nonattainment area and upwind states should adopt and implement control measures that meet RACT standards similar to those in New Jersey for sources such as HEDD power generation, DG/DR power generation and municipal waste combustors. In addition, the upwind states should adopt presumptive NO_x emission limits and averaging time requirements similar to New Jersey and should not allow the buying of allowances to facilitate reduced operation of air pollution controls.

- Mobile Source Rules: Upwind states should adopt mobile source measures similar to those in New Jersey such as the California Low Emission Vehicle Program. The USEPA must also do its part to address mobile source emissions that contribute the largest portion of total NO_x emissions within the nonattainment area as well as the region. For example, the USEPA should finalize its proposed rule to address new engine standards to reduce NO_x emissions from heavy-duty on-road vehicles. The final rule should be as stringent as the current California proposal. The USEPA should also prioritize an update to the Federal Aftermarket Catalytic Converter (AMCC) Policy dated August 5, 1986 to reflect the most recent technological advances.

Emissions Inventories

This SIP revision also includes a statewide 2017 inventory that will be the base year inventory for RFP for the 2015 70 ppb 8-hour ozone NAAQS. The actual 2017 inventory also meets the requirements for the periodic emission inventory for the 2008 75 ppb 8-hour ozone NAAQS and was used as the base for the 2020 projection inventory for RFP for this standard. This SIP also includes a new 2020 projection inventory to meet the RFP requirements for the 75 ppb standard for the northern nonattainment area. This SIP also includes a summary of the regional modeling inventory used in the attainment demonstration for the 75 ppb standard.

As discussed above, a comparison of the new 2017 inventory to previous year inventories continues to show significant decreases in VOC and NO_x. Mobile sources continue to be the dominant source of NO_x emissions.

Other SIP Components

This SIP revision was prepared in accordance with USEPA requirements and guidance regarding photochemical modeling for attainment demonstrations, transportation conformity and contingency measures. Also, New Jersey has met its RFP demonstration requirements. New Jersey's Northern nonattainment area has achieved a total reduction in VOC and NO_x summer tons per day emissions of 57 percent between 2011 and 2017. This is more than three times the RFP CAA requirement of a 15 percent reduction over the six-year period for a moderate area and 18 percent reduction for a serious area. New Jersey estimates a 21 percent reduction from 2017 to 2020, which exceeds the RFP-required 9 percent, for the New Jersey portion of the Northern NJ-NY-CT nonattainment area. This SIP shows that RACT has been met for the 75 ppb 8-hour ozone standard and provides a new RACT analysis for the 70 ppb 8-hour ozone standard. This SIP also summarizes the existing certifications for stationary source emission statements, enhanced vehicle inspection and maintenance, phase II vapor recovery at gasoline service stations and nonattainment new source review (NNSR).

Conclusions

New Jersey has met its obligations for RFP and attainment of the 75 ppb ozone NAAQS. All appropriate New Jersey control measures were adopted and implemented. Attainment of the

Connecticut monitors could not be achieved by the 2021 attainment date without control of the New York power plants and other power generation equipment upwind of the Connecticut monitors. Now that New York has adopted a HEDD measure, it still will not be implemented until 2023, while New Jersey's HEDD and power plant rules were effective from 2009 to 2015, well ahead of New York's HEDD rule and the federal Revised CSAPR Update. New Jersey's statewide stationary generator/emergency generator rules were effective prior to 2009, also well ahead of New York's distributed generation rule to address behind the meter power generation that will not be implemented until May 1, 2021. In addition, it is USEPA's responsibility to ensure that neighboring and upwind states outside of the nonattainment area do their part to address the challenges at the Connecticut monitors by taking measures to reduce contributions to ozone precursors from mobile sources and other sectors. The USEPA should not bump-up the Northern NJ-NY-CT nonattainment area for the 75 ppb ozone NAAQS again until the court-ordered full remedy for addressing transport is implemented and it adopts more stringent mobile source control measures.

It should be noted that a third reclassification of the Northern NJ-NY-CT nonattainment area for the 75 ppb ozone NAAQS would advance the attainment date to July 20, 2027. This would be about three years beyond the current attainment date for the more stringent 70 ppb ozone NAAQS (August 3, 2024). Therefore, attainment of the 2015 70 ppb ozone NAAQS is currently the more stringent objective, making an attainment demonstration SIP submittal regarding achievement of the 75 ppb ozone NAAQS on July 20, 2027 superfluous and futile. The Department is currently preparing the attainment demonstration SIP revision for the 2015 70 ppb ozone NAAQS that is due on August 3, 2021. This SIP revision will include air quality modeling that predicts 2023 ozone design values based on a 2016 base year. An assessment of attainment (and RFP) explicitly for the 70 ppb standard, and implicitly for the 75 ppb standard, will be included in that document.

Chapter 1 INTRODUCTION and BACKGROUND

1.1 Introduction

The purpose of this State Implementation Plan (SIP) revision is to meet the requirements of the Clean Air Act (CAA) regarding New Jersey's plan for attaining the 2008, 75 ppb 8-hour ozone National Ambient Air Quality Standard (NAAQS) in its Northern New Jersey multi-state nonattainment area by its attainment date of July 20, 2021. This nonattainment area was reclassified from moderate to serious by the United States Environmental Protection Agency (USEPA) effective on September 23, 2019. Although attainment for the entire area has not been achieved, New Jersey has satisfied its contributions toward attainment of the 75 ppb ozone NAAQS and has met its obligations for the achievement of Reasonable Further Progress (RFP). This SIP revision includes a comprehensive Reasonably Available Control Technology (RACT) analysis to address both the 2008 75 ppb NAAQS and the 2015 70 ppb NAAQS and the 2017 inventory that will be the base year inventory for RFP for the 2015 70 ppb 8-hour ozone NAAQS. This SIP Revision also addresses the submittal requirements for New Jersey's Nonattainment New Source Review (NNSR) permitting program and includes the required NNSR program compliance certification for both the 2008 75 ppb NAAQS and the 2015 70 ppb NAAQS .

In accordance with 40 CFR §51.112 attainment demonstrations must show that the control measures contained within the SIP are adequate to provide for the timely attainment and maintenance of the NAAQS. Each demonstration must include:

- A summary of the computations, assumptions, and judgments used to determine the degree of reduction of emissions (or reductions in the growth of emissions) that will result from the implementation of the control strategy;
- A presentation of emission levels expected to result from implementation of each measure of the control strategy;
- A presentation of the air quality levels expected to result from implementation of the overall control strategy showing expected maximum pollutant concentration;
- A description of the dispersion models used to project air quality and to evaluate control strategies; and
- For interstate regions, the analysis from each constituent State must, where practicable, be based upon the same regional emission inventory and air quality baseline.

The March 6, 2015, USEPA Ozone Implementation Rule,[10] or SIP requirements rule, for the 75 ppb 8-hour ozone standard states that an attainment demonstration consists of the following:

- Technical analyses, such as base year and future year modeling of emissions which identifies sources and quantifies emissions from those sources that are contributing to nonattainment;
- Analyses of future year emissions reductions and air quality improvement resulting from existing (i.e., already adopted or ''on the books'') national, regional and local programs, and potential new local measures needed for attainment, including Reasonably Available Control Measures (RACM) and Reasonably Available Control Technology (RACT) for the area;

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[10] 80 Fed. Reg. 12264 (March 6, 2015)

- A list of adopted measures (including RACT) with schedules for implementation and other means and techniques necessary and appropriate for demonstrating attainment as expeditiously as practicable but no later than the outside attainment date for the area's classification;
- A RACM analysis to determine whether any additional RACM measures could advance attainment by 1 year.

The CAA provides the United States Environmental Protection Agency (USEPA) with the authority to set primary and secondary standards for criteria air pollutants. The primary standard protects human health, and the secondary welfare standard is designed to protect against any potential environmental and/or property damage. These standards are known as the NAAQS. The criteria pollutants covered by the NAAQS are ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM10) and fine particulate matter (PM2.5) and lead. The 1990 CAA Amendments furthered the mission to reducing air contaminants nationwide by addressing interstate movement of air pollution, emissions control measures, permits, enforcement, deadlines, and public participation to achieve and maintain those air quality standards.

The CAA Section 109 (or 42 U.S.C. §7409) further requires the USEPA to review and, if appropriate, revise the NAAQS for each criteria air pollutant every five years to insure they continue to adequately protect human health and welfare.

When an area does not meet the NAAQS for one or more criteria pollutants, the area is subject to the formal rulemaking process by the USEPA, which designates the area as nonattainment for that pollutant. The CAA further classifies ozone, carbon monoxide, and particulate matter nonattainment areas based on the magnitude of an area's air quality problem. Nonattainment classifications vary in SIP requirements and attainment dates. The technical details underlying these classifications are discussed in the Code of Federal Regulations, Part 81 (40 CFR Part 81).

The CAA contains two sets of provisions – Subpart 1 and Subpart 2 – which address planning, attainment and control requirements for ozone nonattainment areas.[11] Subpart 1, referred to as "basic" nonattainment, contains general, less prescriptive, requirements for nonattainment areas for any pollutant – including ozone – governed by a NAAQS. Subpart 2 sets forth a classification scheme for ozone nonattainment areas and provides more specific requirements for ozone nonattainment areas.[12] Under subpart 2, the ozone nonattainment areas are classified based on the severity of their ozone levels, as determined based on the area's "design value," (which represents air quality in the area for the most recent 3 years).[13] The possible classifications are marginal, moderate, serious, severe, and extreme. Nonattainment areas with a "lower" classification have ozone levels that are closer to the standard than areas with a "higher" classification. Areas in the lower classification levels have fewer and/or less stringent mandatory air quality planning and control requirements than those in the higher classifications. Areas with greater levels of ozone pollution are subject to more prescriptive requirements and are given a longer period to attain the standard. The requirements are designed to bring areas into attainment by their specified attainment dates.

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[11] A description of subpart 1 and subpart 2 are found in CAA Title I, part D

[12] For more information on the subpart 2 classification and requirements see "State Implementation Plans; General Preamble for the Implementation of Title I of the CAA Amendments of 1990; Proposed Rule." April 16, 1992 (57 Fed. Reg. 13498 at 13501 and 13510).

[13] The air quality design value for the 8-hour ozone NAAQS is the 3-year average of the annual 4th highest daily maximum 8-hour average ozone concentration. See 40 CFR part 50, Appendix I.

CAA Section 179 (or 42 U.S.C. §7509) requires sanctions when a State fails to submit a timely and approvable plan or fails to fully implement its commitments. First, the State could face serious economic development constraints. Specifically, the USEPA could order that any proposed new air pollution source in the State secure double the offset of the emissions it might produce before it can be permitted. Second, the State could be exposed to sanctions that could result in the loss of New Jersey's Federal transportation funds. These sanctions must be applied unless the deficiency is corrected within 18 months after a finding of failure or disapproval. Additionally, CAA Section 110(c) (or 42 U.S.C. §7410(c)) requires that the USEPA impose a Federal Implementation Plan (FIP) if a State fails to complete and submit a revised submission within 24 months of the failure to submit or implement a SIP.

1.2 Ozone National Ambient Air Quality Standards

1.2.1 1-Hour Ozone

In 1971, the USEPA established the first NAAQS for photochemical oxidants of 0.08 parts per million (ppm), measured as a 1-hour average concentration. In 1979, the ozone NAAQS was revised to 0.12 parts per million (ppm). The 1-hour ozone standard remained 0.12 ppm until 1997 when the USEPA replaced the 1979 standard with an 8-hour ozone standard set at 0.08 ppm.[14] The entire State of New Jersey was designated by the USEPA as nonattainment for the 1-hour ozone NAAQS and was split into four nonattainment areas. For 1-hour ozone, all of the New Jersey-associated nonattainment areas were classified under Subpart 2 of the CAA. The New Jersey counties included in each of those 1-hour nonattainment areas, as well as their classifications are shown in Table 1-1.

The USEPA revoked the 1-hour ozone standard for all areas except the 8-hour ozone nonattainment Early Action Compact Areas (EAC) areas (which did not include any New Jersey-associated nonattainment areas) on June 15, 2005.[15] This revocation occurred prior to the attainment dates for New Jersey's two severe 1-hour ozone multi-state nonattainment areas associated with Philadelphia (2005) and New York City (2007).

1.2.2 8-Hour Ozone

1997 84 ppb 8-Hour Ozone NAAQS

In 1997, the USEPA revised the ozone NAAQS, setting it at 0.08 ppm (hereafter referred to as 84 ppb) averaged over an 8-hour time frame.[16] The USEPA set the 8-hour ozone standard based on scientific evidence demonstrating that ozone causes adverse health effects at lower ozone concentrations, over longer periods of time, than the then-existing 1-hour ozone standard.

On April 30, 2004,[17] the USEPA finalized designations for the 1997 84 ppb 8-hour ozone NAAQS in Phase 1 of its ozone implementation rule. The entire State of New Jersey was designated as nonattainment. New Jersey was designated into two multi-state nonattainment areas as follows:

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[14] USEPA. History of Ground-level Ozone Standards. United States Environmental Protection Agency, http://epa.gov/oar/ozonepollution/history.html. Last updated March 6, 2007.
[15] 40 CFR Part 81, Subpart C
[16] 62 Fed. Reg. 38856 (July 18, 1997)
[17] 69 Fed. Reg. 23858 (April 30, 2004)

(1) the New York-Northern New Jersey-Long Island nonattainment area (hereafter referred to as the Northern New Jersey-New York-Connecticut or Northern NJ-NY-CT Nonattainment Area); and
(2) the Philadelphia-Wilmington-Atlantic City nonattainment area (hereafter referred to as the Southern New Jersey-Pennsylvania-Delaware-Maryland or Southern NJ-PA-DE-MD Nonattainment Area.)

Under the USEPA's Phase 1 8-hour ozone implementation rule, an area was classified under Subpart 2 based on its 8-hour design value if it had a 1-hour design value at or above 0.121 ppm (the lowest 1-hour design value in Table 1 of subpart 2). Based on this criterion, both multi-state 84 ppb 8-hour ozone nonattainment areas associated with New Jersey were classified under Subpart 2 as moderate in the April 30, 2004 rule,[18] with an attainment date of June 15, 2010. The USEPA Phase 2 8-hour ozone implementation rule, published on November 9, 2005[19] (with corrections published on October 4, 2006 related to Reasonable Further Progress (RFP),[20] addressed the control obligations that apply to areas classified under Subpart 2. New Jersey's multi-state 8-hour ozone nonattainment areas for the 75 ppb standard is shown in Figure 1-1. For the 84 ppb 8-hour ozone standard Kent and Sussex counties in Delaware are also included in New Jersey's Southern NJ-PA-DE-MD Nonattainment Area. The New Jersey counties included in each of those 8-hour nonattainment areas, as well as their classifications, are shown in Table 1-1.

New Jersey submitted a SIP[21] on October 29, 2007 which presented New Jersey's plan to attain the 84 ppb 8-hour ozone standard. USEPA approved the SIP on February 11, 2013.[22]

Both of New Jersey's nonattainment areas attained the standard by the attainment date of June 15, 2010 (the southern area received a 1-year extension with a new attainment date of June 15, 2011). On June 18, 2012, the USEPA issued a clean data determination (CDD) for the 1997 84 ppb 8-hour ozone standard for the Northern NJ-NY-CT Nonattainment Area[23] and on March 26, 2012 for the Southern NJ-PA-DE-MD Nonattainment Area,[24] suspending the States obligations to meet certain attainment-related planning requirements under the USEPA's Clean Data Policy dated December 14, 2004, such as reasonable available control measures (RACM), reasonable further progress, contingency measures and other planning requirements related to attainment, as long as the area continues to attain.

On May 4, 2016, the CDD for the Northern NJ-NY-CT Nonattainment Area, issued in June 2012, was rescinded.[25] USEPA determined that the area exceeded the 84 ppb standard based on 2010-2012 certified monitoring data and issued a SIP call. They required the Northern NJ-NY-CT Nonattainment Area to submit a SIP to address the 84 ppb standard exceedance either specific to the 84 ppb standard or in conjunction with the 75 ppb standard attainment demonstration moderate area SIP by January 1, 2017 and set a new attainment date of July 20,

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[18] 69 Fed. Reg. 23858 (April 30, 2004)
[19] 70 Fed. Reg. 71612 (November 29, 2005)
[20] 71 Fed. Reg. 58498 (October 4, 2006)
[21] State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard 8-Hour Ozone Attainment Demonstration, The State of New Jersey Department of Environmental Protection, October 29, 2007
[22] 78 Fed. Reg. 9596 (February 11, 2013)
[23] 77 Fed. Reg. 36163 (June 18, 2012
[24] 77 Fed. Reg. 17341 (March 26, 2012)
[25] 81 Fed. Reg. 26697 (May 4, 2016)

2018. On December 22, 2017, New Jersey submitted a SIP revision[26] showing that the Northern NJ-NY-CT Nonattainment Area is in compliance with the 1997 84 ppb 8-hour ozone NAAQS and satisfying the May 4, 2016 SIP Call.

2008 75 ppb 8-Hour Ozone NAAQS

The USEPA revised the 8-hour ozone NAAQS again on March 12, 2008.[27] The 8-hour ozone standard was lowered from 84 ppb to 0.075 ppm (75 ppb). The USEPA announced on September 16, 2009 that the 0.075 ppm standard was being reconsidered, and the designations were stayed (put on hold).

On January 19, 2010,[28] the USEPA proposed to strengthen the 8-hour ozone NAAQS set in March 2008 to a level within the range of 0.060 – 0.070 ppm. In September of 2011, the USEPA announced that it would not adopt its proposed ozone NAAQS and would instead proceed with the implementation of the 2008 0.075 ppm 8-hour ozone standard.

On May 21, 2012,[29] the USEPA designated the entire State of New Jersey as nonattainment for the 75 ppb 8-hour ozone NAAQS. The nonattainment areas are the same as those designated for the 84 ppb standard. The final classifications rule for the 2008 NAAQS was signed and published at the same time as the designation rule.[30] In the May 21, 2012 classification rule, both of New Jersey's multi-state nonattainment areas were classified as marginal with an attainment date of July 20, 2015. New Jersey's multi-state 8-hour ozone nonattainment areas for the 75 ppb standard is shown in Figure 1-1. The New Jersey counties included in each of those 8-hour nonattainment areas, as well as their classifications, are shown in Table 1-1.

On June 17, 2015, New Jersey sent a letter to the USEPA requesting a 1-year extension of the attainment date to July 20, 2016 for the Southern NJ-PA-DE-MD Nonattainment Area. On May 4, 2016,[31] the USEPA granted the Southern NJ-PA-DE-MD Nonattainment Area a 1-year attainment date extension to July 20, 2016.

On March 6, 2015,[32] USEPA promulgated the Ozone Implementation Rule or SIP requirements rule for the 75 ppb 8-hour ozone NAAQS, which specifies the detailed requirements for State Implementation Plans.

On May 4, 2016,[33] USEPA reclassified the Northern NJ-NY-CT Nonattainment Area from marginal to moderate because they determined that the area did not attain the 2008 75 ppb ozone standards by the July 20, 2015 attainment date based on its 2012-2014 air quality data. They required the Northern NJ-NY-CT Nonattainment Area to submit a SIP to address the moderate nonattainment area requirements by January 1, 2017 and set a new attainment date of July 20, 2018.

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[26] "1997 84 ppb and 2008 75 ppb 8-Hour Ozone Attainment Demonstration Northern New Jersey-New York-Connecticut Nonattainment Area and Nonattainment New Source Review (NNSR) Program Compliance Certification New Jersey Statewide" (December 22, 2017). https://www.state.nj.us/dep/baqp/ozone75ppb/Ozone%2075%20ppb%20Attain%20North-NNSR%20SIP%2012-14-17%20Revised%208-9-18.pdf
[27] 73 Fed. Reg. 16483 (March 27, 2008)
[28] 75 Fed. Reg. 2938 (January 19, 2010)
[29] 77 Fed. Reg. 30088 (May 21, 2012)
[30] 77 Fed. Reg. 30160 (May 21, 2012)
[31] 81 Fed. Reg. 26697 (May 4, 2016)
[32] 80 Fed. Reg. 12264 (March 6, 2015)
[33] 81 Fed. Reg. 26697 (May 4, 2016)

On April 18, 2017,[34] USEPA proposed that the Southern NJ-PA-DE-MD Nonattainment Area attained the 2008 75 ppb 8-hour ozone NAAQS by the July 20, 2016 attainment date based on complete, certified, and quality assured ambient air quality monitoring data for the 2013–2015 monitoring period.

On August 23, 2019[35], USEPA reclassified the Northern NJ-NY-CT Nonattainment Area from moderate to serious because they determined that the area did not attain the 2008 75 ppb ozone standards by the July 20, 2018 attainment date based on its 2015-2017 air quality data. They required the Northern NJ-NY-CT Nonattainment Area to submit a SIP to address the serious nonattainment area requirements by August 3, 2020 and set a new attainment date of July 20, 2021.

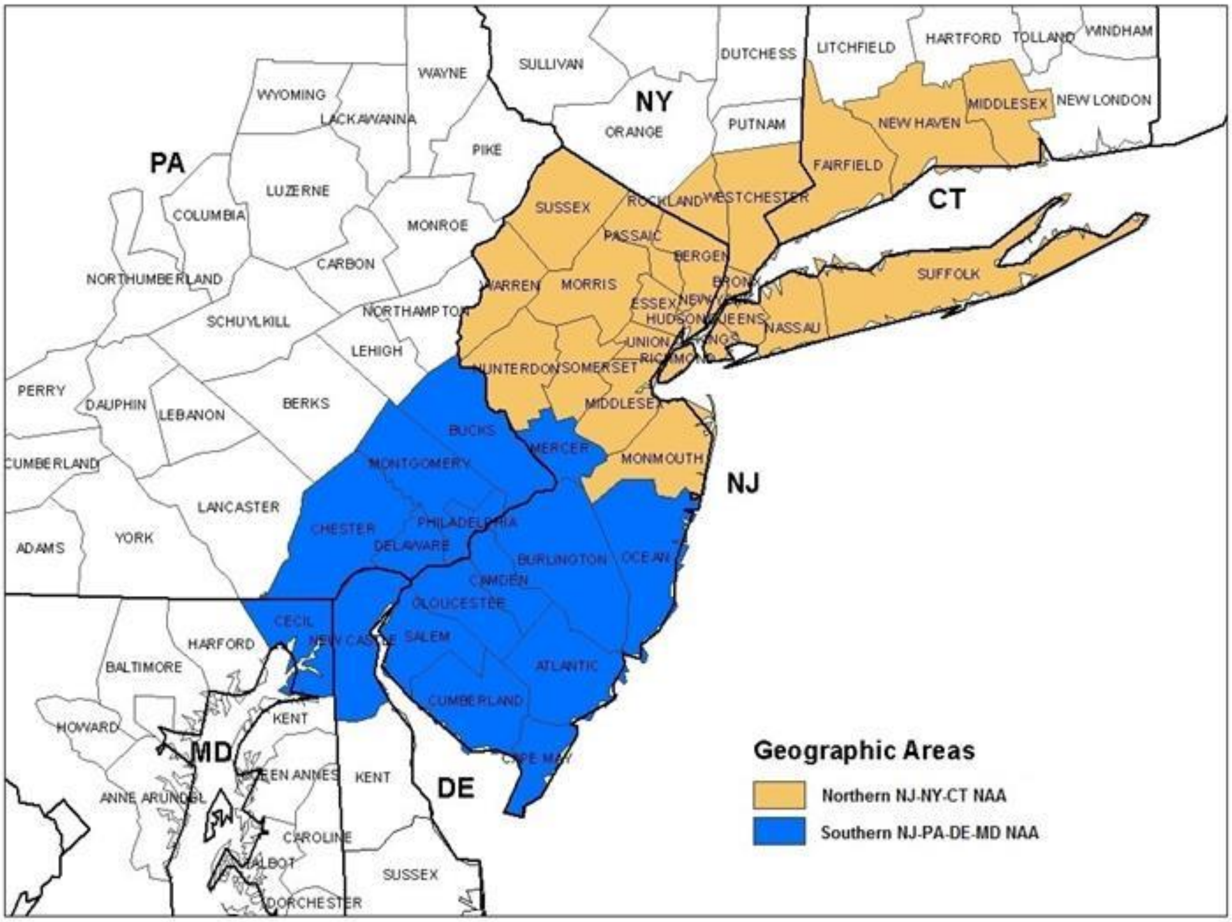
This SIP satisfies the SIP submittal requirements of the September 23, 2019 reclassification for the 2008 75 ppb 8-hour ozone NAAQS.

2015 70 ppb 8-Hour Ozone NAAQS

The USEPA revised the 8-hour ozone NAAQS again on October 1, 2015.[36] The primary 8-hour ozone standard was lowered from 75 ppb to 0.70 ppm (70 ppb). On June 4, 2018, USEPA designated the entire State of New Jersey as nonattainment for the 2015 70 ppb ozone standards. The nonattainment areas are the same as those designated for the 84 ppb standard and the 75 ppb standard. The final classification rule for the 2015 NAAQS was signed and published at the same time as the designation rule.[37] In the June 4, 2018 classification rule, the Northern NJ-NY-CT Nonattainment Area was classified as moderate with an attainment date of August 3, 2024 and the Southern NJ-PA-DE-MD Nonattainment Area was classified as marginal with an attainment date of August 3, 2021. New Jersey's multi-state 8-hour ozone nonattainment areas for the 75 ppb and 70 ppb standards are shown in Figure 1-1. The New Jersey counties included in each of those 8-hour nonattainment areas, as well as their classifications, are shown in Table 1-1.

[34] 82 Fed. Reg. 18268 (April 18, 2017)
[35] 84 Fed. Reg. 44251 (August 23, 2019)
[36] 80 Fed. Reg. 65292 (October 26, 2015).
[37] 83 Fed. Reg. 25819 (June 4, 2018)

Figure 1-1: New Jersey 8-hour Ozone Nonattainment Areas
75 and 70 ppb NAAQS



* **Note:** Kent and Sussex counties in DE are included in the Southern NJ-PA-DE-MD Nonattainment Area for the 84 ppb 8-hour ozone NAAQS.

Table 1-1: New Jersey-Associated Ozone Nonattainment Areas – Designations and Classifications

Area Name	New Jersey 1-Hour Designations	New Jersey 1-Hour Classifications	New Jersey 84 ppb 8-hour Designations	New Jersey 84 ppb 8-Hour Classifications	New Jersey 75 ppb 8-Hour Designations	New Jersey 75 ppb 8-Hour Classifications	New Jersey 70 ppb 8-Hour Designations	New Jersey 70 ppb 8-Hour Classifications
Northern New Jersey-New York-Connecticut, NJ-NY-CT	Bergen Essex Hudson Hunterdon Middlesex Monmouth Morris Ocean Passaic Somerset Sussex Union	Severe 17	Bergen Essex Hudson Hunterdon Middlesex Monmouth Morris Passaic Somerset Sussex Union Warren	Moderate (69 FR 23858 April 30, 2004)	Bergen Essex Hudson Hunterdon Middlesex Monmouth Morris Passaic Somerset Sussex Union Warren	Marginal (77 FR 30135 May 21, 2012) Reclassified to Moderate (81 FR 26719 May 4, 2016) Reclassified to Serious (84 FR 44251 August 23, 2019)	Bergen Essex Hudson Hunterdon Middlesex Monmouth Morris Passaic Somerset Sussex Union Warren	Moderate (83 FR 25819 June 4, 2018)
Southern New Jersey-Pennsylvania-Delaware-Maryland, NJ-PA-DE-MD	Burlington Camden Cumberland Gloucester Mercer Salem	Severe 15	Atlantic Burlington Camden Cape May Cumberland Gloucester Ocean Mercer Salem	Moderate (69 FR 23858 April 30, 2004)	Atlantic Burlington Camden Cape May Cumberland Gloucester Ocean Mercer Salem	Marginal (77 FR 30135 May 21, 2012)(3)	Atlantic Burlington Camden Cape May Cumberland Gloucester Ocean Mercer Salem	Marginal (83 FR 25819 June 4, 2018)
Allentown-Bethlehem-Easton, PA-NJ	Warren	Marginal	(1)	(1)	(1)	(1)	(1)	(1)
Atlantic City, NJ	Atlantic Cape May	Moderate	(2)	(2)	(2)	(2)	(2)	(2)

Notes:
1. Included in the Northern New Jersey-New York-Connecticut nonattainment area
2. Included in the Southern New Jersey-Pennsylvania-Delaware-Maryland nonattainment area
3. Attainment date was extended to July 20, 2016.

1.3 Health Effects and Welfare Impacts

1.3.1 Ozone

Ozone continues to be New Jersey's most pervasive air quality problem. Although the ozone found in the earth's upper atmosphere (stratosphere) forms a protective layer from the sun's ultraviolet radiation, the ozone formed near the earth's surface (troposphere) is inhaled by or comes in contact with people, animals, crops and other vegetation, and can cause a variety of health and other effects. Ozone is a highly reactive gas. In the troposphere, it is formed by complex chemical reactions involving nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight.

Ozone causes health problems because it damages lung tissue, reduces lung function, and sensitizes the lungs to other irritants. Ozone has long been known to increase the incidence of asthma attacks in susceptible individuals. Ozone exposure also makes the lungs more vulnerable to lung diseases such as pneumonia and bronchitis. Ozone not only affects people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well. Exposure to ozone for several hours at relatively low concentrations significantly reduces lung function and induces respiratory inflammation in normal, healthy people during exercise. This decrease in lung function is generally accompanied by symptoms such as chest pain, coughing, sneezing, and pulmonary congestion. Recent research in southern California strongly suggests that, in addition to exacerbating existing asthma, ozone also causes asthma in children.[38] Longer-term exposure to ozone can also lead to scarring of the lung tissue and permanent reductions in lung capacity.[39] Long-term exposure to ozone can eventually lead to premature death.[40]

Besides its impact on human health, ozone also has environmental impacts. Specifically, ozone interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, other pollutants, and harsh weather. Ozone damages the leaves of trees and other plants, ruining the appearance of cities, national parks, and recreation areas. Ozone reduces crop and forest yields and increases plant vulnerability to disease, pests, and harsh weather. This impacts annual crop production throughout the United States, resulting in significant losses, and injures native vegetation and ecosystems. Ozone also damages certain man-made materials, such as textiles, fibers, dyes, and paints, requiring more frequent upkeep and repair.

1.3.2 Ozone Precursor – Nitrogen Oxides (NO_x)

Nitrogen oxides consist of a mixture of gases comprised mostly of nitric oxide (NO) and nitrogen dioxide (NO_2). Although most NO_x is emitted as NO, it is readily converted to NO_2 in the atmosphere. NO_2 is a reddish-brown highly reactive gas that is formed in the air through the oxidation of NO. In the troposphere, near the Earth's surface, NO_2, not molecular oxygen, provides the primary source of the oxygen atoms required for ozone formation. These gases are emitted from a variety of sources such as the exhaust of motor vehicles, boats, planes and locomotives, the burning of coal, oil or natural gas, residential wood burning, forest fires, manufacturing and industrial processes.

In addition to contributing to the formation of ozone, NO_x is also harmful if directly inhaled. Short-term exposures to low levels of nitrogen dioxide may aggravate pre-existing respiratory illnesses, and can cause respiratory illnesses, particularly in children ages 5-12. Symptoms of low-level exposure to NO and NO_2 include irritation to eyes, nose, throat and lungs, coughing, shortness of breath, tiredness and nausea. Long-term exposures to NO_2 may increase susceptibility to respiratory infection and may cause permanent damage to the lung. Studies show a connection between breathing elevated short-term NO_2 concentrations and increased visits to emergency departments and hospital admissions for respiratory issues, especially asthma. Individuals who spend time on or near major roadways can experience high, short-term

[38] MARAMA Appendix A: Health Effects of Air Pollutants, A Guide to Mid-Atlantic Regional Air Quality Report. Mid-Atlantic Regional Air Management Association (MARAMA), October 2005, p. 89.
[39] NJDEP Reasonably Available Control Technology (RACT) for the 8-Hour Ozone NAAQS (NAAQS) and other Associated State Implementation Plan (SIP) Revisions for the Fine Particulate Matter NAAQS, Regional Haze, and the CAA Requirements on Transport of Air Pollution. New Jersey Department of Environmental Protection, August 1, 2007.
[40] USEPA Air Quality Criteria for Ozone and Related Photochemical Oxidants, Volume I of III. United States Environmental Protection Agency, February 2006.

NO_2 exposures. Nitrogen oxides contribute to a wide range of environmental problems. These include potential changes in the composition of some plants in wetland and terrestrial ecosystems, acidification of freshwater bodies, eutrophication of estuarine and coastal waters, increases in levels of toxins harmful to fish and other aquatic life, and visibility impairment.[41]

1.3.3 Ozone Precursor – Volatile Organic Compounds (VOCs)

VOCs are organic chemicals that have a high vapor pressure at ordinary room temperature. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air, a trait known as volatility. The term volatile in VOCs indicates that the compounds evaporate easily at room temperature and organic indicates that they contain carbon. They include compounds known as hydrocarbons, which only contain carbon and hydrogen, and carbonyls, which contain a carbon atom double-bonded to an oxygen atom. Some VOCs are more harmful than others and are considered hazardous air pollutants, toxics or carcinogens (cancer causing). The USEPA and New Jersey regulatory definition of VOC, as it relates to ozone, exempts certain VOCs due to their low reactivity with sunlight to form ozone.[42]

VOCs are emitted from a wide variety of sources such as manufacturing processes, gasoline stations, autobody repair shops, motor vehicles, recreational boating, lawn and garden equipment and consumer product use including household cleaners, paints, cosmetic and hair products, cleaning solvents, adhesives and insecticides. Sources of VOCs also include natural biogenic emissions.

In sufficient quantities, VOC can cause eye, nose, and throat irritations, headaches, dizziness, visual disorders, memory impairment; some are known to cause cancer in animals; some are suspected of causing, or are known to cause, cancer in humans. (See USEPA Volatile Organic Compounds' Impact on Indoor Air Quality https://www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality.) In addition, several VOCs are also hazardous air pollutants (HAPs).[43] HAPs are substances that could cause serious health effects, including cancer, birth defects, nervous system problems and death due to massive accidental releases. (See USEPA Hazardous Air Pollutants at: https://www.epa.gov/haps.)

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[41] Ibid.
[42] USEPA's ozone air quality definition of volatile organic compounds is defined at 40 CFR 51.100(s). New Jersey's ozone air quality rules reference USEPA's definition.
[43] Substances listed in 1990 CAA Title I, Section 112(b).

Chapter 2 AIR MONITORING

2.1 Introduction

This chapter provides a summary of ozone air quality monitoring in New Jersey and its multi-state ozone nonattainment areas. The data summarized includes current and historical 8-hour ozone design values, monitor exceedances, ozone precursor concentrations, and meteorology.

Eight-hour average ozone concentrations in New Jersey have been calculated since 1986, prior to the 8-hour ozone standard implementation in 1997 and before designations were made in 2004. Data for 8-hour ozone before 1997 are used for analysis purposes only and do not represent official reporting for the 8-hour ozone NAAQS.

2.2 8-Hour Ozone

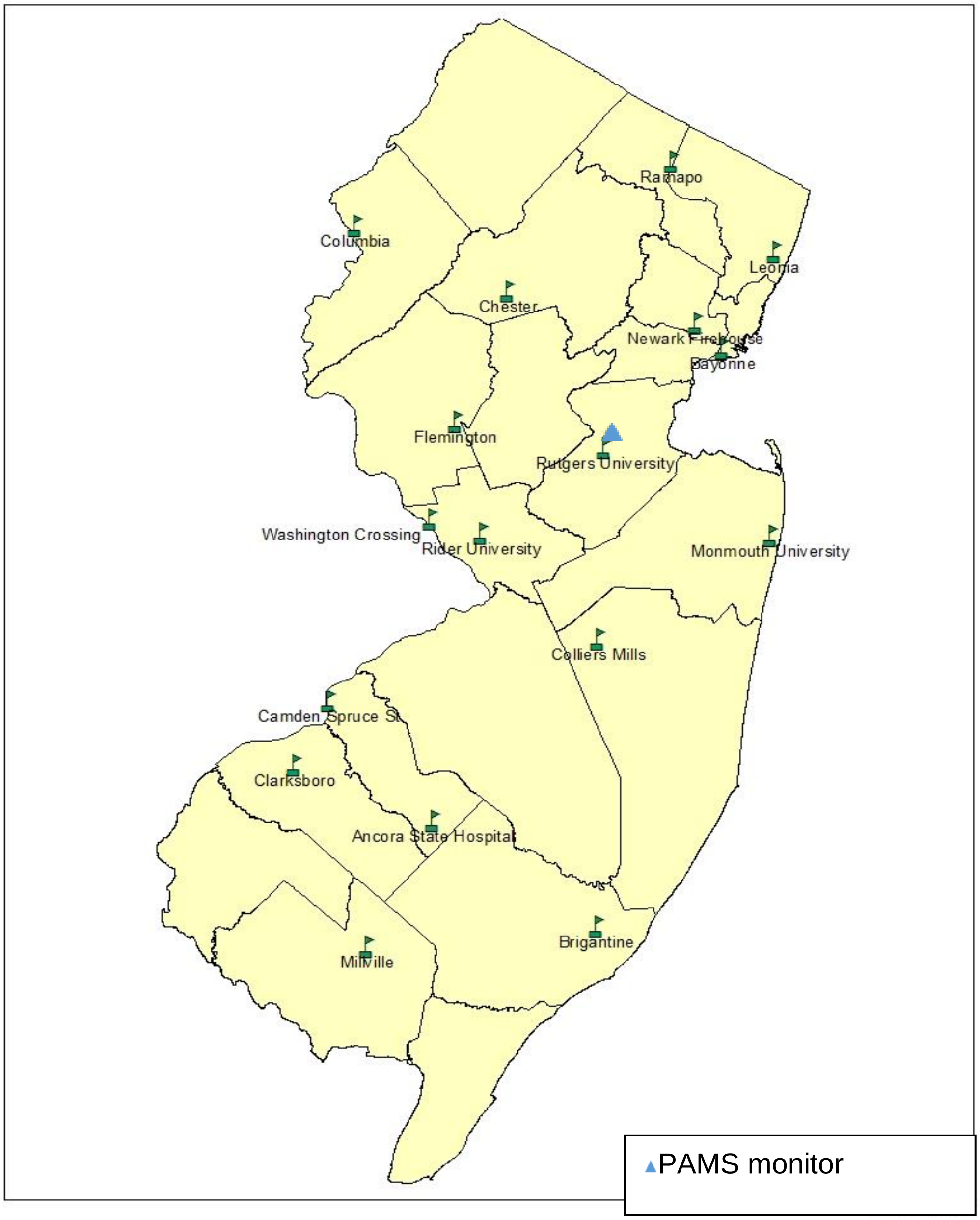
To determine compliance with the NAAQS for ozone, the USEPA established criteria for measuring and reporting ambient air concentrations of ozone at 40 CFR 58. In accordance with 40 CFR 50, data collected from air quality monitors meeting Federal Reference Method (FRM) requirements are used to calculate design values (DV) at each FRM site to determine compliance with the ozone NAAQS. Ozone design values are defined as the three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration measured at any site within an area (multi-state for New Jersey). An area's design value must not exceed the standard to show compliance. The design value for a nonattainment area is the maximum monitor design value for all monitors for each 3-year period. Maximum design values are not necessarily measured at the same site from year to year.

The NJDEP currently measures ozone concentrations at 17 FRM sites in New Jersey. Eleven of the 17 sites have been collecting data continuously for at least 15 years. The Washington Crossing site is a USEPA Clean Air Status and Trends Network (CASTNET) monitor, which is not run by NJDEP, but the data is included in the Southern NJ-PA-DE-MD Nonattainment Area. Not all New Jersey monitoring sites ran continuously from 1985 to present day. Previously, the ozone monitoring season in New Jersey ran from April to October. When the 2015 ozone NAAQS were finalized on October 26, 2015, the ozone monitoring season in New Jersey was changed to run from March 1 to October 31, effective December 28, 2015.

Ozone FRM monitoring site locations in New Jersey are shown in Figure 2-1.

As discussed in Chapter 1, New Jersey is part of two multi-state ozone nonattainment areas. In the multi-state 8-hour ozone Northern NJ-NY-CT Nonattainment Area, there are currently 26 monitors for ozone. Nine of these monitors operate in the 12 county New Jersey portion of Northern NJ-NY-CT Nonattainment Area. For more details regarding New Jersey's air quality monitoring network, see the NJDEP 2019 annual report at https://www.nj.gov/dep/airmon/ under Data.

Figure 2-1: New Jersey Ozone FRM Monitoring Network

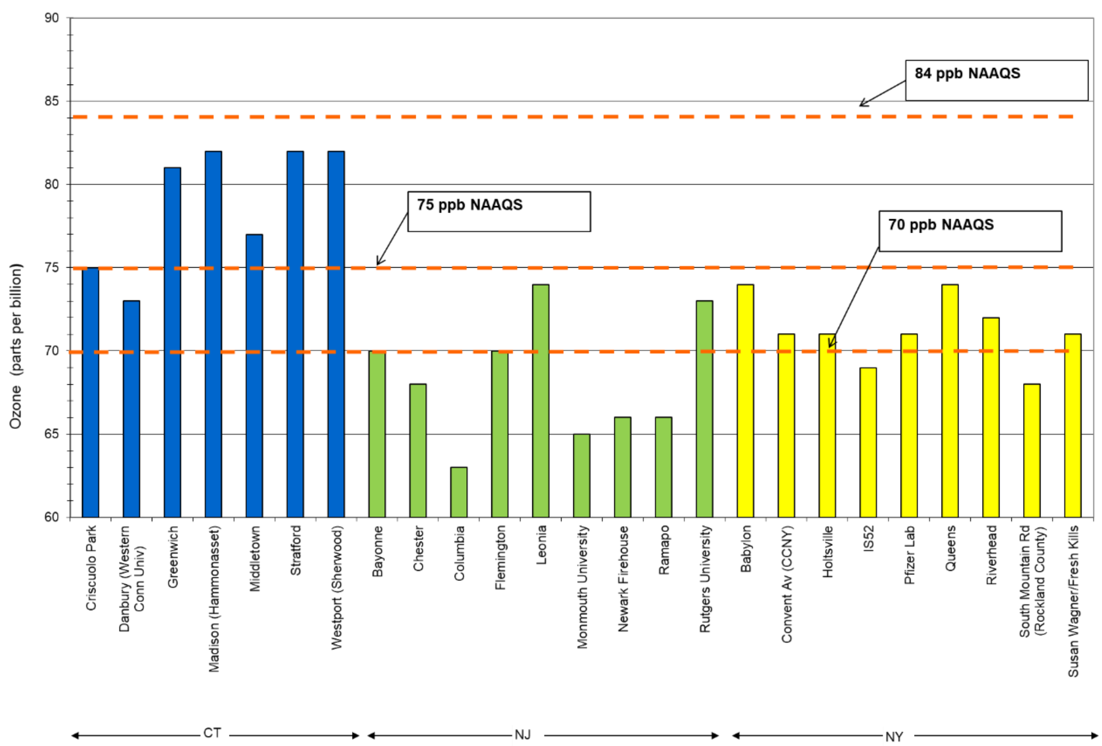


2.2.1 8-Hour Ozone Design Values

The 8-hour ozone design values for 2019 (2017/2018/2019 three-year average of 4th highest daily 8-Hour maximum) in the Northern NJ-NY-CT Nonattainment Area are shown in Figure 2-2. The 8-hour ozone Northern NJ-NY-CT Nonattainment Area's monitors with the highest 2019 design value of 82 ppb each are at Westport (Sherwood Island Connector), Stratford, and Madison (Hammonasset State Park) in Connecticut, followed by 81 ppb at Greenwich in Connecticut.

Preliminary 2020 design values have been included in the table in Appendix 2-1. This data is considered "preliminary" because it requires additional data review to meet federal quality assurance guidelines. Once the preliminary data is validated, it is available from the EPA. As of January 5, 2021, preliminary monitoring data for the 2020 ozone season indicate that the highest design values continue to be the four monitors on the north side of the Long Island Sound in Connecticut. The data shows 82 ppb at the Greenwich and Madison monitoring sites, 81 ppb at Stratford and 79 at Westport. The preliminary monitoring data also shows that all of the New Jersey monitors are lower than the 2019 design values and continue to be below the 75 ppb standard.

Figure 2-2: 8-hour Ozone Design Values 2019
Northern NJ-CT-NY Nonattainment Area



Notes:

1. The Middletown CT monitor 090070007 ends in 2017 and the Middletown CVH CT monitor 090079007 starts in 2018.
2. The Susan Wagner NY monitor 360850067 ends in 2017 and the Fresh Kills NY monitor 360850111 starts in 2018.

2.2.2 8-Hour Ozone Design Value Historical Trends

Historical trends of New Jersey's statewide 8-hour ozone design values and New Jersey's multi-state northern nonattainment area design values are shown in Figures 2-3 and 2-4, respectively. Historical and current tabulated ozone design values for New Jersey and its multi-state nonattainment areas are included in Appendix 2-1.

As shown in Figure 2-3, 8-hour ozone design values in New Jersey have decreased approximately 42 percent from 1988-2019.

Figure 2-4 shows that the 8-hour ozone design values in the Northern NJ-NY-CT Nonattainment Area have decreased approximately 24 percent from 1999-2019.

Figure 2-3: 8-Hour Ozone Design Values 1988-2019
New Jersey Statewide

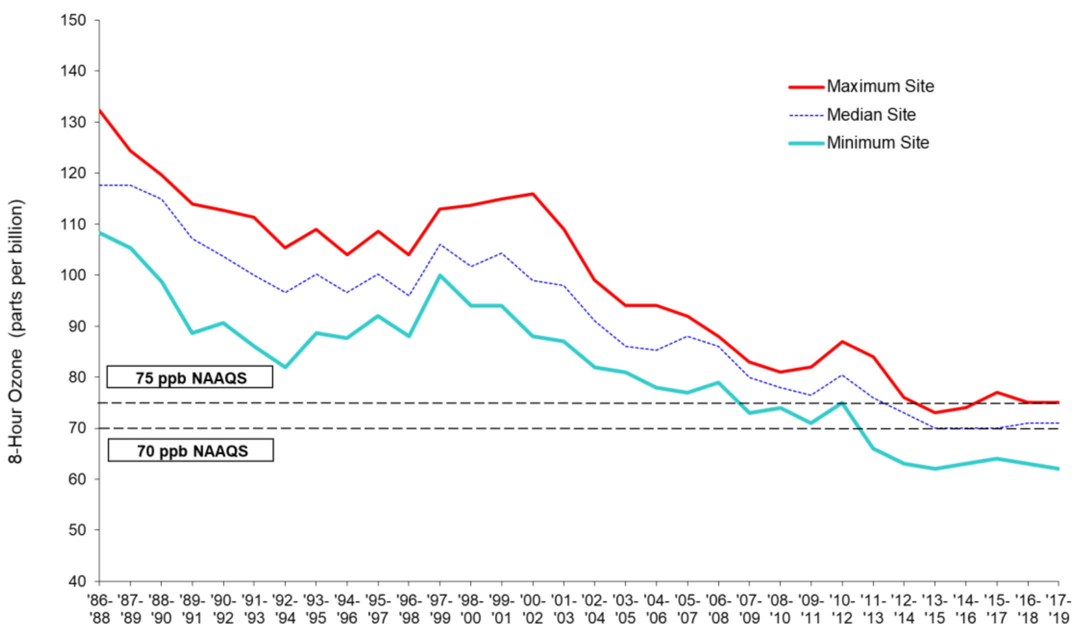
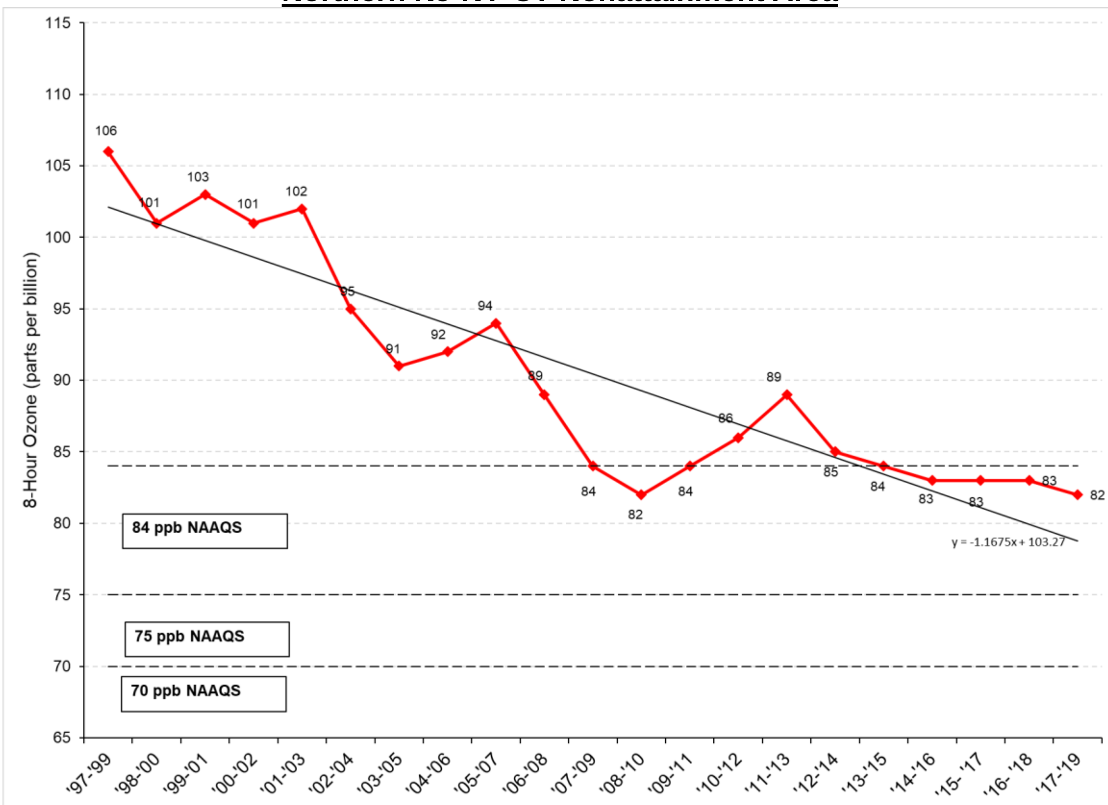


Figure 2-4: 8-Hour Ozone Design Values 1999-2019
Northern NJ-NY-CT Nonattainment Area

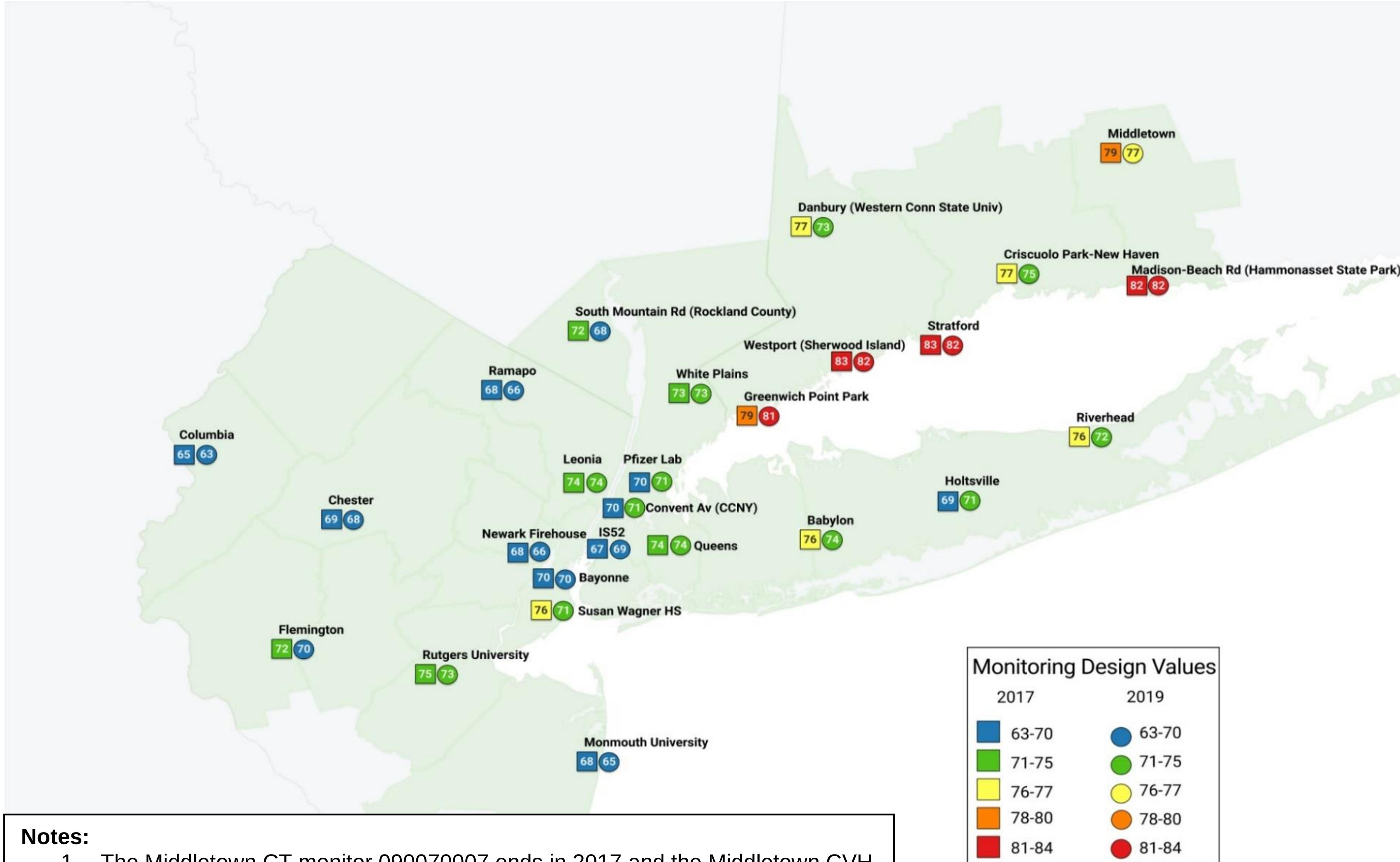


Historical data for the monitors in the Northern NJ-NY-CT Nonattainment Area that are not in compliance with the 2008 75 ppb ozone NAAQS, based on the 2019 design values, were plotted on several graphs to evaluate trends and are included in Appendix 2-2 as Figures A2-2.1 through A2-2.5. As shown in the graphs, the monitors are showing an increasing trend in the annual 4th highest values and the 2011 design values when plotted from 2009 and from the 2009/2010/2011 design value (the base year for modeling), respectively, but are showing a decreasing trend in the 4th highest values when plotted from 2011 and 2012, and a slight decreasing to flat trend in design values when plotted from the 2010/2011/2012 design values.

These observations are indicating that the low 2009 ozone concentrations, which were much lower than average due to a cooler than normal summer, are significantly influencing any data that includes 2009 such as the 2011 design values, which were used in the modeling.

A map summarizing the 2017 and 2019 8-hour ozone air monitoring design values for the Northern NJ-NY-CT nonattainment area is included as Figure 2-5 below. As shown in Figure 2-5, the monitors within New Jersey continue to show equal or decreased design values. The majority of the New York monitors directly downwind of New Jersey also show equal or decreased design values and are all below the 75 ppb standard.

Figure 2-5: 8-hour Ozone Design Values, 2017 and 2019 Northern NJ-NY-CT Nonattainment Area



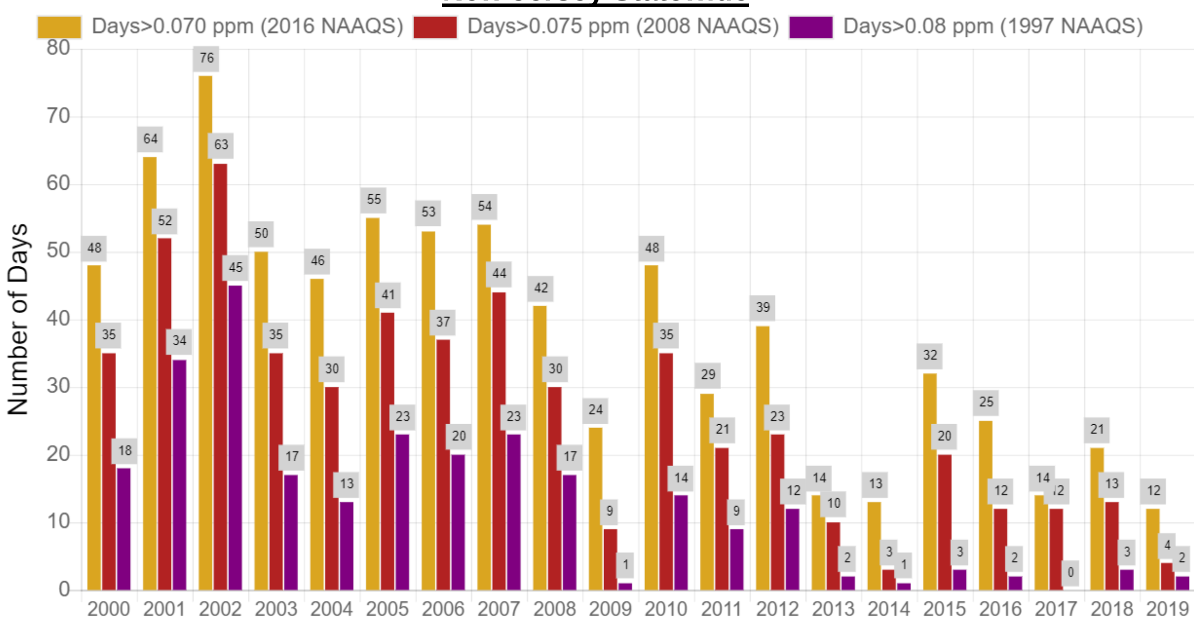
Notes:

1. The Middletown CT monitor 090070007 ends in 2017 and the Middletown CVH CT monitor 090079007 starts in 2018.
2. The Susan Wagner NY monitor 360850067 ends in 2017 and the Fresh Kills NY monitor 360850111 starts in 2018.

2.2.3 New Jersey 8-Hour Ozone Exceedances Historical Trend

One way to measure improvement in ozone air quality is by looking at the number of days' ozone is above the NAAQS across the State. Monitored exceedances occur whenever an 8-hour average ozone concentration is greater than the standard. A historical trend of the number of days the 8-hour ozone concentrations exceeded the 70 ppb, 75 ppb, and 84 ppb ozone standards is shown in Figure 2-6. The total number of monitored exceedances of the 8-hour ozone standards has decreased significantly in New Jersey from 2000 to 2019.

Figure 2-6: Number of Days the 8-Hour Ozone Standard was Exceeded 2000-2016 New Jersey Statewide



2.3 Ozone Precursor Concentrations

Ozone is formed when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight. This section summarizes the monitoring trends for these ozone precursors.

In 1993, Federal revisions to air monitoring regulations required states to enhance monitoring for ozone and its precursors.[44] In accordance with these new regulations, New Jersey has historically monitored three locations through the Photochemical Assessment Monitoring Station (PAMS) program as part of New Jersey's Ambient Air Monitoring Network: Rutgers University, Rider University and Camden. Currently one monitor at Rutgers University is collecting PAMs data. The Rutgers University monitor is both a Type 1 upwind/background site PAMS monitor for the New York City Metropolitan Statistical Area (MSA) and a Type 4 extreme downwind site PAMS monitor for the Philadelphia MSA. Measurements recorded by PAMS include ozone, individual VOCs (including several carbonyls), NO_x, nitric oxide (NO), nitrogen dioxide (NO_2), and some meteorological parameters. The objectives of the PAMS program include providing a speciated ambient air database that is both representative of and useful for ascertaining ambient profiles and distinguishing among various individual VOCs and which is characteristic of source emissions impacts. In addition, PAMS sites contribute to a better understanding of the ozone problem in metropolitan areas while taking into account meteorological and transport factors.

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[44] 58 Fed. Reg. 8452 (February 12, 1993).

2.3.1 Volatile Organic Compounds (VOCs)

VOCs are organic chemicals that have a high vapor pressure at ordinary room temperature. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air, a trait known as volatility. The term volatile in VOCs indicates that the compounds evaporate easily at room temperature and organic indicates that they contain carbon. They include compounds known as hydrocarbons, which only contain carbon and hydrogen, and carbonyls, which contain a carbon atom double-bonded to an oxygen atom. Some VOCs are more harmful than others and are considered hazardous air pollutants, toxics or carcinogens (cancer causing). The USEPA and New Jersey regulatory definition of VOC, as it relates to ozone, exempts certain VOCs due to their low reactivity with sunlight to form ozone.[45]

VOCs are emitted from a wide variety of sources such as manufacturing processes, gasoline stations, autobody repair shops, motor vehicles, recreational boating, lawn and garden equipment and consumer product use including household cleaners, paints, cosmetic and hair products, cleaning solvents, adhesives and insecticides. Sources of VOCs also include natural biogenic emissions.

The VOC and carbonyl measurements at the PAMs sites are only taken during the peak part of the ozone season, from June 1 to August 31 each year (the full monitoring ozone season in New Jersey runs from March 1 to October 31).[46] Historical total non-methane organic carbon (TNMOC) concentrations are summarized in Figures 2-7 and 2-8 for the New York and Philadelphia metropolitan areas. TNMOC is identical to VOCs but excludes methane (a regulatory exempt VOC).

Figures 2-7 and 2-8 show that overall concentrations of TNMOC at the PAMS monitors have decreased with time, similar to monitored ozone concentrations, with some monitors showing a more significant decrease than others. The concentrations appear to have leveled off around 2006.

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[45] USEPA's ozone air quality definition of volatile organic compounds is defined at 40 CFR 51.100(s). New Jersey's ozone air quality rules reference USEPA's definition.
[46] 80 Fed. Reg. 65291 (October 26, 2015)

Figure 2-7: Total Non-Methane Organic Carbon (TNMOC), Peak Ozone Season Average 1995-2017, New York Metropolitan Area

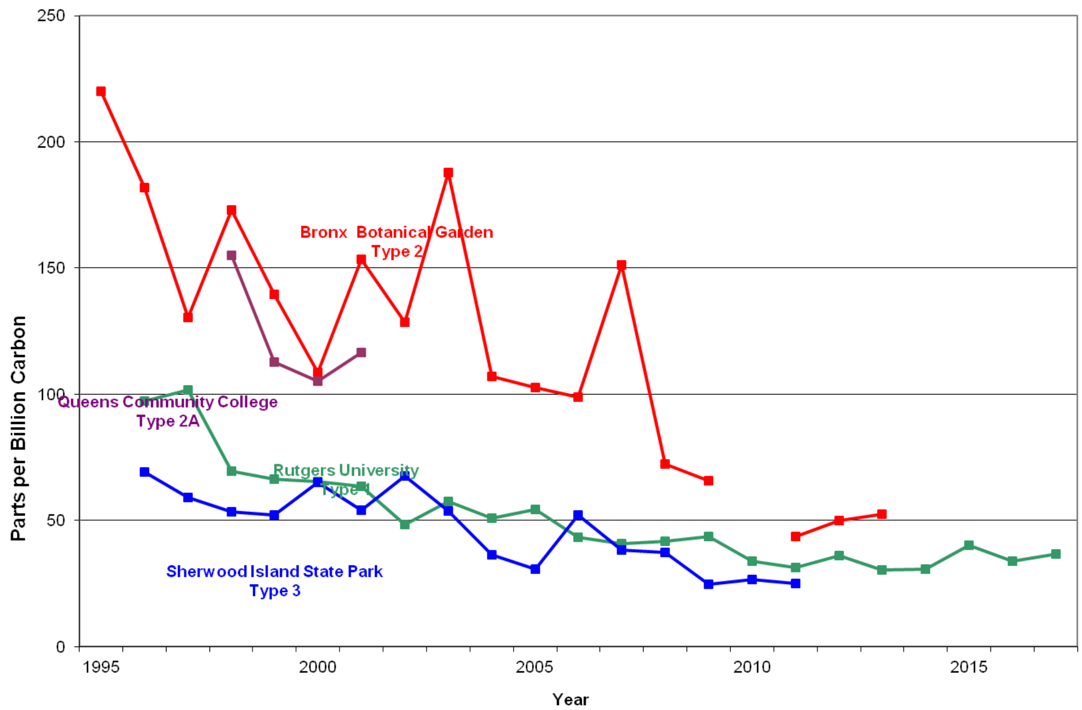
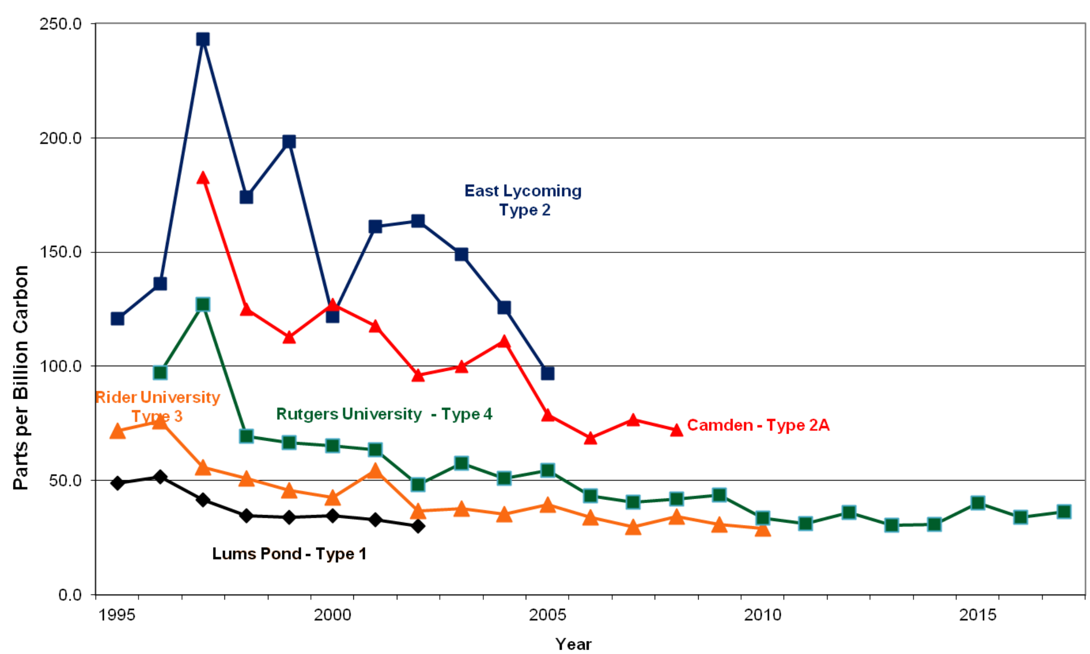


Figure 2-8: Total Non-Methane Organic Carbon (TNMOC), Peak Ozone Season Average, 1995-2017, Philadelphia Metropolitan Area



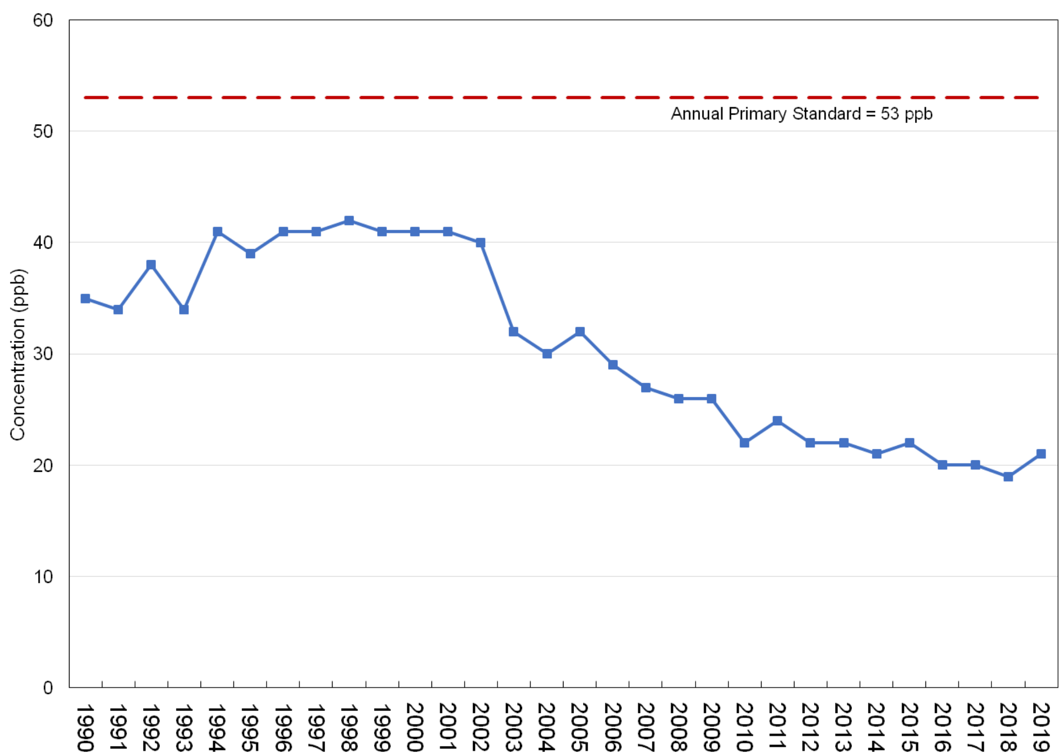
2.3.2 Nitrogen Dioxide

Nitrogen oxides consist of a mixture of gases comprised mostly of nitric oxide (NO) and nitrogen dioxide (NO_2). Although most NO_x is emitted as NO, it is readily converted to NO_2 in the atmosphere. NO_2 is a reddish-brown highly reactive gas that is formed in the air through the oxidation of NO. In the troposphere, near the Earth's surface, NO_2, not molecular oxygen, provides the primary source of the oxygen atoms required for ozone formation. These gases are emitted from a variety of sources such as the exhaust of motor vehicles, boats, planes and locomotives, the burning of coal, oil or natural gas, residential wood burning, forest fires, manufacturing and industrial processes.

NO_x concentrations are higher in the winter compared to the summer partially because poorer local dispersion conditions caused by light winds and other weather conditions that are more prevalent in the colder months of the year. On average, peak concentrations of NO_x (NO_2 and NO) have been observed in the morning and afternoon hours. This trend coincides with motor vehicle rush hours.

Currently, New Jersey monitors NO_2 and NO levels at 10 locations in the Continuous Air Monitoring Network, separate from the PAMS measurements of NO_x, NO_2, and NO. NO_2 concentrations are summarized in Figure 2-9. The annual mean measured at the highest and lowest sites are shown along with the 12-month average for all the sites. As shown in Figure 2-9, NO_2 levels have decreased in New Jersey from 1990-2019, similar to monitored ozone concentrations. The NO_2 NAAQS annual standard of 53 ppb is also reflected in Figure 2-9.

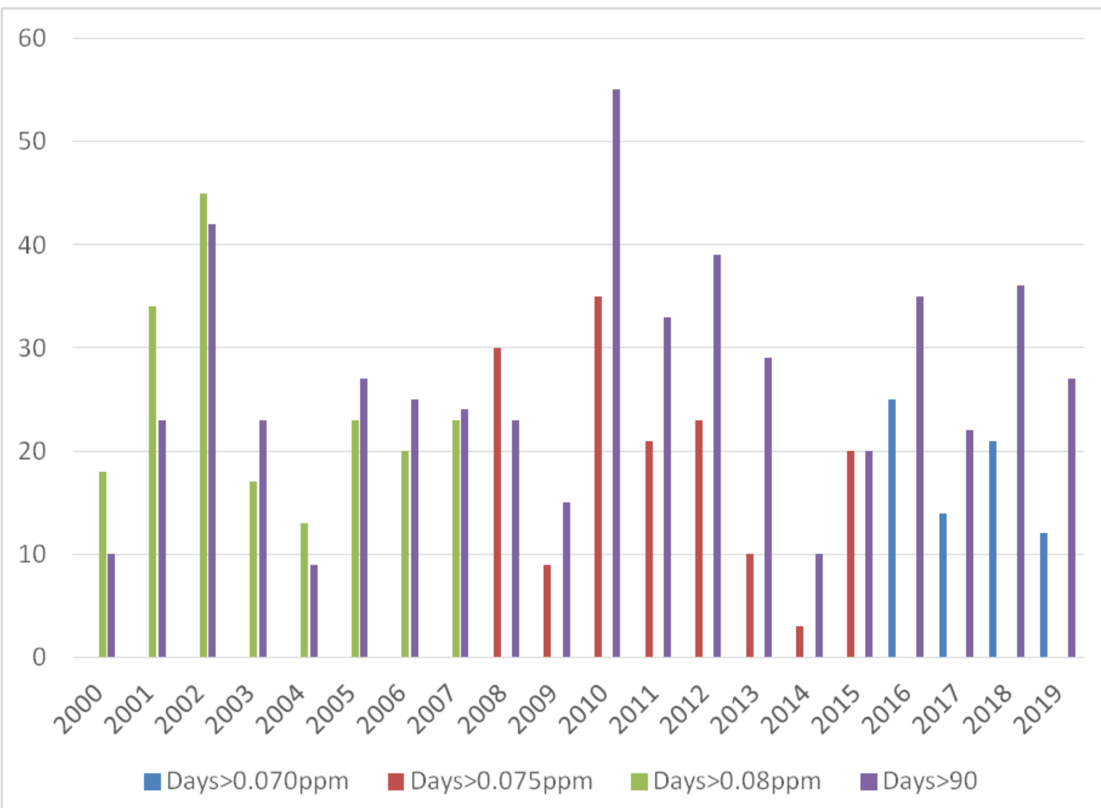
Figure 2-9: Nitrogen Dioxide 12-Month (Calendar Year) Average Concentration, 1990-2019, New Jersey Statewide



2.4 New Jersey Meteorological Trends

Ozone formation is influenced by many factors including weather conditions, transport, and growth in emissions, in addition to changes in emissions brought about by air quality control strategies. Of these factors, weather has a significant effect on year to year variations in ozone levels. As previously stated, ozone is not emitted directly to the atmosphere, but is formed by photochemical reactions between VOCs and NO_x in the presence of sunlight. The hot days of summer are particularly conducive to ozone formation, and as such ozone levels are of general concern during the months of May through September. Hot summers usually produce long periods of elevated ozone concentrations, while ozone production is usually limited during cool and wet summers. A comparison of the number of days the 8-hour ozone standard "in place" at the time was exceeded to days above 90 degrees Fahrenheit is shown in Figure 2-10. As shown in Figure 2-10, from 2000 to 2008, there were more days when the 8-hour ozone NAAQS of 84 ppb was exceeded than "hot" days. However, from, 2009 to 2019, there were more "hot days" than ozone exceedances, where the standards were much lower at 75 ppb from 2008 to 2015 and 70 ppb after 2016. This indicates that there are other factors besides meteorology that contribute to decreasing ozone levels in New Jersey, such as New Jersey's rules to control emissions from power plants that operate on High Electric Demand Days.

Figure 2-10: Number of Days the 8-Hour Ozone Standard was Exceeded vs. Days Above 90 Degrees Fahrenheit 2000-2019 New Jersey Statewide



2.5 Monitoring Summary

Northern NJ-NY-CT Nonattainment Area 75 ppb 8-Hour Ozone NAAQS

The 8-hour ozone Northern NJ-NY-CT Nonattainment Area's monitors with the highest 2019 design value of 82 ppb are located in Connecticut along on the north side of the Long Island Sound in Connecticut. Although the design values mean the Northern NJ-NY-CT is not in compliance with the 2008 75 ppb ozone standard for the 2017-2019 period, all monitors in the New Jersey portion of the nonattainment area were below 75 ppb during that same period and have been below the 75 ppb standard since 2014. New Jersey's ozone design values had significant decreases ranging from two to 10 ppb in its monitors in the Northern NJ-NY-CT nonattainment area from 2011 to 2019. Additionally, New Jersey monitors are demonstrating a decreasing trend in the 4^{th} highest 8-hour daily ozone maximum monitored values and in the number of days that exceed the ozone standards. The preliminary 2020 monitoring data shows that all of the New Jersey monitors are lower than the 2019 design values and continue to be below the 75 ppb standard.

Chapter 3 CONTROL MEASURES

3.1 Reasonably Available Control Measures (RACM)

This section provides a discussion of reasonably available control measures (RACM) for attainment of the 2008 75 ppb 8-hour ozone NAAQS. This includes a demonstration that New Jersey has adopted all reasonable measures (including Reasonably Available Control Technology (RACT)) to meet Reasonable Further Progress (RFP) requirements and to reach attainment as expeditiously as practicable. In addition, New Jersey demonstrates that no additional reasonably available measures would advance the attainment date by a minimum of one year.

In accordance with Section 172(c)(1) of the CAA (or 42 U.S.C. §7502(c)(1)) states are required to implement all RACM as expeditiously as practicable as part of their effort to attain the NAAQS. Specifically:

> "In general – Such plan provisions shall provide for the implementation of all reasonably available control measures as expeditiously as practicable (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) and shall provide for attainment of the national primary ambient air quality standards."

The 2015 Ozone Implementation Rule[47] for the 2008 75 ppb 8-hour ozone NAAQS, describes what the states must include with their attainment demonstration regarding RACM. The USEPA promulgated existing RACM guidance from previous standards for the 2008 75 ppb ozone NAAQS. They interpret the RACM provision to require a demonstration that the state has adopted all reasonable measures (including RACT) to meet RFP requirements and to demonstrate attainment as expeditiously as practicable. USEPA also required an analysis to determine if there are any additional RACM that will advance the attainment date by at least one year. USEPA stated in the 2015 75 ppb Implementation Rule that states should consider all available measures, including those being implemented in other areas, and that a state must adopt measures for an area only if those measures are economically and technologically feasible and will advance the attainment date or are necessary for RFP.

RACM is further defined by the USEPA[48,49] as any potential control measure for application to point, 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.

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[47] 80 Fed. Reg. 12282 (March 6, 2015)

[48] USEPA Memorandum, "Guidance on the RACM Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas", from John S. Seitz, USEPA Director Office of Air Quality Planning and Standards to the USEPA Regional Air Division Directors Regions I-IX, dated November 1999.

[49] USEPA Memorandum, "Additional Submission on RACM From States with Severe 1-hour Ozone Nonattainment Area SIPs", from John S. Seitz, USEPA Director office of Air Quality Planning and Standards and Marge Oge, USEPA Director Office of Transportation and Air Quality to Regional Air Division Directors, Regions I, II, III, V and VI, December 14, 2000.

The New Jersey RACM analysis and conclusions for the 2008 75 ppb 8-hour ozone NAAQS rely and build on the RACM analysis conducted for the 1997 84 ppb 8-hour ozone NAAQS that was documented in New Jersey's 1997 84 ppb ozone attainment demonstration SIP[50] (2007 SIP) and the significant amount of control measures adopted and implemented by New Jersey since 2002.

The New Jersey RACM analysis documented in the 2007 SIP includes:

- a compilation of an exhaustive list of potential control measures from numerous sources including a public workshop conducted by New Jersey;
- an evaluation of the feasibility of the measures in accordance with RACM guidance;
- an evaluation of the potential emission benefits from the measures;
- a list of measures adopted and implemented by New Jersey;
- an evaluation of the potential for additional measures to advance the attainment date.

This SIP expands on this analysis by documenting the additional RACM adopted and implemented by New Jersey since the 2007 SIP.

The list of potential and actual adopted measures was developed through a combination of several evaluations over several years that included State-specific and regional workgroups. As discussed in the 2007 SIP, New Jersey held a workshop and formed several workgroups with stakeholders to evaluate potential control measures. New Jersey participates in several regional workgroups with the goal of identifying RACM to help the States reach their 8-hour ozone attainment goals. New Jersey is an active member of four regional organizations, each with a unique focus with respect to either geographic area, air pollution or both. These organizations include the following:

<u>Ozone Transport Commission (OTC):</u> The OTC provides a forum through which states work together to evaluate new control measures and strategies to reduce ozone and create model rules for states to follow in their regulatory process. The 1990 CAA amendments established the OTC for this purpose. The OTC consists of 12 northeast states and the District of Columbia. New Jersey is an active member of all control specific workgroups and has been for several years.

As a member of the OTC, New Jersey has worked jointly with the other members to assess the nature and magnitude of the ozone problem in the region, evaluate potential new control strategies and recommend regional control measures to help towards the common regional goal of attainment and maintenance of the ozone NAAQS.

To support the goal of attainment of the ozone NAAQS, OTC staff and member states formed several workgroups to identify and evaluate candidate control measures. The OTC workgroups have reviewed over 1,000 candidate control measures. These control measures were identified through sources such as control measures in California (a leader in air quality), USEPA's Control Technique Guidelines (CTGs), STAPPA/ALAPCO's (now NACAA) "Menu of Options" documents, the AirControlNET database, emission control initiatives in other states and stakeholder input.

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[50] The State of New Jersey, Department of Environmental Protection, State Implementation Plan Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard, Final 8-Hour Ozone Attainment Demonstration, October 29, 2007.

The control measures were evaluated for technical feasibility, emissions reductions, cost effectiveness and ease of implementation. Summaries of OTC/State evaluations and model rules developed since 2000 can be found on their website at http://www.otcair.org.

Mid-Atlantic Regional Air Management Association (MARAMA): MARAMA coordinates regional modeling inventories and projections.

Mid-Atlantic Northeast Visibility Union (MANE-VU): MANE-VU coordinates Regional Haze work and plans, including potential control measures for pollutants that also contribute to ozone formation.

Northeast States for Coordinated Air Use Management (NESCAUM): NESCAUM provides a forum through which states work together to evaluate new control measures and does technical projects and work that helps support the state's efforts towards ozone control.

3.1.1 Reasonably Available Control Technology (RACT)

A subset of RACM are the NO_x and VOC control measures that implement a RACT level of control on a major emission source or source category. The CAA Sections 184(b)(1) and 184(b)(2) (or 42 U.S.C. §§7511c(b)(1) and 7511c(b)(2)) and USEPA's March 6, 2015 75 ppb Ozone Implementation Rule[51] require moderate and above nonattainment areas and all states in the Ozone Transport Region, including New Jersey, to adopt RACT for all existing VOC and NO_x source categories covered by a Control Techniques Guideline (CTG), and for all other major sources of VOC and NO_x, including those covered by an Alternative Control Techniques (ACT).

The August 23, 2019 USEPA action[52] reclassifying New Jersey's northern NAA from moderate to serious required that a RACT SIP with full control measure implementation for the 75 ppb 8-hour ozone standard for RACT control measures tied to attainment be submitted by August 3, 2020. The action also required a RACT analysis for additional control measures not tied to attainment to be submitted by March 23, 2021, with implementation of the RACT measures not tied to attainment by July 20, 2021. RACT that meets all of these requirements was satisfied in New Jersey's June 2015 RACT SIP[53] and summarized in New Jersey's December 2017 Attainment Demonstration SIP.[54] In accordance with the December 6, 2018 Implementation rule,[55] a RACT SIP is also due by August 3, 2020 for the 70 ppb 8-hour ozone standard. This analysis is discussed in Chapter 11 of this SIP.

The New Jersey RACT applicability threshold is 25 tons per year (tpy) for the entire State, even though the entire State is not classified as severe nonattainment. The CAA allows a RACT applicability threshold of 100 tpy for facilities located in a moderate nonattainment area and

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[51] 80 Fed. Reg, 12264 (March 6, 2015)
[52] 84 Fed. Reg. 44251 (August 23, 2019)
[53] The State of New Jersey, Department of Environmental Protection, State Implementation Plan (SIP) Revisions, 75 ppb 8-Hour Ozone National Ambient Air Quality Standard
Reasonably Available Control Technology (RACT) Determination, 2011 Periodic Emission Inventory and 8-Hour Carbon Monoxide National Ambient Air Quality Standard Maintenance and Monitoring Plan, June 2015, http://www.state.nj.us/dep/baqp/ozoneco2011inv/ozone2011co-inv-sip-final.pdf
[54] "1997 84 ppb and 2008 75 ppb 8-Hour Ozone Attainment Demonstration Northern New Jersey-New York-Connecticut Nonattainment Area and Nonattainment New Source Review (NNSR) Program Compliance Certification New Jersey Statewide" (December 22, 2017).
https://www.state.nj.us/dep/baqp/ozone75ppb/Ozone%2075%20ppb%20Attain%20North-NNSR%20SIP%2012-14-17%20Revised%208-9-18.pdf
[55] 83 Fed. Reg, 62998 (December 6, 2018)

ozone transport region, 50 tpy for facilities located in a serious nonattainment area and 25 tpy for facilities located in a severe nonattainment area. New Jersey has been implementing the RACT requirements for existing major sources of NO_x using the 25 tpy applicability threshold since 1992, which is based on a severe 1-hour ozone classification. Therefore, New Jersey's previous RACT analysis and implementation of RACT control measures based on the lower threshold satisfies the requirements of the August 23, 2019 USEPA reclassification action and is summarized again below.

RACT is defined by the USEPA as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.[56] RACT SIP requirements that must be addressed include revised RACT rules, if applicable, certifications where appropriate that existing rule provisions continue to be RACT, and negative declarations where there are no sources in the State applicable to a CTG.[57] States should provide for implementation of RACT as expeditiously as possible to help attain the 75 ppb ozone NAAQS.[58] For the purposes of RACT applicability in New Jersey, the major source thresholds are 25 tpy of VOC and NO_x, respectively, which are consistent with the classification of severe and more stringent than the current serious classification thresholds.

New Jersey addressed the RACT requirements for the 2008 75 ppb 8-hour ozone NAAQS in its June 2015 RACT SIP Revision.[59] A summary of RACT measures adopted and implemented post 2011 is discussed in more detail below in Control Measures Section 3.2. New Jersey has met RACT requirements for the 2008 standard and had gone beyond RACT by adopting control measures more stringent than Federal rules, CTGs and neighboring state rules, especially those of most importance that address NO_x on high ozone days, setting the standard for what modern RACT should be. Of particular note are the following:

- <u>Power Plants</u>: In 2009, New Jersey adopted enforceable, short-term, performance standards for NO_x and VOC emissions from power plants (or Electric Generating Units (EGUs)) that are among the most stringent and effective air pollution control regulations. These regulations resulted in the closing of several coal power plants. Currently only three coal boilers operate in New Jersey (Logan-1, Carney-1 and Carney-2) and all are equipped with Selective Catalytic Reduction (SCR) controls.

  Also, in 2009, New Jersey had taken the lead by adopting measures to address emissions from EGUs that operate on High Electric Demand Days (HEDDs) when ozone concentrations tend to be elevated. These sources are critically important contributors to episodes of elevated ozone in the Northern NJ-NY-CT Nonattainment Area. New Jersey received significant emission reductions from the HEDD rules. New Jersey has reduced NO_x emissions from power plants an estimated 64 tons per day on HEDD since implementation of the rule, with Phase I in 2009 and Phase II in 2015.

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[56] 44 Fed. Reg. 53762 (September 17, 1979)
[57] 80 Fed. Reg. 12264 (March 6, 2015)
[58] Ibid.
[59] The State of New Jersey, Department of Environmental Protection, State Implementation Plan (SIP) Revisions, 75 ppb 8-Hour Ozone National Ambient Air Quality Standard
Reasonably Available Control Technology (RACT) Determination, 2011 Periodic Emission Inventory and 8-Hour Carbon Monoxide National Ambient Air Quality Standard Maintenance and Monitoring Plan, June 2015, http://www.state.nj.us/dep/baqp/ozoneco2011inv/ozone2011co-inv-sip-final.pdf

New Jersey's EGU rules more effectively control ozone levels than the USEPA Cross-State Air Pollution Rule (CSAPR) because New Jersey's facilities must meet daily NO_x performance standards for all units, while facilities in other states may, under the Federal rules, purchase allowances to cover their excess emissions on high energy demand days. CSAPR does not guarantee a reduction in emissions at a particular source. It is often more economical for facilities to buy allowances than to run NO_x emission controls. Five-month averaging does not sufficiently lower emissions on the hottest summer days when peak electric demand and peak ozone levels usually occur. Unlike other states that significantly impact New Jersey's air quality, New Jersey power plants cannot turn off their NO_x pollution controls and use excess NO_x allowances to meet emission limits. The short term averaging times ensure that existing control devices at these units are operating when electricity demand increases due to hot weather. Therefore, on days conducive to ozone production, when the RACT control measure are most needed, NO_x emissions are increasing in the upwind states that significantly contribute to the ozone in New Jersey and its shared nonattainment areas.

- Presumptive NO_x limits and Alternative Emission Limits (AELs): New Jersey has been implementing significantly stringent presumptive NO_x emission limits for several source categories including boilers serving electric generating units, stationary combustion turbines, ICI boilers and other indirect heat exchangers, stationary reciprocating engines, asphalt pavement production plants, glass manufacturing furnaces, municipal solid waste incinerators and sewage sludge incinerators. New Jersey's April 20, 2009 RACT rule adoption for 14 sources categories, including storage tanks is available at https://www.nj.gov/dep/rules/adoptions/adopt_090420.pdf.

  For those existing sources which cannot implement the presumptive NO_x RACT requirements for technology and cost effectiveness reasons, New Jersey has been allowing Alternative Emission Limits (AEL) for a period of 10 years. Other upwind states do not have a 10-year periodic review of AELs.

- Distributed Generation/Demand Response (DG/DR): New Jersey's rules for stationary reciprocating internal combustion engines (RICE) do not allow the use of uncontrolled engines for the purpose of distributed electric generation or demand response in non-emergency situations. However, in some states these engines are uncontrolled and used to assist the electric grid during high electric demand periods. Like HEDD EGUs, many of these engines are operating on hot summer days that usually coincide with the high ozone days.

- Sewage Sludge Incinerators and Municipal Solid Waste Incinerators: New Jersey has implemented measures to control NO_x emissions from the sewage sludge incinerators and municipal solid waste (MSW) combustors. New Jersey has taken significant actions to address these important sources.

- State of the Art (SOTA): SOTA air pollution control must be implemented for new, modified, or reconstructed equipment at major and minor facilities for new VOC and NO_x sources of air pollution. New Jersey has developed SOTA manuals for several source categories which are available at https://www.state.nj.us/dep/aqpp/sota.html.

- Petroleum Storage: New Jersey has implemented one of the most stringent petroleum storage rules in the country, which established requirements to reduce VOC emissions from bulk petroleum storage facilities.

In the 2015 RACT SIP Revision, NJDEP committed to address four CTGs, and two NO_x ACT categories as follows:

1. Industrial Cleaning Solvents (2006 CTG);
2. Paper, Film, and Foil Coatings (2007 CTG);
3. Fiberglass Boat Manufacturing Materials (2008 CTG);
4. Misc. Metal and Plastic Parts Coatings (2008 CTG);
5. Stationary RICE (NO_x ACT) and Stationary gas turbines (NO_x ACT) as they relate to natural gas compressors.

New Jersey has fulfilled its commitment for these five source categories. NJDEP proposed rules addressing these categories on January 3, 2017. The final rules were effective November 6, 2017 (49 N.J.R. 3518.) A copy of the rule adoption can be found at: http://www.state.nj.us/dep/aqm/adopt.html. It is estimated that the stationary gas turbine rule will reduce NO_x by approximately 1.8 tons per day and the CTGs will reduce VOCs by approximately 0.4 tons per day. A summary of these rules is included below in Section 3.2.

For effective implementation of the CAA RACT provisions, USEPA should consider the following suggestions:

- USEPA should require other States to adopt the RACT that has been established in New Jersey. In the USEPA 2015 75 ppb 8-hour Ozone Implementation Rule[60], USEPA continues to allow states to certify that existing RACT determinations are RACT for the current ozone standard if appropriate. Although in some cases a recent RACT analysis may result in such a certification, the 1979 120 ppb 1-hour ozone RACT should not be considered RACT for the 2008 75 ppb 8-hr ozone standard.

USEPA stated in their 75 ppb 8-hour ozone Implementation Rule Proposal[61] that "it is not sufficient for states to rely on previous RACT determinations without considering more recent information." They also stated that USEPA "generally considers controls that have been achieved in practice by other existing sources in the same source category to be technologically and economically feasible."

- USEPA should update its CTGs and ACTs. Many of the CTGs and ACTs are outdated and no longer represent RACT due to technological advances. Updating these guidelines would set a nationwide baseline for "presumptive norms" and provide consistency in states' RACT determinations for CTG and ACT source categories. While states have the responsibility to develop RACT rules based on currently available control technologies, having updated Federal guidance would help promote consistency and reduce conflict when USEPA reviews and proposes RACT plans. This would especially be useful for gas, oil, and coal-fired EGUs.

[60] 80 Fed. Reg. 12282 (March 6, 2015)
[61] 78 Fed. Reg. 34178 (June 6, 2013)

- USEPA should not allow averaging over an entire nonattainment area. USEPA allows states to demonstrate that nonattainment area-wide weighted NO_x average emission rates, from sources subject to RACT, meet RACT requirements. A nonattainment area-wide weighted NO_x averaging demonstration that exempts HEDD EGUs from NO_x control does not reduce NO_x emissions when and where such reductions are necessary to attain the ozone NAAQS.

- USEPA should not allow ozone season trading of NO_x emissions as RACT compliant. States currently have the option to show that a regional trading program would achieve RACT-level reductions for certain participating sources within a nonattainment area. A trading program that allows higher NO_x emissions on high ozone days makes it difficult for states that are subjected to upwind sources of NO_x to achieve the ozone standard. During the ozone season, some power plants that are upwind contributors to New Jersey's ozone levels tum off their NO_x controls and buy NO_x allowances to meet their emissions requirements. This practice that is allowed by USEPA adversely impacts New Jersey air quality and its shared nonattainment areas. New Jersey opposes any regulation that would perpetuate this practice.

3.1.2 RACM to Advance the Attainment Date

As discussed above, the USEPA requires an analysis to determine if there are any additional RACM that will advance the attainment date by at least one year. If there are, the state is required to adopt those measures.

For the 2008 75 ppb ozone standard, New Jersey has an attainment date of no later than July 20, 2021. Therefore, in order for emission reductions to contribute towards attainment they must be achieved prior to the end of the 2020 ozone season because the attainment design value will be based on the 2018, 2019 and 2020 maximum ozone levels. To advance the attainment date by one year, the potential RACM measures would have to achieve emission reductions before the end of the 2019 ozone season.

New Jersey has determined that there are no additional RACMs (in addition to what New Jersey has already adopted and implemented) available that meet the criteria discussed in Section 3.1.1 that can provide emission reductions sufficient to advance the attainment date by one year. In addition to this determination, no additional measures could be implemented in time to take effect prior to the end of the 2019 ozone season.

3.1.3 RACM Conclusions

New Jersey has adopted extensive control measures ahead of other states, especially those that address NOx on high ozone days, setting the standard for what RACT should be, and has therefore met RACM and RACT requirements for the 2008 75 ppb ozone standard. The New Jersey measures adopted and implemented since 2002 are summarized in Table 3-1. These measures constitute RACM and RACT for the 2008 75 ppb 8-hour ozone NAAQS. Additional details on the control measures implemented for the 2008 75 ppb 8-hour ozone NAAQS are discussed below.

Table 3-1: New Jersey's Post 2002 Control Measures

Measure	Effective Start Date of Benefits	Pollutant	New Jersey Administrative Code	USEPA Approval
Adhesives & Sealants	2009	VOC	NJAC 7:27-26	7/22/10
Architectural Coatings 2005	2005	VOC	NJAC 7:27-23	11/30/05
Asphalt Paving (cutback and emulsified)	2009	VOC	NJAC 7:27-16.19	8/3/10
Asphalt Production Plants	2009, 2011	NO_x	NJAC 7:27-19.9	8/3/10
Case by Case NO_x and VOC (FSELs/AELs)	2009	NO_x, VOC	NJAC 7:27-16, 19	8/3/10
Consumer Products 2005	2005	VOC	NJAC 7:27-24	1/25/06
Consumer Products 2009	2009	VOC	NJAC 7:27-24	7/22/10
CTG: Fiberglass Boat Manufacturing Materials (2008 CTG);	2018	VOC	7:27-16.14	10/9/18
CTG: Industrial Cleaning Solvents (2006 CTG);	2018	VOC	7:27-16.24	10/9/18
CTG: Misc. Metal and Plastic Parts Coatings (2008 CTG);	2018	VOC	7:27-16.15	10/9/18
CTG: Paper, Film, and Foil Coatings (2007 CTG);	2018	VOC	7:27-16.7	10/9/18
CTG: Printing	2009	VOC	NJAC 7:27-16.7	8/3/10
Diesel Vehicle Retrofit Program	2008-2015	PM	NJAC 7:27-32, 14	NA
EGU: BL England ACO	2000-2015	NO_x, PM, SO_2	NA	NA
EGU: Coal-fired Boilers, Oil and Gas Fired Boilers	2013	NO_x, PM, SO_2	NJAC 7:27-4.2, 10.2, 19.4	8/3/10
EGU: High Electric Demand Day (HEDD)	2009, 2015	NO_x	NJAC 7:27-19.29	8/3/10
EGU: PSEG-Consent Decree	2002-2010	NO_x, PM, SO_2	NA	Filed 7/26/02; amended 11/30/06
Glass Manufacturing	2012	NO_x	NJAC 7:27-19.10	8/3/10
ICI Boilers 2009	2009-2011	NO_x	NJAC 7:27-19.7	8/3/10
ICI Boilers, Turbines and Engines 2005	2007-2010	NO_x	NJAC 7:27-27.19	7/31/07
IM: Program Revisions 2009	2010	VOC, NO_x, CO	NJAC 7:27-15	9/16/11
IM: Diesel Smoke Cutpoint	2010, 2011	PM, NO_x	NJAC 7:27-14	Pending
IM: Heavy Duty OBD	2022	All	NJAC 7:27-14	5/9/18
Low Sulfur Fuel Oil	2014, 2016	PM, SO2, NO_x	NJAC 7:27-9	1/3/12
Mercury Rule	2006-2012	Hg, PM, SO_2, NO_x	NJAC 7:27-27	NA
Mobile Equipment Refinishing (Autobody)	2005	VOC	NJAC 7:27-16	7/2/04
Municipal Waste Combustors (Incinerators)	2009, 2010	NO_x	NJAC 7:27-19.13	8/3/10
New Jersey Low Emission Vehicle (LEV) Program	2009 (1)	All	NJAC 7:27-29	2/13/08
NO_x Budget	1999, 2003	NO_x, SO_2	NJAC 7:27-30	10/1/07
Permitting/Nonattainment New Source Review (NNSR)	Ongoing	All	7:27-8,18, 22	NA
Petroleum Storage	2010-2019	VOC	NJAC 7:27-16.2	8/3/10

Table 3-1 (continued): New Jersey's Post 2002 Control Measures

Measure	Effective Start Date of Benefits	Pollutant	New Jersey Administrative Code	USEPA Approval
Portable Fuel Containers 2005	2005-2015 (1)	VOC	NJAC 7:27-24	1/25/06
Portable Fuel Containers 2009	2009-2019 (1)	VOC	NJAC 7:27-24	7/22/10
Refinery Consent Decree: ConocoPhillips	2006-2014	PM, SO_2, NO_x, VOC	NA	Filed 1/27/05
Refinery Consent Decrees: Valero (Paulsboro)	2006-2014	PM, SO_2, NO_x, VOC	NA	Filed 6/16/05
Sewage and Sludge Incinerators	2009	NO_x	NJAC 7:27-19.28	8/3/10
Solvent Cleaning	2005	VOC	NJAC 7:27-16	7/2/04
Phase I and II Gasoline Vapor Recovery	2003	VOC	NJAC 7:27-16	7/2/04
Phase I and II Gasoline Vapor Recovery	2018	VOC	NJAC 7:27-16	6/18/20
Stationary Gas Turbines and Engines (NO_x ACT)	2020	NO_x	7:27-19.5, 19.8	10/9/18
Vehicle Idling Rule Amendments	2011	PM, NO_x	NJAC 7:27-14.1, 14.3	4/14/09
Voluntary Mobile Measures	2017 (1)	All	NA	NA

Legend/Notes:

NA = Not Applicable
EGU - Electric Generating Unit
ICI = Industrial, Commercial and Institutional Boilers
IM = Inspection and Maintenance for Motor Vehicles
OBD = On-board Diagnostics
RICE = Reciprocating Internal Combustion Engines
MACT = Maximum Achievable Control Technology
CTG = Control Technology Guideline
All = NO_x, VOC, CO, PM2.5, PM10
1. Turnover rule which means measure has cumulative benefits each year until complete fleet or equipment turnover

3.2 Control Measures in the SIP

This section summarizes the post 2011 control measures implemented in New Jersey's ozone attainment demonstration. The post 2011 control measures are summarized in Table 3-2. The benefits from the implementation of these measures, and the benefit calculations, are included in Chapter 4.

Table 3-2: Control Measures in the SIP Post 2011

State or Federal	Sector	Control Measure	Effective Start Date of Benefits	Pollutant	New Jersey Administrative Code	USEPA Approval	In 2020 Attainment Modeling/RFP	Not in 2020 Attainment Modeling	RACT	RACM	2020 RFP Contingency	2020 Attainment Contingency
State	Point, Area	CTG: Fiberglass Boat Manufacturing Materials (2008 CTG);	2018	VOC	7:27-16.14	10/9/18		x	x			
State	Point, Area	CTG: Industrial Cleaning Solvents (2006 CTG);	2018	VOC	7:27-16.24	10/9/18		x	x			
State	Point, Area	CTG: Misc. Metal and Plastic Parts Coatings (2008 CTG);	2018	VOC	7:27-16.15	10/9/18		x	x			
State	Point, Area	CTG: Paper, Film, and Foil Coatings (2007 CTG);	2018	VOC	7:27-16.7	10/9/18		x	x			
State	Point, Area	Low Sulfur Fuel Oil Phase 1	2014	PM, SO_2, NO_x	7:27-9	1/3/12	x			x		
State	Point, Area	Low Sulfur Fuel Oil Phase 2	2016	PM, SO_2, NO_x	7:27-9	1/3/12	x			x		
State	Point, Area	Permitting/Nonattainment New Source Review (NNSR)	Ongoing	All	7:27-8,18, 22	NA	x					
State	Point, Area	Stationary Gas Turbines and Engines (NO_x ACT)	2020	NO_x	7:27-19.5, 19.8	10/9/18		x	x			
State	Point	EGU: BL England ACO	2007 - 2019	NO_x, PM, SO_2	NA	NA	x		x			
State	Point	EGU: Coal-fired Boilers, Oil and Gas Fired Boilers	2013	NO_x, PM, SO_2	7:27-4.2, 10.2, 19.4	8/3/10	x		x			
State	Point	EGU: High Electric Demand Day (HEDD)	2009, 2015	NO_x	7:27-19.5	8/3/10	x		x			
State	Point	Glass Manufacturing	2012	NO_x	7:27-19.10	8/3/10	x		x			
State	Point	Petroleum Storage	2009-2017	VOC	7:27-16.2	8/3/10	x		x			
State	Area	Portable Fuel Containers	2009-2019	VOC	7:27-24	7/22/10	x			x		
State	Area	Phase I and II Gasoline Vapor Recovery	2018	VOC	7:27-16.3	6/18/20		x		x		
State	Onroad	IM: Gasoline	Ongoing	VOC, NO_x,CO	NJAC 7:27-15	9/16/11	x					
State	Onroad	IM: Diesel Smoke Cutpoint	2011	All	7:27-14	Pending		x				
State	Onroad	IM: Heavy Duty OBD	2022	All	7:27-14	5/9/18		x				

Table 3-2 (continued): Control Measures in the SIP Post 2011

State or Federal	Sector	Control Measure	Effective Start Date of Benefits	Pollutant	New Jersey Administrative Code	USEPA Approval	In 2020 Attainment Modeling/RFP	Not in 2020 Attainment Modeling	RACT	RACM	2020 RFP Contingency	2020 Attainment Contingency
State	Onroad	New Jersey Low Emission Vehicle (LEV) Program	2009 (1)	All	7:27-29	2/13/08	x			x		
State	Onroad, Nonroad	Voluntary Mobile Measures	2017 (1)	All	NA	NA		x				
Federal	Point, Area	Boiler/Process Heater NESHAP	2016	All	NA	NA	x					
Federal	Point, Area	Natural Gas Turbine NSPS	2017	NO_x	NA	NA	x					
Federal	Point, Area	RICE NESHAP	2017	All	NA	NA	x					
Federal	Point, Area	RICE NSPS	2017	NO_x, CO	NA	NA	x					
Federal	Point	EGU: CSAPR	2017	NO_x	NA	NA	x					
Federal	Point	EGU: Mercury and Air Toxics Standards (MATS), Coal- and oil-fired	2016	PM, SO_2, NO_x	NA	NA		x				
Federal	Point	Process Heater NSPS	2017	NO_x	NA	NA	x					
Federal	Point	Refinery Consent Decree: ConocoPhillips	2014	NO_x	NA	NA	x					
Federal	Point	Refinery Consent Decree: Valero (Paulsboro)	2014	PM	NA	NA	x					
Federal	Area	Refueling ORVR	1998 (1)	All	NA	NA	x					
Federal	Area	Residential Woodstove NSPS	2014	All	NA	NA	x					
Federal	Onroad	Fleet Turnover 2021	2018	All	NA	NA		x			x	x
Federal	Onroad	Heavy-Duty Vehicle Standards and Diesel Fuel Sulfur Control	2004-2010 (1)	All	NA	NA	x					
Federal	Onroad	National Low Emission Vehicle Program (NLEV)	1999 (1)	All	NA	NA	x					
Federal	Onroad	Tier 1 Vehicle Program	1994 (1)	All	NA	NA	x					
Federal	Onroad	Tier 2 Vehicle Program/Low Sulfur Fuels	2004 (1)	All	NA	NA	x					
Federal	Onroad	Tier 3 Vehicle Program/ Fuel Standards	2017 (1)	All	NA	NA	x					
Federal	Nonroad	Diesel Compression Ignition Engines	1996 - 2015 (1)	All	NA	NA	x					
Federal	Nonroad	Diesel Marine Engines over 37 kW: Category 1 Tier 2, Category 3 Tier 1	2004 (1)	All	NA	NA	x					

Table 3-2 (continued): Control Measures in the SIP Post 2011

State or Federal	Sector	Control Measure	Effective Start Date of Benefits	Pollutant	New Jersey Administrative Code	USEPA Approval	In 2020 Attainment Modeling/RFP	Not in 2020 Attainment Modeling	RACT	RACM	2020 RFP Contingency	2020 Attainment Contingency
Federal	Nonroad	Diesel Marine Engines over 37 kW: Category 2 Tier 2	2007 (1)	All	NA	NA	x					
Federal	Nonroad	Diesel Marine Engines over 37 kW: Category 3 Tier 2	2011 (1)	All	NA	NA	x					
Federal	Nonroad	Diesel Marine Engines over 37 kW: Category 3 Tier 3	2016 (1)	All	NA	NA	x					
Federal	Nonroad	Large Industrial Spark-Ignition Engines over 19 kW (>50 hp) Tier 1	2004 (1)	All	NA	NA	x					
Federal	Nonroad	Large Industrial Spark-Ignition Engines over 19 kW (>50 hp) Tier 2	2007 (1)	All	NA	NA	x					
Federal	Nonroad	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder Tier 0	1998 (1)	All	NA	NA	x					
Federal	Nonroad	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder Tier 2	2002 (1)	All	NA	NA	x					
Federal	Nonroad	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder Tier 3	2008 (1)	All	NA	NA	x					
Federal	Nonroad	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder Tier 4	2014 (1)	All	NA	NA	x					
Federal	Nonroad	Recreational Vehicles (Snowmobiles, Off-road Motorcycles, All-terrain Vehicles)	2006 - 2012 (1)	All	NA	NA	x					
Federal	Nonroad	Spark Ignition Engines, Equipment, and Vessels at or below 19 kW (Lawn and Garden and Small Watercraft)	1997 - 2016 (1)	All	NA	NA	x					

Legend/Notes:

NA = Not Applicable
EGU - Electric Generating Unit
ICI = Industrial, Commercial and Institutional Boilers
IM = Inspection and Maintenance for Motor Vehicles
OBD = On-board Diagnostics
RICE = Reciprocating Internal Combustion Engines
MACT = Maximum Achievable Control Technology
CTG = Control Technology Guideline
All = NO_x, VOC, CO, PM2.5, PM10

1. Turnover rule which means measure has cumulative benefits each year until complete fleet or equipment turnover

State Rules: Point and Area Sources

Control Techniques Guidelines (CTG): Fiberglass Boat Manufacturing Materials (2008 CTG):

USEPA issued a CTG in 2008 that provides control recommendations for reducing VOC emissions from the use of gel coats, resins, and materials used to clean application equipment in fiberglass boat manufacturing operations. The CTG recommends the use of low-VOC content (monomer and non-monomer VOC) resin and gel coats with specified application methods. The CTG recommends the use of covers on mixing containers to further reduce VOC emissions from gel coats and resins. The CTG also recommends the use of low-VOC and low vapor pressure cleaning materials. Because the CTG recommendations are based on the 2001 National Emission Standards for Hazardous Air Pollutants (NESHAP) for boat manufacturing, those facilities that are major sources of HAP are already complying with the 2001 NESHAP and have already adopted these control measures. Because the 2001 NESHAP does not apply to area sources, area source fiberglass boat manufacturing facilities are not currently required to implement the measures provided in the NESHAP and recommended in the CTG. There are boat manufacturing facilities in ozone nonattainment areas that meet the applicability threshold in the CTG and would provide VOC emission reductions when the CTG recommended controls are applied. These control approaches are recommended for all fiberglass boat manufacturing facilities where total actual VOC emissions from all fiberglass boat manufacturing operations are equal to or exceed 15 pounds per day.

The NJDEP proposed new rules at N.J.A.C. 7:27-16.14 on January 3, 2017. The final rules were effective November 6, 2017 (49 N.J.R. 3518.) The new rules are based on the USEPA CTG, which establish an applicability limit of actual VOC emissions, before add-on control, of 15 pounds per day from all fiberglass boat manufacturing operations. Exemptions include production of vessels that must meet military specifications and production of parts of boats that do not involve the manufacture of fiberglass. Compliance can be achieved by meeting a maximum monomer VOC content standard, meeting a maximum monomer VOC mass emission rate, or installation of a VOC control apparatus. Recordkeeping must be maintained which demonstrates compliance.

Control Techniques Guidelines: Industrial Cleaning Solvents (2006 CTG):

USEPA issued a CTG for industrial cleaning solvents in 2006 that includes recommended control techniques. This category includes the industrial cleaning solvents used by many industries. It includes a variety of products that are used to remove contaminants such as adhesives, inks, paint, dirt, soil, oil and grease. The recommended measures for controlling VOC emissions from the use, storage and disposal of industrial cleaning solvents includes work practice standards, limitations on VOC content of the cleaning materials, and an optional alternative limit on composite vapor pressure of the cleaning materials. They also include the use of add-on controls with an overall emission reduction of at least 85 percent by mass. The first two recommendations and the last one is based on the Bay Area AQMD rule.

The NJDEP proposed new rules at N.J.A.C. 7:27-16.24 on January 3, 2017. The final rules were effective November 6, 2017 (49 N.J.R. 3518.) The new rules are based on the USEPA CTG, which specifies VOC content and vapor pressure limits for solvents used in solvent cleaning activities conducted to remove material through wiping, flushing, or spraying. Facilities can be exempt based on annual industrial cleaning solvent usage and source operation type. Compliance can be achieved by meeting a maximum VOC content, a maximum VOC composite vapor pressure, or a minimum control efficiency. Applicable facilities must implement best management practices, which include keeping cleaning materials in closed containers when not in use. Recordkeeping must be maintained which demonstrates compliance.

Control Technique Guidelines: Misc. Metal and Plastic Parts Coatings (2008 CTG):

In the 2008 USEPA CTG for miscellaneous metal and plastic parts coatings three options were recommended for controlling VOC emissions: (1) VOC content limits for each coating category based on the use of low-VOC content coatings and specified application methods to achieve good transfer efficiency; (2) equivalent VOC emission rate limits based on the use of a combination of low-VOC coatings, specified application methods, and add-on controls; or (3) an overall VOC control efficiency of 90 percent for facilities that choose to use add-on controls instead of low-VOC Content coatings and specified application methods. In addition, USEPA recommended work practices to further reduce VOC emissions from coatings as well as to minimize emissions from cleaning materials used in miscellaneous metal product and plastic part surface coating processes. The recommendations in this CTG are similar to the South Coast regulations governing miscellaneous metal product and plastic part surface coating operations, and Michigan Rule 336.1632.

The NJDEP proposed new rules at N.J.A.C. 7:27-16.15 on January 3, 2017. The final rules were effective November 6, 2017 (49 N.J.R. 3518.) The new rules are based on the USEPA CTG, which specify an applicability limit of 2.7 tons of actual VOC emissions during any consecutive 12-month period from all miscellaneous metal and plastic part coating operations, including related cleaning activities. Compliance can be achieved by either meeting the maximum allowable VOC content, achieving a minimum 90 percent overall control efficiency, or meeting a minimum overall control efficiency which is based upon the characteristics of the coating. Exemptions include surface coating operations that exclusively use powder coating and metal part coatings which must comply with a military specification that has been formulated to meet a higher, less stringent VOC content. Applicable facilities must implement best management practices, which include keeping cleaning materials in closed containers when not in use. Recordkeeping must be maintained which demonstrates compliance.

Control Technique Guidelines: Paper, Film, and Foil Coatings (2007 CTG):

USEPA issued a 2007 CTG for paper, film and foil coatings. Previous Federal actions that affected this source category included a 1977 CTG for controlling VOC emissions from surface coating of paper, the 1983 new source performance standards (NSPS) for surface coating of pressure sensitive tape and labels (a subset of this category), and a 2002 NESHAP for paper and other web coating. USEPA recommends applying the control recommendations for coatings only to individual paper, film and foil surface coating lines with the potential to emit at least 25 tpy of VOC from coatings, prior to controls. USEPA recommends an overall VOC control efficiency of 90 percent as RACT for each coating line. This level of control is based on current rules in San Diego and Ventura air districts in California, as well as the NSPS. The CTG does not recommend the 95 percent control level that is currently required by the NESHAP and seven State's regulations.

The NJDEP proposed amendments to N.J.A.C. 7:27-16.7 on January 3, 2017. The final rules were effective November 6, 2017 (49 N.J.R. 3518.) The new rules are based on the CTG, which requires paper, film, and foil coating operations to implement best management practices if the actual VOC emissions exceed 15 pounds per day for all coating operations.

Permitting/Nonattainment New Source Review (NNSR):

The CAA Section 173(a)(2) requires new or modified major sources to install the Lowest Achievable Emission Rate (LAER) control equipment. In addition, CAA Section 173(c) requires new or modified major stationary sources to obtain equal or greater emission offsets in order to operate in a nonattainment area. Thus, the LAER and offset provisions of 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 new, reconstructed, or modified significant source is also required to install state of the art (SOTA) control technology. SOTA, pursuant to New Jersey's minor NSR program at N.J.A.C. 7:27-8, also provides for emission reductions from the facilities. New Jersey's SOTA requirements, referred to in the New Jersey Air Pollution Control Act as "advances in the art of air pollution control," mandate best available control technology (BACT) if the equipment or control apparatus is subject to the Prevention of Significant Deterioration (PSD) regulation 40 CFR 52.21 or LAER if the equipment or control apparatus is subject to the Nonattainment New Source Review (NNSR) regulations N.J.A.C. 7:27-18.

Stationary Natural Gas Compressor Turbines and Engines:

At N.J.A.C. 7:27-19.5, NJDEP adopted new standards for NO_x emissions from existing simple cycle combustion turbines combusting natural gas compressing gaseous fuel at major NO_x facilities (compressor turbines). At N.J.A.C. 7:27-19.8, NJDEP adopted new standards for NO_x emissions from stationary reciprocating engines combusting natural gas and compressing gaseous fuel at major NO_x facilities (compressor engines). These rules address NOx RACT requirements by establishing new limits on NO_x emissions from existing simple cycle combustion turbines combusting natural gas and compressing gaseous fuel at major NO_x facilities (compressor turbines) and stationary reciprocating engines combusting natural gas and compressing gaseous fuel at major NO_x facilities (compressor engines). On January 3, 2017, NJDEP proposed amendments to its rules for stationary gas turbines and engines. The final rules were effective November 6, 2017 (49 N.J.R. 3518.) The effective date of the NO_x emission benefits is November 6, 2019.

State Rules: Point Sources

Electric Generating Units (EGUs) Administrative Consent Order (ACO) B.L. England:

On January 24, 2006, an ACO was signed with B.L.England to reduce air pollutants from its EGUs. The ACO was amended on October 31, 2006, January 13, 2010 and May 18, 2012. Under the ACO agreement, B.L. England initially reduced air pollutants by shutting down one of its coal-fired units (Unit 1) since 2013. It was anticipated that B.L. England would convert its coal fired units to natural gas and was included that way in the attainment modeling. Rather than convert the remaining units, B.L. England ceased operation of all units by May 1, 2019. Their permit was terminated December 3, 2019.

EGU Rule, Coal, Oil and Gas Fired Boilers:

In addition to NJDEP's mercury rule at N.J.A.C. 7:27-27.7(d), which reduced multiple pollutants from EGUs, the NJDEP adopted amendments to N.J.A.C. 7:27-4.2 and 7:27-10.2 on April 20, 2009, which set performance standards to reduce allowable NO_x, SO_2 and particulate emissions from all ten coal-fired boilers in New Jersey. The NJDEP required compliance by 2012 (2013, if the Department grants a one year extension due to a demonstrated need). The NJDEP also adopted amendments to 7:27-19.4, on April 20, 2009, which set performance standards for NO_x emissions for gas and oil-fired boilers serving EGUs.

EGU Rule, High Electrical Demand Day (HEDD) Units:

The NJDEP adopted amendments to N.J.A.C. 7:27-19.5, on April 20, 2009, which set performance standards to reduce NO_x emissions from EGUs that primarily operate on HEDDs. 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 these six states were not controlled and produced 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 was due to power production from uncontrolled HEDD units.

The New Jersey rule Phase 1 was effective April 20, 2009 and reduced NO_x emissions by approximately 19.8 tpd on these high electrical demand days. Specifically, power generators in New Jersey were responsible for securing these reductions and were required to submit a plan on how they would reduce NO_x. The New Jersey rule Phase 2 was effective May 1, 2015 and required that all HEDD units meet performance standards that reflect modern low NO_x. Many of the existing units in New Jersey shutdown if they were not able to meet these standards.

Glass Manufacturing:

The NJDEP adopted amendments to N.J.A.C. 7:27-19.10, on April 20, 2009, which set performance standards to reduce NO_x emissions from glass manufacturing facilities. The glass manufacturing process requires that raw materials, such as sand, limestone, soda ash, and cullet (scrap and recycled glass), be fed into a furnace at temperatures between 2,700 degrees Fahrenheit to 3,100 degrees Fahrenheit. The raw materials then chemically react creating the molten material known as glass. The main product types are flat glass, container glass, pressed and blown glass, and fiberglass. The reaction of nitrogen and oxygen in the furnace creates NO_x emissions.

New Jersey's rules prior to the amendments specified NO_x emission limits for a glass manufacturing furnace used to produce a container-type glass of 5.5 pounds (lbs) NO_x per ton of pulled glass and 11 lbs NO_x per ton of pulled glass for specialty container glass.[62] Pulled glass is the total output from the furnace and includes the glass produced, including the rejected glass. New Jersey's rules prior to the amendments did not specify a NO_x emissions limit for a glass manufacturing furnace used to produce flat glass.

New Jersey's adopted amendments require the NO_x emission rates to reduce emissions consistent with the installation of oxy-fuel firing 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), oxy-fuel firing is consider 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, oxy-fuel firing is demonstrated technology and has penetrated all segments of the glass industry.

Petroleum Storage:

The NJDEP adopted amendments to N.J.A.C. 7:27-16.2, on April 20, 2009, which established requirements to reduce VOC emissions from bulk petroleum storage facilities. Some petroleum and VOC products are stored in large storage tanks that are capped with floating roofs.

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[62] "Specialty container glass" means clear or colored glass made of soda-lime recipe, which is produced to meet the specifications of any standard set forth by The United States Pharmacopeia or The National Formulary, and which is used for pharmaceutical, cosmetic or scientific purposes.

Evaporative VOC emissions from floating roof tanks are the result of standing storage and working losses. Standing storage losses are evaporative losses through rim seals, deck fittings, and or deck seams. Floating roof storage tanks move vertically on slotted guide pole legs. VOCs escape from gaps at the juncture of the roof and legs. Working losses, including landing losses,[63] are due to changes in the stored liquid levels due to filling and draining operations. There are several control techniques now available to limit emissions due to standing storage and working losses including vapor recovery systems, retrofitting slotted guide poles with covers or sleeves, retrofitting to domed roof, and lower landing heights.

New Jersey's amendments include the following:

- Cover or dome external floating roof tanks;
- Implement measures to reduce VOC emissions emitted during degassing, cleaning, and landing operations, and from slotted guide poles;
- Apply to existing tanks the NSPS for floating roof seal and deck fitting specifications; and tank preventive inspection and maintenance requirements.

State Rules: Area Sources

Portable Fuel Containers (PFCs):

The NJDEP adopted amendments to N.J.A.C. 7:27-24, on May 3, 2004 and December 1, 2008, which regulate VOC emissions from PFCs. PFCs are designed for transporting and storing fuel from a retail distribution to a point of use and the eventual dispensing of the fuel into equipment. Commonly referred to as "gas cans," these products come in a variety of shapes and sizes with nominal capacities ranging in size from less than one gallon to over six gallons. VOC emissions from PFCs are classified by five different activities: transport-spillage, diurnal emissions, permeation, and equipment refueling vapor displacement and spillage emissions. Diurnal evaporative emissions are the largest category. Diurnal evaporative emissions are evaporative emissions resulting from the daily cycling of ambient temperatures.

Specifically, the New Jersey rule contains requirements that address VOC emissions from PFCs, effective January 1, 2005 and 2009. The rule requires that PFCs and/or spouts be equipped with an automatic shut-off device, an automatic device that closes and seals when it is removed from the fuel tank and sets a permeability limit. The rule also requires that a PFC have a fuel flow rate and fill level standards. The USEPA promulgated a similar Federal rule with an effective date of January 1, 2009.

State Rules: Onroad Mobile Sources

IM: Diesel Smoke Cutpoint:

The NJDEP adopted amendments to N.J.A.C. 7:27 - 14.2, 14.4, 14.6, and 7:27B - 4.5 on April 3, 2009, which reduce the allowable smoke from heavy-duty diesel vehicles during inspections. 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. Newer trucks are equipped with emission control equipment which reduces the exhaust emissions. Smoke opacity is an indicator that maintenance is needed.

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[63] "Landing losses" refer to emissions that occur from floating-roof tanks whenever the tank is drained to a level where its roof rests on its deck legs (or other supports).

IM: Heavy Duty OBD:

The NJDEP adopted amendments to N.J.A.C. 7:27 – 14, 15, and N.J.A.C. 7:27B-4, B-5 on September 9, 2016, which added on-board diagnostic (OBD) inspection and maintenance requirements for heavy duty vehicles. OBD equipment monitors the status of vehicle emission controls and engine performance, alerting the driver via a dashboard indicator if there is a vehicle malfunction. The rules require heavy duty vehicles with OBD systems installed, model years 2014 and newer, to pass an OBD inspection every year for commercial vehicles and every two years for passenger vehicles. The estimated start date of the program is in 2022.

Beginning March 2, 2020, the New Jersey Motor Vehicle Commission (NJMVC) began a pilot program for the roadside inspections of medium duty diesel vehicles (MDDVs). The pilot will be conducted in cooperation with the NJDEP and with the aid of the New Jersey State Police. The primary purpose of these inspections will be to obtain data to determine a rate of compliance for all diesel-powered motor vehicles, whether registered “Commercial” or “Passenger,” with gross vehicle weight ratings between 8,501 lbs. to 17,999 lbs. and subject to the State’s self-inspection program and emission laws.

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.[64] The rule requires all new vehicles offered 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.

State Voluntary Mobile Measures

Emission reduction estimates in this section are not being relied on to meet any required SIP milestones but support the States goal of ozone attainment.

Transportation Control Measures (TCMs)

An important class of mobile source control measures which States are authorized to implement is Transportation Control Measures (TCMs). TCMs are transportation strategies, specific to mobile sources, which reduce emissions by reducing the number and/or length of vehicle trips and/or improve traffic flow. After the passage of the CAA Amendments of 1990, New Jersey made a full-scale commitment to TCMs. To this day New Jersey’s transportation capital program continues to stress transit projects, system preservation, and systems management over the provision of new highway capacity. The NJDOT has continued to commit to the support and implementation of air quality-friendly transportation projects and programs.

Transportation Management Associations (TMAs) are non-profit organizations that work with businesses, commuters, county and local governments, and state agencies to implement programs that reduce traffic congestion and improve air quality. There are eight TMAs currently operating in the state of New Jersey. Seven TMAs operate in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area. They are: EZRide (Meadowlink), TransOptions, Ridewise of Raritan Valley, Keep Middlesex Moving, HART Commuter Information Services, Greater Mercer TMA and Hudson TMA. The eighth TMA is the Cross County Connection. TMAs carefully apply selected approaches to facilitating the movement of people and goods

[64] 38 N.J.R. 497(b) (January 17, 2006).

within an area. NJTPA coordinates the activities of the TMAs within the NJTPA region. In New Jersey, many TCMs are organized and operated by the TMAs with additional assistance from NJTPA on more encompassing projects (such as ride match services.) Details on these TCM programs are available on the web sites for each of the TMAs.

North Jersey Transportation Planning Authority Transportation Clean Air Measures

The NJTPA is currently soliciting proposals for grants under the FY 2021-2023 Congestion Mitigation and Air Quality (CMAQ) Program, supported by federal CMAQ funds allocated to northern New Jersey. The purpose of this competitive program is to advance readily implementable and innovative projects and services that improve air quality and reduce congestion in the NJTPA's air quality maintenance and non-attainment areas. Eligible activities program falls under two categories: Local Mobility Initiatives (Shuttle Services) and Transportation Clean Air Measures (TCAMs). Examples of recent TCAM funded projects include:

- NJ Transit Locomotive Idle Reduction Program – Greater than $350k project that resulted in reductions of VOCs, NO_x, PM2.5 and GHGs.
- Port Authority of New York and New Jersey/CSX Railroad Project – A $3M diesel freight locomotive retrofit/replacement program.
- NJ Clean Construction Program – See description below.
- Truck Replacement Program – See description below.

Truck Replacement Program

The North Jersey Regional Truck Replacement Program will continue to make grant incentives available to assist private truck owners in the replacement of their old, high-emissions trucks with newer fuel-efficient vehicles because of recent grants from the USEPA. Sponsored by the Port Authority of New York and New Jersey, this private/public partnership with independent truck owner-operators, has replaced numerous trucks from the 1994-1995 model year. The program was initially funded by $13.7 M of CMAQ grants; however, the program was put on hold in 2017 by a presidential "Buy-America" Executive Order (EO) that made the program implementation infeasible. The USEPA's $2 M grant, not subject to the EO, was awarded in February 2019. This added to a previous USEPA grant of $1.75 M. The program pays the owners of trucks with aging engines up to $25,000 to assist them in paying the cost to replace them with 2007-or-newer engines. The USEPA grants to Port Authority of New York and New Jersey since 2017 have been replacing older trucks with trucks that meet USEPA's 2010 heavy duty engine standards. With the USEPA grants it is estimated that it will be possible to remove all trucks with engines made in 1994 and 1995 from the port and some from 1996.

NJ Clean Construction Program

The New Jersey Clean Construction Program is implemented by the NJDEP. The New Jersey Clean Construction Program provides funding for the modernization of off-road construction equipment, which provides reductions in particulate matter, VOC and NO_x emissions. Grant money is used to aid in the purchasing of replacement equipment (up to 30 percent of the purchase, not to exceed $100,000). The New Jersey Clean Construction Program prioritizes projects by construction equipment used on projects that are conducted in urban/sensitive areas; construction equipment with the highest use; and older construction equipment. Replacing older equipment with equipment that meets USEPA's Tier 4 standards will achieve approximately 27 tons of NO_x and 1.6 tons of VOC over 20 years starting in 2018. Emissions benefits for the vehicle replacements were calculated using the USEPA Diesel Emission Quantifier (DEQ).

Marine Ferry Repower Program

The Marine Repower Program focuses on replacing older marine diesel engines with new cleaner versions that operate more efficiently and have lower emissions. Marine engines remain in service for far longer than their estimated useful life, which makes it necessary for repower programs to ensure emission reductions. Repowering the marine engines to Tier 3 or Tier 4 when appropriate will achieve lifetime benefits of approximately 2000 tons of NO_x and 100 tons of PM. In addition, more efficient, higher-powered engines reduce fuel consumption by approximately 10%.

Port Authority of New York and New Jersey Cargo Handling Equipment

A Fleet Modernization and Replacement Program for Cargo Handling Equipment is intended to replace yard equipment that serve the Port Authority's marine terminals located in Essex and Union counties with new cleaner burning equipment. This project is sponsored by the Port Authority of New York and New Jersey and was funded by a $2 million federal Congestion Mitigation Air Quality (CMAQ) grant. It incentivizes port tenants to replace their older fleet with new equipment with Tier IV engines or alternative powered equipment, including all electric, diesel electric or hydraulic hybrids, and liquefied or compressed natural gas. Successful applicants can get reimbursed 20% of the purchase price, up to $20,000 per unit replaced. Old equipment must be scrapped.

Idle Reduction Program

The Idle Reduction Program focuses on refrigerated diesel trucks that spend excessive amounts of time idling to keep the truck's contents cool or frozen. This program focuses on electrifying parking spaces at warehouses or distribution centers and retrofitting the diesel auxiliary engines so they can be plugged during loading and unloading or while remaining stationary. Estimated annual benefits in the North Jersey Transportation Planning Authority Planning area are estimated to be 50 tons of NO_x and 12 tons of PM. Additional benefits are the decreased noise levels of 5 to 6 decibels when transitioning from diesel to electric.

Nonroad Mobile Measures in Southern NJ-PA-DE-MD Nonattainment Area:

Forklift Replacements:

The South Jersey Port Corporation (SJPC), in Camden County, New Jersey, an agency of the State of New Jersey, operates and maintains two of the port terminals in this area. Cargo handling equipment, such as forklifts, are essential in the day-to-day operation of the marine terminals along the Delaware River. These forklifts work many hours to keep the cargo moving between ship, rail and highway. SJPC replaced nine of their oldest (31 to 55 years old), highest-use forklifts with new Tier 4 engine forklifts. The new equipment will have a minimum useful life of 20 years, though it is expected that the equipment will be in use for many more years. The project emission benefits are: 56 tons of PM, 108 tons of NO_x, 18 tons of hydrocarbons, and 197 tons of carbon monoxide in the New Jersey portion of the Southern NJ-PA-DE-MD Nonattainment Area. These benefits were calculated with the USEPA Diesel Emissions Quantifier.

EMS Idle Reduction Program:

This program is a pilot program that will focus on ambulances that spend significant time periods in an idling mode of operation. These vehicles idle to ensure that medicine and oxygen kept onboard remain at a constant, cool temperature. This program will provide funding to install small, auxiliary power units that will aid in climate control for the vital contents onboard without having to run the vehicle's larger diesel engine. These vehicles idle in residential neighborhoods most of the day. The small amount of funding is projected to install 17 units on ambulances with an estimated annual emission benefit of 62 lbs of NO_x and 5 lbs of PM.

USEPA Diesel Emission Reduction Act (DERA)

- Retrofit and Replacements

  USEPA allows for up to 25% of funding, not to exceed $100,000 per piece of equipment, to replace old diesel non-road equipment with new Tier 4 equipment or 100% the cost of installation of a diesel retrofit device. This funding is estimated to cover 2 retrofits and 2 equipment replacements with a lifetime estimated statewide benefit of 62 tons of NO_x and 15 tons of PM.

- Marine Repowers

  USEPA allows for up to 40% of funding towards the cost of a repowered marine diesel engine to Tier 3 or better. Marine vessels operate much longer than their estimated useful life therefore funding provides an opportunity for quicker turnover to cleaner and more efficient engines. Funding is estimated to repower 5 vessels with estimated annual benefits of 47 tons of NO_x and 0.3 tons of PM.

Electric Vehicles

New Jersey is supportive of the roll-out of Electric Vehicle (EV) support infrastructure and seeks to encourage greater adoption of EVs statewide. NJDEP is prioritizing transportation initiatives that reduce emissions and associated health impacts in communities disproportionally impacted by pollution.

Enacted in 2004, a significant state measure that encourages the purchase of EVs is the New Jersey Sales and Use Tax Act (N.J.S.A. 54:32B-8.55) that provides a sale and use tax exemption for zero emission vehicles (ZEVs), which are vehicles certified pursuant to the California Air Resources Board zero emission standards for the model year. NJ is the only state to offer a sales tax exemption for electric vehicles.

In place since 2016, NJDEP's grant program for electric vehicle charging stations, It Pay$ To Plug In, has allocated more than $4 million for electric vehicle charging station grants. NJDEP has also conducted numerous electric vehicle ride-and-drive events, and actively participates in the regional Drive Change. Drive Electric campaign to help raise consumer awareness about the benefits of clean vehicles.

Additional new measures are discussed in Section 3.4

Federal Rules: Point and Area Sources

Boiler/Process Heater NESHAP:

The Federal Industrial/Commercial/Institutional (ICI) Boilers and Process Heaters NESHAP rule promulgates national emission standards for the control of hazardous air pollutants (HAP) for new and existing industrial, commercial, and institutional (ICI) boilers and process heaters at major HAPs sources. The final rule was published in the Federal Register in January 2013 and requires existing major sources to comply with the standards by January 2016. In addition, there is an area source Boiler NESHAP rule that requires tune-ups for smaller boilers. It is expected that many boilers that burn coal or oil will be replaced by new natural gas boilers because of the rule. The expected co-benefit for criteria air pollutants at these facilities is expected to be significant.

New Jersey adopted amendments to rules regulating boilers on October 17, 2005 and on April 20, 2009 at N.J.A.C. 7:27-19.7. The amendments revised the NO_x emission limits for both point and area source ICI boilers and required boiler tune-ups for point and area source boilers. Under the 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 and boilers greater than 5 MMBtu/hr are required to have annual tune-ups.

Due to New Jersey already having stringent boiler rules in place prior to 2011, minimal reductions are expected from the Federal rule in New Jersey after 2011.

Natural Gas Turbine NSPS:

The NSPS for stationary combustion turbines are outlined in the Code of Federal Regulations under 40 CFR Part 60 Subparts GG and KKKK. Subpart GG covers turbine engines that commenced constructed after October 3, 1977 and before February 18, 2005. Subpart KKKK covers both the combustion turbine engine and any associated heat recovery steam generator for units that commenced construction after February 18, 2005. The key pollutants USEPA regulates from these sources includes NO_x and sulfur dioxide (SO_2).

In 2006, USEPA promulgated standards of performance for new stationary combustion turbines in 40 CFR subpart KKKK. The standards reflect changes in NO_x emission control technologies and turbine design since standards for these units were originally promulgated in 40 CFR part 60, subpart GG. The 2006 NSPSs affecting NO_x and SO_2 were established at levels that bring the emission limits up-to-date with the performance of current combustion turbines. Stationary combustion turbines were also regulated by the NO_x SIP Call, which required affected gas turbines to reduce their NO_x emissions by 60 percent.

On August 29, 2012, USEPA proposed to amend the NSPS for stationary gas turbines (40 CFR 60 Subpart GG) and stationary combustion turbines (40 CFR 60 Subpart KKKK) in response to a petition for reconsideration. The proposed amendments are intended to clarify the intent in applying and implementing specific rule requirements. Those affected by this proposed rule include owners or operators of stationary combustion turbines on which construction, modification or reconstruction began after 18 February 2005 and that have a base load rating equal to or greater than 2.9 megawatts (MW) (10 million British thermal units per hour [MMBtu/h]). The proposed amendments would increase the environmental benefits of the existing requirements because the emission standards would apply at all times. The proposed amendments would also promote efficiency by recognizing the environmental benefit of combined heat and power and the beneficial use of low energy content gases.

Reciprocating Internal Combustion Engine (RICE) NSPS:

The CAA requires USEPA to set NSPS for stationary internal combustion engines, which are generally diesel engines. The standards must consider available emission control technologies and costs of control. On July 11, 2006, USEPA issued standards of performance for stationary reciprocating internal combustion engines. These engines are used at facilities such as power plants, and chemical and manufacturing plants, to generate electricity and to power pumps and compressors. They are also used in emergencies to produce electricity and to pump water for flood and fire control. The final standards, limited emissions of NO_x, PM, SO_2, CO, and hydrocarbons (HC) from stationary RICE to the same stringent levels required by USEPA's nonroad diesel engine regulations. The final rule also limited the amount of sulfur in the diesel fuel used to run these engines.

In June 2011, USEPA amended the standards to align emission limits for certain categories of stationary internal combustion engines with similar sized engines used in marine applications. These amendments are effective in 2016.

<u>RICE NESHAP:</u>

USEPA developed control factors for three NESHAP rulemakings for RICE. These rules reduce HAPs from existing and new RICE sources. In order to meet the standards, existing sources with certain types of engines will need to install controls. In addition to reducing HAPs, these controls have co-benefits that also reduce CAPs, specifically, CO, NO_x, VOC, PM, and SO_2. The RICE NESHAP rules apply to both point and area sources. These rules are effective in 2017.

<u>Federal Rules: Point Sources</u>

<u>EGUs: CSAPR:</u>

On July 6, 2011, the USEPA finalized the Cross-State Air Pollution Rule (CSAPR) to address air pollution from upwind states that crosses state lines and affects air quality in downwind states. This rule requires certain states in the eastern half of the U.S. to improve air quality by reducing power plant emissions that cross state lines and contribute to smog and soot pollution in downwind states. The CSAPR replaced USEPA's 2005 Clean Air Interstate Rule (CAIR), following the direction of a 2008 court decision that required EPA to issue a replacement regulation. Several amendments to the rule followed. The CSAPR is discussed in detail in Chapter 8.

<u>EGUs: Mercury and Air Toxics Standards:</u>

On December 16, 2011, the USEPA promulgated the Mercury and Air Toxics Standards (MATS) to reduce emissions of toxic pollutants from power plants. The MATS are national CAA standards to reduce mercury and other toxic emissions from new and existing coal- and oil-fired electric utility steam generating units (EGUs). The standards will reduce emissions of metals, including mercury (Hg), arsenic (As), chromium (Cr) and nickel (Ni), acid gases, including hydrogen chloride (HCl) and hydrogen fluoride (HF). Emission controls to reduce air toxics will also reduce emissions of PM2.5 and SO_2. The MATS rule includes revisions to the Federal NSPS for new fossil fuel-fired electric generating units, including revised numerical emission limits for PM, SO_2, and NO_x.

Existing sources have 4 years, if needed, to comply with MATS. The USEPA estimates that there are approximately 1,400 units affected by this action, which includes approximately 1,100 existing coal-fired units and 300 oil fired units at about 600 power plants. USEPA listed 73 facilities in New Jersey, Pennsylvania, Delaware, New York and Connecticut that could potentially be affected by the MATS.

Process Heater NSPS:

Process heaters are used throughout refineries and chemical plants to raise the temperature of feed materials to meet reaction or distillation requirements. Fuels are typically residual oil, distillate oil, refinery gas, or natural gas. In some sense, process heaters can be considered as emission control devices because they can be used to control process streams by recovering the fuel value while destroying the VOC. The criteria pollutants of most concern for process heaters are NO_x and SO_2.

In 2011, process heaters have not been subject to regional control programs like the NO_x SIP Call, so most of the emission controls installed at refineries and chemical plants have resulted from RACT regulations that were implemented as part of SIPs to achieve ozone NAAQS compliance in specific nonattainment areas, and from refinery consent decrees. The boiler/process heater NSPS established NO_x emission limits for new and modified process heaters. The boiler/process heater NSPS established NO_x emission limits for new and modified process heaters.

Refinery Consent Decrees:

The USEPA and various state and local agencies negotiated Consent Decrees with certain 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 Detection and Repair (LDAR), and Benzene/Wastewater. The New Jersey refineries with settlements included Sunoco (now closed), Hess (now closed and owned by Buckeye), Valero and ConocoPhillips.

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 several refineries that are owned by the same firm. Therefore, the companies decide which individual boilers/heaters to control and the control techniques to apply.

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. The Consent Decrees have various phase-in dates.

Federal Rules: Area Sources

Residential Woodstove NSPS:

On February 3, 2015, the USEPA strengthened its clean air standards for residential wood heaters to make new heaters significantly cleaner and improve air quality in communities where people burn wood for heat. The updates, which are based on improved wood heater technology, strengthen the emissions standards for new woodstoves, while establishing the first ever Federal air standards for several types of previously unregulated new wood heaters, including outdoor and indoor wood-fired boilers (also known as hydronic heaters), and indoor woodburning forced air furnaces. The rule will not affect existing woodstoves and other wood-burning heaters currently in use in people's homes.

Federal Rules: Onroad Mobile Sources

Heavy Duty Vehicle Standards and Diesel Fuel Sulfur Control[65]:

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 even cleaner engines, reducing air pollution from trucks and buses by another 90 percent. The USEPA issued the final rule, to take effect in 2006-2010 on January 18, 2001.[66]

National Low Emission Vehicle Program (NLEV):

The NLEV[67] 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 committed to participate in the NLEV Program ending with model year 2006, except as provided in 40 CFR. §86.1707. However, if by no later than December 15, 2000, the USEPA did not adopt standards at least as stringent as the NLEV standards for model years 2004, 2005 or 2006, the State's participation in NLEV would extend only until the model year 2004. The USEPA promulgated its Tier 2 new motor vehicle standards commencing with model year 2004 on February 10, 2000. These standards are more stringent than the NLEV standards provided for in 40 CFR Part 86, subpart R. As such, New Jersey's participation in the NLEV program extended through model year 2006, after which New Jersey came under the Federal Tier 2 program.

Tier 1 Vehicle Program:

Pursuant to 42 U.S.C. §7521, the USEPA promulgated regulations which revised the tailpipe/extended useful life standards of the Federal Motor Vehicle Control Program (FMVCP) for light duty vehicles and light duty trucks.[68] 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[69] levels for light-duty vehicles and light-duty trucks, as well as new vehicle weight classes. The regulation affected petroleum and methanol fueled motor vehicles.

Tier 2 Vehicle Program/Low Sulfur Fuels:

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[65] For more information, see the USEPA's Office of Transportation and Air Quality web site at http://www.epa.gov/otaq/hd-hwy.htm.
[66] 66 Fed. Reg. 5002 (January 18, 2001).
[67] For more information on NLEV, see USEPA website at http://www.epa.gov/otaq/lev-nlev.htm.
[68] 56 Fed. Reg. 25724 (June 5, 1991).
[69] Useful life is the number of years that the vehicle is expected to be in use.

On February 10, 2000, the USEPA promulgated rules for its comprehensive Tier2/Low Sulfur Gasoline program.[70] 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 - 2007.

Tier 3 Motor Vehicle Emission and Fuel Standards:

On April 28, 2014, the USEPA promulgated Tier 3 motor vehicle emissions and fuel standards.[71] The Tier 3 program is part of a comprehensive approach to reducing the impacts of motor vehicles on air quality and public health. The program considers the vehicle and its fuel as an integrated system, setting new vehicle emissions standards and a new gasoline sulfur standard beginning in 2017. The vehicle emissions standards will reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. The lower gasoline sulfur standard will enable more stringent vehicle emissions standards and will make emissions control systems more effective.

Federal Rules: Nonroad Mobile Sources

Diesel Compression Ignition Engines:

In June 1994, the USEPA promulgated regulations to control VOC, NO_x and carbon monoxide emissions from diesel-powered compression ignition engines at or greater than 50 horsepower (hp) (i.e., bulldozers).[72] These Tier 1 standards phased in from 1996 to 2000. In October 1998, the USEPA promulgated regulations to control VOC, NO_x and carbon monoxide (CO) emissions from diesel-powered compression ignition engines for all engine sizes.[73] 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.[74] The new Tier 1 standards were phased in between the years 1999 and 2000, Tier 2 standards between 2001 and 2006, Tier 3 between 2006 and 2008, and Tier 4 standards between 2011 and 2015.

Diesel Marine Engines over 37 KW (Commercial Marine Engines)[75] :

In December 1999, the USEPA promulgated regulations for commercial marine diesel engines over 37 kilowatts (kW), including engines with per cylinder displacement up to 30 liters.[76] 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

[70] 65 Fed. Reg. 6698 (February 10, 2000).
[71] 79 Fed. Reg. 23414 (April 28, 2014).
[72] 59 Fed. Reg. 31306 (June 17, 1994).
[73] 63 Fed. Reg. 56968 (October 23, 1998).
[74] 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.
[75] 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.
[76] 64 Fed. Reg. 73300 (December 29, 1999).

with per cylinder displacement between 2.5 and 30 liters.[77] 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 - specific displacement greater than or equal to 5, but less than 30 liters per cylinder. These engines are primarily found in tug and towboats. In February 2003, the USEPA promulgated regulations for commercial marine diesel engines at or above 30 liters per cylinder.[78] This rule established Tier 1 NO_x emission standards to meet the International Maritime Organization (IMO) Annex VI to the International Convention for the Prevention of Pollution from ships (also called MARPOL) requirements for Category 3 marine diesel engines. These standards apply to new Category 3 marine diesel engines manufactured January 1, 2004 or later. These engines range in size from about 2,500 to 70,000 kilowatts (3,000 to 100,000 horsepower). These are very large marine diesel engines used for propulsion power on ocean-going vessels such as container ships, oil tankers, bulk carriers, and cruise ships.

On April 30, 2010, the USEPA adopted new standards to regulate new Category 3 marine diesel engines which are equivalent to the current MARPOL ANNEX VI standards.[79] These standards add two new tiers of NO_x emission standards and fuel sulfur limits. The Tier 2 standards will begin in 2011 and the Tier 3 standards will begin in 2016. Also, new fuel requirements will generally forbid the production and sale of other fuels above 1,000 ppm sulfur for use in most U.S. waters.

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.

On November 8, 2002, the USEPA adopted new standards to regulate these engines.[80] 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.

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. Finally, the rule also includes special standards to allow for measuring emissions without removing engines from equipment.

Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder:

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[77] 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.
[78] 68 Fed. Reg. 9746 (February 28, 2003).
[79] 75 Fed. Reg. 22896 (April 30, 2010).
[80] 67 Fed. Reg. 68241 (November 8, 2002).

In April 1998, the USEPA adopted three sets of emission standards for locomotives, with applicability of the standards dependent on the date a locomotive is first manufactured.[81] The first set of standards (Tier 0) applies to locomotives and locomotive engines originally manufactured from 1973 through 2001, any time they are manufactured or remanufactured. The second set of standards (Tier 1) apply to locomotives and locomotive engines originally manufactured from 2002 through 2004. These locomotives and locomotive engines will be required to meet the Tier 1 standards at the time of original manufacture and at each subsequent remanufacture. The final set of standards (Tier 2) applies to locomotives and locomotive engines originally manufactured in 2005 and later. Tier 2 locomotives and locomotive engines will be required to meet the applicable standards at the time of original manufacture and at each subsequent remanufacture.

On June 30, 2008, the USEPA adopted more stringent exhaust emission standards for locomotives and marine diesel engines less than 30 liters per Cylinder.[82] The standards include: tightening emission standards for existing locomotives and marine vessels 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 after treatment technology. The USEPA is also proposing provisions to eliminate emissions from unnecessary locomotive idling.

The standards for remanufactured locomotives and marine vessels 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.

Recreational Vehicles: Recreational vehicles include snowmobiles, off-highway motorcycles, and all-terrain-vehicles (ATVs). In November 2002, the USEPA adopted new standards to regulate nonroad recreational engines and vehicles.[83] These new engine standards were phased in from 2006 through 2012.

Spark Ignition Engines, Equipment, and Vessels at or below 19 kW (Lawn and Garden and Small Watercraft):

In July 1995, the USEPA promulgated the first phase of its regulations to control emissions from most new handheld and nonhandheld nonroad spark ignition engines that have a gross power output at or below 19 kilowatts.[84] This regulation established VOC and carbon monoxide emission standards beginning in model year 1997[85] for 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.

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81 63 Fed. Reg. 18978 (April 16, 1998).
82 73 Fed. Reg. 37096 (June 30, 2008).
83 67 Fed. Reg. 68242 (November 8, 2002).
84 60 Fed. Reg. 34582 (July 3, 1995).
85 Ibid; Model year 1997 is defined as “The 1997 model year will run from January 2, 1996 to December 31, 1997.”

In October 1996, the USEPA promulgated regulations applicable to new gasoline spark ignition marine engines that established VOC and NO_x standards. These new standards were phased in between the years 1998 to 2006.[86]

In March 1999, the USEPA promulgated Phase 2 regulations to control emissions from new nonroad spark ignition engines.[87] 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 April 2000, the USEPA promulgated additional Phase 2 regulations to control emissions from new nonroad spark ignition engines.[88] This regulation established tighter VOC, $NO_{x,}$ and CO standards for handheld equipment such as string trimmers (i.e., weedwhackers), leaf blowers and chainsaws. The new standards were phased in between the years 2002 to 2007 with an allowance for small volume engine manufacturers to meet these standards from 2008 to 2010.

On October 8, 2008, the USEPA promulgated new rules that would set stricter standards for most lawn and garden equipment and small recreational watercraft.[89,90] 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. The new standards would apply as early as 2010 to 2011 for watercraft and 2011 to 2012 for most lawn and garden equipment (under 25 horsepower). This proposed rule also includes fuel evaporative standards for all the types of equipment and watercraft covered in the rulemaking to be phased in between 2009 to 2016.

3.3 CAA Required Control Measures

3.3.1 Motor Vehicle Inspection and Maintenance Program Certification

In 1974, New Jersey was among the first inspection and maintenance (IM) programs in the nation to implement mandatory emissions testing for motor vehicles, primarily in response to the CAA of 1970. Early generations of this vehicle testing program were basic IM programs that relied for the most part on exhaust emission testing using an idle test, which measured emissions in tailpipe exhaust while the vehicle was at idle. New Jersey’s IM program remained largely unchanged, with only minor updates in equipment and test standards, from 1974 until 1999. The CAA Amendments of 1990 Section 182(c)3 for serious areas (182(b)(4) for moderate areas), required that certain areas in serious nonattainment of NAAQS for certain criteria pollutants implement an “enhanced” IM program; later codified in 1992 in USEPA regulations that prescribed the required elements of an enhanced IM program. New Jersey, to which the requirements applied, first promulgated rules to implement an enhanced program in 1995. This was followed by a series of rule amendments that further modified and defined the program. New Jersey vehicles were first subject to testing under the enhanced IM program in December 1999. The program was more than just an idle test and included such major changes as the dynamometer-based ASM5015 testing and gas cap testing. In 2003, on-board diagnostics (OBD) testing was added for newer vehicles. The IM program is jointly implemented by the Department and the Motor Vehicle Commission (MVC).

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[86] 61 Fed. Reg. 52088 (October 4, 1996).
[87] 64 Fed. Reg. 15207-15208 (March 30, 1999).
[88] 65 Fed. Reg. 24268 (April 25, 2000).
[89] 73 Fed. Reg. 59034 (October 8, 2008).
[90] 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.

There are four categories of vehicles that are subject to the enhanced IM program: light and heavy-duty gasoline-fueled vehicles, and light and heavy-duty diesel-powered vehicles. Within each category are commercial and non-commercial vehicles.

On April 3, 2009 and September 9, 2016, New Jersey adopted amendments to its enhanced IM Program. These amendments were shown to be consistent with New Jersey's SIP and its efforts to meet and/or maintain the 75 ppb ozone NAAQS. The April 3, 2009 amendments were approved by USEPA on March 15, 2012.[91] USEPA proposed approval of the September 9, 2016 amendments on October 6, 2017 and they were approved on May 9, 2018.[92,93]

New Jersey certifies that its rules at N.J.A.C. 7:27-14 and 15, N.J.A.C. 7:27B-4 and B-5 and the Motor Vehicle Commission (MVC) rules at N.J.A.C. 13:20-43, satisfy Federal requirements for an enhanced motor vehicle IM Program for the 2008 75 ppb 8-hour ozone NAAQS.

3.3.2 Phase II Vapor Recovery Program Certification

New Jersey adopted its first statewide Phase II (also referred to as Stage II) vapor recovery rules in 1988 based on the California program. California started developing vapor recovery control rules and programs in 1975. The 1990 CAA, sections 182(b)(3), (c), (d), and (e) or 42 U.S.C. 7511a(b)(3), 7511a(c), 7511a(d) and 7511a(e), required Phase II gasoline vapor recovery systems as an emissions control measure in areas that were classified as "moderate", "serious," "severe," and "extreme" nonattainment with the ozone NAAQS (serious and above after 1994.) USEPA approved New Jersey's Phase II rules at N.J.A.C. 7-27-16.3 on March 26, 1991.[94] New Jersey adopted amendments to its Phase II rules which were effective June 2, 2003. USEPA approved those amendments on August 2, 2004.[95]

Vapor recovery systems are installed at gasoline dispensing facilities to control hydrocarbon emissions from gasoline vapors during the delivery and dispensing of gasoline. These systems are comprised of two Phases, Phase I and Phase II (also referred to as Stage I and Stage II). Phase I systems control the emissions of gasoline vapors during the transfer of gasoline from the tanker truck to the gasoline dispensing facility storage tank by returning the vapors back to the truck. Phase II systems are designed to capture gasoline vapors displaced from the vehicle fuel tank during refueling and transport those vapors through the nozzle and vapor return lines back to the storage tank.

The CAA required two types of controls for capturing gasoline vapor during vehicle refueling: Phase II vapor recovery systems, and onboard refueling vapor recovery (ORVR) systems. The purpose of ORVR is to collect gasoline refueling emissions from within the vehicle fuel tank. During refueling, a carbon canister in the vehicle captures the fuel tank vapors and later releases them to the engine for combustion. CAA Section 202(a)(6), 42 U.S.C. 7521(a)(6) requires USEPA to develop standards for ORVR controls on light-duty vehicles and provides for the Phase-in of the ORVR requirement. On April 16, 1994, USEPA promulgated regulations setting standards for and requiring the Phase-in of ORVR controls on new vehicles. Installation of ORVR systems was Phased in over the 1998 to 2006 vehicle model years.

Congress recognized that ORVR and Phase II would eventually become largely redundant technologies and provided authority to the USEPA to allow states to remove Phase II from their SIPs after the USEPA finds that ORVR is in widespread use. Effective May 16, 2012, the

[91] 77 Fed. Reg. 15263 (March 15, 2012)
[92] 82 Fed. Reg. 46742 (October 6, 2017).
[93] 83 Fed. Reg. 21174 (May 9, 2018)
[94] 56 Fed. Reg. 124500 (March 26, 1991)
[95] 69 Fed. Reg. 40321 (August 2, 2004)

USEPA waived the CAA Phase II requirements after determining that ORVR is in widespread use. However, the widespread use date is not equivalent to a date where there is zero emission impact in every state. In order to remove existing Phase II requirements, states are required to do a state specific demonstration and have a USEPA-approved SIP revision in accordance with the demonstration requirements outlined in the widespread use rule (77 FR 28772, May 16, 2012) and USEPA's 2012 Guidance (Guidance on Removing Stage II Gasoline Vapor Control Programs from State Implementation Plans and Assessing Comparable Measures, EPA-457/B12-001, August 07, 2012).

The NJDEP proposed revisions to New Jersey's Phase II rules and SIP on July 3, 2017. This proposal can be found at: http://www.state.nj.us/dep/baqp/sip/siprevs.htm. The final rules are effective November 20, 2017 (49 N.J.R. 3590). A copy of the rule adoption can be found at: http://www.state.nj.us/dep/aqm/adopt.html. USEPA approved NJDEP's SIP Revision on June 18, 2020.

New Jersey certifies that its Phase II vapor recovery rules at N.J.A.C. 7-27-16.3, and associated amendments and SIP revision, are in accordance with Federal requirements for the 2008 75 ppb 8-hour ozone NAAQS.

3.4 Additional New Control Measures to Address Ozone Nonattainment

RACM

New Jersey is in the process of proposing the following rules to address emissions of NO_x and VOCs.

- Aftermarket Catalytic Converters: The proposed rule will reduce NO_x emissions from light-duty, gasoline-fueled vehicles in need of a replacement catalytic converter that is no longer under warranty by incorporating an Ozone Transport Commission (OTC) model rule that prohibits the sale or installation of any aftermarket catalytic converter unless it is certified via a CARB Executive Order or is an original equipment manufacturer (OEM) converter. It is anticipated that the NO_x reductions from this rule will be about three tons per day.

- Architectural and Industrial Maintenance Coatings: The proposed rules will control VOC emissions from architectural and industrial maintenance coatings by incorporating amendments that are based on the 2011OTC model rule and the 2007 California Air Resource Board suggested control measure. The proposed rules will lower the VOC content for several coating categories. It is anticipated that the VOC reductions from this rule will be about six tons per day.

- Consumer Products: The proposed rules will control VOC emissions from consumer products by incorporating amendments that are based upon the 2010 and 2012 OTC model rules. The proposed rules will incorporate VOC limits for several new categories of products and will lower the VOC limits for several existing categories of products. It is anticipated that the VOC reductions from this rule will be about five tons per day.

Clean Energy

New Jersey is a national leader in reducing emissions from the electric power sector. In recent years New Jersey has implemented several measures that will increase renewable energy, thereby resulting in further reductions in ozone precursor emissions from the New Jersey electric power sector. These measures include:

- Offshore Wind Goals: Governor Murphy signed two Executive Orders[96] that directed all New Jersey state agencies with responsibilities under the Offshore Wind Economic Development Act to fully implement it. The Orders also established goals to increase New Jersey's offshore wind power to 7,500 megawatts by 2035.

- Rejoining the Regional Greenhouse Gas Initiative (RGGI): RGGI is the first mandatory market-based program in the United States to reduce greenhouse gas emissions from the power sector. New Jersey's participation in RGGI is part of Governor Murphy's goal to achieve 100% clean energy by 2050. On June 17, 2019 New Jersey formally rejoined RGGI when the Department adopted two rules[97]. The rules govern New Jersey's reentry into the RGGI auction and distribution of the RGGI auction proceeds.

- Clean Energy Act: On May 23, 2018 Governor Murphy signed the New Jersey Clean Energy Act (P.L.2018, c.17). The Clean Energy Act takes several critical steps to improve and expand New Jersey's renewable energy programs. These include strengthening New Jersey's Renewable Portfolio Standard by requiring 35% renewable power by 2025 and 50% renewable power by 2030, requires energy efficiency measures to reduce electricity usage by 2% and natural gas usage by 0.75%, and codifies goals for offshore wind and energy storage.

Electric Vehicles

In addition to the measures discussed in Section 3.2, significant recent measures have been enacted by New Jersey.

In 2019, NJDEP awarded $24 million in grants to electrify garbage trucks, school buses, NJ TRANSIT buses, and port and airport equipment. Also, in 2019, the NJDEP joined the New Jersey Economic Development Authority and the New Jersey Board of Public Utilities in a Partnership to Plug-In Memorandum of Understanding, which helped dovetail each agency's efforts to electrify the transportation sector.

DEP's, It Pay$ to Plug In, electric vehicle charging program provides reimbursements for Level 1, Level 2, and limited DC fast charging infrastructure. This grant program offsets costs to purchase and install charging stations, which encourages the purchase of electric vehicles. One of the biggest obstacles to electric vehicle ownership is range anxiety, therefore funding electric vehicle charging stations at workplaces and around the state provides confidence that a charger is never too far away. Reimbursements vary depending on location type and the amount of charging ports installed. CMAQ funding for this program has been provided by all 3 Metropolitan Planning Organizations.

In 2020, NJDEP announced it will fund approximately $37.2 million worth of projects converting old diesel trucks, buses, port equipment, marine vessels, and trains to electric power. In

[96] Executive Order No. 8, January 31, 2018; Executive Order No. 92, November 19, 2019.
[97] 51 N.J.R. 992(a) and 51 N.J.R. 1043(a), June 17, 2019.

addition, NJDEP will dedicate an additional $7.6 million for electric vehicle charging infrastructure, including fast chargers, throughout the state. This represents the remaining balance of the Volkswagen Mitigation Trust allocated to NJDEP.

On January 17, 2020 Governor Murphy signed landmark legislation that established goals and incentives for the increased use of plug-in electric vehicles in New Jersey. This legislation establishes New Jersey as a leader in attracting electric vehicles to the state thereby making significant contributions to the attainment of existing air pollution and energy goals. The act, which took effect immediately, includes the following:

1. Goals: the following goals were established for the use of plug-in electric vehicles and the development of plug-in electric vehicle charging infrastructure (EVSE) in New Jersey:
   - At least 330,000 of the total number of registered light duty vehicles in the State shall be plug-in electric vehicles by December 31, 2025;
   - At least 2 million of the total number of registered light duty vehicles in the State shall be plug-in electric vehicles by December 31, 2035;
   - At least 85 percent of all new light duty vehicles sold or leased in the State shall be plug-in electric vehicles by December 31, 2040;
   - By December 31, 2025, at least 400 DC Fast Chargers shall be available for public use at no fewer than 200 charging locations in the State,
   - By December 31, 2025, at least 1,000 Level Two chargers shall be available for public use across the State;
   - By December 31, 2025, at least 15 percent of all multi-family residential properties in the State shall be equipped with EVSE for the routine charging of plug-in electric vehicles by residents, and this rises to 30 percent by December 31, 2030;
   - By December 31, 2025, 20 percent of all franchised 46 overnight lodging establishments shall be equipped with EVSE for routine electric vehicle charging by guests of the establishment, and this rises to 50 percent by December 31, 2030.

2. State Purchases: requires the purchases of electric buses by New Jersey Transit and light-duty plug-in electric vehicles by State departments.

3. Financial Incentives: financial incentives were established for the purchase of plug-in electric vehicles and home charging equipment. The financial incentives for the purchase of plug-in electric vehicles are not less than $30 million in disbursements each year for 10 years. Eligible vehicles must have a price (MSRP) below $55,000.

4. Consumer Education: a consumer education program was established to provide a program to educate consumers about the availability and benefits of plug-in electric vehicles, the State goals for plug-in electric vehicle deployment and the availability of financial incentives.

Protecting Against Climate Threats (PACT)

In addition to the above legislation, Governor Murphy signed Executive Order Number 100 on January 27, 2020 that initiated a targeted regulatory reform effort that will modernize New Jerseys environmental laws. This effort is referred to as: Protecting Against Climate Threats (NJ PACT). NJ PACT will usher in systemic change, modernizing air quality and environmental land use regulations, that will enable governments, businesses and residents to effectively respond to current climate threats and reduce future climate damages.

As a national leader in environmental protection, over the next two years, the NJDEP will create a regulatory roadmap for other states to follow to reduce emissions, build resilience, and adapt to a changing climate. Specifically, the NJDEP will:

- Complete a comprehensive accounting of greenhouse gas emissions that will enable New Jersey to focus on priority pollutants and limit them aggressively to meet our goals of reducing emissions to 80 percent below 2006 levels by 2050.

- Enact new air pollution regulations that achieve critically needed reductions in carbon dioxide and short-lived climate pollutants (methane, hydrofluorocarbons, and black carbon) (SLCPs) including technology forcing measures that pave the way for a new clean energy economy.

- Reform our environmental land use rules to help New Jersey residents better plan and build resilient communities by avoiding flood-prone areas, reestablishing chronically inundated wetlands, revegetating riparian areas, and encouraging green building and green infrastructure.

- Lead by example by ensuring that projects built with public funds integrate climate resilience measures.

The NJ PACT will strengthen New Jersey's long-term ability to withstand impacts of climate change and will make New Jersey fairer by putting vulnerable communities and future generations at the forefront of new policies. In addition, many of the new air pollution regulations promulgated to address carbon dioxide and SLCPs will also reduce emissions of ozone precursors.

<u>Other Transportation Initiatives</u>

On April 17, 2020, the NJDEP, Board of Public Utilities (BPU) and Economic Development Authority (EDA) jointly released a strategic funding plan for investing the state's auction proceeds from RGGI. New Jersey plans to invest an estimated $80 million each year in programs that reduce both greenhouse gas emissions and criteria pollutants. The funding plan indicates that the lion's share (75%) of this investment will be used for the clean and equitable transportation initiative. The goal of this initiative is to accelerate transportation electrification in the State, focusing on reducing emissions from transportation sources in communities disproportionately impacted by the effects of environmental degradation and climate change.[98]

Finally, New Jersey is taking action in two areas that are important for future reductions in both GHGs and ozone precursor pollutants; the implementation of fuel cell technology and the promotion of ZEVs for medium/heavy duty vehicles.

On June 19, 2020 Governor Murphy signed legislation that establishes a New Jersey Fuel Cell Task Force that will recommend a plan to increase the use of fuel cells in the State, the task

[98] https://nj.gov/rggi/docs/rggi-strategic-funding-plan.pdf

force will issue a yearly report that will include any recommendations for legislative or regulatory action that are necessary to effectuate the plan.[99]

On July 14, 2020 it was announced that New Jersey was one of 15 states and the District of Columbia to sign a memorandum of understanding (MOU).[100] The MOU commits the signers to work collaboratively to advance and accelerate the market for electric medium- and heavy-duty vehicles. The goal is to ensure that 100 percent of all new medium- and heavy-duty vehicle sales be zero emission vehicles by 2050 with an interim target of 30 percent zero emission vehicle sales by 2030. Within six months, a multi-state action plan will be developed to identify barriers and propose solutions to support widespread electrification of medium- and heavy-duty vehicles. As appropriate, the action plan will give consideration to the need for leveraging environmental and air quality benefits associated with adoption of the California Advanced Clean Trucks rule under Section 177 of the Clean Air Act.

Regional Haze "Asks"

The Federal Clean Air Act sets a national goal to restore visibility to its natural conditions in many of the national parks and wilderness areas in the United States of America. New Jersey is home to one of these areas, the Brigantine Wilderness Area in the Edwin B. Forsythe National Wildlife Refuge. Additional measures to control air pollution, including ozone precursors, in New Jersey and other states within its shared ozone nonattainment area, as well as upwind contributing states, have occurred as part of states' Regional Haze State Implementation Plans (SIPs) for the first implementation planning period of 2008-2018. States in the MANE-VU region are currently in various stages of developing Regional Haze SIPs for the second implementation planning period of 2018 -2029. New Jersey submitted its final Regional Haze SIP to USEPA on March 26, 2020. Included in the Regional Haze SIP was a list of "asks" for states that contribute to visibility impairment to consider undertaking as air pollution control measures in their Regional Haze SIPs. The "asks" addressed emissions of SO2 and NO_x from states within and outside of the MANE-VU Region.

The "Asks" include more stringent controls for electric generating units (EGUs) and peaking combustion turbines, evaluation of emission sources to determine reasonable installation or upgrade of emission controls, adoption of MANE-VU's 2007 ultra-low sulfur fuel oil standard, locking in lower emission rates by updating of permits, enforceable agreements, and/or rules, and increased use of energy efficiency measures and other clean technologies including fuel cells, wind, and solar.

The "Asks" also includes a request that the Federal Land Managers consult with MANE-VU Class I area states when scheduling prescribed burns, and EPA to develop measures that will further reduce emissions from heavy-duty onroad vehicles and ensure that Class I Area state "Asks" are addressed by states identified as significantly contributing to MANE-VU Class I areas.

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[99] Senate No. 762, State of New Jersey, 219th Legislature.
[100] https://ww2.arb.ca.gov/sites/default/files/2020-07/Multistate-Truck-ZEV-Governors-MOU-20200714.pdf

Chapter 4 EMISSION INVENTORIES FOR 2008 OZONE NAAQS

4.1 Regional Modeling Air Emission Inventory

To perform this modeling demonstration for the 75 ppb 8-hour ozone NAAQS, two regional air emission inventories were developed to represent the 2011 base inventory and the 2020 projected future grown and controlled inventory. These inventories are referred to as the Gamma modeling inventory for input in the photochemical model.

The modeling inventories include:

1. Annual county-level emissions for criteria air pollutants and their precursors, NO_x, VOC, CO, PM2.5, PM10, SO_2, NH_3, by emission sector for the State and Local agencies included in the Mid-Atlantic Northeastern Visibility Union (MANE-VU) modeling domain shown in Table 4-1;

2. Hourly emissions for the electric generating unit sector consistent with the USEPA's Clean Air Markets Division (CAMD) data for the 2011 base year and projected to 2020 using the ERTAC EGU Projection Tool;

3. Hourly emissions for the onroad sector consistent with USEPA MOVES 2014a and USEPA's 2011 v6.2 and 2011 v6.3 modeling platforms;

4. Temporal allocation profiles, which convert annual emissions to monthly, daily or hourly; The temporal profiles and cross-reference files are consistent with the USEPA's 2011 v6.3 modeling platform, with the exception of the ERTAC EGU, Non-ERTAC IPM EGU, and Non-EGU point sectors;

5. Hourly temporal profiles for the electric generating unit sector consistent with CAMD data;

6. Speciation profiles, which are used to disaggregate the total VOC and PM2.5 emissions to the chemical species expected by the air quality model; The speciation and cross-reference files were taken from USEPA's 2011 v6.3 modeling platform and are based on the Speciate 4.4 database;

7. Spatial allocation profiles, which assign fractions of county-total emissions to the model grid cells intersecting the county based on a "surrogate" data type (e.g., population, housing data); The spatial surrogates for the 12 km domain were extracted from the National Grid 12 km U.S. gridding surrogates provided with USEPAs 2011 V6.3 modeling platform;

8. Biogenic emissions calculated using the BEIS v3.6.1 model;

9. Inventories for other Regional Planning Organizations and Canada by state, region and country. These regions include Central States Air Resource Agencies (CENSARA), Lake Michigan Air Directors Consortium/ Midwest Regional Planning Organization (LADCO/ MWRPO) and Southeastern States Air Resource Managers (SESARM);

Further details about the Gamma modeling inventories can be found in the "Technical Support Document for the 2011 Ozone Transport Commission /Mid-Atlantic Northeastern Visibility Union Modeling Platform," prepared by the Mid-Atlantic Northeastern Visibility Union (MANE-VU

Modeling TSD)) and the Ozone Transport Commission (OTC) and dated October 18, 2018, which is included as Appendix 4-1.

Table 4-1:
States and Regions in the MANE-VU Modeling Domain

REGION	STATE	In Domain
CenSARA	Arkansas	Partial
CenSARA	Iowa	Partial
CenSARA	Louisiana	Partial
CenSARA	Minnesota	Partial
CenSARA	Missouri	Partial
LADCO/MWRPO	Illinois	Yes
LADCO/MWRPO	Indiana	Yes
LADCO/MWRPO	Michigan	Yes
LADCO/MWRPO	Ohio	Yes
LADCO/MWRPO	Wisconsin	Yes
MANE-VU	Connecticut	Yes
MANE-VU	Delaware	Yes
MANE-VU	DC	Yes
MANE-VU	Maine	Yes
MANE-VU	Maryland	Yes
MANE-VU	Massachusetts	Yes
MANE-VU	New Hampshire	Yes
MANE-VU	New Jersey	Yes
MANE-VU	New York	Yes
MANE-VU	Pennsylvania	Yes
MANE-VU	Rhode Island	Yes
MANE-VU	Vermont	Yes
SESARM	Alabama	Partial
SESARM	Georgia	Partial
SESARM	Kentucky	Yes
SESARM	Mississippi	Partial
SESARM	North Carolina	Yes
SESARM	South Carolina	Yes
SESARM	Tennessee	Yes
SESARM	Virginia	Yes
SESARM	West Virginia	Yes

4.1.1 2011 Base Air Emission Modeling Inventory

The base emission inventory year for the attainment demonstration was chosen based on monitoring and meteorological data. Analyses of monitored data and meteorological data concluded that for the MANE-VU region, 2010, 2011 and 2012 were the candidate base years to model for future ozone NAAQS planning. Transport patterns of 2011 ozone events in the region confirmed that using 2011 would be appropriate. Other factors were considered including availability of a USEPA national emission inventory and consistency with the USEPA modeling platform, research data availability, and decisions on modeling base years by USEPA and nearby RPOs. As a result, 2011 was determined to be the best candidate base year for this multi-pollutant modeling platform (Ozone, Regional Haze and PM2.5). Also, at the time that the Northern NJ-NY-CT NAA was reclassified to Serious, the 2011 Gamma modeling platform was and still is the most current and available for preparation of this SIP. More details can be found in the document "Future Modeling Platform Base Year Determination" prepared by the MANE-VU Technical Support Committee October 9, 2013, which is included in Appendix 4-2.

The 2011 air emissions modeling inventory was developed for the MANE-VU domain by each state and included portions of the USEPA emissions inventories and modeling platform. The Mid-Atlantic Regional Air Management Association (MARAMA) coordinated development of the regional inventory and quality assured the inventory data. The 2011 emissions for non-MANE-VU Region areas within the modeling domain were obtained from other Regional Planning Organizations for their corresponding areas. The MARAMA Gamma version of the 2011 base year emission inventory was used in the regional modeling for the MANE-VU region.

A detailed description of the development of the MANE-VU 2011 and 2020 air emissions modeling inventories is included in the "Technical Support Document Emission Inventory Development for 2011 and Projections to 2020 and 2023 for the Northeastern U.S. Gamma Version", prepared by the Mid-Atlantic Regional Air Management Association (MARAMA) and dated January 29, 2018 (MARAMA 2011/2020 TSD). This document can be found in Appendix 4-3 with select document appendices and references. The full document including all appendices and inventory summaries can be found on the MARAMA website at: https://marama.org/technical-center/emissions-inventory/2011-inventory-and-projections/.

Additional details on the development of the New Jersey inventory can be found in Appendices 4-5 through 4-7.

4.1.2 2020 Projection Air Emission Modeling Inventory

The future projection year emission inventory for the attainment demonstration modeling was chosen based on the required attainment date for the 2008 75 ppb 8-hour ozone NAAQS. Based on the moderate reclassification[101] dated May 4, 2016, the Northern NJ-NY-CT Nonattainment Area had an attainment date of no later than July 20, 2018. The USEPA subsequently found that the Northern NJ-NY-CT Nonattainment Area failed to attain the 2008 ozone NAAQS by the original attainment date and did not qualify for a 1-year attainment date extension. The USEPA determined that the area would be reclassified as serious nonattainment for the 2008 ozone NAAQS on September 23, 2019, moving the attainment date to July 20, 2021. Because July 20th is in the middle of the 2021 ozone season, attainment must be demonstrated for the last full ozone season. Compliance with the ozone NAAQS will be determined based on three years of data, 2018, 2019, and 2020. Therefore, the future projection year emission inventory established for the attainment demonstration was 2020.

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[101] 81 FR 26697, May 4, 2016

MARAMA and New York State Department of Environmental Conservation (NYSDEC) prepared the 2020 inventory for modeling using elements from the 2017 and 2023 regional and USEPA inventories. A detailed description of the development of the MANE-VU 2011 and 2020 air emissions modeling inventories is included in the MARAMA 2011/2020 TSD in Appendix 4-3. Additional details on the development of the New Jersey inventory can be found in Appendices 4-5 through 4-7.

4.1.3 Biogenics

Biogenic emission sources are emissions that come from natural sources. Biogenic emissions must be accounted for in photochemical grid modeling, as most types are widespread and ubiquitous contributors to background air chemistry. Biogenic emissions from vegetation and soils are computed using a model that utilizes spatial information on vegetation, land use and environmental conditions of temperature and solar radiation. The model inputs are typically horizontally allocated (gridded) data, and the outputs are gridded biogenic emissions that can be speciated and utilized as input to photochemical grid models. Biogenic emissions for VOCs, NO_x and CO were calculated for input into the modeling. The emissions are based on the USEPA BEIS version 3.61 model and USEPA's 2011 v6.3 modeling platform. This is an update from USEPA's 2011 NEIv2 modeling platform, which used BEIS version 3.60.

More details of how biogenic emissions were estimated using the BEIS 3.61 modeling platform are included in the MANE-VU Modeling TSD in Appendix 4-1 and the MARAMA 2011/2020 TSD in Appendix 4-3.

4.1.4 Modeling Inventory SMOKE Processing

The USEPA Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer (SMOKE) model was used to process the air emissions inventories to prepare them for input into the photochemical model. The purpose of SMOKE (or any emissions processor) is to convert the resolution of the emission inventory data to the resolution needed by an air quality model. Emission inventories are typically available with an annual-total emissions value for each emissions source. The models typically require emissions data on an hourly basis, for each model grid cell (and perhaps model layer), and for each model species. Consequently, emissions processing involves transforming an emission inventory through temporal allocation, chemical speciation, and spatial allocation, to achieve the input requirements of the model. Additionally, a cross-reference file is needed to assign profiles to the inventory records by SCC, facility, geographic area such as state or county, or some other inventory characteristics. The USEPA provides a starting point for the profiles and cross-reference files as part of their latest modeling platforms. The USEPA has also developed a SMOKE utility program (Gentpro) that estimates temporal profiles for residential wood combustion (RWC), agricultural NH_3 from animals, and other generic (user defined) area sources by relating meteorology to air emission fluxes. Gentpro reads in hourly gridded meteorological data (temperature and wind) from the Meteorology-Chemistry Interface Processor (MCIP) and a gridded spatial surrogate to produce temporal profiles and cross-reference data.

For the MANE-VU Region, the modeling inventories were processed by the NYSDEC using the SMOKE (Version 3.7) model. NJDEP processed the onroad mobile source files through SMOKE-MOVES using the CB06r3 chemistry. A summary of the emission inventory files by sector pre-SMOKE processing and post-SMOKE processing is shown in Table 4-2. Additional details regarding SMOKE processing can be found in the MANE-VU Modeling TSD in Appendix 4-1.

Table 4-2:
Modeling Inventory Files Pre-SMOKE and Post-SMOKE

Gamma Inventory Files Pre-Smoke	Gamma Inventory Files Post-SMOKE
C3 Marine	C3 CMV
Small EGU	EGU-Point
ERTAC EGU	EGU-Point
Ethanol	NonEGU-Point
Point Non-IPM*	NonEGU-Point*
Point Oil & Gas	NonEGU-Point
Refueling** (Phase I) Point	NonEGU-Point
Nonroad	Nonroad
Dust	Other Nonpoint-Area
Dust No Precip.	Other Nonpoint-Area
Nonpoint Oil & Gas	Oil&Gas-Nonpoint
Onroad**	Onroad**
Agricultural NH_3	Other Nonpoint-Area
Agricultural Burning	Other Nonpoint-Area
Nonpoint	Other Nonpoint-Area
PFCs	Other Nonpoint-Area
Refueling** (Phase I) Nonpoint	Other Nonpoint-Area
C1C2 Rail	Rail and C1/C2 CMV
Residential Wood Burning	Res Wood Burning
Wildfires	Wildfires
Prescribed Burning	Prescribed Burning

Notes:

* Aircraft emissions are included in point sources.

** USEPA includes a refueling file in their 2011 based modeling platform upon which New Jersey's modeling platform is based. This is not actually refueling or Phase II emissions, it is Phase I loading and unloading emissions. EPA also includes the actual refueling emissions (Phase II and ORVR) in onroad emissions because the MOVES model is used to calculate the emissions. However, refueling emissions are actually stationary area sources.

4.1.5 Modeling Inventory Data

Details about the regional modeling inventories, including the file names and where they are located can be found in the MANE-VU Modeling TSD, which is included in Appendix 4-1. A summary of the pre-SMOKE New Jersey Modeling Inventory is included in Appendix 4-4A and 4-4B.

4.2 Point Source Emission Statement Program Certification

Clean Air Act Section 183(a)(3)(B) requires that states have an emission reporting program called an emission statement program for VOC and NO_x sources for marginal and above classified ozone nonattainment areas. The required state program and associated regulation defines how states obtain emissions data directly from point source facilities and report it to the USEPA.

According to the USEPA 2008 75 ppb 8-hour ozone implementation rule[102], if an area has a previously approved emission statement rule in force for the 1997 ozone NAAQS or the 1-hour ozone NAAQS that covers all portions of the nonattainment area for the 2008 ozone NAAQS, such rule should be sufficient for purposes of the emissions statement requirement for the 2008 ozone NAAQS. The state should review the existing rule to ensure it is adequate and, if it is, may rely on it to meet the emission statement requirement for the 2008 ozone NAAQS. New Jersey's emission statement rules at N.J.A.C. 7:27-21 were approved for the 1997 85 ppb 8-hour NAAQS on August 3, 2010.[103]

N.J.A.C. 7:27-21 requires the submission of annual emission statements from major facilities. From these statements, NJDEP develops reports of emissions of all criteria pollutants and submits them to the USEPA pursuant to the Federal Air Emission Reporting Requirements (AERR) Rule for uploading to the USEPA's National Emission Inventory (NEI).

New Jersey's rules at N.J.A.C. 7:27-21 for an emission statement program for the 2008 75 ppb 8-hour ozone NAAQS were approved October 9, 2018.[104]

4.3 Ozone Season Air Emission Inventories

The CAA 42 U.S.C. §7410(a)(2)(F) (Section 110 (a)(2)(F)) requires the submission by states to the USEPA of periodic reports on the nature and amounts of emissions from pollutants with a NAAQS and emissions related data. CAA 42 U.S.C. §§7511a(1), 7511a(3) and 7502 (Sections 182(a)1, 182(a)(3) and 172(c)(3)) require that states submit periodic emission inventories for marginal and above nonattainment areas in accordance with USEPA guidance.

The USEPA periodic emission inventories or National Emissions Inventories (NEI) and the regional modeling inventories include annual county-level emission inventories for criteria air pollutants and their precursors; NO_x, VOC, CO, PM2.5, PM10, SO_2, NH_3 (and other pollutants such as hazardous air pollutants (HAPs.) The periodic emission inventory requirements and guidance for ozone nonattainment areas and for Reasonable Further Progress (RFP) demonstrations require peak ozone season (June, July and August for New Jersey) tons per day emissions for ozone precursors VOC, NO_x and CO.[105]

As discussed above, 2011 was chosen as the base emission inventory year for the attainment demonstration and annual modeling inventory. For statewide and regional consistency purposes, 2011 was also chosen as the base year for the RFP demonstration. The USEPA's 2015 implementation rule for the 2008 75 ppb 8-hour ozone NAAQS[106] requires that states should use as the baseline year for RFP, the calendar year for the most recently available triennial emission inventory at the time ROP/RFP plans are developed. The New Jersey portion

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[102] 80 Fed. Reg. 12285 (March 6, 2015)
[103] 75 Fed. Reg. 45483 (August 3, 2010)
[104] 83 Fed. Reg. 50507 (October 9, 2018)
[105] Draft Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, USEPA, December 2016
[106] 80 Fed. Reg. 12285 (March 6, 2015)

of the Northern NJ-NY-CT Nonattainment Area was designated nonattainment in 2012 and the 2011 regional inventory was the most recently available triennial emission inventory, therefore, 2011 was chosen as the base year.

New Jersey submitted a full annual and seasonal 2011 emission inventory for all criteria pollutants in a State Implementation Plan dated June 11, 2015.[107] The USEPA approved New Jersey's 2011 inventory on September 21, 2017.[108] Revisions to the 2011 base emission inventory have been conducted since submittal to USEPA, were documented in New Jersey's 2017 moderate ozone attainment demonstration SIP revision[109], and were incorporated into the 2011 inventories used in this SIP revision.

The CAA also requires nonattainment areas to demonstrate continued progress (RFP) to attain the ozone standard. CAA section 172(c)(2) requires moderate areas to obtain 15 percent ozone precursor emission reductions over the first 6 years after the baseline year. CAA section 182(c)(2)(B) requires serious and above areas to obtain 18 percent ozone precursor emission reductions in that 6 year period and an additional 3 percent per year reduction until the attainment date. Based on the 2015 Implementation rule for moderate areas, New Jersey demonstrated RFP compliance in the 2017 moderate attainment demonstration SIP[110] for its northern NAA by showing greater than 15 percent reduction in ozone precursors from 2011 to 2017, using a projection inventory for 2017. Based on New Jersey's reclassification from moderate to serious for the northern NAA[111], New Jersey is required to show an additional 3 percent per year reduction from 2017 to 2020.

This SIP updates the 2017 projection inventory with New Jersey's actual 2017 emissions inventory as documented in Chapter 10. The actual 2017 emissions inventory serves as New Jersey's periodic emissions inventory, is used in New Jersey's updated RFP demonstration in Chapter 5 for the 75 ppb ozone standard, serves as the new base year for the RFP required projection to 2020 for the 75 ppb ozone standard and is expected to be the new RFP base year for the 70 ppb 8-hour ozone standard attainment demonstration SIP revision in a future New Jersey SIP.

As required for RFP, this SIP presents an estimated 2020 projection inventory for ozone precursor summer tons per day emissions. In order to calculate a future projection inventory, the base inventory emissions are grown based on the estimated future activity of the source and then reduced to account for the benefits achieved from any applicable Federal or State control measures between the base and future year. As discussed above, the starting inventory for the 2020 projection inventory is the 2017 actual emission inventory for emissions in summer tons per day of volatile organic compounds (VOC), oxides of nitrogen (NO_x), and carbon monoxide (CO). The actual 2017 emission inventory was used as the base for projecting the 2020 summer day inventory instead of the 2011 base because actual 2017 provides the most up to

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[107] State Implementation Plan for the 75 ppb 8-Hour Ozone National Ambient Air Quality Standard (NAAQS) Reasonably Available Control Technology (RACT) Determination, 2011 Periodic Emission Inventory, and 8-Hour Carbon Monoxide NAAQS Maintenance and Monitoring Plan, New Jersey Department of Environmental Protection, June 11, 2015.

[108] 82 Fed. Reg. 44100 (September 21, 2017)

[109] State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the 75 ppb and 84 ppb Ozone National Ambient Air Quality Standards, Ozone Attainment Demonstration and Nonattainment New Source Review (NNSR) Program Compliance Certification, January 8, 2018, https://www.nj.gov/dep/baqp/ozone75ppb/Ozone%2075%20ppb%20Attain%20North-NNSR%20SIP%2012-14-17%20Revised%208-9-18.pdf

[110] Ibid

[111] 84 Fed. Reg. 44238 (August 23, 2019)

date base inventory. The projected emission inventories are “grown” from the 2017 actual emission inventory and then “controlled”.

The peak ozone season 2020 projection inventories for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area and their methodologies are discussed in detail in Appendices 4-5 to 4-7. Stationary source (point and area) projection inventories are discussed in Appendix 4-5. The 2020 onroad mobile source projection inventory is discussed in Appendix 4-6. The 2020 nonroad mobile source projection inventory is discussed in Appendix 4-7.

A summary of the 2011 peak ozone season emission inventories for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area was included in the 2017 moderate attainment demonstration. An updated comparison of pre-2017 historical emission inventories is included in Chapter 10 of this SIP. A summary of the 2017 and 2020 peak ozone season emission inventories for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area is shown in Tables 4-3 through 4-5 below. The peak ozone season air emission inventories for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area show overall decreases in VOC, NO_x and CO from 2017 to 2020. VOC emissions are estimated to decrease by 15 summer tpd or 5 percent. NO_x emissions are estimated to decrease by 39 summer tpd or 16 percent. CO emissions are estimated to decrease by 102 summer tpd or 6 percent. The largest decreases of VOC, NO_x and CO are in the onroad mobile source sector. The inventories are discussed in more detail in Appendices 4-5 to 4-7.

Table 4-6 summarizes the control measures in place between 2011 (the modeling base year) and 2020 and their emission reductions or benefits. The estimated control measure benefits for electric generating units (EGUs) in the 2017 75 ppb ozone attainment demonstration for the New Jersey portion of the northern NAA between the base year of 2011 and the projected future year of 2017 were calculated using a combination of existing State and federal inventory data and the Eastern Regional Technical Advisory Committee (ERTAC) EGU Forecast Tool. The estimated benefits predicted a reduction of 14.2 NOx summer tons per day (tpd) and a reduction of 2.9 VOC summer tpd between 2011 and 2017. Since publication of that SIP the peak ozone season tons per day for 2017 was reported to New Jersey through the Emission Statement Program. The updated estimated EGU emission reductions from 2011 to 2017 using emission statement data is 35.9 NOx summer tpd and 3.3 VOC summer tpd.

Table 4-3:
VOC Inventory Summary for 2017 and 2020 by County and Sector
New Jersey Portion of the Northern New Jersey-New York-Connecticut Nonattainment Area

County	VOC Emissions (summer tons/day)											
	Point		Area		Onroad		Nonroad		County Totals		Change	Percent Change
	2017	2020	2017	2020	2017	2020	2017	2020	2017	2020	2017-2020	2017-2020
Bergen	2.11	1.80	23.83	24.34	9.07	6.15	7.42	7.13	42.42	39.42	-3.01	-7%
Essex	1.06	1.02	17.97	18.20	6.11	4.61	4.76	4.75	29.90	28.57	-1.33	-4%
Hudson	1.71	1.72	15.46	15.90	3.52	2.67	2.75	2.53	23.45	22.82	-0.63	-3%
Hunterdon	0.13	0.09	4.00	4.03	1.74	1.41	1.74	1.64	7.60	7.18	-0.43	-6%
Middlesex	15.89	14.89	22.32	22.96	8.23	6.36	5.41	5.20	51.85	49.40	-2.45	-5%
Monmouth	0.44	0.40	16.55	16.72	6.82	5.22	5.46	5.12	29.27	27.46	-1.81	-6%
Morris	0.50	0.39	14.09	14.30	5.25	3.54	4.96	4.75	24.81	22.98	-1.84	-7%
Passaic	0.77	0.71	12.15	12.29	3.98	3.33	2.59	2.42	19.49	18.75	-0.74	-4%
Somerset	0.89	0.66	9.44	9.68	3.39	2.38	3.77	3.68	17.49	16.40	-1.09	-6%
Sussex	0.16	0.16	3.93	3.91	1.54	1.26	1.59	1.41	7.21	6.74	-0.47	-7%
Union	3.23	3.24	13.89	14.18	5.06	4.22	3.20	3.08	25.38	24.72	-0.66	-3%
Warren	0.31	0.21	3.30	3.30	1.40	1.31	0.93	0.84	5.94	5.67	-0.27	-5%
Totals	27.21	25.29	156.93	159.81	56.10	42.46	44.58	42.54	284.82	270.09	-14.73	-5%

Notes:

1. Wildfires and prescribed burning are not included.

Table 4-4:
NO_x Inventory Summary for 2017 and 2020 by County and Sector
New Jersey Portion of the Northern New Jersey-New York-Connecticut Nonattainment Area

County	NOx Emissions (summer tons/day)											
	Point		Area		Onroad		Nonroad		County Totals		Change	Percent Change
	2017	2020	2017	2020	2017	2020	2017	2020	2017	2020	2017-2020	2017-2020
Bergen	2.16	1.92	2.84	2.89	15.71	10.32	10.03	8.85	30.74	23.98	-6.76	-22%
Essex	3.74	3.72	2.26	2.30	11.56	8.31	13.99	13.79	31.55	28.11	-3.43	-11%
Hudson	0.85	0.75	1.81	1.84	6.26	4.64	17.89	15.88	26.82	23.12	-3.70	-14%
Hunterdon	1.36	1.27	0.39	0.39	5.00	3.62	2.66	2.33	9.42	7.61	-1.81	-19%
Middlesex	7.02	5.93	2.55	2.60	18.72	14.17	8.92	7.72	37.21	30.42	-6.80	-18%
Monmouth	0.42	0.42	1.85	1.87	10.15	7.23	10.54	9.27	22.95	18.80	-4.15	-18%
Morris	0.72	0.73	1.78	1.80	10.48	6.31	4.88	4.27	17.86	13.11	-4.75	-27%
Passaic	0.15	0.15	1.25	1.27	5.37	4.40	3.49	3.06	10.26	8.88	-1.37	-13%
Somerset	4.62	4.64	1.16	1.19	7.70	4.87	4.18	3.67	17.66	14.36	-3.30	-19%
Sussex	0.10	0.10	0.42	0.41	1.84	1.38	1.38	1.17	3.74	3.06	-0.68	-18%
Union	8.20	8.62	1.49	1.51	9.57	7.78	5.35	4.79	24.62	22.71	-1.91	-8%
Warren	0.74	0.76	0.30	0.30	3.95	3.73	0.91	0.78	5.90	5.56	-0.34	-6%
Totals	30.08	29.01	18.12	18.37	106.29	76.77	84.23	75.57	238.73	199.72	-39.00	-16%

Notes:

1. Wildfires and prescribed burning are not included.

Table 4-5:
CO Inventory Summary for 2017 and 2020 by County and Sector
New Jersey Portion of the Northern New Jersey-New York-Connecticut Nonattainment Area

County	CO Emissions (summer tons/day)											
	Point		Area		Onroad		Nonroad		County Totals		Change	Percent Change
	2017	2020	2017	2020	2017	2020	2017	2020	2017	2020	2017-2020	2017-2020
Bergen	0.92	0.85	3.98	4.05	122.21	93.22	144.08	144.88	271.20	243.00	-28.20	-10%
Essex	0.97	0.96	2.97	3.01	81.97	77.23	69.21	70.21	155.12	151.40	-3.73	-2%
Hudson	0.70	0.46	2.16	2.19	38.99	35.33	34.28	34.35	76.13	72.33	-3.80	-5%
Hunterdon	1.90	2.02	1.21	1.20	24.71	19.90	28.60	28.58	56.42	51.70	-4.72	-8%
Middlesex	7.20	7.16	3.45	3.51	121.47	111.55	100.96	101.27	233.08	223.48	-9.60	-4%
Monmouth	0.31	0.31	2.98	3.01	99.50	84.01	88.71	88.76	191.51	176.09	-15.42	-8%
Morris	0.54	0.55	3.02	3.04	75.05	56.16	90.22	90.46	168.82	150.21	-18.62	-11%
Passaic	0.18	0.18	1.79	1.81	47.11	46.55	45.02	45.05	94.09	93.59	-0.50	-1%
Somerset	2.00	2.01	1.83	1.85	46.47	34.30	71.11	71.31	121.41	109.47	-11.94	-10%
Sussex	1.33	1.33	1.48	1.46	17.41	14.81	19.01	18.87	39.22	36.47	-2.75	-7%
Union	2.23	2.19	2.08	2.12	64.71	62.65	59.87	60.00	128.89	126.95	-1.93	-2%
Warren	0.25	0.25	0.98	0.98	18.57	18.37	12.78	12.66	32.58	32.26	-0.32	-1%
Totals	18.52	18.26	27.93	28.24	758.17	654.07	763.85	766.39	1,568.48	1,466.95	-101.53	-6%

Notes:

1. Wildfires and prescribed burning are not included.

Table 4-6: Projected Emissions and Control Measure Benefits Summary
New Jersey Portion of Northern New Jersey-New York-Connecticut Nonattainment Area

Federal or State	Control Measure	NJAC	EPA Approval	Pollutants	2017 Inventory (Note 1)		2020 Projection Inventory	
					VOC tpd	NOx tpd	VOC tpd	NOx tpd
Non-EGU Point Sources								
Non-EGU Point Source Control Measure Benefits, post 2011								
State	Glass Manufacturing	7:27-19.10	08/03/10	NOx	NA	NA	NA	NA
State	Low Sulfur Fuel Oil	7:27-9	01/03/12	PM, SO2, NOx	NA	0.08	NA	NA
State	Petroleum Storage	7:27-16.2	08/03/10	VOC	0.62	NA	1.12	NA
State	Permitting/Nonattainment New Source Review (NNSR)	7:27-8,18, 22	10/09/18	All	NQ	NQ	NQ	NQ
State	Stationary Gas Turbines and Engines (NO_x ACT) (Note 2)	7:27-19.5, 19.8	10/09/18	NOx	NA	0.39	NA	0.28
State	Fiberglass Boat Manufacturing Materials (2008 CTG);	7:27-16.14	10/09/18	VOC	NA	NA	NA	NA
State	Industrial Cleaning Solvents (2006 CTG);	7:27-16.24	10/09/18	VOC	NA	NA	0.25	NA
State	Misc. Metal and Plastic Parts Coatings (2008 CTG);	7:27-16.15	10/09/18	VOC	NA	NA	0.59	NA
State	Paper, Film, and Foil Coatings (2007 CTG);	7:27-16.7	10/09/18	VOC	NA	NA	0.47	NA
Federal	Boiler/Process Heaters NESHAP	NA	NA	All	0.00	0.00	NA	NA
Federal	Natural Gas Turbine NSPS	NA	NA	NOx	NA	0.23	NA	NA
Federal	Process Heater NSPS	NA	NA	NOx	NA	0.00	NA	NA
Federal	RICE NESHAP	NA	NA	All	0.10	0.02	NA	NA
Federal	RICE NSPS	NA	NA	NOx, CO	NA	0.37	NA	NA
Federal	Refinery Consent Decree: ConocoPhillips	NA	NA	NOx	NA	0.17	NA	NA
Total Non-EGU Point Source Control Measure Benefits, post 2011					**0.73**	**1.26**	**2.43**	**0.28**
Non-EGU Point Source Emissions, Growth Only							**27.21**	**19.86**
NON-EGU Point Source Emissions Grown and Controlled					**26.72**	**19.45**	**24.79**	**19.58**
EGU Point Sources								
EGU Point Source Control Measure Benefits, post 2011								
State	EGU: BL England ACO (Note 3)	NA	NA	NOx, PM, SO2	NA	NA	NA	NA
State	EGU: Coal-fired Boilers, Oil and Gas Fired Boilers (Note 4)	7:27-4.2, 10.2, 19.4	08/03/10	NOx, PM, SO2	3.30	35.90	NA	NA
State	EGU: High Electric Demand Day (HEDD) (Note 4)	7:27-19.5	08/03/10	NOx			NA	NA
Federal	EGU: CSAPR	NA	NA	NOx	NA	NA	NQ	NQ
Federal	EGU: Mercury and Air Toxics Standards (MATS), Coal- and oil-fired	NA	NA	PM, SO2, NOx	NA	NA	NQ	NQ
Total EGU Point Source Control Measure Benefits, post 2011					**3.30**	**35.90**	**0.00**	**0.00**
EGU Point Source Emissions Grown and Controlled					**0.49**	**10.63**	**0.49**	**9.44**

Table 4-6 (continued): Projected Emissions and Control Measure Benefits Summary
New Jersey Portion of Northern New Jersey-New York-Connecticut Nonattainment Area

Federal or State	Control Measure	NJAC	EPA Approval	Pollutants	2017 Inventory (Note 1)		2020 Projection Inventory	
Area Sources								
					VOC tpd	NOx tpd	VOC tpd	NOx tpd
Area Source Control Measures Benefits, post 2011								
State	Low Sulfur Fuel Oil	7:27-27.9	1/3/12	SO2, NOx	NA	0.66	NA	NA
State	Portable Fuel Containers	7:27-24	7/22/10	VOC	6.80	NA	0.69	NA
Federal	Boiler/Process Heaters NESHAP	NA	NA	NOx, VOC	0.02	0.13	NA	NA
Federal	Refueling ORVR	NA	NA	VOC	0.96	0.00	NA	NA
Federal	Residential Woodstove NSPS	NA	NA	All	NQ	NQ	NQ	NQ
Federal	RICE MACT	NA	NA	All	NA	NA	0.01	NA
Total Area Source Benefits, post 2011					**7.78**	**0.79**	**0.69**	**0.00**
Area Source Emissions Grown and Controlled					**156.93**	**18.12**	**159.81**	**18.37**
Onroad Sources								
Onroad Source Control Measures, post 2011								
State	IM: Diesel Smoke Cutpoint	NJAC 7:27-14	Pending	All	NA	NA	NQ	NQ
State	New Jersey Low Emission Vehicle (LEV) Program	NJAC 7:27-29	2/13/2008	All	NA	NA	Note 5	Note 5
Federal	Heavy-Duty Vehicle Standards and Diesel Fuel Sulfur Control	NA	NA	All	NA	NA	Note 5	Note 5
Federal	National Low Emission Vehicle Program (NLEV)	NA	NA	All	NA	NA	Note 5	Note 5
Federal	Tier 1, 2 and 3 Vehicle Program	NA	NA	All	NA	NA	Note 5	Note 5
Total Onroad Control Measure Benefits, post 2011					**16.81**	**73.42**	**13.64**	**29.52**
Onroad Emissions, Grown and Controlled					**56.10**	**106.29**	**42.46**	**76.77**
Nonroad Sources								
Nonroad Source Control Measures, post 2011								
Federal	Diesel Compression Ignition Engines	NA	NA	All	NA	NA	Note 5	Note 5
Federal	Diesel Marine Engines over 37 kW	NA	NA	All	NA	NA	Note 5	Note 5
Federal	Large Industrial Spark-Ignition Engines over 19 kW (>50 hp)	NA	NA	All	NA	NA	Note 5	Note 5
Federal	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder	NA	NA	All	NA	NA	Note 5	Note 5
Federal	Recreational Vehicles (Snowmobiles, Off-road Motorcycles, All-terrain Vehicles)	NA	NA	All	NA	NA	Note 5	Note 5
Federal	Spark Ignition Engines, Equipment, and Vessels at or below 19 kW (Lawn and Garden and Small Watercraft)	NA	NA	All	NA	NA	Note 5	Note 5
Total Nonroad Control Measure Benefits, post 2011					**34.8**	**14.74**	**19.12**	**28.77**
Nonroad Emissions, Grown and Controlled					**44.58**	**90.41**	**42.54**	**75.57**
All Sectors								
TOTAL BENEFITS, post 2011					**63.42**	**126.11**	**35.88**	**58.57**
TOTAL EMISSIONS, Grown and Controlled					**284.82**	**244.90**	**270.09**	**199.73**

Notes:

NA = Not Applicable NQ = Not Quantified, not included in the benefit total

1. The control measure benefits from the 2011 base year to 2017 are shown in the 2017 column
2. Early compliance observed in actual emissions
3. B.L England is located in New Jersey's southern nonattainment area
4. Benefits from New Jersey's EGU boiler rules and HEDD rules are combined
5. Included in total, not quantified individually
6. Wildfires and prescribed burning are not included

All = NOx, VOC, CO, PM2.5, PM10

Chapter 5 REASONABLE FURTHER PROGRESS (RFP)

5.1 RFP Introduction

This chapter describes the methodologies and calculations used to show that New Jersey meets requirements for reasonable further progress (RFP).

The CAA requires nonattainment areas to demonstrate continued progress to attain the ozone standard. The 2015, 75 ppb 8-Hour Ozone Implementation Rule[112] defines reasonable further progress (RFP) as the emissions reductions required under CAA Section 172(c)(2) and contains requirements and updated guidance on how to demonstrate RFP for the 2008 75 ppb standard. For the purposes of the 2008 75 ppb ozone NAAQS, for areas with an approved 1-hour or 1997 85 ppb 8-hour ozone NAAQS 15 percent VOC Rate of Progress (ROP) plan that are classified as moderate or higher, such as New Jersey, the EPA is interpreting CAA section 172(c)(2) to require moderate areas to obtain 15 percent ozone precursor emission reductions over the first 6 years after the baseline year, and is interpreting CAA section 182(c)(2)(B) to require serious and above areas to obtain 18 percent ozone precursor emission reductions in that 6 year period. Under the CAA section 172(c)(2) and CAA section 182(c)(2)(B) RFP requirements, NO_X emission reductions could be substituted for VOC reductions. For serious and above areas, CAA section 182(c)(2)(B) requires an additional 3 percent per year reduction in VOC emissions, averaged over consecutive 3-year periods, starting within 6 years after November 15, 1990 and until the attainment date.

For the 2008 75 ppb 8-hour ozone NAAQS, the USEPA is recommending that states use as the baseline year for RFP, the calendar year for the most recently available triennial emission inventory at the time the RFP plan is developed. In the case of areas designated nonattainment in 2012, this translates to 2011. They also allow an alternate year to be used. For a multistate nonattainment area, all states associated with the nonattainment area must consult and agree on the same year to use as the baseline year for RFP. New Jersey and the other states in the Northern NJ-NY-CT nonattainment year are using 2011 as the baseline year for RFP.

The 2015 75 ppb 8 Hour Ozone Implementation Rule requires that the creditable emission reductions for fixed percentage reduction RFP must be obtained from sources within the nonattainment area, a departure from previous requirements. Also, different from previous requirements, states no longer have to perform emission reduction calculations for the following four types of pre-1990 non-creditable control measure emission reductions listed under CAA section 182(b)(1)(D)(i) for exclusion from the RFP analysis:

1. Federal Motor Vehicle Control Program (FMVCP) tailpipe and evaporative standards applicable as of January 1, 1990;
2. Federal regulations limiting the Reid Vapor Pressure (RVP) of gasoline in ozone nonattainment areas applicable as of June 15, 1990;
3. State regulations correcting deficiencies in reasonably available control technology (RACT) rules; and
4. State regulations establishing or correcting inspection and maintenance (IM) programs for onroad vehicles.

In addition, CAA Sections 172(c)(9) and 182(c)(9) and the 2015 75 ppb 8-Hour Ozone Implementation Rule require that the SIPs for all 8-hour ozone nonattainment areas include contingency measures for RFP. Contingency measures are additional controls needed to further reduce emissions in the event an area fails to meet a RFP milestone or fails to attain by

[112] 80 Fed. Reg. 12316 (March 6, 2015).

its attainment date. These contingency measures must be fully adopted rules or measures that are ready for implementation quickly without further action by the State or the USEPA upon failure to meet a RFP milestone or reach attainment. Contingency measures for RFP and attainment for the New Jersey portion of the Northern NJ-NY-CT nonattainment area are discussed in Chapter 9.

Based on the 2015 Implementation rule for moderate areas, New Jersey demonstrated RFP compliance in the 2017 moderate attainment demonstration SIP[113] showing greater than 15 percent reduction in ozone precursors from 2011 to 2017. That demonstration has been updated in this SIP with a more current 2017 actual emissions inventory. In addition, New Jersey's demonstration will show compliance with an additional three percent per year until the attainment date for serious nonattainment areas, or nine percent from 2017 to 2020 based on its reclassification from moderate to serious[114]. New Jersey has elected to establish RFP and contingency target levels comprised of 1/3 VOC reductions and 2/3 NO_x reductions. While both pollutants contribute to ozone formation, the preference for NOx reductions recognizes that the ozone problem for the Northern NJ-NY-CT nonattainment area is often NO_x limited in recent times, as compared to VOC limited at the time the CAA was written.

5.2 RFP Calculations

This section describes the calculations performed to determine compliance with RFP requirements. The RFP calculations are shown in Table 5-1 for the New Jersey portion of the Northern NJ-NY-CT nonattainment area. The steps described below correspond with the rows in Table 5-1. The calculation steps are based on USEPA's 1992 and 1994 guidance[115][116] documents, adjusted to account for updated requirements in the 2015 ozone implementation rule.

Step 1: Calculate the 2011 base year anthropogenic emission inventory for the peak ozone season (tons per summer day.) This inventory does not include biogenic emissions. The development of the base year inventory was documented in the 2011 Inventory SIP dated June 2015[117], with additional updates which were documented in the 2017 New Jersey Moderate Attainment Demonstration SIP for this nonattainment area.

Step 2: Calculate the RFP emission reduction required (percent). As discussed above, New Jersey demonstrated the required reduction of combined VOC and NO_x emissions by 15 percent from 2011 to 2017 in its 2017 moderate attainment demonstration and is updating it in this SIP with an updated 2017 actual emissions inventory. New Jersey is also required to reduce the combined VOC or NO_x emissions by 9 percent from 2017 to 2020 for its serious

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[113] State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the 75 ppb and 84 ppb Ozone National Ambient Air Quality Standards, Ozone Attainment Demonstration and Nonattainment New Source Review (NNSR) Program Compliance Certification, January 8, 2018, https://www.nj.gov/dep/baqp/ozone75ppb/Ozone%2075%20ppb%20Attain%20North-NNSR%20SIP%2012-14-17%20Revised%208-9-18.pdf

[114] 84 Fed. Reg. 44238 (August 23, 2019)

[115] USEPA. Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 percent Rate of Progress Plans. United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-452/R-92-005, October 1992.

[116] USEPA. Guidance on the Post-1996 Rate-of-Progress Plan and the Attainment Demonstration. United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-452/R-93-015, January 1994, Corrected Version as of February18,1994.

[117] State Implementation Plan (SIP) for the 75 ppb 8-Hour Ozone National Ambient Air Quality Standard (NAAQS) Reasonably Available Control Technology (RACT) Determination, 2011 Periodic Emission Inventory, and 8-Hour Carbon Monoxide NAAQS Maintenance and Monitoring Plan, June 24, 2015, https://www.nj.gov/dep/baqp/ozoneco2011inv/ozone2011co-inv-sip-final.pdf

reclassification. A VOC reduction of 5 percent and a NO_x reduction of 10 percent were shown between 2011 and 2017. A VOC reduction of 3 percent and a NO_x reduction of 6 percent were shown between 2017 and 2020.

Step 3: Calculate the RFP-required VOC and NO_x target emission reductions (tons per summer day) by multiplying the 2011 base year emissions in Row 1 by the percent reduction in Row 2.

Steps 4 through 9: The actual 2017 and the projected (grown and controlled) VOC and NO_x inventories for the 2020 peak ozone season (tons per summer day) are presented by emission sector in Rows 4 through 8 and totaled in Row 9. The inventories are derived as discussed in Chapter 4.

Step 10: Calculate the RFP target emissions for 2017 by subtracting the emission reductions in Row 3 from the 2011 actual emissions in Row 1. Calculate the RFP target emissions for 2020 by subtracting the emission reductions in Row 3 from the 2017 actual emissions in Row 9.

Steps 11 and 12: The VOC and NO_x emission reductions are presented in tons per summer day in Row 11 and as a percentage of the 2011 base year inventory in Row 12. The 2017 reductions are from the 2011 base year inventory and the 2020 reductions are from the 2017 inventory.

Step 13: The RFP % emission reductions achieved for 2017 are calculated as the sum of the VOC and NOx emission reductions from the 2011 base year inventory. The RFP % emission reductions achieved for 2020 are calculated as the sum of the VOC and NOx emission reductions from the 2017 inventory.

Table 5-1:
Rate of Further Progress
New Jersey Portion of Northern NJ-NY-CT Nonattainment Area

ROW		2011 Inventory		2017 Inventory		2020 Projection	
		VOC tpd	NOx tpd	VOC tpd	NOx tpd	VOC tpd	NOx tpd
1	**2011 Base Year Emissions**	360	379				
2	**RFP % Reduction Required 2017:(VOC+NOx=15%) 2020:(VOC+NOx=9%)**			**5%**	**10%**	**3%**	**6%**
3	**RFP Target Emission Reductions**			**18**	**38**	**11**	**23**
4	Point Emissions	31	72	27	30	25	29
5	Area Emissions	176	22	157	18	160	18
6	Event Emissions*			1	1	1	1
7	Onroad Emissions	73	180	56	106	42	77
8	Nonroad Emissions	79	105	45	84	43	76
9	**Total Emissions**			**286**	**240**	**271**	**201**
10	**RFP Target Emissions**			342	341	275	217
11	**Achieved Emission Reductions**			74	139	15	39
12	**% Emission Reductions Achieved**			21%	37%	5%	16%
13	**RFP % Emission Reductions Achieved (VOC + NOx)**			**57%**		**21%**	

* Event emissions are wildfire and prescribed burning emissions and were included in area emissions for the 2011 inventory.

5.3 RFP Summary and Conclusions

As shown in Table 5-1, the percent reduction of VOC and NO_x from the 2011 baseline to 2017 is 57 percent, which exceeds the RFP-required 15 percent, for the New Jersey portion of the Northern NJ-NY-CT nonattainment area. The total emissions for 2017 are less than the RFP target emissions for 2017. Therefore, the New Jersey portion of the Northern NJ-NY-CT nonattainment area meets and exceeds the RFP requirement for 2017. Also note, the RFP emission reductions from 2011 to 2017 also exceed the CAA required 18 percent reduction for serious areas. In addition, the updated calculations using actual 2017 emission instead of projected 2017 emissions resulted in a reduction 13 percent higher than projected.

The projected percent reduction of VOC and NO_x from 2017 to 2020 is 21 percent, which exceeds the RFP-required 9 percent, for the New Jersey portion of the Northern NJ-NY-CT nonattainment area. Also, the total emissions for 2020 are less than the RFP target emissions for 2020. Therefore, the New Jersey portion of the Northern NJ-NY-CT nonattainment area also meets and exceeds the RFP requirement for 2020.

Chapter 6 ATTAINMENT DEMONSTRATION

6.1 Introduction

This chapter summarizes the results of the regional photochemical modeling for ozone conducted by the NJDEP and the Ozone Transport Commission (OTC) Modeling Centers, and other data and factors influencing air quality that are not included in the modeling. Attainment demonstration conclusions incorporate regional air quality monitoring, control measures and air emission inventories discussed in previous chapters, as well as ozone contributions from upwind transport.

USEPA's "Modeling Guidance for Demonstrating Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze" dated November 2018 (hereafter referred to as the USEPA 2018 Modeling Guidance), recommends that the following be included in the technical documentation:

- Overview of the air quality issue being considered including historical background;
- List of the planned participants in the analysis and their expected roles;
- Schedule for completion of key steps in the analysis and final documentation;
- Description of the conceptual model for the area;
- Description of periods to be modeled, how they comport with the conceptual model, and why they are sufficient;
- Models to be used in the demonstration and why they are appropriate;
- Description of model inputs and their expected sources (e.g., emissions, met, etc.);
- Description of the domain to be modeled (expanse and resolution);
- Process for evaluating base year model performance (meteorology, emissions, and air quality) and demonstrating that the model is an appropriate tool for the intended use;
- Description of the future years to be modeled and how projection inputs will be prepared;
- Description of the attainment test procedures and (if known) planned weight of evidence;
- Expected diagnostic or supplemental analyses needed to develop weight of evidence analyses.

These items are discussed in more detail in the Technical Support Document, "Ozone Transport Commission/ Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October Update, October 18, 2018", (MANE-VU Modeling TSD) in Appendix 4-1.

6.2 The Conceptual Model – The Nature of the Ozone Air Quality Problem in the Northeast

As recommended in the USEPA 2018 Modeling Guidance, the first step in developing an attainment demonstration should be to construct a conceptual description of the problem that is being addressed. Conceptual descriptions, which are also referred to as conceptual models, are comprehensive summaries of the "state of the knowledge" regarding the influence of emissions, meteorology, transport, and other relevant atmospheric processes on air quality in the area.

As discussed in the MANE-VU Modeling TSD, the interaction of meteorology, chemistry, and topography lead to a complex process of ozone formation and transport. Ozone episodes in the eastern United States often begin with an eastern moving large high-pressure area from the Midwest to the Ozone Transport Region (OTR), which collects pollution from stationary and mobile sources as it moves. When the air mass settles in the OTR, sometimes even for days, local pollution is added. The stagnant air mass under cloudless sky would exacerbate ozone levels since it allows sunlight more time to increase reactions of ozone precursors (NO_x and VOCs) and promote ozone formation. Additional pollution can be introduced to the systems from the Southeast through the nocturnal low-level jet, a fast-moving air mass that resides below the nocturnal boundary layer. This highly polluted air can also be kept from dissipating along the coast due to bay and sea breezes that push pollution back to shore.

Some ozone is also natural or transported internationally leading to ozone that is not considered relatable. This United States Background ozone in the Eastern United States is in the range of 30 to 35 ppb though it can be as high as 50 ppb in the Intermountain West[118].

Another complexity involves the nonlinear relationship between NO_x and VOC levels and ozone formation. Areas, such as the majority of the landscape in the OTR, that have extensive forests that produce high levels of isoprene and other VOCs during the summer month achieve the best ozone reduction through reductions in regional NO_x, but dense urban areas such as New York City that lack natural VOC production can be VOC limited, and in some cases NO_x reductions increase ozone levels due to less NO_x being available to destroy already formed ozone through titration.

To address this great level of complexity that occurs when evaluating the conceptual model of ozone, OTC based the modeling exercise on the conceptual model as described in "The Nature of the Ozone Air Quality Problem in the Ozone Transport Region: A Conceptual Description (Hudson et al. October 2006)."

6.3 The Contribution of Transport to Nonattainment

6.3.1 Background

In addition to local sources of air pollution, air pollution transported hundreds of miles from distant sources in and outside the OTR, contribute to ozone pollution in New Jersey and its multi-state nonattainment areas. Transport of air pollution is an important factor in understanding how ground-level ozone is produced and what geographical areas influence ozone production. During ozone events, high levels of ozone impact over 200,000 square miles across the eastern United States from beyond the OTR's borders.

There are three meteorological mechanisms that contribute to the transport of air pollution into and within the Ozone Transport Region: ground level transport, transport by the nocturnal low-level jet, and westerly transport aloft.

Ground-level transport is the result of interaction between the broad meteorological features and local effects, such as sea breeze and the Appalachian lee side trough.

Transport within the Ozone Transport Region can also occur via the nocturnal low-level jet that forms late at night or in the very early morning hours. The nocturnal low-level jet is a regional scale phenomenon of higher wind speeds that often forms a few hundred meters above the ground just above the stable nocturnal boundary layer. This phenomenon is a result of the differential heating of the air between the Appalachian Mountains and the Atlantic Ocean. The land, sea, mountain, and valley breezes can selectively affect relatively local areas and they play a vital role in drawing ozone-laden air into some areas, such as coastal areas, that are far removed from major emission source regions. The nocturnal low-level jet can transport ozone that formed within the Ozone Transport Region to other areas, can transport ozone formed outside the region into the Ozone Transport Region or can move locally formed ozone within the confines of the Ozone Transport Region. It extends the entire length of the Northeast corridor from Virginia to Maine and has been observed as far south as Georgia.

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[118] USEPA 2014b, "Policy Assessment for the Review of the O3 National Ambient Air Quality Standards." Research Triangle Park, NC

Finally, westerly transport aloft is dominated by the anti-cyclonic flow around a high-pressure system, which can lead to transport of an ozone reservoir, created by emissions in areas that lie outside the Ozone Transport Region, into the Ozone Transport Region. Local emissions within the Ozone Transport Region add to the polluted air mixing down from above that arrived from more distant locations.

6.3.2 Transport CAA Section 110 (or Good Neighbor) and CSAPR

CAA Section 110(a)(2)(D)(i) (or 42 U.S.C. § 7410(a)(2)(D)(i)), requires that each state's SIP contain adequate provisions prohibiting any source, or other type of emissions activity, within the State from emitting any air pollutants in amounts that will:

> "Contribute significantly to nonattainment of the National Ambient Air Quality Standards (NAAQS) for areas in another state or interfere with the maintenance of the NAAQS by another state."

A detailed timeline of New Jersey's Transport SIP submittals and USEPA's actions related to transport and its Cross State Air Pollution Rules (CSAPR) is documented in Chapter 8 Section 8.1.1.

The transport of ozone from sources upwind of the nonattainment area continues to contribute significantly to the poor ozone air quality in the Northern NJ-NY-CT nonattainment area, particularly at monitors located in Connecticut. The September 7, 2016, USEPA CSAPR Update [119] was only a partial remedy for addressing ozone transport and does not provide the necessary reductions for the Northern NJ-NY-CT Nonattainment Area to attain by July 20, 2021. The December 21, 2018 Revised CSAPR Rule also does little to remedy the transport contributions to nonattainment in the Northern NJ-NY-CT nonattainment area by the attainment deadline.

Attainment of the 2008 75 ppb ozone NAAQS in the Northern NJ-NY-CT Nonattainment Area is not projected to occur by July 20, 2021 because additional actions were not taken earlier by the USEPA and other states to address the interstate ozone transport issue. In 2016, the USEPA finalized the CSAPR Update rule to partially reduce the impact of upwind states' pollution on ozone nonattainment in downwind states. The USEPA acknowledged (and the court subsequently determined) that it fell short of providing the full remedy required by the "good neighbor" provision of CAA Section 110(a)(2)(D)(i)(I). Indeed, USEPA modeling predicted that with implementation of the CSAPR Update, the Northern NJ-NY-CT Nonattainment Area would not achieve attainment of the 75 ppb NAAQS until 2023 at the earliest, well beyond the deadline established by Section 110(a)(2)(D) of Clean Air Act. Considering that the CAA requires states to address their significant contribution to ozone nonattainment within three years of the promulgation of the standard, well ahead of the current 75 ppb attainment demonstration SIP submittal deadline for New Jersey's northern nonattainment area, the USEPA's partial solution to transport was insufficient to address the transport contribution to nonattainment by the moderate attainment deadline of July 2018 (2017 ozone season) as well as the current attainment deadline of July 2021 (2020 ozone season). The USEPA's failure to address the significant ozone contributions from upwind states means New Jersey cannot show attainment. The December 21, 2018 Revised CSAPR Rule also is not sufficient to remedy the transport contributions to nonattainment in the Northern NJ-NY-CT nonattainment area by the attainment

[119] 81 Fed. Reg. 74504 (October 26, 2016).

deadline. As stated in New Jersey's February 19, 2020 legal action, [120] the USEPA is not moving fast enough to issue more stringent regulations despite the requirement in a court order.

6.4 Photochemical Modeling and Inputs

6.4.1 Introduction

The CAA and Federal regulations[121] require that states use photochemical grid modeling, or any other analytical method determined by the Administrator to be at least as effective as photochemical grid modeling as part of their demonstration of attainment of the ozone NAAQS by the required attainment date. The USEPA 2018 Modeling Guidance also recommends this approach. Therefore, New Jersey's attainment demonstration for the Northern NJ-NY-CT Nonattainment Area includes photochemical grid modeling. All the regional modeling was conducted in accordance with the USEPA 2018 Modeling Guidance.

6.4.2 Air Quality Model: CMAQ

As recommended in the USEPA 2018 Modeling Guidance, the photochemical model selected for the attainment modeling demonstration was the USEPA's Models-3/Community Multi-Scale Air Quality (CMAQ) Model version 5.2.1 for 2011 and 2020 Gamma version Ozone modeling used in this SIP. Photochemical modeling was performed with the CMAQ Chemical-Transport Model (CCTM) software that is part of the CMAQ modeling package.

The CMAQ modeling system was selected for the attainment demonstration primarily because it is a photochemical grid model capable of modeling a variety of pollutants over a range of time and space scales, i.e., a "one-atmosphere" photochemical grid model. The CMAQ model is peer reviewed, and has been validated and widely used by Federal, state, and local government, as well as research institutes and universities. Not only is CMAQ used to model ozone by OTC, but it is also being used to model particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$) and Regional Haze in the Northeast.

The CMAQ model requires specific inputs, including meteorological information and emissions information. The remainder of this section discusses, in general, the data inputs for the CMAQ model, the CMAQ model parameters chosen for the modeling runs, validation of the CMAQ model and the results of the modeling.

More detailed information is included in the MANE-VU Modeling TSD in Appendix 4-1.

6.4.3 Regional Modeling Coordination

Under the coordination of the OTC Modeling Committee, several states and modeling centers performed regional modeling runs and/or contributed to the preparation of technical information for the regional modeling effort. Those organizations included:

1) the New York State Department of Environmental Conservation (NYSDEC);
2) the New Jersey State Department of Environmental Protection;
3) the Virginia Department of Environmental Quality;
4) the Maryland Department of the Environment and the University of Maryland;
5) the Ozone Research Center at Rutgers University, New Jersey; and
6) the Mid-Atlantic Regional Air Management Agency (MARAMA).

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[120] Civil Action No. 20-cv-1425, filed February 19, 2020.
[121] 42 U.S.C. § 7511a(c)(2)(A) and 40 CFR §51.908(c).

The lead agency for coordinating regional air quality modeling efforts and performing base year and future year CMAQ model runs for this ozone attainment demonstration was the NYSDEC. The NYSDEC ran the CMAQ model using the protocol discussed below and, in the MANE,-VU Modeling TSD, and performed post-processing of the results, including calculating the projected ozone design values using the relative response factor (RRF) method specified in the USEPA 2018 Modeling Guidance. The NJDEP ran SMOKE-MOVES to prepare onroad mobile emissions using USEPA's MOVES data. Both agencies conducted a series of sensitivity modeling studies together with Rutgers to support SIP modeling. The air emissions inventory work was completed by individual states, USEPA and MARAMA, and coordinated by MARAMA.

The CMAQ model was installed at all participating modeling centers and diagnostic tests were run to ensure that the model was operating as designed. In addition, the CMAQ model was benchmarked against other modeling platforms to ensure similar results.

6.4.4 Regional Emission Inventories and Control Measures

To perform this modeling demonstration, two regional air emission inventories were developed to represent the 2011 base inventory and the 2020 projected future grown and controlled inventory. The USEPA SMOKE model was used to process the air emissions inventory to prepare them for input into the CMAQ model. For the MANE-VU Region, the modeling inventories were processed by the NYSDEC using the SMOKE (Version 3.7) model. NJDEP processed the onroad mobile source files through SMOKE-MOVES using the CB06r3 chemistry.

A detailed description of the development of the MANE-VU 2011 and 2020 air emissions modeling inventories is included in Chapter 4. A detailed description of the control measures in the inventory is included in Chapter 3.

6.4.5 Meteorology Data

As discussed in Section 4.1.1, 2011 was designated as the base year for this 8-hour ozone attainment demonstration. The regional modeling used meteorological data from USEPA's 2011 photochemical modeling of the Continental/Contiguous United States (CONUS) (See Appendix 6-1.) The USEPA CONUS domain used meteorological field generated by Weather Research and Forecasting (WRF) v3.4. The northeast regional modeling extracted a subset of the USEPA CONUS domain as discussed below and illustrated in Figure 6-1 (USEPA 2018 Modeling TSD) using the Meteorology-Chemistry Interface Processor (MCIP).[122] MANE-VU retained the same 12 km square grid size and 35 layer column depth as was used by USEPA. Based on model evaluation of key parameters by both USEPA and OTC, it was determined by the modeling group that 2011 WRF v3.4 meteorological data developed by USEPA is appropriate for the regional modeling.

6.4.6 Episode Selection

The majority of the ozone season, April 15 to October 30, was simulated for the 2011 and 2020 modeling runs (with 2011 meteorology conditions). As a result, the total number of days examined for the complete ozone season far exceeds the USEPA 2018 Modeling Guidance and provides for better assessment of the simulated pollutant fields.

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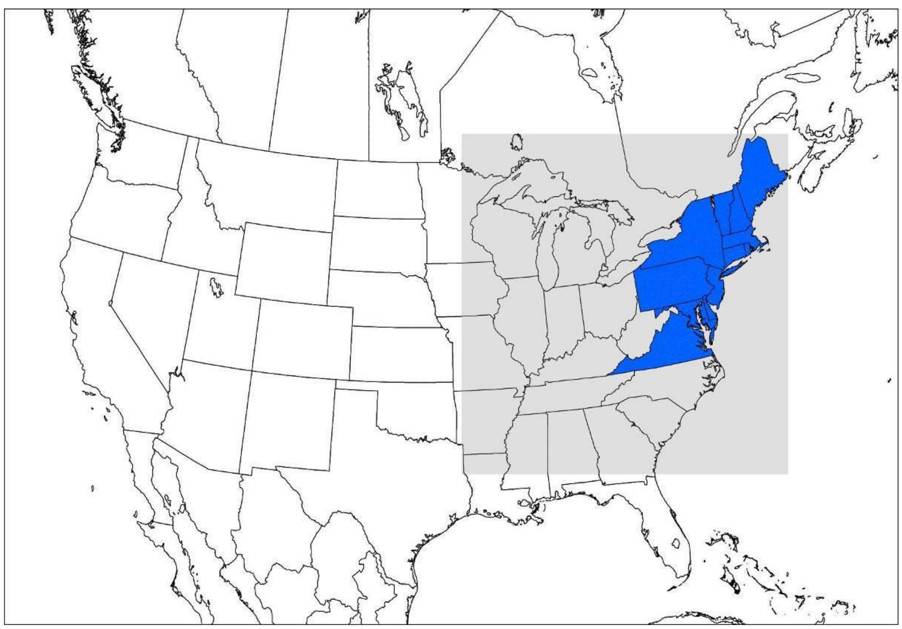
[122] Otte and Pleim 2010, The Meteorology-Chemistry Interface Processor (MCIP) for the CMAQ modeling system: updates through MCIP v3.41

6.4.7 Modeling Domain

In defining the modeling domain, one must consider the location of the local urban area, the downwind extent of the elevated ozone levels, the location of large emission sources, and the availability of meteorological and air quality data. The domain or spatial extent to be modeled includes as its core the nonattainment area. Beyond this, the domain includes enough of the surrounding area such that major upwind sources fall within the domain and the emissions produced in the nonattainment area remain within the domain throughout the day.

Figure 6-1 shows the extent of USEPA CONUS and the MANE-VU modeling boundaries. The MANE-VU modeling domain includes states in MANE-VU (or the OTR), other Regional Planning Organizations and Canada. The MANE-VU modeling domain is shown in gray, with the MANE-VU states shown in blue. The modeling domain used in this application represented a subset of the USEPA continental-modeling domain that covered the entire 48-state region with emphasis on the OTR. This domain covers the Northeast region, including the Northeastern, Central and Southeastern United States as well as Southeastern Canada. The final SIP modeling analysis utilized this MANE-VU modeling domain shown in gray. A more detailed summary of the states and regional planning groups in the domain is included in Table 4-1 in Chapter 4.

Figure 6-1: MANE-VU 12-Kilometer CMAQ Modeling Domain



6.4.8 Horizontal Grid Size

The basic CMAQ modeling platform utilized a 12 km horizontal grid resolution for the CONUS domain. A larger domain was selected for the WRF simulations to provide a buffer of several grid cells around each boundary of the CMAQ 36 km domain. This was designed to minimize any errors in the meteorology from boundary effects. A 12 km inner domain was selected to better characterize air quality in the MANE-VU Region and surrounding Regional Planning Organization regions. The horizontal grid definitions for the CMAQ and WRF modeling domains are discussed in the MANE-VU Modeling TSD in Appendix 4-1.

6.4.9 Vertical Resolution

The vertical grid used in the CMAQ modeling was primarily defined by the WRF vertical structure. The WRF model employed a terrain-following coordinate system defined by atmospheric pressure. The layer averaging scheme adopted for CMAQ is designed to reduce the computational cost of the CMAQ simulations, therefore only the uppermost layers of the CMAQ domain were coalesced. All layers in the planetary boundary layer were left undisturbed in moving from the WRF to the CMAQ simulation. This ensures that the near-surface processes that affect air pollution the most are represented realistically in CMAQ, while the meteorological systems that are driven by upper level winds are allowed to develop properly in WRF. The effects of layer averaging have a relatively minor effect on the model performance metrics when compared to ambient monitoring data. The vertical layer definitions and other details related to the WRF and CMAQ modeling domains are discussed in the MANE-VU Modeling TSD in Appendix 4-1.

6.4.10 Initial and Boundary Conditions

The objective of a photochemical grid model is to estimate the air quality given a set of meteorological and emissions conditions. When initializing a modeling simulation, the exact concentration fields are not known in every grid cell for the start time. Therefore, photochemical grid models typically begin with clean conditions within the domain and are allowed to stabilize before the period of interest is simulated. This was accomplished for the SIP modeling by starting the modeling 15 days prior to the period of interest (the ozone season); this is called "spin-up time".

The winds move pollutants into, out of, and within the domain. The model handles the movement of pollutants within the domain and out of the domain. An estimate of the concentration of pollutants at the edge of the domain, and therefore the quantity of pollutants moving into the domain, is needed as an input to the model. These are called boundary conditions. The boundary conditions for the 12 km grid were developed from a 2.5 x 2.5 degree Goddard Earth Observing System-Chem (GEOS-Chem) (version 8) global simulation produced by USEPA for use in the 2011 modeling platform.[123] GEOS-Chem is a global 3-D chemical transport model for atmospheric composition driven by meteorological input from the Goddard Earth Observing System (GEOS) of the NASA Global Modeling and Assimilation Office. GEOS-CHEM output provides boundary conditions for the 12km CONUS domain, while CMAQ output of the CONUS domain provides boundary conditions for the 12km OTC domain. To address the transport of the pollutants through the boundaries, the GEOS-Chem data were used to develop the initial and boundary condition for the 2011 modeling platform. As discussed above, the CMAQ simulations used a 15-day "spin-up" period, which is sufficient to establish pollutant levels that are encountered in the Eastern United States, to wash out the effect of the initial fields. Additionally, the predominating winds flow from west to east, thus New Jersey is not influenced by nearby boundary conditions. Additional information on the extraction of boundary conditions is provided in the MANE-VU Modeling TSD in Appendix 4-1.

6.5 Photochemical Modeling Results

6.5.1 Relative Response Factor (RRF)

The USEPA 2018 Modeling Guidance recommends the use of a modeled attainment test, which is described as a procedure in which an air quality model is used to simulate current and future

[123] Eyth and Vukovich 2015, p.2, USEPA Technical Support Document (TSD) Preparation of Emission Inventories for the Version 6.2, 2011 Emissions Modeling Platform

air quality. For this modeled attainment test, model estimates are used in a “relative” rather than “absolute” sense. The ratio of the model’s future year to baseline year ozone estimates are calculated at each ozone monitor. These ratios are called Relative Response Factors (RRF). RRF’s are calculated with CMAQ output from the maximum modeled ozone of a 3X3 array of grid cells centered on the location of the monitor using the following equation:

> RRF = (average future year ozone over the highest 10 modeled ozone days selected based on base year ozone concentrations) / (average base year ozone over the highest 10 modeled ozone days)

More detail regarding RRF calculations is provided in the MANE-VU Modeling TSD in Appendix 4-1.

6.5.2 Baseline Design Values

The baseline design values used in modeling are calculated differently from the monitored design values used for NAAQS compliance, although both are based on monitored ambient air quality data. For modeling purposes, the USEPA 2018 Modeling Guidance recommends that the baseline design value is calculated by averaging three air quality compliance design value periods, centered around the base inventory year of 2011. Specifically, the modeling baseline design value was calculated by averaging the 2009-2011, 2010-2012, and 2011-2013 air monitoring design values. Since the baseline design value is the anchor point for the future year projected concentrations it is believed that the average of the three design value periods best represents the baseline concentrations, while taking into account the variability of the meteorology and emissions (over a five year period). For more information regarding the modeling design values see the MANE-VU Modeling TSD in Appendix 4-1.

6.5.3 Modeling Results

Future estimated ozone design value concentrations are calculated for each monitoring site by multiplying the modeled RRF by the baseline ozone design values to obtain the future estimated value. Design values are truncated in accordance with 40 CFR Part 50.10, Appendix I.

A summary of the modeling design value results compared to the latest air quality monitoring design values discussed in Chapter 2 is shown in Table 6-1. For more information regarding the modeling results see the MANE-VU Modeling TSD in Appendix 4-1.

Table 6-1:
Ozone Design Value Modeling vs Monitoring Summary
Northern NJ-NY-CT Nonattainment Area

8-hour Ozone Design Values (ppb)							
				Modeling		**Monitoring**	
Site Name	**AQS Code**	**County**	**State**	**2011 GAMMA**	**2020 GAMMA "3x3" Avg**	**2019**	**2020 (prelim)**
Westport (Sherwood Island Connector)	90019003	Fairfield	CT	83.7	83.4	82	79
Stratford	90013007	Fairfield	CT	84.3	76.8	82	81
Greenwich Point Park	90010017	Fairfield	CT	80.3	76.2	81	82
Middletown/Middletown CVH	090070007/ 090079007	Middlesex	CT	79.3	66.8	77	74
Danbury (Western Conn State Univ)	90011123	Fairfield	CT	81.3	71.1	73	71
Criscuolo Park-New Haven	90090027	New Haven	CT	74.3	67.7	75	72
Madison-Beach Rd (Hammonasset State Park)	90099002	New Haven	CT	85.7	73.9	82	82
Susan Wagner HS/ Fresh Kills	360850067/ 360850111	Richmond	NY	81.3	79.4	71	68
Leonia	340030006	Bergen	NJ	77	66.4	74	72
Rutgers University	340230011	Middlesex	NJ	81.3	68.5	73	70
White Plains	361192004	Westchester	NY	75.3	72.7	73	71
Babylon	361030002	Suffolk	NY	83.3	75.2	74	71
Bayonne	340170006	Hudson	NJ	77	69.5	70	68
Riverhead	361030004	Suffolk	NY	78	68.5	72	70
South Mountain Rd (Rockland County)	360870005	Rockland	NY	75	65.4	68	66
Flemington	340190001	Hunterdon	NJ	78	65.7	70	65
Newark Firehouse	340130003	Essex	NJ	78	67.2	66	66
Pfizer Lab	360050133	Bronx	NY	74	68	71	71
Convent Av (CCNY)	360610135	New York	NY	73.3	67.7	71	70
Monmouth University	340250005	Monmouth	NJ	80	69.3	65	65
Queens	360810124	Queens	NY	78	72	74	70
Chester	340273001	Morris	NJ	76.3	64.7	68	65
Ramapo	340315001	Passaic	NJ	73.3	63.6	66	65
Holtsville	361030009	Suffolk	NY	78.7	72.9	71	72
Columbia	340410007	Warren	NJ	66	55.9	63	59
IS52	360050110	Bronx	NY	NA	NA	69	68

Notes:

1. All modeling: CMAQ, ozone season (April 15 to October 30), MARAMA BETA2, MOVES14, BEIS 3.6.1, ERTAC 2011v2.5 and 2017v2.5L2, EPA 2014 Modeling Guidance for RRF/DV
2. 2011 Base, 5 year average
3. Monitoring design values are three year average of fourth high ozone value.
4. Values above the 75 ppb 8-hour ozone NAAQS are highlighted.
5. There is no available modeling data for IS52 but monitoring values are included.
6. 2020 preliminary data as of January 5, 2021.

6.6 Model Performance Quality Assurance Evaluation

The USEPA 2018 Modeling Guidance states that "a model performance evaluation should be considered prior to using modeling to support an attainment demonstration" (USEPA, 2018). Specifically, at least a complete operational evaluation should be conducted, while diagnostic evaluation, dynamic evaluation, and probabilistic evaluation are encouraged.

All the air quality, emissions, and meteorological data within the MANE-VU Regional Planning Organization used in the regional modeling effort were reviewed to ensure completeness, accuracy, and consistency before proceeding with modeling. Any errors, missing data or inconsistencies, were addressed using appropriate methods that are consistent with standard practices. All modeling was benchmarked through the duplication of a set of standard modeling results across different modeling centers. Emissions inventories obtained from the other Regional Planning Organizations were examined to check for errors in the emissions estimates. If errors were discovered, the problems in the input data files were corrected, and the models were run again.

The first step in the modeling process is to verify the model's performance in terms of its ability to predict ozone and precursor concentration fields in the right locations and at the right levels. To do this, model predictions for the base year simulation are compared to the actual ambient data observed in the historical episode. The purpose of the model performance evaluation is to assess how accurately the model predicts ozone levels observed in the historical episode and to use the knowledge of CMAQ's performance to put CMAQ's predictions of future year air quality in the appropriate context.

The CMAQ air quality model inputs and outputs were plotted and examined to ensure sufficiently accurate representation of the observed data in the model ready fields, and temporal and spatial consistency and reasonableness. The CMAQ model underwent operational and scientific evaluations in order to facilitate the quality assurance review of the meteorological and air quality modeling procedures and are discussed in greater detail in the MANE-VU Modeling TSD in Appendix 4-1.

The model evaluations demonstrated that the model performs reasonably well over the diurnal cycle and not just in terms of daily maximum or average values. Also, they demonstrated that the model can reliably reproduce concentrations above the ground level. The model performance for the Northern NJ-NY-CT Nonattainment Area averaged over all stations and all days met the guidelines in the USEPA 2018 Modeling Guidance. However, although the CMAQ modeling meets the USEPA guidelines, it should be noted that it may in fact under predict or over predict the magnitude of ozone change at a particular site and the results should not be viewed as exact. Additional discussion on the uncertainty associated with the CMAQ model results is provided below in Section 6.7.

Unmonitored Area Analysis

The USEPA 2018 Modeling Guidance and 75 ppb Implementation rule[124] recommend an unmonitored area analysis to examine ozone and/or PM2.5 concentrations in unmonitored areas. The unmonitored area analysis is intended to be a means for identifying high ozone and/or PM2.5 concentrations outside of traditionally monitored locations, particularly in nonattainment areas where modeling or other data analyses have indicated potential high concentration areas of ozone and/or PM2.5 outside of the existing monitoring network. The

[124] 80 Fed. Reg. 12270 (March 6, 2015)

"unmonitored area analysis" describes an analysis that uses a combination of model output and ambient data to identify areas that might exceed the NAAQS in areas that are not currently monitored. The analysis should include, at a minimum, all nonattainment counties and counties surrounding the nonattainment area, as appropriate.

An unmonitored area analysis was performed for New Jersey's multi-state nonattainment areas and included in New Jersey's Ozone Attainment Demonstration SIP revision, submitted on October 29, 2007.[125] This analysis concluded that all areas of maximum ozone concentration in the ozone nonattainment areas associated with New Jersey are adequately reflected by the monitoring locations and the modeling performed. This analysis is also applicable to this demonstration, as the monitored areas are the same. In addition, New Jersey's monitored locations far exceed that of USEPA's minimum requirements and there is no reason to believe there are areas with potentially high concentrations that are not already reflected in the existing monitoring network.

6.7 Model Results Evaluation and Uncertainties

Sea and Bay Breeze Effect

The highest monitored 8-hour ozone design values in the Northern NJ-NY-CT Nonattainment Area are at Greenwich and Madison-Beach Road, followed closely by the Stratford and Westport monitors, all in Connecticut, based on preliminary 2020 monitoring data. All of these monitors are located in close proximity to a major highway, I-95, and are directly downwind of the major metropolitan area of New York City, which makes them heavily influenced by local transported air pollutants. Additionally, all of these sites are situated on the perimeter of the Long Island Sound making them susceptible to a bay breeze effect that is similar to a sea breeze effect.

Field studies and numerical modeling efforts around the country and internationally have shown that a sea breeze circulation can influence local ozone concentrations.[126,127,128,129,130,131,132] A sea breeze may exacerbate air pollution levels by constricting horizontal and vertical ventilation, and re-circulating air that would otherwise move offshore. On other occasions, a sea breeze

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[125] State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard 8-Hour Ozone Attainment Demonstration, The State of New Jersey Department of Environmental Protection, October 29, 2007.
[126] Seaman, N. L. and Michelson, S.A. Mesoscale Meteorological Structure of a High-Ozone Episode during the 1995 NARSTO-Northeast Study. *Journal of Applied Meteorology*, 39, 384-398, 1998.
[127] McElroy, M.B. and Smith, T.B. Vertical Pollutant Distributions and Boundary Layer Structure Observed by Airborne LIDAR near the Complex California Coastline. *Atmospheric Environment*, 20, 1555-1566, 1986.
[128] Bornstein, R.D., Thunis, P., and Schayes, G. Simulation of Urban Barrier Effects on Polluted Urban Boundary-Layers Using the Three Dimensional URBMET/TVM Model with Urban Topography-New Results from New York City. In: Zanetti, P. (Ed), Air Pollution, Computational Mechanics Publications, Southampton, Boston, 15-34, 1993.
[129] Cheng, W. L. Ozone Distribution in Coastal Central Taiwan under Sea-Breeze Conditions. *Atmospheric Environment*, 36, 3445-3459, 2002.
[130] Boucouvala, D. and Bornstein, R. Analysis of Transport Patterns during an SCOS97-NARSTO Episode. *Atmospheric Environment*, 37(S2), S73-S94, 2003.
[131] Martilli, A., Roulet, Y.A., Junier, M., Kirchner, F., Mathias, W. R., and Clappier, A. On the Impact of Urban Surface Exchange Parameterizations on Air Quality Simulations: The Athens Case. *Atmospheric Environment*, 37, 4217-4231, 2003.
[132] Evtyugina, M. G., Nunes, T., Pio, C., and Costa, C. S. Photochemical Pollution under Sea Breeze Conditions, during Summer, at the Portuguese West Coast. *Atmospheric Environment*, 40, 6277-6293, 2006.

may move relatively clean air onshore, which will rapidly lower ozone concentrations. The Maryland Department of the Environment examined the theoretical impact of the Chesapeake Bay sea breeze on the ozone monitor site in Edgewood, Maryland.[133] The conclusions of this analysis were that a local-scale sea breeze circulation can exacerbate peak ozone concentrations not only during regional-scale high ozone episodes, but also during periods when local scale circulation is more significant than regional transport.

Evaluation of modeling data shows that CMAQ does not always accurately predict ozone concentrations at monitors on the land/water interface. As discussed in the 2018 MANE-VU Modeling TSD, when monitors are located so as to result in one or more of the eight additional grid cells falling over a body of water OTC has found that those monitors are often not responsive to changes in emissions. Research conducted by the University of Maryland on the calculation of future design values has demonstrated some potential flaws with USEPA modeling guidance in regards to calculating RRFs for these particular monitors.[134] It is often the case that due to slower dry deposition of ozone, fewer clouds being over bodies of water, Planetary Boundary Layer (PLB) (also known as the atmospheric boundary layer (ABL) venting, PBL height, and emissions from marine vessels, ozone measurements are much higher over bodies of water than nearby land masses. As a result, the maximum values in the 3x3 grid occur in a grid cell over water where ozone pollution is higher and less responsive to changes in emissions.

Electric Generation on High Electric Demand Day (HEDD)

It is difficult to accurately represent the effects of electric generating units (EGU) in photochemical modeling. Great strides have been accomplished in recent years by using the ERTAC EGU program and upgrading to hourly temporal profiles in the modeling. Actual continuous emission monitoring (CEM) of hourly data is used for the EGU temporal profiles. For the 2011 base year, EGU actual hourly emissions from CAMD are input into the modeling. However, the effect of peaking electric generating unit emissions on hot summer days, which usually coincide with elevated levels of ozone, is still difficult to accurately portray when modeling over the entire ozone season. The effect of the emissions from power plants on these peak days is still most likely underpredicted in the CMAQ modeling.

A study of the August 2003 Northeast Blackout demonstrated the effect of what happened when the power was not being generated.[135] University of Maryland flight data collected 24 hours into the Northeast Blackout showed that ozone was 30 ppb lower throughout the 0.5-1.5 km section of the atmosphere and 38 ppb lower at ground level, than on a meteorologically similar day. When the ozone levels on the blackout day were compared to a reference day it was shown that the blackout caused a drop of at least 7 ppb ozone, and likely considerably more. However, a modeling study of the same event using CMAQ predicted only a 2 ppb change.[136] These results

[133] Maryland Department of the Environment. Appendix G-11: The Role of Land-Sea Interactions on Ozone Concentrations at the Edgewood, Maryland Monitoring Site, Cecil County, Maryland 8-Hour Ozone State Implementation Plan and Base Year Inventory. Maryland Department of the Environment, June 15, 2007.

[134] Goldberg, DL, CP, Tzortziou, M, Stehr, JW, Pickening, KE, Morufu, LT and Dickerson RR 2014, 'Higher surface ozone concentrations over the Chesapeake Bay than over the adjacent land: Observations and models from Discover-AQ and CBODAQ campaigns', Atmospheric Environment, vol. 84 pp, 9-19

[135] Marufu, L.T., Taubman, B. F., Bloomer, B., Piety, C. A., Doddridge, B. G., Stehr, J. W., and Dickerson, R. R. The 2003 North American Electrical Blackout: An Accidental Experiment in Atmospheric Chemistry. *Geophysical Research Letters*, 31, L13106, 2004.

[136] Hu, Y., Odman, M. T., and Russell, A. G. Re-examination of the 2003 North American Electrical Blackout Impacts on Regional Air Quality. *Geophysical Research Letters*, 33, 2006.

demonstrated that CMAQ greatly under predicted the ozone reductions achieved when the power generating plants were not operating by a factor of approximately 3. However as stated above, improvements in EGU inputs in the modeling have been made since this analysis.

Distributed Generation/Demand Response

Distributed Generation/Demand Response (DG/DR) (also known as behind the meter electricity generation or back-up generators) is electric power generated from small stationary reciprocating internal combustion engines (RICE) fueled by natural gas, diesel fuel, or gasoline that is used during emergencies in New Jersey. However, in some states these engines are also used to assist the electric grid during high electric demand periods. New Jersey's rules for stationary RICE (or emergency generators) do not allow the use of uncontrolled engines for the purpose of demand response/distributed electric generation. Some other states in New Jersey's multi-state nonattainment areas do allow this type of emissions. The emissions from these units are not properly accounted for in states inventories, or in the USEPA National Emissions Inventory (NEI) due to lack of data on the sources. It is difficult to quantify these emissions as they are not always reported to the states and many are in the area source inventory, which is based on statewide fuel consumption, not unit specific emissions. Like HEDD EGUs, many of these engines are operating on hot summer days that typically coincide with the high ozone days.

In general, DG/DR units were originally installed to provide power to a facility in the event that service from the electrical grid was interrupted (e.g., due to a grid failure or natural disaster). However, there has been increased use of these units as part of financial incentive programs to reduce grid electricity use during times of high demand (generally referred to as Demand Response (DR) programs). According to the Federal Energy Regulatory Commission (FERC), DR is the reduction of energy consumption by customers in response to the increased price of electricity or in response to financial incentives to reduce electric demand.[137]

In addition to the emissions not being properly accounted for in state and Federal inventories, the temporal profiles used in the emissions model for many area source categories tend to distribute emissions evenly over the year. This could also lead to an underestimate of emissions due to DG/DR units operating on a peak electric demand day.

The OTC HEDD Workgroup performed a review of state rules and regulations that pertain to the participation of emergency generators in demand response programs.[138] They determined that in most states an engine that participates in a voluntary demand response program or other supply arrangement with a utility or system operator is considered a non-emergency engine. On April 15, 2016, the USEPA provided its "Guidance on Vacatur of RICE NESHAP and NSPS Provisions for Emergency Engines". This guidance clarified and modified the USEPA's requirements concerning the participation of generation resources in non-emergency programs. The guidance specifies that the previous allowance for emergency engines to operate when an Energy Emergency Alert (EEA) Level 2 has been declared, or when there are specific voltage or frequency deviations, is vacated as of May 2, 2016. The USEPA further clarifies that any such operation for these purposes would be considered non-emergency operation after this date. While it is not known whether USEPA's requirements were the cause, there was a noticeable decrease in the amount of generating resources that cleared the PJM auction for DR participation between 2015 and 2016 in the OTC workgroup analysis.

[137] NESCAUM. Air Quality, Electricity, and Back-up Stationary Diesel Engines in the Northeast; Northeast States for Coordinated Air Use Management, Boston, MA, 2014.

[138] OTC Stationary and Area Source Committee, HEDD Workgroup White Paper: Examining the Air Quality Effects of Small EGUs, Behind the Meter Generators, and Peaking Units during High Electric Demand Days, 11/10/16.

An emission analysis was also conducted for these units by the OTC workgroup. The estimated emissions show a potentially significant amount of emissions from these units in the New York City Metropolitan/Long Island area on peak ozone days in the range of 2 to 3 tons per day. On March 11, 2020 New York adopted regulation, 6 NYCRR Part 222, that establishes performance standards for distributed generation sources with a compliance date of May 1, 2021. The implementation of this rule in New York will contribute to the attainment of the 75 ppb ozone standard in the Northern NJ-NY-CT Nonattainment Area.

6.8 Control Measures Not Included in the Photochemical Modeling

A weight of evidence (WOE) analysis is a supplemental analysis to support SIP modeling attainment demonstration results. Guidance for what may be included in a WOE analysis can be found in the USEPA 2018 Modeling Guidance. In some cases, a single modeling demonstration may not be appropriate as the determining factor in demonstrating whether an area will attain the NAAQS by the attainment date or when an area will attain the NAAQS. Depending on the results of the SIP modeling attainment demonstration, a state may choose to perform a WOE analysis to support the SIP modeling. A WOE analysis may include, but is not limited to, emissions reductions and control measures that were not included in the modeling and actual monitored design values.

New Jersey has adopted or implemented additional measures that have not been included in the air quality modeling, which are discussed below. These measures provide additional VOC and NO_x emission reductions that contribute towards the goal of attainment of the ozone NAAQS.

6.8.1 Quantified Control Measures

Stationary Gas Turbines and Engines

As discussed in more detail in Chapter 3, New Jersey adopted rules for stationary turbines and engines effective November 6, 2017, with a compliance date of November 6, 2019. It is estimated that this rule will reduce NO_x emissions approximately 1.8 tons per day in New Jersey. Some early compliance has been observed.

Control Techniques Guidelines: Fiberglass Boat Manufacturing Materials; Industrial Cleaning Solvents; Misc. Metal and Plastic Parts Coatings; Paper, Film, and Foil Coatings

As discussed in more detail in Chapter 3, New Jersey adopted four CTGs, effective November 6, 2017. It is estimated that these rules will reduce VOC emissions more than approximately 0.4 tons per day in New Jersey starting in 2018. Additional reductions will be obtained from best management practices that have not been quantified.

Gasoline Transfer Operations 2017 Amendments

As discussed in more detail in Chapter 3, New Jersey adopted amendments to its Gasoline Transfer Operations rules, effective November 20, 2017 and operative on December 23, 2017 with compliance dates ranging from one to seven years from the operative date. The Department estimates that the requirements for a CARB-certified Phase I Enhanced Vapor Recovery (EVR) system, including the CARB-certified pressure/vacuum valve and a dual-point vapor balance system for new gasoline dispensing facilities, will result in an emission reduction of approximately 5 tons per day (tpd) of VOCs. It is estimated that the requirements for dripless enhanced conventional (ECO) nozzles and low permeation hoses will result in an emission reduction of approximately 3.5 tpd of VOCs.

Electric Generating Units (EGUs) Administrative Consent Order (ACO) for B.L. England

As discussed in Chapter 3, on January 24, 2006, an ACO was signed with B.L.England to reduce air pollutants from its EGUs. It was anticipated that B.L. England would convert its coal fired units to natural gas and was included that way in the attainment modeling. Rather than convert the remaining units, B.L. England ceased operation of all units by May 1, 2019. Their permit was terminated December 3, 2019. Approximately 81 tons of NO_x, 28 tons of VOC and 52 tons of carbon monoxide were included in the 2020 attainment modeling, that were not actually emitted in 2020 in New Jersey's southern nonattainment area.

State Voluntary Mobile Measures

As discussed in more detail in Chapter 3, New Jersey has implemented several transportation programs and initiatives such as the New Jersey Clean Construction Program, Marine Ferry Repower Program, Forklift Replacements, EMS Idle Reduction Program and USEPA Diesel Emission Reduction Act (DERA) Retrofit and Replacements and Marine Repowers programs. These programs are estimated to achieve approximately 2,295 tons of NO_x and 183 tons of particulate matter. Emission reduction estimates in this section are not being relied on to meet any required SIP milestones but support the States goal of ozone attainment.

6.8.2 Non-Quantified Control Measures

IM: Diesel Smoke Cutpoint

As discussed in Chapter 3, the NJDEP adopted amendments to N.J.A.C. 7:27 - 14.2, 14.4, 14.6, and 7:27B - 4.5 on April 3, 2009, which reduce the allowable smoke from heavy-duty diesel vehicles during inspections. 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. Newer trucks are equipped with emission control equipment which reduces the exhaust emissions. Smoke opacity is an indicator that maintenance is needed.

IM: Heavy Duty On-board Diagnostics (OBD)

As discussed in Chapter 3, the heavy duty on-board diagnostics (OBD) inspection and maintenance program requirements were discussed in Chapter 3 Control Measures. The NJDEP adopted amendments to N.J.A.C. 7:27 – 14, 15, and N.J.A.C. 7:27B-4, B-5 on September 9, 2016, which added on-board diagnostic (OBD) inspection and maintenance requirements for heavy duty vehicles. OBD equipment monitors the status of vehicle emission controls and engine performance, alerting the driver via a dashboard indicator if there is a vehicle malfunction. The rules require heavy duty vehicles with OBD systems installed, model years 2014 and newer, to pass an OBD inspection every year for commercial vehicles and every two years for passenger vehicles. The estimated start date of the program is in 2022.

Beginning March 2, 2020, the New Jersey Motor Vehicle Commission (NJMVC) began a pilot program for the roadside inspections of medium duty diesel vehicles (MDDVs). The pilot will be conducted in cooperation with the NJDEP and with the aid of the New Jersey State Police. The primary purpose of these inspections will be to obtain data to determine a rate of compliance for all diesel-powered motor vehicles, whether registered "Commercial" or "Passenger," with gross vehicle weight ratings between 8,501 lbs. to 17,999 lbs. and subject to the State's self-inspection program and emission laws.

State Voluntary Mobile Measures

As discussed in more detail in Chapter 3, and in addition to the programs with estimated emission reductions discussed above, New Jersey has implemented several transportation programs and initiatives such as Transportation Control Measures (TCMs), Transportation Management Associations (TMAs), North Jersey Transportation Planning Authority Transportation Clean Air Measures and the Port Authority of New York and New Jersey Cargo Handling Equipment program.

Electric Vehicles

As discussed in more detail in Chapter 3, Section 3.2 for measures prior to the attainment date and Section 3.4 for additional recent measures, New Jersey has taken significant actions regarding electric vehicles that will help New Jersey's goal of ozone attainment now and far into the future.

EGUs: Mercury and Air Toxics Standards

As discussed in detail in Chapter 3, on December 16, 2011, the USEPA promulgated the Mercury and Air Toxics Standards (MATS) to reduce emissions of toxic pollutants from power plants. The MATS include revisions to the Federal NSPS for new fossil-fuel-fired electric generating units, including revised numerical emission limits for NO_x.

Regional Haze "Asks"

As discussed in Chapter 3, Section 3.4, the Federal Clean Air Act sets a national goal to restore visibility to its natural conditions in many of the national parks and wilderness areas in the United States of America. New Jersey is home to one of these areas, the Brigantine Wilderness Area in the Edwin B. Forsythe National Wildlife Refuge. Additional measures to control air pollution, including ozone precursors, in New Jersey and other states within its shared ozone nonattainment area, as well as upwind contributing states, have occurred as part of states' Regional Haze State Implementation Plans (SIPs) for the first implementation planning period of 2008-2018. States in the MANE-VU region are currently in various stages of developing Regional Haze SIPs for the second implementation planning period of 2018 -2029. New Jersey submitted its final Regional Haze SIP to USEPA on March 26, 2020. Included in the Regional Haze SIP was a list of "asks" for states that contribute to visibility impairment to consider undertaking as air pollution control measures in their Regional Haze SIPs. The "asks" addressed emissions of sulfur dioxide (SO_2) and NO_x from states within and outside of the MANE-VU Region.

The "Asks" include more stringent controls for electric generating units (EGUs) and peaking combustion turbines, evaluation of emission sources to determine reasonable installation or upgrade of emission controls, adoption of MANE-VU's 2007 ultra-low sulfur fuel oil standard, locking in lower emission rates by updating of permits, enforceable agreements, and/or rules, and increased use of energy efficiency measures and other clean technologies including fuel cells, wind, and solar.

The "Asks" also includes a request that the Federal Land Managers consult with MANE-VU Class I area states when scheduling prescribed burns, and EPA to develop measures that will further reduce emissions from heavy-duty onroad vehicles and ensure that Class I Area state "Asks" are addressed by states identified as significantly contributing to MANE-VU Class I areas.

6.9 Attainment Demonstration Summary

The attainment modeling did not predict attainment of the 2008 75 ppb 8-hour ozone NAAQS. The modeling predicted noncompliance at three monitors located in Connecticut and two monitors in New York. All of the monitors in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area were predicted to be in compliance with 75 ppb standard.

The ambient air monitoring for the Northern NJ-NY-CT Nonattainment Area is measuring noncompliance with the 75 ppb standard at five monitors based on the 2019 monitoring design values and four monitors based on the preliminary 2020 monitoring design values. All of the monitors are located in Connecticut. All of the monitors in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area are in compliance with 75 ppb standard and have been below the 75 ppb standard since 2014. In addition, the monitors downwind of New Jersey in New York are in compliance with the 75 ppb standard based on the 2019 and preliminary 2020 design values.

New Jersey's NO_x and VOC (ozone precursor) emissions have decreased significantly. New Jersey's annual NO_x emissions have decreased approximately 78 percent from 1990 to 2017 and 42 percent from 2011. Annual VOC emissions have decreased approximately 69 percent from 1990 to 2017 and 23 percent from 2011. A significant decreasing trend has also been shown in 8-hour ozone air quality monitoring design values in New Jersey of approximately 42 percent from 1988 to 2019. The 8-hour ozone design values in the Northern NJ-NY-CT Nonattainment Area have decreased approximately 24 percent from 1999-2019.

New Jersey's ozone design values had significant decreases ranging from four to 14 ppb in its monitors in the NJ-NY-CT nonattainment area from 2011 to preliminary 2020. The New York monitors directly downwind of New Jersey have also shown significant decreases from 2011 to preliminary 2020 monitoring data ranging from one to 15 ppb.

These decreasing trends in emissions and monitoring values demonstrate the effectiveness of New Jersey's rules. New Jersey has met Reasonably Available Control Measures (RACM) and Reasonably Available Control Technology (RACT) requirements and has gone beyond RACM and RACT by adopting control measures more stringent than Federal rules, Control Technique Guidelines (CTGs) and neighboring state rules, especially those of most importance that address NO_x on high ozone days, thereby setting the standard for what modern RACT should be. Most specifically are New Jersey's rules for:

Power Plants

New Jersey has enforceable, short term, performance standards for NO_x and VOC emissions from power plants (or EGUs) that are among the most stringent and effective air pollution control regulations in the country. New Jersey has taken the lead by adopting measures to address emissions from EGUs that operate on HEDDs when ozone concentrations tend to be elevated. These sources are critically important contributors to episodes of elevated ozone in the Northern NJ-NY-CT Nonattainment Area.

All major facility permits for new EGU sources issued by the Department limit NO_x emissions based on hourly or daily averaging times, which are monitored by continuous emissions monitors (CEMs) and stack testing. These shorter averaging times lower NO_x emissions on a daily basis during the summertime (when they are needed to control outdoor ozone levels), rather than allowing facilities to emit high levels of NO_x during a summer day while still meeting an annual or ozone season cap. New Jersey's EGU rules include similar short-term emission limits for existing sources of NO_x, including all existing coal, oil and gas-fired EGU's.

New Jersey's EGU rules more effectively control ozone levels than CSAPR because New Jersey's facilities must meet daily NO_x performance standards for all units, while facilities in other states may, under the Federal rules, purchase allowances to cover their excess emissions on high energy demand days. New Jersey's daily enforceable emission limitations better address ozone nonattainment than emission trading programs that allow the averaging of NO_x emissions over the entire summer. Five-month compliance periods are insufficient to ensure attainment of the ozone NAAQS because emissions can be high on days when ozone levels are high. Five-month averaging does not sufficiently lower emissions on the hottest summer days when peak electric demand and peak ozone levels usually occur. Unlike other states that significantly impact New Jersey's air quality, New Jersey power plants cannot turn off their NO_x pollution controls and use excess NO_x allowances to meet emission limits.

USEPA's ozone season trading program in CSAPR is inadequate to address NO_x emissions from HEDD units that are preferentially used on high temperature, high ozone days. New Jersey has reduced NO_x emissions from power plants an estimated 64 tons per day on HEDD since implementation of the rule, with Phase I in 2009 and Phase II in 2015.

<u>Distributed Generation/Demand Response (DG/DR)</u>

New Jersey's rules for stationary reciprocating internal combustion engines (RICE) do not allow the use of uncontrolled engines for the purpose of distributed electric generation or demand response in non-emergency situations. However, in some states these engines are uncontrolled and used to assist the electric grid during high electric demand periods. The emissions from these units are not properly accounted for in states inventories, or in the USEPA National Emissions Inventory (NEI) and they are not properly temporalized in the modeling. Like HEDD EGUs, many of these engines are operating on hot summer days which usually coincide with the high ozone days. Emissions from these units in the New York City Metropolitan/Long Island area on peak ozone days may be significantly contributing to ozone formation.

<u>Area Source VOC Rules</u>

New Jersey has implemented several area source VOC control measures which are more stringent than Federal standards, many based on stringent California standards. These include rules for consumer products including hairspray, insecticides, household cleaners, air fresheners, automotive brake cleaners, carpet and upholstery cleaners and household adhesives, paints, stains and varnishes, automotive refinishing, industrial and commercial adhesives, asphalt paving and solvent degreasing.

<u>State of the art (SOTA)</u>

SOTA air pollution control must be implemented for significant equipment at minor facilities for new VOC and NO_x sources of air pollution.

<u>Petroleum Storage</u>

New Jersey has implemented one of the most stringent petroleum storage rules in the country, which established requirements to reduce VOC emissions from bulk petroleum storage facilities.

Municipal Waste Combustors

New Jersey has implemented measures to control NO_x emissions from Municipal Waste Combustors. New Jersey has taken significant actions to address these important sources while the USEPA, State of New York, and other nearby states, including upwind states that significantly contribute to ozone nonattainment, have not.

New Jersey Mobile Source Controls

New Jersey has also done its part to address emissions from mobile sources to the extent that state action on mobile source control measures is not pre-empted by the Clean Air Act. New Jersey has adopted a Low Emission Vehicle Program (NJLEV) addressing motor vehicle emissions based on the standards used by the State of California to ensure that the lowest emitting vehicles available in the nation are sold in New Jersey including zero emission standards. Other states have not made the same commitment. New Jersey also has some of the most stringent rules in the country for vehicle idling and heavy-duty vehicle inspection and maintenance using on-board diagnostics (OBD) technology.

New Jersey has met its RFP demonstration requirements. New Jersey's Northern nonattainment area has achieved a total reduction in VOC and NO_x summer tons per day emissions of 57 percent between 2011 and 2017. This is more than three times the RFP CAA requirement of a 15 percent reduction over the six-year period for a moderate area and 18 percent reduction for a serious area. New Jersey estimates a 21 percent reduction from 2017 to 2020, which exceeds the RFP-required 9 percent, for the New Jersey portion of the Northern NJ-NY-CT nonattainment area.

6.10 Attainment Plan Conclusions

New Jersey has met its obligation for implementing control measures to address its contribution to ozone nonattainment within the nonattainment area. New Jersey has gone beyond RACM and RACT by adopting control measures more stringent than Federal rules, CTGs and neighboring state rules, especially those of most importance that address NO_x on high ozone days. All monitors in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area are below the 75 ppb standard and have been since 2014. The monitors above the standard in Connecticut are along the downwind side of the Long Island Sound and are significantly affected by emissions from the New York metropolitan area, a bay breeze effect and the I-95 corridor. Demonstration of New Jersey's accomplishments can be seen in the monitoring data as the New York monitors downwind of New Jersey but upwind of the noncompliant Connecticut monitors are in compliance with the standard.

New Jersey does not anticipate attainment in the Northern NJ-NY-CT Nonattainment Area without a full transport solution from the USEPA and other states controlling to New Jersey levels. While New York has adopted rules that address power generation on high electric demand days and distributed generation, the effective dates of compliance of the rules are May 1, 2023 and May 1, 2025 for HEDD and May 1, 2021 for DG and were not in place to assist in compliance of the 75 ppb attainment date of July 2021 (2018, 2019 and 2020 ozone seasons).

Following are recommendations to achieve compliance:

- Transport/CSAPR

  USEPA should adopt a full remedy to transport, addressing those largest contributing States identified by USEPA's analysis of contributing States outside the non-attainment area (e.g., Pennsylvania, Ohio, Virginia, West Virginia, Indiana, Michigan and Illinois), that includes, but is not limited to:
  - Daily NO_x performance standards for EGUs, including distributed generation units, similar to those implemented in New Jersey.
  - A requirement that all installed NO_x controls on EGUs be fully operated at optimized control levels, as required in New Jersey.
  - Measures to address non-EGU emissions.

- Rules That Address Power Generation Emissions in New York

  The New York metropolitan area is directly upwind of the controlling Connecticut monitors, with a bay in between. New Jersey has adopted measures to address emissions from EGU sources that operate on high electric demand days when ozone concentrations tend to be elevated that were effective in 2009, 2013, 2014 and 2015, prior to the current attainment dates. On December 11, 2020 New York adopted a rule that addresses NO_x emissions from peaking combustion turbine EGUs with compliance dates of May 1, 2023 (100 ppm limit) and May 1, 2025 (25 ppm limit for gas and 42 ppm limit for oil). On February 19, 2020 New York adopted a regulation, 6 NYCRR Part 222, that establishes performance standards for distributed generation sources with a compliance date of May 1, 2021.

  It is important for upwind states to implement measures to reduce emissions from electric generation on high electric demand days, including electric generating units in CAMD, smaller electric generating units and behind the meter demand response units. These rules will assist New York in meeting its good neighbor requirements and assist in achieving attainment of the 75 ppb ozone standard in the Northern NJ-NY-CT Nonattainment Area. However, New Jersey's stationary generator rule is more stringent than New York's based on applicability thresholds, effective date of emissions limits, and exemptions. New Jersey rules are also implemented statewide while New York's distributed generation rule is limited in scope to the New York Metropolitan area.

- New Jersey RACT Rules in Other States

  Nonattainment area and upwind states should adopt and implement control measures that meet RACT standards similar to those in New Jersey for sources such as HEDD power generation, DG/DR power generation and municipal waste combustors. In addition, the upwind states should adopt presumptive NO_x emission limits and averaging time requirements similar to New Jersey and should not allow the buying of allowances to facilitate reduced operation of air pollution controls.

- Mobile Source Rules

  Upwind states should adopt mobile source measures similar to those in New Jersey such as the California Low Emission Vehicle Program and heavy-duty vehicle OBD inspection and maintenance. The USEPA must also do its part to address mobile source emissions that contribute the largest portion of total NO_x emissions within the nonattainment area as well as the region. For example, the USEPA should finalize its proposed rule to address new engine standards to reduce NO_x emissions from heavy-duty on-road vehicles. The final rule should be as stringent as the current California proposal. The USEPA should also prioritize an update to the Federal Aftermarket Catalytic Converter (AMCC) Policy dated August 5, 1986 to reflect the most recent technological advances.

Chapter 7 CONFORMITY

The Clean Air Act[139] requires that Federal actions conform to a state's State Implementation Plan (SIP). Specifically, the act requires the Federal action/activity will not:

- Cause or contribute to any new violation of any standard in any area;
- Increase the frequency or severity of any existing violation of any standard in any area; or,
- Delay timely attainment of any standard or any required interim emission reductions or any other milestones in any area.

To implement this requirement, the Clean Air Act directed the United States Environmental Protection Agency (USEPA) to issue rules that governed how conformity determinations would be conducted for two categories of actions/activities: a) those dealing with transportation plans, programs and projects (Transportation Conformity), and b) all other actions, e.g., projects requiring Federal permits. This latter category is referred to as General Conformity.

7.1 Transportation Conformity

The Federal Transportation Conformity Rule (40 CFR Sect. 93.100-160) provides the process by which the air quality impact of transportation plans, transportation improvement programs, and projects are analyzed. The agency preparing Transportation Plans (20 or more years), Transportation Improvement Programs (at least four years), or approving a transportation project must analyze the emissions expected from such a proposal in accordance with the Transportation Conformity Rule.[140]

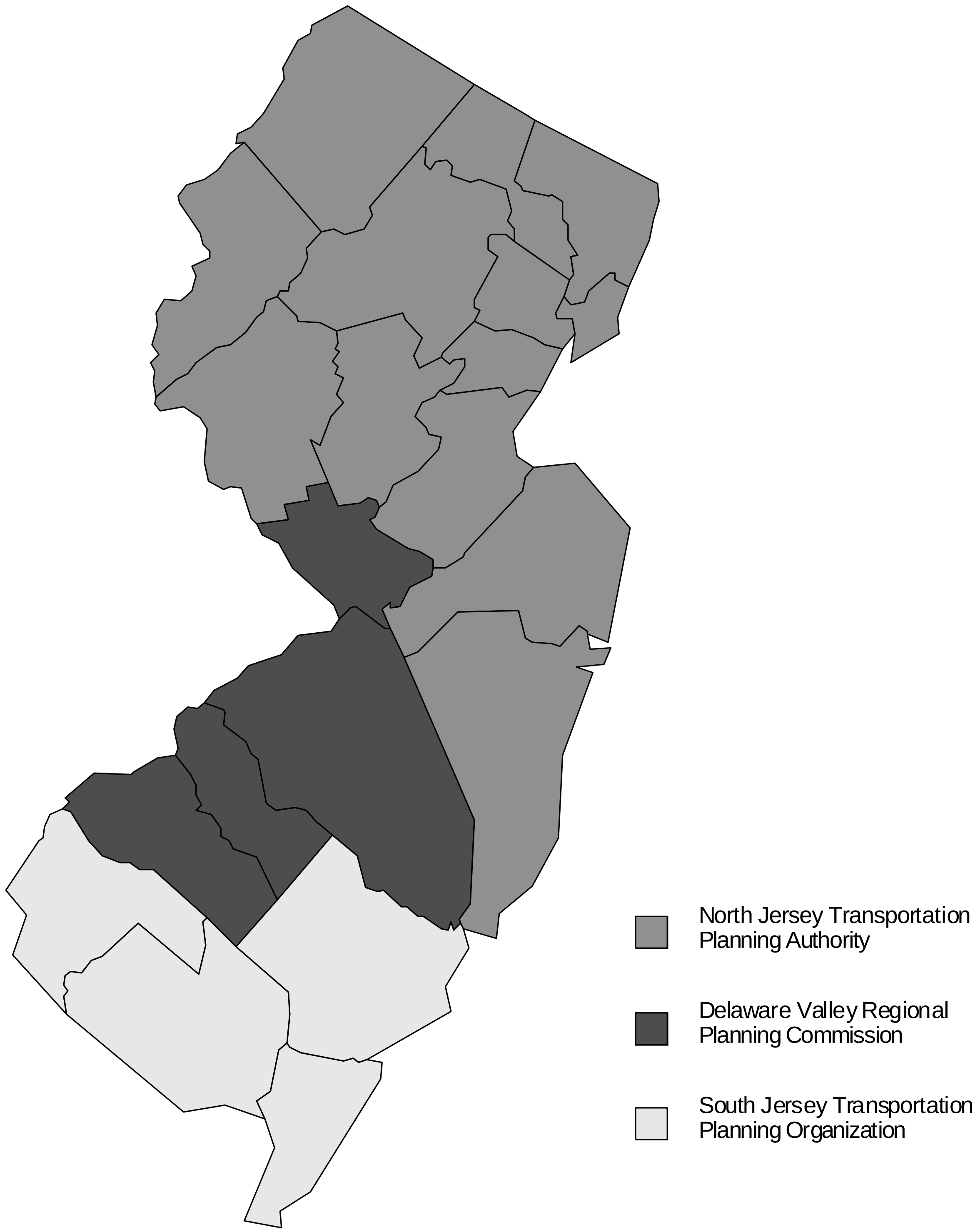
For the purposes of transportation conformity, the emissions budget is essentially a cap on the total emissions allocated to onroad vehicles. The projected emissions from a Transportation Plan, Transportation Improvement Program, or project, estimated in accordance with the Transportation Conformity Rule, may not exceed the motor vehicle emissions budget or cap contained in the appropriate SIP. Every significant revision to a Transportation Plan or Transportation Improvement Program must be accompanied by a transportation conformity determination. Transportation conformity determinations must demonstrate, via detailed modeling, that the proposed transportation projects do not increase area emissions above the emissions budgets. Approval of the Transportation Plan or Transportation Improvement Program by the Federal Highway Administration, and thereby the approval of the use of Federal funds, is contingent on the completion of a transportation conformity determination that shows that emissions will remain below the budgets. Emissions in years for which no motor vehicle emissions budgets are specifically established must be less than or equal to the motor vehicle emissions budget established for the most recent prior year.

According to the USEPA's Implementation Rule,[141] 8-hour ozone transportation conformity budgets must be established for the RFP emission reduction milestone year of 2017 and the 8-hour ozone attainment year. Transportation conformity budgets for 2017 were included in the previous moderate-classified ozone attainment demonstration SIP for the Northern NJ-NY-CT Nonattainment Area. Now that this area is classified as serious, 2020 is the attainment year (note that although the attainment date is July 20, 2021, the area must demonstrate attainment by 2020). This section finalizes 8-hour ozone Transportation Conformity emissions budgets for

[139] 42 U.S.C. §7506
[140] For New Jersey, such plans are prepared by three Metropolitan Planning Organizations (North Jersey Transportation Planning Authority, South Jersey Transportation Planning Organization and Delaware Valley Regional Planning Commission).
[141] Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule, 80 FR 12264, March 6, 2015.

2020 for the North Jersey Transportation Planning Authority (NJTPA), which is the Metropolitan Planning Organization (MPO) for the nonattainment counties classified as Serious in New Jersey. As shown in Figure 7-1, New Jersey's 21 counties fall into one of three MPOs.

Figure 7-1: Metropolitan Planning Organizations in New Jersey



Each MPO is responsible for the Transportation Plans and Transportation Improvement Programs for its designated area, and each work in consultation with the United States Department of Transportation (USDOT), USEPA, New Jersey Department of Transportation (NJDOT), New Jersey Transit, and New Jersey Department of Environmental Protection (NJDEP) to meet established transportation emissions budgets for their area. The transportation conformity budgets are established for each MPO area by nonattainment area. For example, the NJTPA MPO includes the 13 northern-most counties in New Jersey; however, the Northern NJ-NY-CT Nonattainment Area includes only 12 of these counties (Ocean County is part of the Southern NJ-PA-DE-MD Nonattainment Area). The transportation conformity determinations (that undergo separate public processes) conducted by NJTPA to support its Transportation Plans and Transportation Improvement Programs use both sets of budgets as appropriate. Budgets for a nonattainment area are calculated by adding the onroad emission inventories from individual counties.

New Jersey has two 8-hour ozone nonattainment areas, i.e., the Northern NJ-NY-CT Nonattainment Area and the Southern NJ-PA-DE-MD Nonattainment Area. Only the Northern NJ-NY-CT Nonattainment Area is the subject of this SIP revision. This area is classified as Serious based on the severity of its ozone problem. Areas classified as Serious must demonstrate attainment by July 20, 2021 or the 2020 ozone season.

The control measures assumed in the development of the Transportation Conformity budgets are those used to estimate highway onroad emissions as described in Chapter 4. The approach used to calculate the budgets is the same as that used to calculate the emission inventories as described in detail in Appendix 4-6. The onroad source emission projections are presented in Table 7-1. These emission projections are being established as the 8-hour ozone Transportation Conformity budgets.

Table 7-1:
8-Hour Ozone Transportation Conformity Budgets

Transportation Planning Area	VOC Emissions (tons per summer work weekday)	NO_x Emissions (tons per summer work weekday)
	2020	**2020**
North Jersey Transportation Planning Authority - 12 Counties (Excluding Ocean County)	42.46	76.77

It should be noted that these 2020 emission projection budgets are less than (more stringent than) the previous 2017 budgets documented in New Jersey's prior moderate-classified attainment demonstration SIP for these counties. 2017 budgets for VOCs and NO_x were 48.69 tpd and 103.22 tpd, respectively. The 2020 budgets are 13.7% lower for VOCs and 29.4% lower for NO_x which demonstrates the magnitude of the continuing progress in reducing onroad emissions in these counties that includes the largest city in the State (Newark).

7.2 General Conformity

The authority to address General Conformity is set forth in Section 176(c) of the Clean Air Act and the requirements to demonstrate conformity are found in the USEPA's implementing regulation (40 CFR Part 93, Subpart B – Determining Conformity of General Federal Actions to State or Federal Implementation Plans). The purpose of General Conformity is to ensure that actions undertaken by Federal agencies will conform to the State Implementation Plan (SIP) to attain and maintain the National Ambient Air Quality Standards (NAAQS).

General Conformity applies to criteria pollutants in nonattainment and maintenance areas. Actions that receive Federal funding, require a Federal permit, license, approval or support but do not fall under Transportation Conformity are subject to General Conformity. The Federal General Conformity regulation (40 CFR 93.161) provides Federal installations with the ability to develop a facility-wide budget to demonstrate conformity. New Jersey has established General Conformity budgets for McGuire Air Force Base (AFB) and Lakehurst Naval Air Station (NAS) for volatile organic compounds (VOC) and nitrogen oxides (NO_x) and these budgets continue to remain in effect.

Chapter 8 OTHER SIP COMPONENTS

8.1 Infrastructure CAA Section 110

When the USEPA establishes a new or makes a revision to a NAAQS, the CAA Section 110(a)(2) (or 42 U.S.C. § 7410(a)(2)), requires the states to submit to the USEPA a SIP revision or certification indicating that the State has the authority to develop, implement, and enforce an air quality management program that provides for attainment and maintenance of the NAAQS. This SIP revision is referred to as an “Infrastructure” SIP.

Table 8-1 provides a summary of the SIP elements and the citations for New Jersey’s authority in the State’s statutes, including the Air Pollution Control Act.

Table 8-1:
Infrastructure Elements Required under the CAA Section 110(a)(2)

CAA Element	Summary of Element	New Jersey Authority
110(a)(2)(A)	Enforceable Emission Limitations and Other Control Measures	N.J.S.A. 26:2C-8, 9, 18 and 19 N.J.A.C. 7:27
110(a)(2)(B)	Ambient Air Quality Monitoring, Compilation, Data Analysis, and Reporting	N.J.S.A. 26:2C-9.a.
110(a)(2)(C)	Enforcement and Stationary Source Permitting (PSD)	N.J.S.A. 13:1D-9 N.J.S.A. 26:2C-8 and 19 N.J.S.A. 26:2C-9.b (specifically 9.b(4), 9.b(5) and 9.b(8)) and 9.1 N.J.A.C. 7:27 and 7:27A N.J.A.C. 7:27-8 and 22
110(a)(2)(D)	Interstate Transport of Air Pollution and International Pollution Abatement	N.J.A.C. 7:27 N.J.A.C. 7:27-22.11(k) and 22.24 N.J.S.A. 26:2C-8 and specifically 8.11 N.J.S.A. 26:2C-9 and 9.b(6)
110(a)(2)(E)	Resources, Conflict of Interest, and Emergency Backstop (Funding)	N.J.S.A. 26:2C-3.2 and 8 N.J.S.A. 13:1D-9 N.J.S.A. 52:13D-14 and 16 N.J.S.A. 26:2C-22 N.J.S.A. 26:3A2-21 et seq. N.J.A.C. 7:1H-1 et seq.
110(a)(2)(F)	Stationary Source Emissions Monitoring and Reporting (Emissions Statements)	N.J.S.A. 26:2C-9.b(3) and (4) and 9.2 N.J.A.C. 7:27-8, 11.3(e), 21, and 22.18
110(a)(2)(G)	Emergency Powers and Contingency Plans	N.J.S.A. 26:2C-26 et seq. N.J.A.C. 7:27-12
110(a)(2)(H)	State Implementation Plan Revision for Revised Air Quality Standards or New Attainment Methods	N.J.S.A. 13:1D-9
110(a)(2)(I)	State Implementation Plan for Non-attainment Areas (NNSR)	N.J.S.A. 13:1D-9
110(a)(2)(J)	Consultation, Public Notification, and Prevention of Significant Deterioration (PSD)	N.J.S.A. 26:2C-8, 9, and 19 N.J.S.A. 52:14B-1 et seq. N.J.A.C. 7:27-8.10 and 22.11
110(a)(2)(K)	Air Quality Modeling and Reporting	N.J.S.A. 26:2C-9.2(b) N.J.A.C. 7:27-8.5 and 22.8
110(a)(2)(L)	Major Stationary Source Permitting Fees	N.J.A.C. 7:27-22.31 N.J.S.A. 26:2C-9.b(7), 9.5 and 9.6
110(a)(2)(M)	Consultation with Local Entities	N.J.S.A. 26:2C-8 N.J.S.A. 52:14B-1 et seq.

On October 17, 2014, the NJDEP submitted a Multi-Pollutant Infrastructure SIP revision to USEPA, which addressed the requirements of CAA Section 110(a)(2) for the 2008 75 ppb 8-hour ozone NAAQS. The majority of the infrastructure elements were approved by USEPA on May 30, 2018[142]. A summary of the remaining elements is discussed below.

8.1.1 Infrastructure: Transport (or Good Neighbor SIP) and CSAPR

CAA Section 110(a)(2)(D)(i) (or 42 U.S.C. § 7410(a)(2)(D)(i)), requires that each state's SIP contain adequate provisions prohibiting any source, or other type of emissions activity, within the State from emitting any air pollutants in amounts that will:

> "Contribute significantly to nonattainment of the National Ambient Air Quality Standards (NAAQS) for areas in another state or interfere with the maintenance of the NAAQS by another state."

On July 6, 2011, the USEPA finalized the Cross-State Air Pollution Rule (CSAPR) to address air pollution from upwind states that crosses state lines and affects air quality in downwind states. This rule requires certain states in the eastern half of the U.S. to improve air quality by reducing power plant emissions that cross state lines and contribute to smog and soot pollution in downwind states. The CSAPR replaced USEPA's 2005 Clean Air Interstate Rule (CAIR), following the direction of a 2008 court decision that required EPA to issue a replacement regulation.

On October 17, 2014, the NJDEP submitted a Multi-Pollutant Infrastructure SIP revision to USEPA, which addressed the requirements of CAA Section 110(a)(2)(D)(i) for the 2008 75 ppb ozone NAAQS.

On January 1, 2015 CSAPR implementation began.

On November 16, 2015, the USEPA proposed an update to its existing Cross-State Air Pollution Rule (CSAPR). The purpose of the CSAPR update was to "partially" address the requirements of Section 110(a)(2)(D)(i) and the transport of ozone and its precursors from upwind states that significantly contribute to ozone nonattainment or interfere with maintenance of the 2008 75 ppb ozone NAAQS in downwind areas and to act as a Federal Implementation Plan (FIP). The CSAPR Update was a partial remedy for addressing ozone transport and does not provide the necessary reductions for the Northern NJ-NY-CT Nonattainment Area to attain by July 20, 2021.

On March 30, 2016, New Jersey withdrew the CAA Section 110(a)(2)(D)(i)(I) transport portion of its Multi-Pollutant October 17, 2014 Infrastructure SIP revision as it related to the 2008 75 ppb 8-hour ozone NAAQS. This withdrawal was at USEPA's request to facilitate USEPA's progress in implementing the FIP, especially on those upwind states significantly contributing to ozone levels in New Jersey and its shared nonattainment areas. The withdrawal allowed USEPA to include New Jersey in the CSAPR Update FIP.

On June 15, 2016,[143] USEPA published a finding of failure to submit for New Jersey for the interstate transport requirements of CAA Section 110(a)(2)(D)(i)(I) for the 2008 75 ppb 8-hour ozone NAAQS, which was necessary for USEPA to promulgate a FIP to address interstate transport for the 2008 75 ppb 8-hour ozone NAAQS.

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[142] 83 Fed. Reg. 24661 (May 30, 2018).
[143] 81 Fed. Reg. 38963 (June 15, 2016).

On September 7, 2016, the USEPA finalized its “partial” remedy update to CSAPR for the 2008 75 ppb ozone NAAQS.[144] The 2016 CSAPR update established lower ozone season NO_x emission budgets for electric generating units (EGUs). The USEPA acknowledged that the 2016 CSAPR Update does not fully address the problem of upwind transport and only provides a partial remedy for the significant contribution of upwind states to downwind nonattainment and maintenance areas for the 2008 75 ppb 8-hour ozone NAAQS.[145]

On January 6, 2017, the USEPA issued a "Notice of Availability of the Environmental Protection Agency’s Preliminary Interstate Ozone Transport Modeling Data for the 2015 Ozone NAAQS" (NODA) for public comment. The information included emission inventories and modeling results for 2011 and 2023 modeling platform.[146]

On May of 2017 implementation of the 2016 CSAPR Update began.

On October 27, 2017, the USEPA issued a transport guidance memo for the 2008 ozone NAAQS with supplemental updated 2023 modeling based on comments received on the NODA and different technical scenarios.[147]

On March 27, 2018, the USEPA issued a transport guidance memo that provided an update to the January 2017 contribution modeling for the 2015 ozone NAAQS and built upon the information provided in the October 2017 memo.[148]

On July 10, 2018, the USEPA issued a proposed rule, "Determination Regarding Good Neighbor Obligations for the 2008 Ozone National Ambient Air Quality Standard," hereafter referred to as the “USEPA 2018 Good Neighbor Proposal.”[149] The rule proposes a determination that, for 20 states for which USEPA has not proposed or taken separate action, the 2016 CSAPR Update fully satisfied the obligations of these states and USEPA under the Good Neighbor provision of the Act for the 2008 ozone NAAQS. USEPA relies on the cost-effectiveness threshold established in the 2016 CSAPR Update and the subsequent USEPA 2023 Transport Modeling. New Jersey does not agree with this proposal, the control measure assumptions, its cost-effectiveness threshold or its use of 2023 modeling for a 2018 attainment date.

On August 31, 2018, in response to stakeholder comments on the March 27, 2018 memo, the USEPA issued a memorandum revising the contribution metric spreadsheet for the 2023 modeling platform originally posted in March 2018 to include the most recent design values (i.e., 2014-2016) and information regarding "home state" and upwind state collective contribution.

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[144] 81 Fed. Reg. 74504 (October 26, 2016).
[145] USEPA Fact Sheet for the Final Cross-State Air Pollution Rule Update for the 2008 NAAQS, June 2017. https://www.epa.gov/airmarkets/fact-sheet-final-cross-state-air-pollution-rule-update-2008-naaqs
[146] 82 Fed. Reg. 1733, January 6, 2017.https://www.epa.gov/airmarkets/notice-data-availability-preliminary-interstate-ozone-transport-modeling-data-2015-ozone
[147] USEPA Memo titled "Supplemental Information on the Interstate Transport State Implementation Plan Submissions for the 2008 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I), October 27, 2017." https://www.epa.gov/airmarkets/october-2017-memo-and-supplemental-information-interstate-transport-sips-2008-ozone-naaqs
[148] "USEPA Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(1)(I)(I), March 27, 2018," and Supplemental Information Regarding Interstate Transport SIPs for the 2015 Ozone NAAQS, https://www.epa.gov/airmarkets/memo-and-supplemental-information-regarding-interstate-transport-sips-2015-ozone-naaqs
[149] 83 Fed. Reg. 31915 (July 10, 2018).

On December 21, 2018, the USEPA finalized its 2018 Good Neighbor Proposal.[150]

On May 14, 2019, the NJDEP submitted a Transport (Good Neighbor) Infrastructure SIP revision to the USEPA that fully addressed the requirements of CAA Section 110(a)(2)(D)(i)(I), for the 2008 75 ppb and 2015 70 ppb 8-hour ozone NAAQS.

On September 13, 2019, the US Court of Appeals for the DC Circuit remanded the CSAPR Update to the USEPA to address the court's holding that the rule unlawfully allows significant contribution to continue beyond downwind attainment deadlines. The September 13, 2019 decision by the DC Circuit US Court of Appeals found that "…in one respect, the Rule is inconsistent with the Act: it allows upwind States to continue their significant contributions to downwind air quality problems beyond the statutory deadlines by which downwind States must demonstrate their attainment of air quality standards."

On October 1, 2019, the D.C. Circuit vacated the CSAPR Close-Out on the same grounds on which it had remanded without vacatur the CSAPR Update in "Wisconsin, New York v. EPA, 781 Fed. App'x 4, 7 (D.C. Cir. 2019) (New York)." The court found the CSAPR Close-Out inconsistent with the Wisconsin holding because the rule analyzed the year 2023 rather than the next applicable attainment date of 2021 and failed to demonstrate that it was an impossibility to address significant contribution by the 2021 attainment date.[151]

On February 19, 2020 New Jersey was part of a legal action that filed suit on the basis of the EPA's alleged failure to perform nondiscretionary statutory duties, namely the EPA's obligation to promulgate FIPs for Upwind States fully addressing those States' Good Neighbor obligations for the 2008 ozone NAAQS by the statutory deadlines.[152]

8.1.2 Infrastructure: Visibility

On September 19, 2016,[153] USEPA approved the portion of the October 17, 2014 SIP submittal from New Jersey pertaining to the requirements of CAA section 110(a)(2)(D)(i)(II) prong 4 requirement for visibility (or prong 4) for the 2008 Lead, 2008 Ozone, 2010 NO_2, 2010 SO_2, and 2012 PM2.5, 2006 PM10 and 2011 CO NAAQS.

8.1.3 Infrastructure: Prevention of Significant Deterioration (PSD) Permitting

The Clean Air Act requires a state to implement a prevention of significant deterioration (PSD) permitting program at Section 110(a)(2)(D)(i)(II) prong 3. New Jersey's PSD permitting program applies when a major source that is located in an area designated as attainment or unclassifiable for any criteria pollutant, is constructed, or undergoes a major modification. New Jersey has elected to comply with the Federal PSD requirements by accepting delegation of the Federal rules and has been successfully implementing this program for many years. New Jersey accepted delegation of the administration of the Federal PSD program from the USEPA on February 22, 1983 and the provisions of 40 CFR 52.21(b) through (w), related to Prevention of Significant Deterioration, were incorporated into New Jersey's SIP at 40 CFR 52.1603(b). New Jersey's delegation was most recently revised on July 11, 2011.

However, USEPA does not recognize a delegated PSD program as satisfying the Infrastructure SIP requirements. Therefore, on September 19, 2016 [154], USEPA disapproved New Jersey's

[150] 83 Fed. Reg. 65878 (December 21, 2018).
[151] 85 Fed. Reg. 68966.
[152] Civil Action No. 20-cv-1425, filed February 19, 2020.
[153] 81 Fed. Reg. 64070 (September 19, 2016).
[154] 81 Fed. Reg. 64070 (September 19, 2016).

submittal pertaining to the requirements of CAA section 110(a)(2)(D)(i)(II) requirement for PSD (or prong 3) for the 2008 Lead, 2008 Ozone, 2010 NO_2, 2010 SO_2, and 2012 PM2.5, 2006 p.m.10 and 2011 CO NAAQS. USEPA noted in its disapproval that New Jersey is complying with the Federal PSD requirements by accepting delegation of the Federal rules and has been successfully implementing this program for many years. The disapproval will not trigger any sanctions or additional Federal Implementation Plan obligation because a PSD Federal Implementation Plan is in place. New Jersey's regulations at N.J.A.C. 7:27-8.5, 18, and 22.8 meet the Federal requirements for preventing a violation of the NAAQS in areas already attaining the NAAQS. Also note, the entire state of New Jersey is in nonattainment for ozone, therefore, nonattainment new source review (NNSR) applies in New Jersey for ozone, not PSD.

8.1.4 Infrastructure: Nonattainment New Source Review (NNSR) Permitting

USEPA no longer takes action on the NNSR element as part of a State's infrastructure SIP at 110(a)(2)I and instead address's NNSR as part of a State's attainment demonstration. USEPA's September 2013 guidance[155] stated that the NNSR elements were not to be addressed in infrastructure SIP submissions and were to be addressed through a separate process. NNSR is addressed below.

8.2 New Source Review/Permitting

8.2.1 Introduction and Background

The CAA section 110(a)(2)(C) requires that States include a permitting program in their SIP to ensure that the construction or modification of a stationary source of air pollution does not interfere with the attainment or maintenance of a NAAQS or violate the control strategy in a nonattainment area. The Federal New Source Review (NSR) program is a pre-construction permitting program designed to meet these requirements. The Federal NSR program has three components: nonattainment NSR (NNSR); prevention of significant deterioration (PSD); and minor NSR.

The NNSR program applies when a new major stationary source is constructed in a nonattainment area, or if the proposed or actual emissions from a modified existing source exceed the applicable thresholds at 40 CFR 51.165 and 40 CFR Part 51, Emission Offset Interpretative Ruling (Appendix S). NNSR can also apply to a major source or major modification that is proposed in an attainment or unclassifiable area, if it would significantly affect a nonattainment area or cause a violation of the NAAQS in an attainment area. To obtain a permit that complies with the Federal requirements, an applicant must show that the lowest achievable emission rate (LAER) control technology will be installed; certify that all major sources owned or operated by the applicant in the state are in compliance with all applicable State rules and Federal regulations; conduct an alternative siting analysis, which demonstrates that the benefits of the proposed construction or modification outweigh its environmental and social costs; and secure creditable emission reductions to offset increased emissions. New Jersey's NNSR program, codified in N.J.A.C. 7:27-18, is described in section 8.2.3 below.

The PSD program applies to new and modified major sources in an attainment or unclassifiable area. A new or modified source that is subject to the PSD requirements must obtain a pre-construction permit and demonstrate compliance with the PSD program requirements at 40 CFR Part 52.21. The Federal PSD program can be administered by: 1) USEPA; 2) any state to which USEPA has delegated PSD permit review authority; or 3) any state that has incorporated the Federal PSD program or an equivalent regulation approved into its SIP. New Jersey has delegated permit review authority pursuant to the April 19, 1983 delegation agreement between USEPA and New Jersey (48 FR 16738) as revised on July 15, 2011. Therefore, the Department includes the Federal PSD program requirements in its air pollution control permits, and reviews permit applications to ensure that the permits reflect compliance with the PSD program requirements. The PSD requirements are reflected in N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22.

The minor NSR program applies to the construction or modification of minor sources, whether the area in which the source is located is designated in attainment or nonattainment. The Federal minor NSR program rules at 40 CFR Part 51, Subpart I, do not establish specific standards or requirements for the regulated entities; these are left to the states to formulate. A state can customize the requirements of the minor NSR program if its program meets minimum requirements. New Jersey's minor NSR program at N.J.A.C. 7:27-8 is part of the SIP's control strategy to achieve and maintain the NAAQS for ozone and other criteria pollutants.

8.2.2 New Jersey's NNSR Program

New Jersey is required to implement a permitting program that conforms with section 172(c)(5) and section 173 of the CAA related to requirements for ozone nonattainment areas. New Jersey counties were designated as nonattainment for the 1-hour ozone NAAQS and classified as severe. New Jersey implemented an NNSR permitting program statewide for addressing the ozone precursors (VOC and NO_x) in accordance with the requirements of its 1-hour ozone severe classification with an applicability threshold of 25 tons per year (tpy) of VOC and NO_x, respectively, for the entire State in 1992. New Jersey continued to be nonattainment for the 1997, 2008 and 2015 8-hour ozone standards at lower classifications than for the 1-hour ozone standards. The CAA allows an applicability threshold of 100 tpy for facilities located in a moderate nonattainment area and 50 tpy for facilities located in a serious nonattainment area.

New Jersey's NNSR program remains in effect statewide with a major source applicability threshold of 25 tpy of VOC and NO_x, respectively, consistent with the classification of severe and are more stringent than what is required for New Jersey's current statewide classifications, in accordance with requirements for anti-backsliding provisions at CAA section 172(e).

New Jersey codified the federal NNSR requirements for ozone and other criteria pollutants (including PM2.5) at N.J.A.C. 7:27-18, the Emission Offset rules, which are part of its SIP. New Jersey's proposal to address the Federal requirements for PM2.5 emissions in the Emission Offset rules was proposed in the March 20, 2017 New Jersey Register and finalized in the November 6, 2017 New Jersey Register (49 N.J.R. 3511.) New Jersey submitted the rule adoption as a New Jersey SIP revision to USEPA for review and approval on November 30, 2017 (Appendix 8-1). In addition to the adoption of PM2.5 federal requirements, New Jersey also submitted to USEPA a demonstration that the provisions of N.J.A.C. 7:27-18 are at least as stringent as the Federal requirements at 40 CFR 51.165 for ozone and its precursors.

8.2.3 NNSR Program Compliance Certification

On December 22, 2017, New Jersey submitted its NNSR Program Compliance Certification addressing the submittal requirements for New Jersey's NNSR permitting program for

implementing the 75 ppb 2008 ozone NAAQS.[156] On October 9, 2018, [157] USEPA approved New Jersey's "ozone specific provisions nonattainment new source review program." USEPA granted full approval of New Jersey NNSR program with a specific note which states "The EPA is also approving the portions of the comprehensive SIP revision submitted by New Jersey that certify that the State has satisfied the requirements for an enhanced motor vehicle Inspection and Maintenance program, certify that the State has satisfied the requirements for an emission statement program, certify that the State has satisfied the requirements for an ozone specific provisions nonattainment new source review program…"
New Jersey is again certifying that its existing NNSR rules codified at N.J.A.C. 7:27-18, which regulate the New Jersey portions of the Northern NJ-NY-CT and Southern NJ-PA-DE-MD Nonattainment Areas for the 2008 75 ppb and 70 ppb 8-hour ozone NAAQS are at least as stringent as the Federal requirements at 40 CFR 51.165 for ozone and its precursors for the State's current classifications in its northern and southern areas. A compliance demonstration of New Jersey NNSR rules with the Federal provisions, that was submitted and approved previously as discussed above for 2008 75 ppb ozone NAAQS is also provided in Table 8-2 for the 2015 70-ppb ozone NAAQS.

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[156] "1997 84 ppb and 2008 75 ppb 8-Hour Ozone Attainment Demonstration Northern New Jersey-New York-Connecticut Nonattainment Area and Nonattainment New Source Review (NNSR) Program Compliance Certification New Jersey Statewide" (December 22, 2017). https://www.state.nj.us/dep/baqp/ozone75ppb/Ozone%2075%20ppb%20Attain%20North-NNSR%20SIP%2012-14-17%20Revised%208-9-18.pdf
[157] 83 Fed. Reg. 50506 (October 9, 2019).

Table 8-2:
New Jersey Nonattainment New Source Review (NNSR) Rules
Compliance Demonstration with Federal Provisions

	75 ppb Ozone NNSR SIP Requirements	Federal Provisions	New Jersey Provisions*
1	Major source thresholds for ozone – VOC and NO_x	40 CFR 51.165(a)(1)(iv)(A)(1)(i)-(iv) and (2)	N.J.A.C. 7:27-18.2(a)1 and 2
2	Change constitutes a major source by itself	40 CFR 51.165(a)(1)(iv)(A)(*3*)	N.J.A.C. 7:27-18.2(a)2
3	Significant net emissions increase of NO_x is significant for ozone	40 CFR 51.165(a)(1)(v)(E)	N.J.A.C. 7:27-18.7(a)1 and 2; and the definition of "Respective criteria pollutant" at N.J.A.C. 7:27-18.1
4	Any emissions change of VOC in Extreme area triggers NNSR	40 CFR 51.165(a)(1)(v)(F)	Not Applicable. New Jersey does not have, nor has ever had, "extreme" areas
5	Significant emissions rates for VOC and NO_x as ozone precursors	40 CFR 51.165(a)(1)(x)(A)-(C) and (E)	N.J.A.C. 7:27-18.7, Table 3
6	Provisions for emissions reduction credits	40 CFR 51.165(a)(3)(ii)(C)(*1*)-(*2*)	N.J.A.C. 7:27-18.5(a) and (b) N.J. A.C. 7:27-18.1 N.J.A.C. 7:27-18.8(f)
7	Requirements for VOC apply to NO_x as ozone precursors	40 CFR 51.165(a)(*8*)	N.J.A.C. 7:27-18.2(a)1 and 2; N.J.A.C. 7:27-18.7, Table 3, and the definition of "Respective criteria pollutant" at N.J.A.C. 7:27-18.1
8	Offset ratios for VOC and NO_x for ozone nonattainment areas	40 CFR 51.165(a)(*9*)(i)-(iii)	N.J.A.C. 7:27-18.5(c), Table 2
9	Anti-backsliding provision(s), where applicable	40 CFR 51.165(a)(*12*)	Statewide NNSR thresholds and offset ratios were adopted in1992 based on New Jersey's most stringent classification of severe nonattainment for the 1-hour ozone NAAQS. These thresholds and offset ratios have not been amended to be less stringent since adoption. The entire State continues to be in nonattainment for the 75 ppb and 70 ppb 8-hour ozone NAAQS, therefore, the existing ozone NNSR program remains in effect with no amendments that affect stringency.

* A copy of N.J.A.C. 7:27-18 is available at http://www.state.nj.us/dep/aqm/Sub18.pdf

Chapter 9 CONTINGENCY MEASURES

9.1 Introduction

The CAA Sections 172(c)(9) and 182(c)(9) and the USEPA Ozone Implementation Rule for the 2008 75 ppb 8-hour ozone standard[158] require that the SIPs for all 8-hour ozone nonattainment areas include contingency measures. Contingency measures are additional controls needed to further reduce emissions in the event an area fails to meet a reasonable further progress (RFP) milestone or fails to attain by its attainment date. These contingency measures must be fully adopted rules or measures that are ready for implementation quickly without further action by the State or the USEPA upon failure to meet an RFP milestone or reach attainment.

The USEPA has provided guidance over time that defines the requirements for identifying RFP and attainment demonstration contingency measures. Specifically:

- Contingency measures are required for each milestone year. As discussed in Chapter 4, the future projection year for the attainment demonstration is 2020. Therefore, the 75 ppb 8-hour ozone attainment milestone is defined as 2020. For RFP the milestone years are 2017 and 2020. Since RFP has already been achieved for the 2017 milestone year, the only RFP milestone year relevant to this SIP revision is 2020.

- Contingency measures, combined, must provide for a three percent reduction in the 2011 base year VOC emissions inventory for both RFP and attainment.[159]

- Post-1996 RFP and attainment demonstration contingency measures may reduce emissions of either VOC or NO_x. However, in meeting the three percent reduction requirement, a minimum of 0.3 percent VOC must be included.[160]

9.2 Contingency Measures for RFP and Attainment

New Jersey must identify contingency measures to be implemented in the event that the State does not attain the 2008 75 ppb 8-hour ozone standard by July 20, 2021, as determined by the 2020 ozone season design values. Both the RFP and attainment contingency requirement for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area will be met with a combination of VOC and NO_x emission reductions from Federal and state onroad and nonroad mobile control measures due to fleet and equipment turnover from 2020 to 2021, which was not included in the attainment demonstration modeling.

The turnover of the onroad fleet of cars and trucks, as well as the turnover of nonroad equipment, will result in additional VOC and NO_x emission benefits beyond the 2020 modeled projection year because the new vehicles/equipment have significantly lower emission standards than the older sources they are replacing. The new vehicle/equipment emission standards are lower primarily because of a number of Federal rules such as: The Tier 2 and Tier 3 standards for automobiles and light trucks, the 2007 Heavy Duty Diesel standards for large diesel highway trucks, the 2004 Tier 4 emission standards for nonroad diesel engines, and the 2008 emission standards for new nonroad spark-ignition engines, equipment and vessels. The new vehicle emission standards are also lower due to the New Jersey Low Emission

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[158] 80 Fed. Reg. 12285 (March 6, 2015).
[159] 57 Fed. Reg. 13498 (April 16, 1992).
[160] USEPA Memorandum from Michael H. Shapiro to Region Air Directors, "Guidance on Issues Related to 15% Rate-of-Progress Plans," August 23, 1993.

Vehicle Program. The 2020 to 2021 emission benefits for onroad and nonroad fleet/equipment turnover were estimated as one-third the difference between the actual 2017 emissions and the projected 2020 emissions. This calculation results in an estimated VOC benefit of 5.6 tons per day and NO_x benefit of 12.0 tons per day. Calculation details are provided in Appendix 9-1.

Table 9-1 summarizes the contingency measure calculations including the three percent necessary based on the 2011 inventory, the minimum amount of contingency that must be VOC based on 0.3 percent of the base, the amount of onroad and nonroad emission reductions available for contingency and the emission reductions allocated for 2020 contingency for the New Jersey portion of the Northern NJ-NY-CT.

Table 9-1:
Contingency Measure Demonstration for RFP and Attainment
for the New Jersey Portion of the Northern NJ-NY-CT Ozone Nonattainment Area

2011 Base Year Inventory		Three Percent Contingency Requirement (three percent of base)	Three Percent Contingency Requirement with NO_x Substitution (VOC 0.3 percent of base)	Reductions from Onroad and Nonroad Fleet Turnover for 2021	Reductions Allocated for 2020 RFP and Attainment Contingency
summer tpd		summer tpd	summer tpd	summer tpd	summer tpd
VOC	360	10.8	1.1	5.6	**3.6**
NO_x	379	NA	9.7	12.0	**7.2**
Total		10.8	10.8	17.6	**10.8**

9.3 Contingency Measure Implementation Schedule

States have no more than one year after notification by the USEPA of an RFP or attainment failure to achieve the contingency plan reductions.[161] New Jersey's designated contingency measures are already adopted and implemented measures with future effective new benefits. Therefore, no additional schedule is necessary for new control measures.

By following the USEPA's guidance that encourages early implementation of contingency measures and relying on measures already implemented, New Jersey is ensuring that any contingency measures will not need to be backfilled and is safeguarding itself against failure to meet the RFP and attainment milestones.

9.4 Contingency Measure Conclusions

New Jersey demonstrates that it has met its contingency requirements for both RFP and attainment.

[161] 57 Fed. Reg. 13498 (April 16, 1992).

Chapter 10 2017 PERIODIC EMISSION INVENTORY

10.1 Introduction

The Clean Air Act 42 U.S.C. § 7410(a)(2)(F) (Section 110 (a)(2)(F)) requires the submission by states to the United States Environmental Protection Agency (USEPA) of periodic reports on the nature and amounts of emissions from pollutants with a National Ambient Air Quality Standard (NAAQS criteria pollutant) and emissions related data. The Clean Air Act 42 U.S.C. §§ 7511(a)(1), 7511(a)(3) and 7502(c)(3) (Sections 182(a)1,182(a)(3) and 172(c)(3)) require that states submit periodic emission inventories for marginal and above nonattainment areas in accordance with USEPA guidance.
The CAA also requires nonattainment areas to demonstrate continued progress (Reasonable Further Progress or RFP) to attain the ozone standard. CAA section 172(c)(2) requires moderate areas to obtain 15 percent ozone precursor emission reductions over the first 6 years after the baseline year. CAA section 182(c)(2)(B) requires serious and above areas to obtain 18 percent ozone precursor emission reductions in that 6-year period and an additional 3 percent per year reduction until the attainment date. New Jersey is classified as serious for ozone in the northern NJ-NY-CT NAA, and marginal for ozone in the southern NJ-PA-DE-MD NAA.

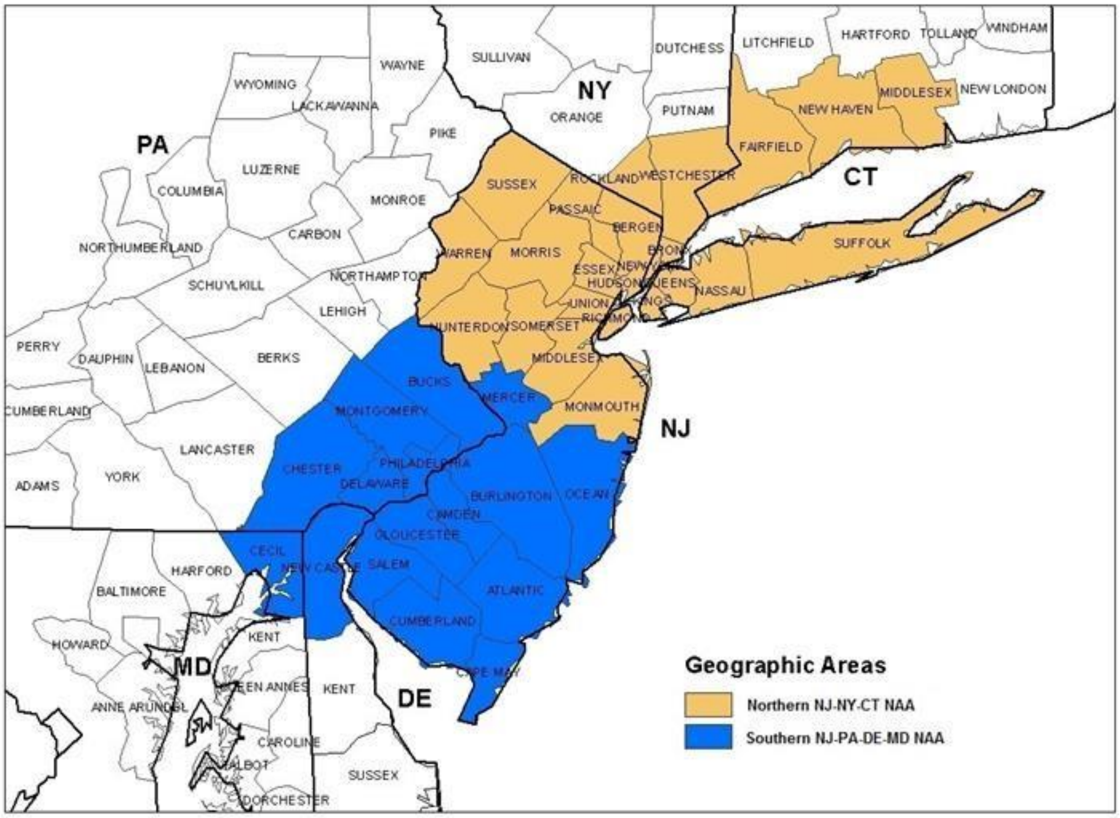
Therefore, this 2017 emissions inventory serves as:

1. New Jersey's periodic emissions inventory for the ozone NAAQS;
2. A component in New Jersey's updated RFP demonstration in Chapter 5 for the 75 ppb ozone standard;
3. The new base year for the RFP-required projection to 2020 for the 75 ppb 8-hour ozone standard; and,
4. The expected new RFP base year for the 70 ppb 8-hour ozone standard attainment demonstration SIP revision in a future New Jersey SIP.

The 2017 emission inventory may also be used by USEPA and states for planning, policy and rule development, modeling, regional haze compliance and other national ambient air quality standard compliance efforts.

The following map represents New Jersey's nonattainment areas for 8-hour ozone (Figure 10-1).

Figure 10-1: New Jersey 8-Hour Ozone Nonattainment Areas (NAA)



10.2 Statutory and Regulatory Background

In 2002, the USEPA promulgated the Consolidated Emission Reporting Rule (CERR), 40 CFR 51, Subpart A that provided inventory requirements including:

- Consolidating the various emissions reporting requirements that already existed into one place in the Code of Federal Regulations;
- Establishing new reporting requirements related to particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$);
- Establishing new requirements for the statewide reporting of area source and mobile source emissions; and,
- Requiring two types of inventories - annual inventories and three-year cycle inventories.

On December 17, 2008[162], the USEPA amended the CERR and renamed it the Air Emissions Reporting Requirements (AERR). The AERR amendments included:

- Shortening the timeline for reporting data;
- Eliminating the emissions reporting requirement for biogenic emissions; and
- Requiring state and local agencies to adopt the definition of a "point source" as specified under Title V of the Clean Air Act.

[162] 73 FR76539 (December 17, 2008)

Several amendments to the AERR were adopted on February 6, 2015. These AERR amendments included:

- Lowering the current threshold for reporting lead emissions sources as "point sources";
- Eliminating the requirement for state and local agencies to report emissions from wildfire and prescribed fires;
- Requiring agencies to report the inputs needed to model emissions from mobile sources;
- Removing the requirements for agencies to report daily and seasonal emissions; and
- Clarifying, removing, or simplifying some current emissions reporting requirements.

In 2014 EPA issued draft emission inventory guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. They finalized this guidance in July 2017.[163]

10.3 2017 Emission Inventory Overview

This inventory is a compilation of the emissions from sources of anthropogenic (human-made) and biogenic (natural) volatile organic compounds (VOCs), oxides of nitrogen (NO_x), carbon monoxide (CO), particulate matter less than 2.5 micrometers and 10 micrometers in diameter (PM2.5 and PM10), sulfur dioxide (SO_2) and ammonia (NH_3) in the outdoor air. The sources are divided into five sectors and each making up one component of the inventory: point sources, area sources, onroad mobile sources, nonroad mobile sources and biogenic sources.

Point sources are stationary facilities that emit or have the potential to emit at or above any of the following thresholds: 10 tons per year (tpy) of VOC, 25 tpy of NO_x, 100 tpy of carbon monoxide, $PM_{2.5}$, SO_2 or ammonia. Area sources include emissions from numerous facilities or activities that individually release small amounts of a given pollutant, but collectively they can release significant amounts of a pollutant. This includes small stationary sources that fall below required emission reporting thresholds by the Emission Statement Program such as gas stations, autobody refinishing facilities and dry cleaners. Area sources also include emissions from the use of products by the general population such as from the use of paints and consumer products. Onroad mobile source emissions include exhaust (i.e., tailpipe) and brake/tire emissions from all onroad vehicles such as cars, trucks and buses. Nonroad mobile source emissions include exhaust emissions from sources such as commercial marine vessels, airplanes, locomotives, pleasure boats, forklifts, lawn and garden equipment, portable generators. Biogenic emissions are produced by living organisms or biological processes and include emissions from plant matter as well as humans, domestic animals, and wild animals.

This report includes the 2017 air emission inventory for the pollutants listed in Table 10-1.

[163] Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, U.S. Environmental Protection Agency, July 2017.

Table 10-1: 2017 Air Emission Inventories Prepared

	Summer Day	Annual
VOC	√	√
NO_x	√	√
CO	√	√
PM2.5		√
PM10		√
SO_2		√
NH_3		√

Summaries of the 2017 periodic emission inventory are included in the Tables and Figures below. As discussed in Chapter 4, calculation methodology documentation and full 2017 inventories for onroad and nonroad sources are included in Appendices 4-6 and 4-7. Calculation methodology documentation and full 2017 inventories for point and area sources are included in Appendix 10-1. Inventory graphs are included in Appendix 10-2.

Table 10-2: 2017 Statewide Emission Inventory by Source Sector and Pollutant

VOC					
Source Sector	**Tons per Summer Day**	**Tons per Year**	**% of Total Annual Inventory**	**% of Anthropogenic Summer Day Inventory**	**% of Anthropogenic Annual Inventory**
Point	36	6,809	3%	8%	5%
Area	241	81,555	34%	55%	57%
Onroad	87	28,652	12%	20%	20%
Nonroad	72	25,476	11%	17%	18%
Biogenic	242	88,238	37%	NA	NA
Wildfire and Prescribed	14	5,690	2%	NA	NA
Total in State	**693**	**236,420**	**100%**	**NA**	**NA**
Total Anthropogenic	**437**	**142,492**	**NA**	**100%**	**100%**

NOx					
Source Sector	**Tons per Summer Day**	**Tons per Year**	**% of Total Annual Inventory**	**% of Anthropogenic Summer Day Inventory**	**% of Anthropogenic Annual Inventory**
Point	49	9,824	7%	14%	7%
Area	26	23,208	17%	8%	17%
Onroad	151	60,681	45%	44%	45%
Nonroad	120	40,215	30%	35%	30%
Biogenic	6	2,045	1%	NA	NA
Wildfire and Prescribed	1	346	0%	NA	NA
Total in State	**353**	**136,318**	**100%**	**NA**	**NA**
Total Anthropogenic	**346**	**133,927**	**NA**	**100%**	**100%**

CO					
Source Sector	**Tons per Summer Day**	**Tons per Year**	**% of Total Annual Inventory**	**% of Anthropogenic Summer Day Inventory**	**% of Anthropogenic Annual Inventory**
Point	31	5,733	1%	1%	1%
Area	42	61,948	8%	2%	8%
Onroad	1,113	380,323	47%	49%	50%
Nonroad	1,096	308,691	38%	48%	41%
Biogenic	31	11,357	1%	NA	NA
Wildfire and Prescribed	121	48,191	6%	NA	NA
Total in State	**2,435**	**816,243**	**100%**	**NA**	**NA**
Total Anthropogenic	**2,282**	**756,695**	**NA**	**100%**	**100%**

Table 10-2 (continued):
2017 Statewide Emission Inventory by Source Sector and Pollutant

Source Sector	PM2.5			Source Sector	PM10		
	Tons per Year	% of Total Inventory	% of Anthropogenic Annual Inventory		Tons per Year	% of Total Inventory	% of Anthropogenic Annual Inventory
Point	2,084	10%	11%	Point	2,534	8%	8%
Area	13,136	60%	66%	Area	21,045	63%	68%
Onroad	2,055	9%	10%	Onroad	4,639	14%	15%
Nonroad	2,543	12%	13%	Nonroad	2,692	8%	9%
Biogenic	NA	NA	NA	Biogenic	NA	NA	NA
Wildfire and Prescribed	2,090	10%	NA	Wildfire and Prescribed	2,466	7%	NA
Total in State	**21,908**	**100%**	**NA**	**Total in State**	**33,376**	**100%**	**NA**
Total Anthropogenic	**19,818**	**NA**	**100%**	**Total Anthropogenic**	**30,910**	**NA**	**100%**

Source Sector	SO_2			Source Sector	Ammonia		
	Tons per Year	% of Total Inventory	% of Anthropogenic Annual Inventory		Tons per Year	% of Total Inventory	% of Anthropogenic Annual Inventory
Point	2,221	51%	54%	Point	1,120	16%	17%
Area	555	13%	13%	Area	3,249	46%	49%
Onroad	721	17%	17%	Onroad	2,173	31%	33%
Nonroad	630	15%	15%	Nonroad	53	1%	1%
Biogenic	NA	NA	NA	Biogenic	NA	NA	NA
Wildfire and Prescribed	186	4%	NA	Wildfire and Prescribed	396	6%	NA
Total in State	**4,313**	**100%**	**NA**	**Total in State**	**6,990**	**100%**	**NA**
Total Anthropogenic	**4,127**	**NA**	**100%**	**Total Anthropogenic**	**6,594**	**NA**	**100%**

Notes:

1. Onroad and nonroad annual values from are from the USEPA 2017 National Emission Inventory (NEI).
2. Biogenic annual emissions are from the USEPA 2017 NEI. 2017 tons per day values were estimated by dividing the annual value by 365.
3. Area Source fugitive dust emissions are post-adjustment.

Table 10-3: New Jersey Portion of Northern NJ-NY-CT Ozone Nonattainment Area 2017 Emission Inventory

County	VOC							
	Tons Per Summer Day							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Bergen	2.11	23.83	9.06	7.42	4.06	0.08	46.56	42.42
Essex	1.06	17.97	6.11	4.76	2.39	NA	32.30	29.90
Hudson	1.71	15.46	3.52	2.75	1.03	NA	24.47	23.44
Hunterdon	0.13	4.00	1.74	1.74	10.58	0.04	18.23	7.60
Middlesex	15.89	22.32	8.23	5.41	5.82	0.03	57.71	51.86
Monmouth	0.44	16.55	6.83	5.46	12.38	0.20	41.85	29.28
Morris	0.50	14.09	5.25	4.96	14.41	0.07	39.30	24.81
Passaic	0.77	12.15	3.98	2.59	8.36	0.14	27.99	19.49
Somerset	0.89	9.44	3.38	3.77	7.44	0.02	24.94	17.48
Sussex	0.16	3.93	1.54	1.59	17.30	0.15	24.66	7.21
Union	3.23	13.89	5.06	3.20	2.00	0.00	27.39	25.38
Warren	0.31	3.30	1.40	0.93	11.71	0.08	17.73	5.94
Total in Northern NAA Area	**27.21**	**156.93**	**56.10**	**44.58**	**97.48**	**0.82**	**383.12**	**284.82**

County	NO_x							
	Tons per Summer Day							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Bergen	2.16	2.84	15.71	10.03	0.07	0.01	30.82	30.74
Essex	3.74	2.26	11.56	13.99	0.06	NA	31.61	31.55
Hudson	0.85	1.81	6.26	17.89	0.03	NA	26.85	26.82
Hunterdon	1.36	0.39	5.00	2.66	0.46	0.00	9.88	9.42
Middlesex	7.02	2.55	18.72	8.92	0.21	0.00	37.43	37.21
Monmouth	0.42	1.85	10.15	10.54	0.41	0.01	23.38	22.95
Morris	0.72	1.78	10.48	4.88	0.16	0.00	18.03	17.86
Passaic	0.15	1.25	5.37	3.49	0.07	0.01	10.34	10.26
Somerset	4.62	1.16	7.70	4.18	0.27	0.00	17.93	17.66
Sussex	0.10	0.42	1.84	1.38	0.27	0.01	4.02	3.74
Union	8.20	1.49	9.57	5.35	0.05	0.00	24.67	24.62
Warren	0.74	0.30	3.95	0.91	0.30	0.01	6.21	5.91
Total in Northern NAA Area	**30.08**	**18.12**	**106.31**	**84.23**	**2.35**	**0.06**	**241.15**	**238.75**

Table 10-3 (continued): New Jersey Portion of Northern NJ-NY-CT Ozone Nonattainment Area 2017 Emission Inventory

County	CO							
	Tons per Summer Day							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Bergen	0.92	3.98	122.21	144.08	0.76	0.71	272.66	271.20
Essex	0.97	2.97	81.97	69.21	0.51	NA	155.63	155.12
Hudson	0.70	2.16	38.99	34.28	0.24	NA	76.37	76.13
Hunterdon	1.90	1.21	24.71	28.60	1.35	0.36	58.12	56.42
Middlesex	7.20	3.45	121.47	100.96	1.01	0.25	234.34	233.08
Monmouth	0.31	2.98	99.51	88.71	1.81	1.66	194.98	191.51
Morris	0.54	3.02	75.05	90.22	1.60	0.61	171.04	168.83
Passaic	0.18	1.79	47.11	45.02	0.95	1.19	96.24	94.10
Somerset	2.00	1.83	46.47	71.11	1.04	0.18	122.64	121.41
Sussex	1.33	1.48	17.41	19.01	1.81	1.26	42.29	39.23
Union	2.23	2.08	64.71	59.87	0.45	0.04	129.38	128.89
Warren	0.25	0.98	18.57	12.78	1.29	0.69	34.56	32.58
Total in State	**18.52**	**27.93**	**758.18**	**763.85**	**12.82**	**6.94**	**1,588.25**	**1,568.49**

Notes:

Biogenic annual emissions are from the USEPA 2017 NEI. 2017 tons per day values were estimated by dividing the annual value by 365.

Table 10-4: New Jersey Portion of Southern NJ-PA-DE-MD Ozone Nonattainment Area 2017 Emission Inventory

County	VOC							
	Tons Per Summer Day							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	0.08	7.27	2.60	3.59	40.71	0.92	55.17	13.54
Burlington	1.06	13.70	4.73	4.26	50.31	0.14	74.20	23.75
Camden	0.67	12.56	4.62	2.55	15.62	0.10	36.12	20.40
Cape May	0.08	2.98	1.04	3.69	14.71	0.06	22.57	7.79
Cumberland	0.43	6.18	1.30	1.34	27.08	0.63	36.95	9.24
Gloucester	5.36	14.43	2.89	2.42	16.97	0.56	42.63	25.10
Mercer	0.36	10.20	7.02	2.60	9.72	0.01	29.91	20.17
Ocean	0.45	14.31	5.69	6.45	41.73	10.97	79.61	26.91
Salem	0.62	2.74	0.74	0.76	17.21	0.03	22.10	4.85
Total in Southern NAA Area	**9.10**	**84.37**	**30.63**	**27.66**	**234.06**	**13.43**	**399.25**	**151.76**

Table 10-4 (continued): New Jersey Portion of Southern NJ-PA-DE-MD Ozone Nonattainment Area 2017 Emission Inventory

County	NO_x Tons per Summer Day							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	0.35	0.82	5.51	4.56	0.26	0.07	11.57	11.24
Burlington	1.63	1.33	8.98	5.17	0.35	0.01	17.47	17.11
Camden	2.27	1.43	7.73	3.88	0.18	0.00	15.50	15.32
Cape May	0.11	0.30	2.06	4.27	0.18	0.00	6.92	6.73
Cumberland	1.86	0.43	2.10	2.86	0.36	0.03	7.64	7.25
Gloucester	5.59	0.79	5.66	3.48	0.28	0.04	15.85	15.52
Mercer	1.02	1.40	3.60	4.01	0.19	0.00	10.22	10.03
Ocean	2.02	1.34	7.90	6.37	0.26	0.46	18.35	17.63
Salem	3.74	0.20	1.45	1.50	0.38	0.00	7.27	6.89
Total in Southern NAA Area	**18.58**	**8.04**	**44.99**	**36.12**	**2.44**	**0.62**	**110.79**	**107.73**

County	CO Tons per Summer Day							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	0.27	1.57	31.70	34.07	3.43	78.39	149.43	67.61
Burlington	1.12	2.46	65.99	57.60	5.32	131.94	264.44	127.18
Camden	0.61	2.12	58.55	44.31	1.48	107.62	214.69	105.60
Cape May	0.15	0.62	11.41	28.82	1.41	43.27	85.68	41.00
Cumberland	2.02	0.98	13.03	14.11	2.74	37.92	70.80	30.14
Gloucester	2.32	1.48	41.87	38.35	1.78	89.87	175.66	84.01
Mercer	0.65	1.99	49.42	45.39	1.29	98.52	197.26	97.45
Ocean	2.09	2.51	74.09	62.02	4.25	237.28	382.24	140.71
Salem	3.41	0.54	8.38	7.79	1.72	21.57	43.41	20.12
Total in State	**12.64**	**14.27**	**354.44**	**332.47**	**23.42**	**846.37**	**1,583.62**	**713.82**

Notes:

Biogenic annual emissions are from the USEPA 2017 NEI. 2017 tons per day values were estimated by dividing the annual value by 365.

Table 10-5: 2017 Statewide Emission Inventory by County, Source Sector and Pollutant

County	VOC							
	Tons per Year							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	25.77	2,478	979	1,556	9,861	188	15,087	5,038
Bergen	277.41	7,875	3,085	2,370	1,482	10	15,100	13,608
Burlington	253.88	4,711	1,779	1,406	10,381	1,559	20,090	8,150
Camden	256.74	4,184	1,729	828	2,739	100	9,837	6,997
Cape May	10.33	1,009	402	1,592	5,829	174	9,016	3,013
Cumberland	90.69	2,078	517	645	7,583	737	11,651	3,331
Essex	286.06	5,914	2,059	1,624	874	331	11,087	9,883
Gloucester	965.17	4,768	1,059	850	2,667	196	10,504	7,642
Hudson	616.40	5,030	1,295	948	375	0	8,264	7,889
Hunterdon	20.60	1,498	630	542	3,862	91	6,645	2,692
Mercer	95.29	3,440	1,351	718	2,220	34	7,859	5,605
Middlesex	1,798.78	7,398	2,556	1,577	2,124	4	15,458	13,330
Monmouth	112.88	5,638	2,083	1,843	4,518	194	14,389	9,677
Morris	115.06	4,990	1,706	1,567	5,261	181	13,819	8,378
Ocean	149.61	5,038	1,941	3,246	8,728	1,760	20,862	10,375
Passaic	154.29	3,980	1,407	906	3,051	17	9,514	6,447
Salem	141.50	918	290	342	2,650	4	4,347	1,692
Somerset	191.80	3,273	1,116	1,055	2,715	43	8,394	5,636
Sussex	57.52	1,597	556	573	6,314	57	9,154	2,783
Union	1,122.24	4,515	1,605	977	730	1	8,950	8,220
Warren	67.12	1,222	508	311	4,273	10	6,391	2,108
Total in State	**6,809**	**81,555**	**28,652**	**25,476**	**88,238**	**5,690**	**236,420**	**142,492**

Notes:

1. Onroad and nonroad annual values from are from the USEPA 2017 National Emission Inventory (NEI).
2. Biogenic annual emissions are from the USEPA 2017 NEI.

Table 10-5 (continued): 2017 Statewide Emission Inventory by County, Source Sector and Pollutant

County	NOx							
	Tons Per Year							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	58.01	731	2,056	1,517	117	14	4,493	4,362
Bergen	455.04	2,534	6,281	3,737	27	1	13,035	13,007
Burlington	168.88	1,180	3,900	1,511	183	103	7,045	6,759
Camden	464.21	1,271	3,220	1,398	77	7	6,438	6,354
Cape May	65.87	269	842	1,637	57	13	2,883	2,813
Cumberland	345.33	371	997	1,029	163	42	2,947	2,742
Essex	1,110.80	2,002	4,290	5,109	20	15	12,548	12,512
Gloucester	1,592.71	728	2,409	1,361	154	16	6,261	6,091
Hudson	135.42	1,581	2,464	5,756	10	0	9,946	9,936
Hunterdon	102.20	350	1,940	679	166	8	3,245	3,070
Mercer	178.12	1,176	2,903	806	107	3	5,173	5,063
Middlesex	1,179.58	2,215	6,657	2,370	77	0	12,498	12,421
Monmouth	95.59	1,668	3,635	3,425	150	14	8,988	8,824
Morris	67.71	1,535	3,973	1,729	59	11	7,374	7,304
Ocean	258.66	1,329	3,338	2,603	121	88	7,738	7,529
Passaic	35.57	1,130	2,223	1,344	24	1	4,757	4,732
Salem	726.41	172	740	538	209	0	2,386	2,176
Somerset	120.89	999	2,920	1,198	97	4	5,339	5,238
Sussex	27.04	362	748	304	100	5	1,547	1,442
Union	2,400.28	1,328	3,585	1,904	18	0	9,235	9,217
Warren	235.86	277	1,559	261	109	1	2,442	2,333
Total in State	**9,824**	**23,208**	**60,681**	**40,215**	**2,045**	**346**	**136,318**	**133,927**

Notes:

1. Onroad and nonroad annual values from are from the USEPA 2017 National Emission Inventory (NEI).
2. Biogenic annual emissions are from the USEPA 2017 NEI.

Table 10-5 (continued): 2017 Statewide Emission Inventory by County, Source Sector and Pollutant

County	CO							
	Tons per Year							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	111.90	2,605	13,995	11,203	1,113	1,585	30,613	27,915
Bergen	251.88	4,402	42,820	39,219	277	83	87,052	86,692
Burlington	286.57	4,969	24,691	15,526	1,309	13,183	59,965	45,472
Camden	129.63	2,835	20,911	12,295	414	846	37,430	36,170
Cape May	52.20	941	5,532	10,939	631	1,470	19,566	17,464
Cumberland	209.70	1,584	6,209	5,270	874	6,252	20,399	13,274
Essex	312.88	2,674	28,144	21,038	185	2,816	55,170	52,169
Gloucester	676.04	2,727	15,272	10,488	412	1,647	31,223	29,163
Hudson	121.83	1,405	15,477	9,977	87	0	27,068	26,981
Hunterdon	18.83	2,328	8,007	7,094	491	766	18,705	17,448
Mercer	141.31	2,652	17,778	11,040	347	288	32,245	31,611
Middlesex	1,409.67	3,831	36,385	25,734	368	30	67,757	67,360
Monmouth	54.89	4,882	29,321	24,211	662	1,640	60,771	58,468
Morris	76.89	5,673	23,026	23,618	584	1,531	54,509	52,394
Ocean	515.58	5,287	25,610	23,355	1,156	14,952	70,874	54,767
Passaic	41.20	2,077	17,069	12,884	348	140	32,560	32,072
Salem	521.27	928	3,968	2,655	421	35	8,528	8,072
Somerset	99.05	2,955	13,105	17,250	381	364	34,155	33,410
Sussex	81.97	3,341	5,971	5,448	660	478	15,980	14,843
Union	545.67	1,934	20,801	15,891	166	5	39,342	39,172
Warren	73.73	1,918	6,231	3,556	471	81	12,332	11,779
Total in State	**5,733**	**61,948**	**380,323**	**308,691**	**11,357**	**48,191**	**816,243**	**756,695**

Notes:

1. Onroad and nonroad annual values from are from the USEPA 2017 National Emission Inventory (NEI).
2. Biogenic annual emissions are from the USEPA 2017 NEI.

Table 10-5 (continued): 2017 Statewide Emission Inventory by County, Source Sector and Pollutant

County	PM2.5							
	Tons per Year							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	15.98	498	50	94	NA	70	729	659
Bergen	98.51	1,082	224	311	NA	4	1,720	1,716
Burlington	35.17	887	123	108	NA	578	1,732	1,154
Camden	42.80	557	111	102	NA	38	850	812
Cape May	18.55	270	22	85	NA	66	461	395
Cumberland	215.80	345	27	42	NA	269	899	631
Essex	91.81	692	158	208	NA	119	1,269	1,150
Gloucester	453.73	514	72	100	NA	74	1,214	1,139
Hudson	45.04	462	105	176	NA	0	788	788
Hunterdon	10.49	507	69	55	NA	35	677	642
Mercer	48.02	519	100	84	NA	13	764	751
Middlesex	375.27	868	232	188	NA	1	1,664	1,663
Monmouth	33.24	1,077	113	205	NA	73	1,501	1,429
Morris	7.18	1,007	140	174	NA	66	1,395	1,328
Ocean	35.77	1,016	88	169	NA	634	1,943	1,309
Passaic	1.03	498	77	108	NA	6	690	683
Salem	134.77	283	21	23	NA	2	463	462
Somerset	7.16	604	119	122	NA	17	869	853
Sussex	4.31	553	25	33	NA	22	638	617
Union	378.89	532	128	130	NA	0	1,168	1,168
Warren	30.95	363	49	26	NA	4	472	469
Total in State	**2,084**	**13,136**	**2,055**	**2,543**	**NA**	**2,090**	**21,908**	**19,818**

Notes:

1. Onroad and nonroad annual values from are from the USEPA 2017 National Emission Inventory (NEI).
2. Area Source fugitive dust emissions are post-adjustment.

Table 10-5 (continued): 2017 Statewide Emission Inventory by County, Source Sector and Pollutant

County	SO_2 Tons per Year							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	186.89	19	24	30	NA	7	267	260
Bergen	42.59	44	73	11	NA	0	171	171
Burlington	45.19	32	46	48	NA	53	225	171
Camden	80.49	21	40	13	NA	4	158	155
Cape May	36.21	6	10	5	NA	7	64	57
Cumberland	195.12	15	11	13	NA	23	257	234
Essex	71.66	45	48	334	NA	9	507	498
Gloucester	528.98	17	28	18	NA	8	600	592
Hudson	35.26	19	27	62	NA	0	143	143
Hunterdon	0.80	16	19	2	NA	4	41	37
Mercer	10.96	17	34	6	NA	1	70	68
Middlesex	111.70	28	78	14	NA	0	231	231
Monmouth	14.64	55	58	20	NA	7	154	147
Morris	1.14	58	49	5	NA	6	119	113
Ocean	48.45	26	43	18	NA	52	187	135
Passaic	0.08	40	27	3	NA	1	71	70
Salem	675.08	9	7	7	NA	0	699	699
Somerset	1.97	18	33	3	NA	2	59	57
Sussex	5.62	42	11	1	NA	2	62	60
Union	101.95	16	40	16	NA	0	174	174
Warren	26.28	13	14	1	NA	0	54	54
Total in State	**2,221**	**555**	**721**	**630**	**NA**	**186**	**4,313**	**4,127**

Notes:

Onroad and nonroad annual values from are from the USEPA 2017 National Emission Inventory (NEI).

Table 10-5 (continued): 2017 Statewide Emission Inventory by County, Source Sector and Pollutant

County	Ammonia Tons per Year							
	Point Sources	Area Sources	Onroad Sources	Nonroad Sources	Biogenic	Wildfire and Prescribed	Total	Total Anthropogenic
Atlantic	17.60	124	84	2	NA	13	240	227
Bergen	286.02	78	220	6	NA	1	591	591
Burlington	35.24	280	142	2	NA	108	568	460
Camden	18.07	47	118	2	NA	7	193	186
Cape May	0.69	44	33	2	NA	12	92	80
Cumberland	30.40	149	35	1	NA	51	267	216
Essex	67.96	167	144	4	NA	23	406	383
Gloucester	130.82	171	90	2	NA	14	407	393
Hudson	31.29	46	73	4	NA	0	154	154
Hunterdon	1.32	266	54	1	NA	6	329	322
Mercer	7.98	118	105	2	NA	2	235	233
Middlesex	241.03	106	229	4	NA	0	580	579
Monmouth	51.16	313	178	4	NA	14	561	547
Morris	3.30	134	140	3	NA	13	293	280
Ocean	76.85	162	142	4	NA	122	508	385
Passaic	0.35	49	81	2	NA	1	134	132
Salem	4.20	336	24	1	NA	0	365	364
Somerset	0.76	89	91	2	NA	3	185	182
Sussex	0.04	249	33	1	NA	4	287	283
Union	107.41	29	116	3	NA	0	255	255
Warren	7.55	293	40	0	NA	1	342	341
Total in State	**1,120**	**3,249**	**2,173**	**53**	**NA**	**396**	**6,990**	**6,594**

Notes:

Onroad and nonroad annual values from are from the USEPA 2017 National Emission Inventory (NEI).

Figure 10-2:
2017 New Jersey Volatile Organic Compound Emissions
Tons Per Summer Day

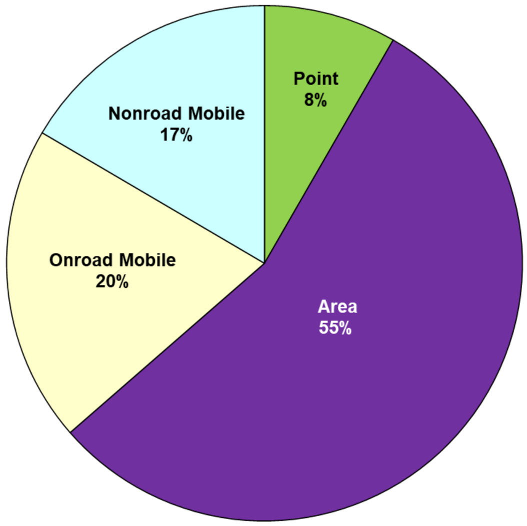


Figure 10-3:
2017 New Jersey Volatile Organic Compound Emissions including Biogenic Sources
Tons Per Summer Day

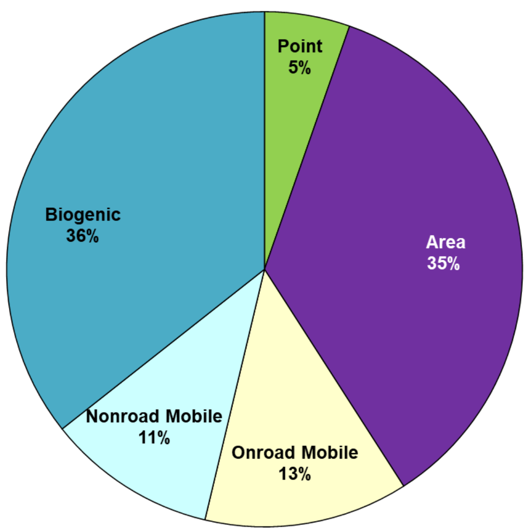


Figure 10-4:
2017 New Jersey Oxides of Nitrogen Emissions
Tons Per Summer Day

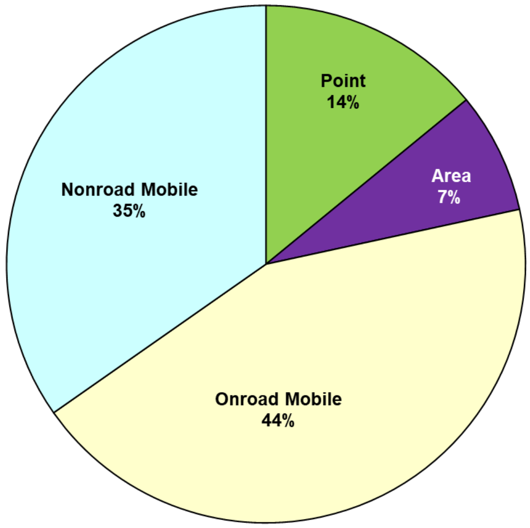


Figure 10-5:
2017 New Jersey Carbon Monoxide Emissions Tons Per Summer Day

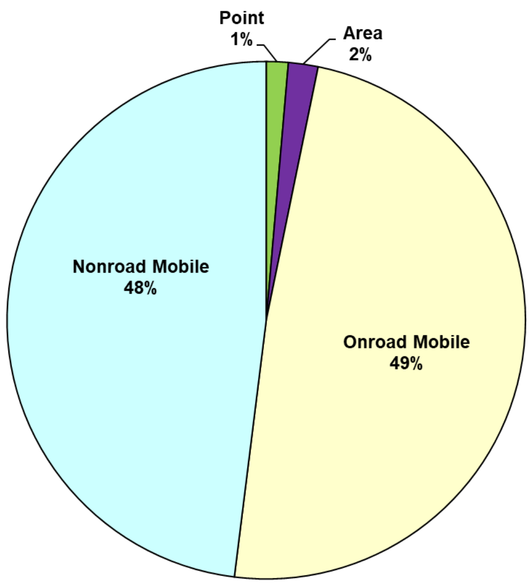
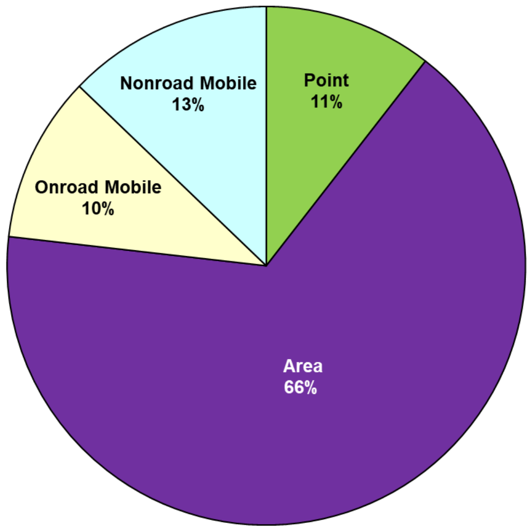


Figure 10-6:
2017 New Jersey Fine Particulate Matter Emissions
Tons Per Year



Note: Area source fugitive dust emissions are post-adjustment.

Figure 10-7:
2017 New Jersey Sulfur Dioxide Emissions
Tons Per Year

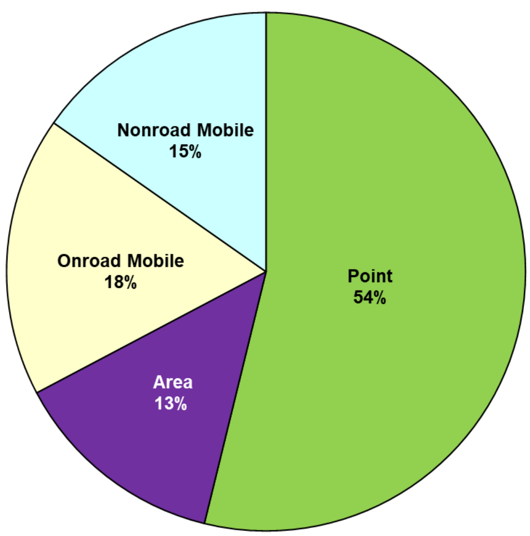
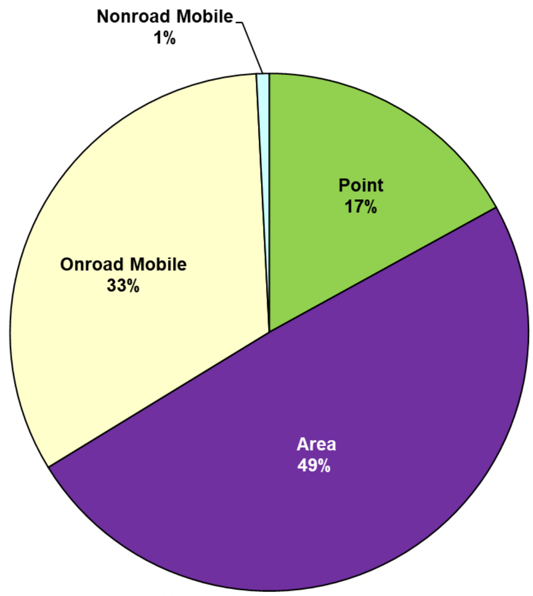


Figure 10-8:
2017 New Jersey Ammonia Emissions
Tons Per Year



As shown in Table 10-2 and Figures 10-1 through 10-8, in the 2017 emission inventory, biogenic sources represent the largest fraction of summer day VOCs. The area source sector represents the largest fraction of human-made summer day VOC, followed by the onroad sector. The onroad sector represents the largest fraction of summer day NO_x, followed by the nonroad sector. The onroad sector represents the largest fraction of summer day carbon monoxide, followed by the nonroad sector. The area source sector represents the largest fraction of annual PM2.5. The point source sector represents the largest fraction of annual SO_2, followed by the onroad mobile sector. Area source represents the largest fraction of human-made annual ammonia.

Figures 10-9 through 10-13 show a ranking of emission categories, from human-made sources, from highest to lowest.

Figure 10-9:
2017 New Jersey Volatile Organic Compound Emission Inventory
Top 15 by Emission Type

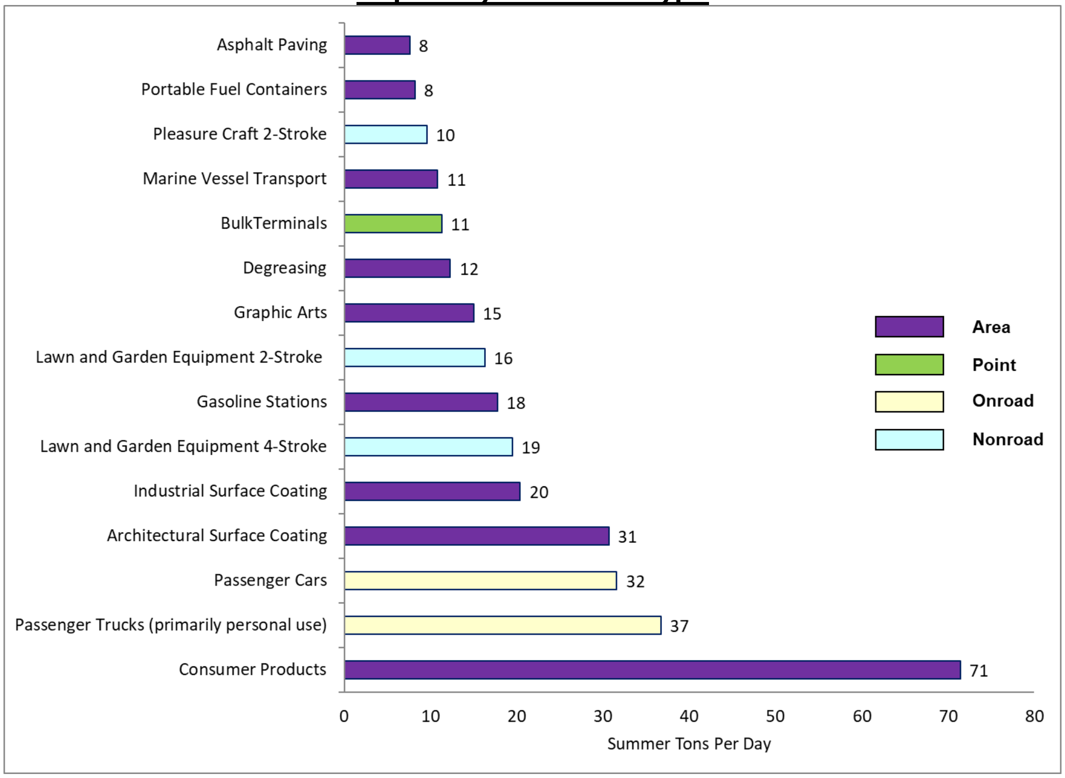


Figure 10-10:
2017 New Jersey Oxides of Nitrogen Emission Inventory
Top 15 by Emission Type

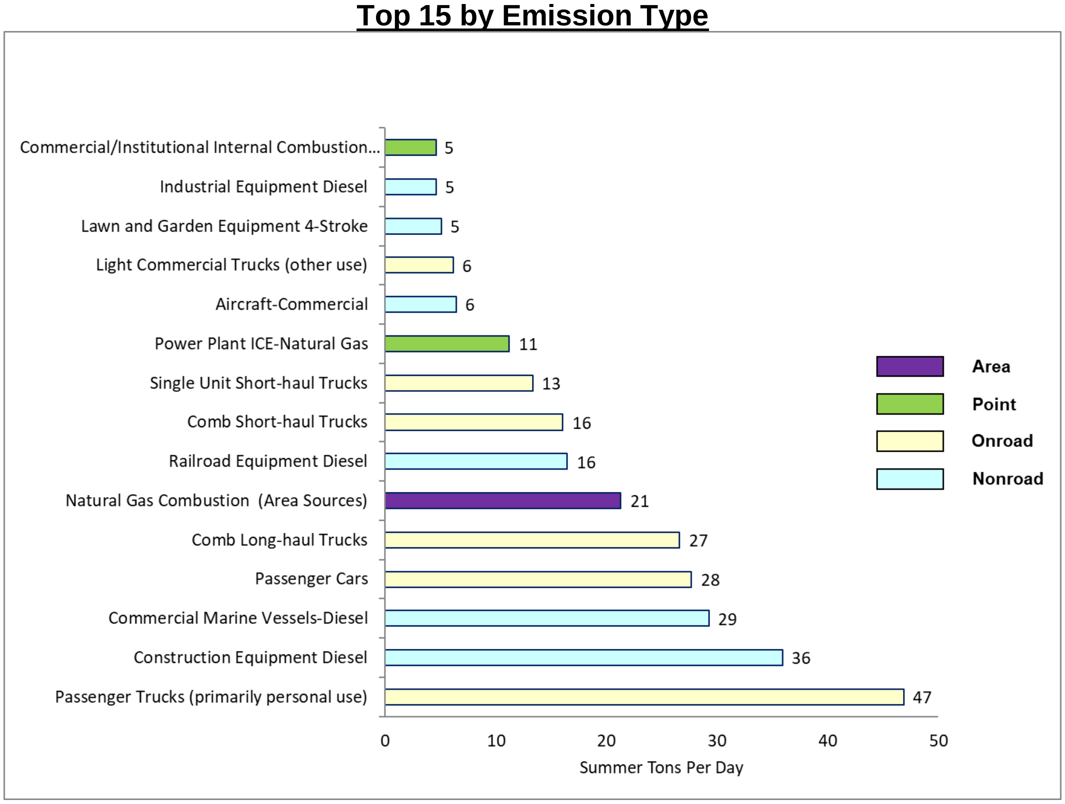


Figure 10-11: 2017 New Jersey Carbon Monoxide Emission Inventory Top 15 by Emission Type

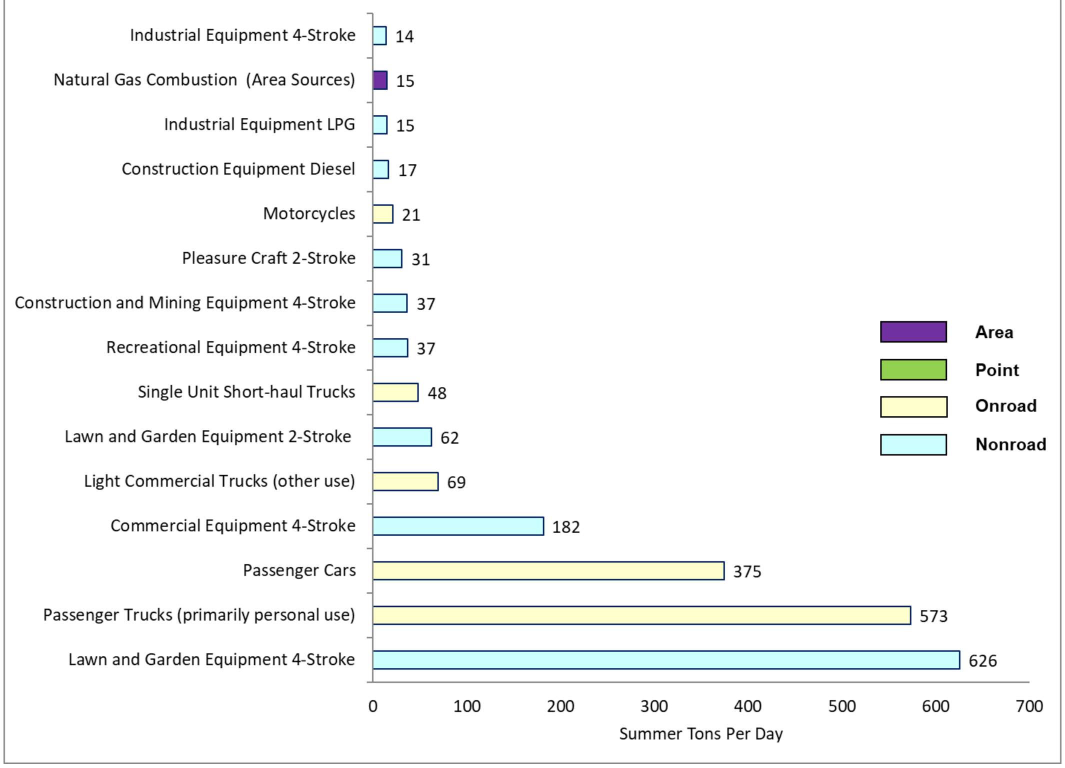
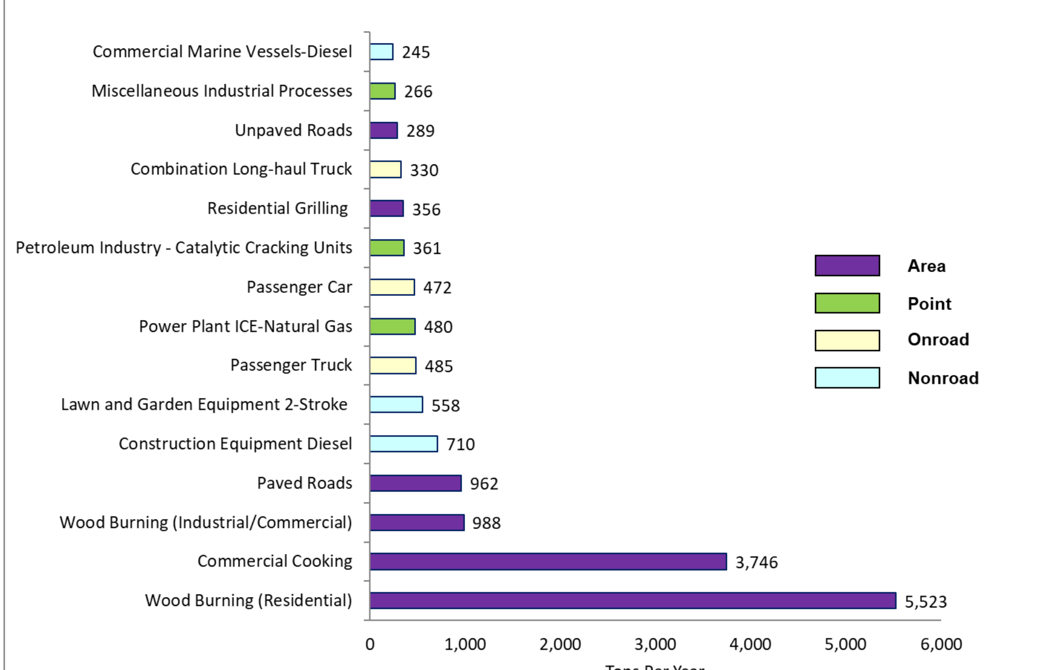


Figure 10-12: 2017 New Jersey Fine Particulate Matter Emission Inventory Top 15 by Emission Type



Note: Area Source fugitive dust emissions are post-adjustment.

Figure 10-13:
2017 New Jersey Sulfur Dioxide Emission Inventory
Top 15 by Emission Type

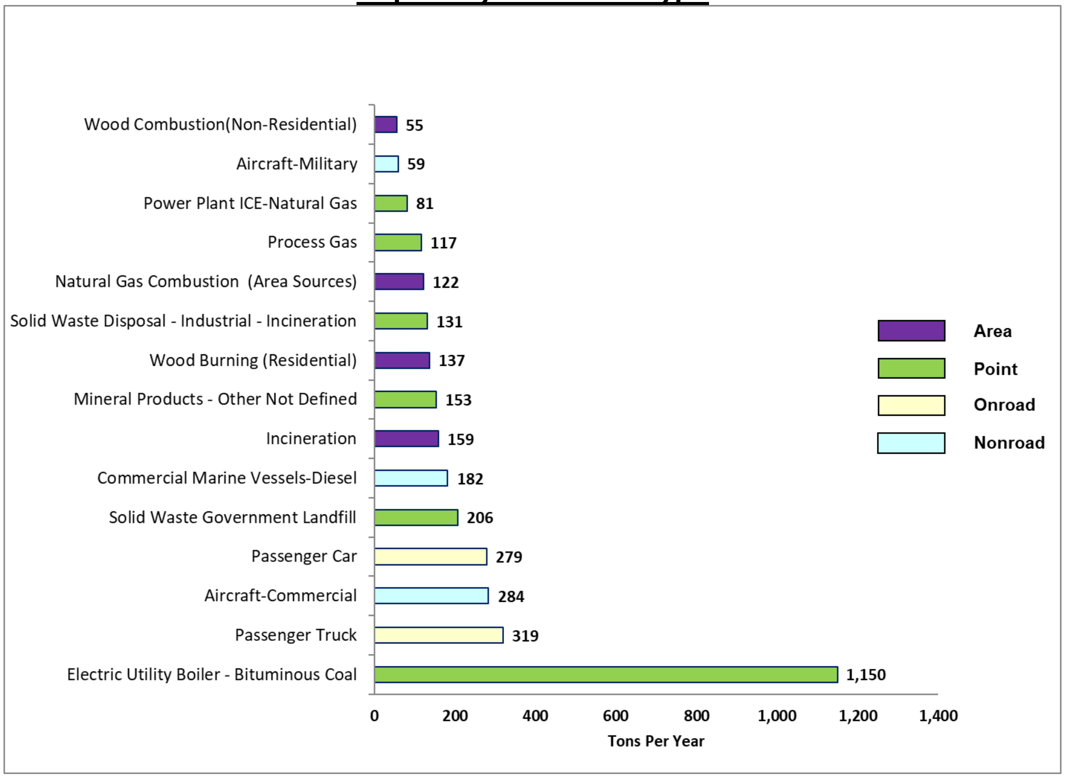
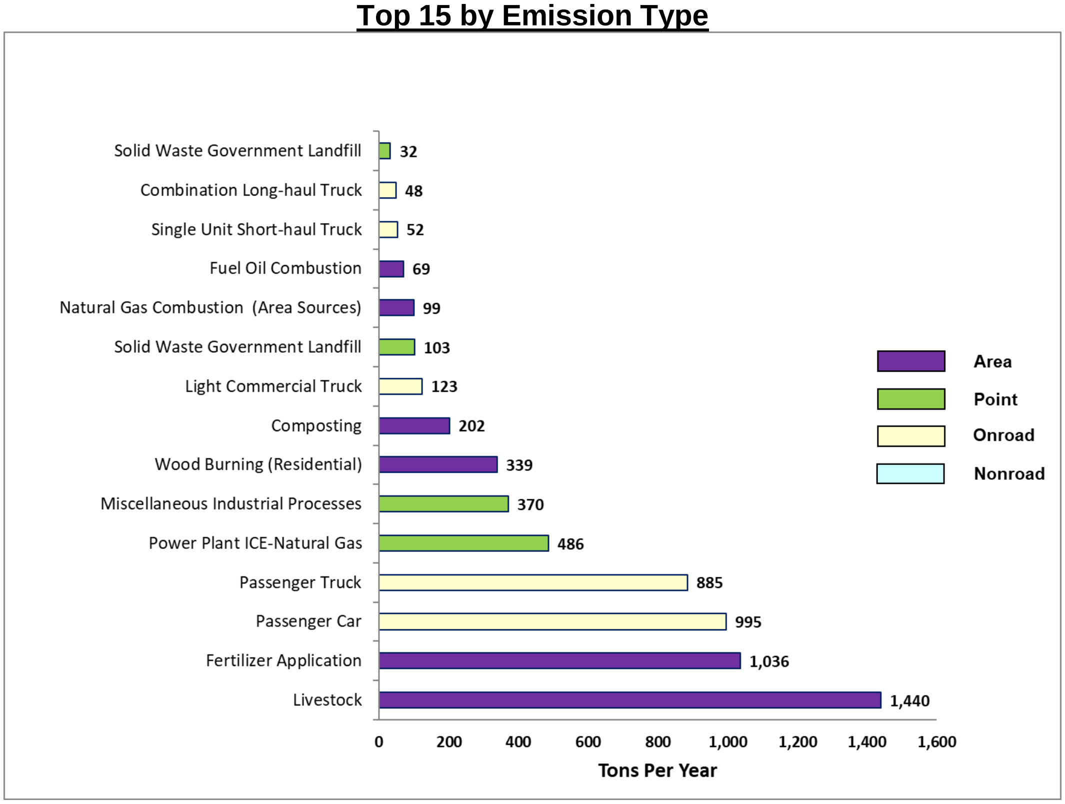


Figure 10-14:
2017 New Jersey Ammonia Emission Inventory
Top 15 by Emission Type



As shown in Figures 10-9 through 10-14, the top 5 categories of human-made 2017 emissions for summer day VOCs are consumer products, passenger trucks, passenger cars, architectural surface coatings, and industrial surface coatings. The top 5 categories for summer NO_x are passenger trucks, construction equipment, commercial marine vessels, passenger cars, and combination long-haul trucks. The top 5 categories for annual PM2.5 are residential woodburning, commercial cooking, industrial/commercial wood combustion, paved road dust, and diesel construction equipment. The top 5 categories for annual SO_2 are coal power plant boilers, passenger trucks, commercial aircrafts, passenger cars, and solid waste disposal at government landfills. The top 5 categories for annual ammonia are livestock, fertilizer, passenger car exhaust, passenger trucks, and electric utility combustion engines.

While passenger car emissions have decreased significantly from 2011 to 2017, passenger truck emissions have increased. This results in an overall decrease in passenger car and truck emissions. This is due to a growth spurt in passenger truck population from 2011 to 2017. The population growth results in more vehicle miles traveled for that category which results in more emissions. This trend continues past 2017. In 2020 passenger cars have the highest population of all vehicle source types in New Jersey.

10.4 Inventory Trends

Figures 10-15 through 10-20 show emission trends from 2002 to 2017, from human-made sources.

Figure 10-15:
New Jersey Statewide Volatile Organic Compound Emission Trend

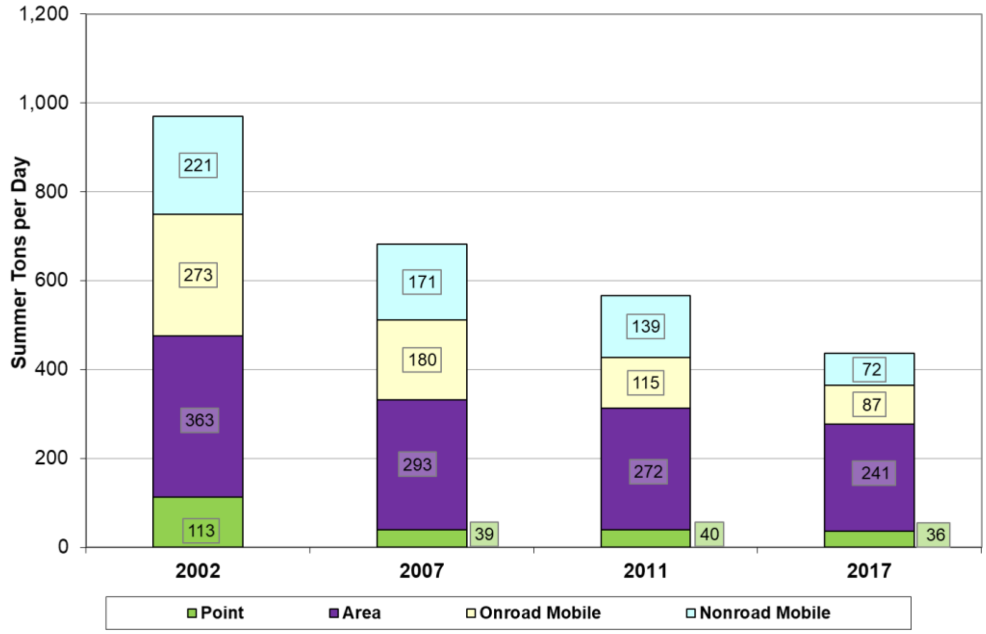


Figure 10-16:
New Jersey Statewide Oxides of Nitrogen Emission Trend

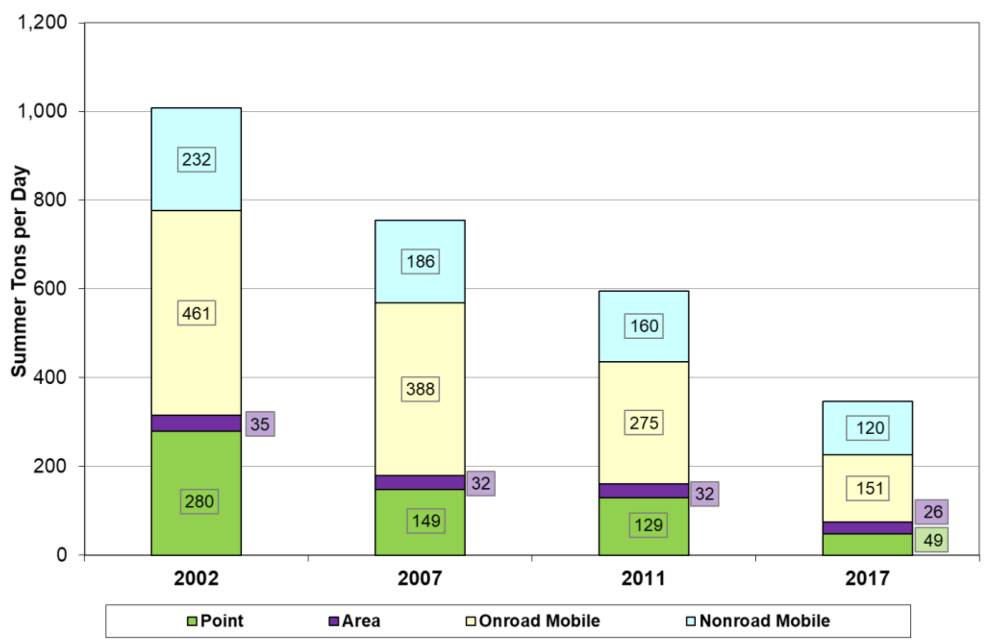


Figure 10-17:
New Jersey Statewide Carbon Monoxide Emission Trend

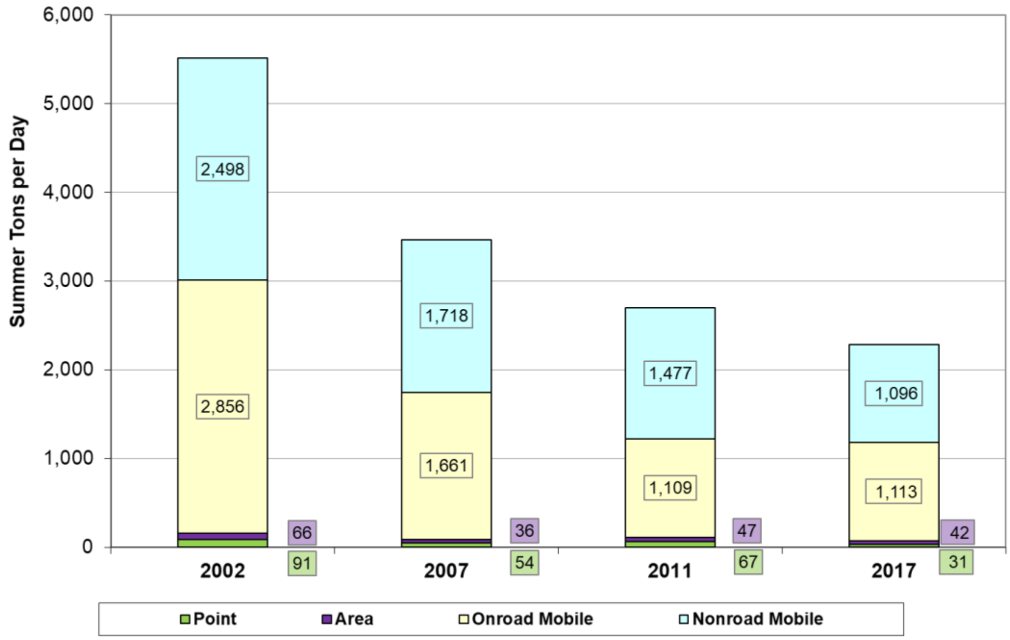
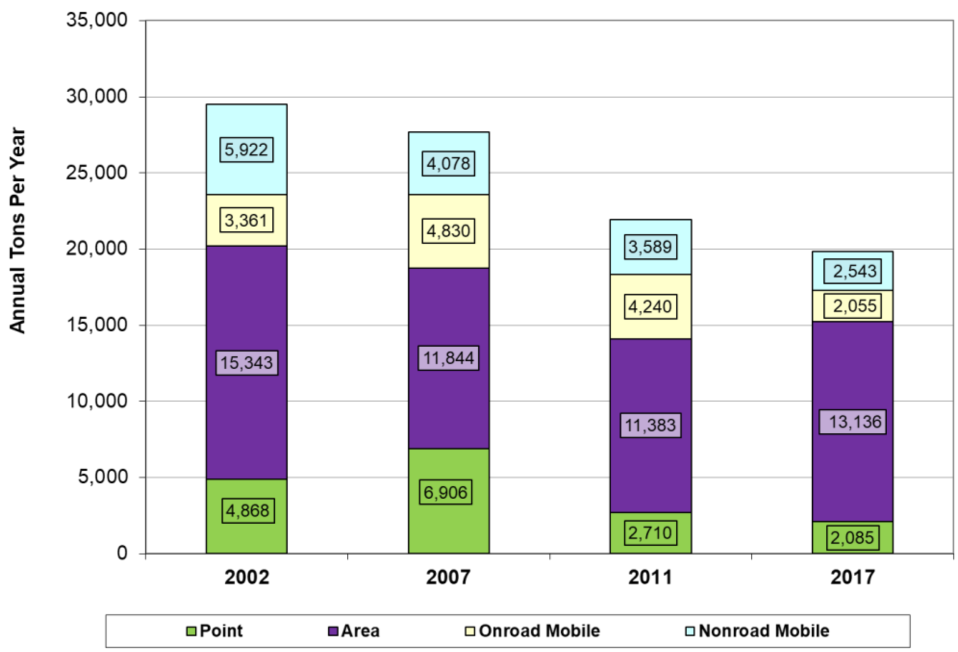


Figure 10-18:
New Jersey Statewide Fine Particulate Matter Emission Trend



Note: Area Source fugitive dust emissions are post-adjustment.

Figure 10-19:
New Jersey Statewide Sulfur Dioxide Emission Trend

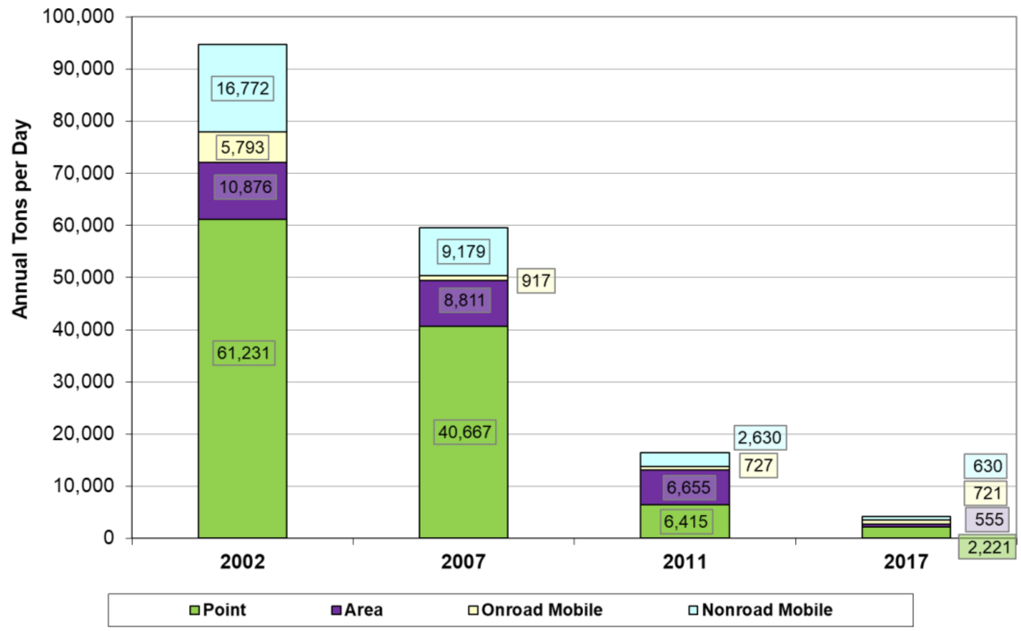
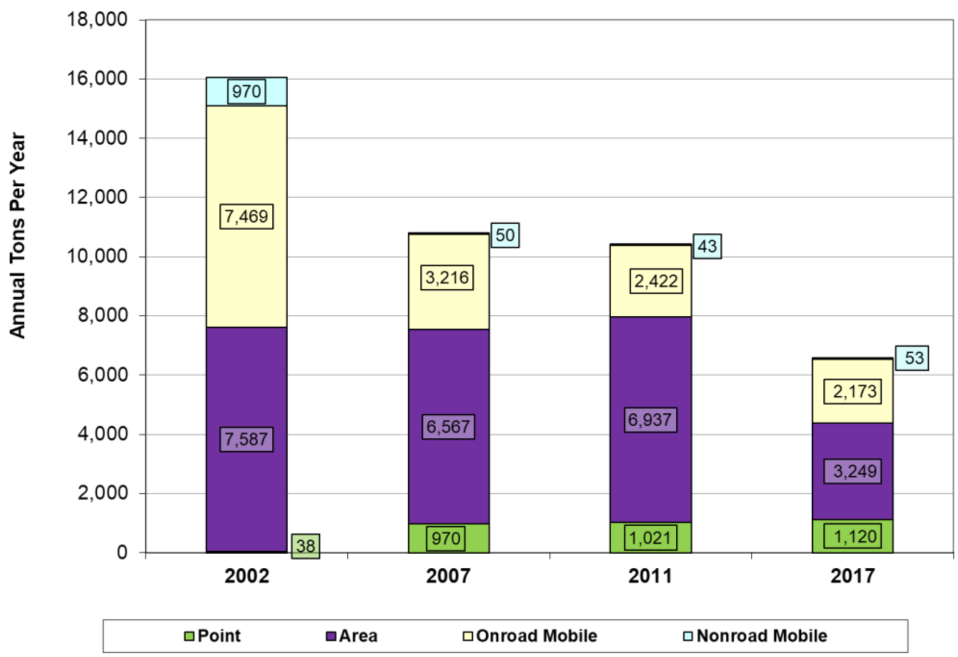


Figure 10-20:
New Jersey Statewide Ammonia Emission Trend



There were some emission calculation methodology changes in each emission inventory which should be noted when evaluating trends. For the onroad sector, emissions were calculated with a new USEPA model (MOVES) in 2007 and 2011, which was different than the model used for the 2002 inventory (MOBILE6). The new model results in higher NOx and PM2.5 emission estimates, than those in 2002. The actual 2017 emission inventory used the Nonroad model included in MOVES2014b. This version replaced MOVES2014a in August 2018. It incorporated updated nonroad engine growth rates, nonroad Tier 4 engine emission rates, and sulfur levels of nonroad diesel fuels. In addition, national updates were made to the MOVES2014b defaults for allocating national populations of agricultural and construction equipment to state and county levels. These updates resulted in nonroad equipment emission reductions from those calculated by the earlier MOVES2014a version. USEPA methodologies for calculating aircraft and commercial marine vessels have also changed for the 2017 inventory, increasing estimated emissions before accounting for reductions from controls. USEPA Residential wood burning methodologies and calculations changed for each of the inventories shown, resulting in significantly different results, lower in 2007 and higher again in 2011. This would primarily affect annual trends, not summer day trends. There are also known issues with the USEPA county distribution of the statewide residential wood burning emissions. Wildfires are not included in the trends graphs, because they are considered events and are inconsistent from year to year. PM2.5 was not reported in the 2002 Emission Statement program; therefore, the point source emissions were estimated based on PM10 reporting, resulting in lower emissions in 2002 than 2007. Ammonia was also not reported in the 2002 Emission Statement program. Therefore, the 2007 and 2011 emissions are more representative of actual point source emissions for PM2.5 and ammonia, than 2002 emissions.

Figures 10-15 through 10-20 show estimated human-made emissions of summer tons per day VOCs have decreased from 2002-2017 by about 55%, summer tons per day NO_x have decreased by about 66%, summer carbon monoxide has decreased by about 59%, annual PM2.5 has decreased by about 33%, annual SO_2 has decreased by about 96%, and annual ammonia has decreased by about 59%.

VOC decreases were achieved in all sectors due to motor vehicle fleet turnover, Federal new engine standards for onroad and nonroad vehicles and equipment, the National and State low emission vehicle programs, area source rules such as consumer products, portable fuel containers, paints, autobody refinishing, asphalt paving applications, and solvent cleaning operations, and point source controls such as refinery consent decrees.

NO_x decreases were achieved in the onroad sector due to motor vehicle fleet turnover and the National and State low emission vehicle programs, and in the point source sector due primarily to the NO_x budget program for power plants, power plant and refinery consent decrees (contractual agreements) and New Jersey's high electric demand day and multi-pollutant power plant rules. NO_x decreases were achieved in the nonroad sector due to new engine standards for nonroad vehicles and equipment.

Carbon monoxide decreases were achieved primarily in the onroad and nonroad mobile sectors due to motor vehicle fleet turnover and new engine standards for nonroad vehicles and equipment.

Direct PM2.5 has decreased in the point source sector due to power plant and refinery consent decrees and in the onroad and nonroad sectors due to motor vehicle fleet turnover, new engine standards for nonroad vehicles and equipment and the National and State low emission vehicle programs. Increases shown on the graphs in onroad, area and point sources are due to calculation methodology changes discussed above.

SO_2 decreases were achieved in all sectors and significantly in the point source sector due to the acid rain program, power plant consent decrees and New Jersey's power plant rules, in the area source sector due a decline in the use of distillate oil for heating, and in the onroad and nonroad sectors due to Federal rules that reduced sulfur levels in diesel fuel.

Ammonia decreases were achieved in the onroad and nonroad sectors due to motor vehicle fleet turnover and new engine standards for nonroad vehicles and equipment.

Chapter 11 REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) REQUIREMENTS FOR THE 70 PPB 8-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD

The air pollutants that contribute most to the formation of ozone are volatile organic compounds (VOC) and nitrogen oxides (NO_x). The Clean Air Act 42 U.S.C. §§7511c(b)(1) and 7511c(b)(2) (Sections 184(b)(1) and 184(b)(2)) requires states in the Ozone Transport Region, including New Jersey, to adopt Reasonably Available Control Technology (RACT) for all existing VOC and NO_x source categories covered by a Control Techniques Guideline (CTG), and for all other major sources of VOC and NO_x, including those covered by an Alternative Control Techniques (ACT).[164] In New Jersey, the major source threshold for VOC and NO_x is 25 tons per year (tpy) each for the purposes of RACT applicability.

RACT is defined by the USEPA as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.[165] The RACT State Implementation Plan (SIP) requirements that must be addressed include revised RACT rules, certifications where appropriate, that existing rule provisions continue to be RACT, and negative declarations that there are no sources covered by a specific CTG source category.[166] States should provide for implementation of RACT as expeditiously as possible to help attain the 70 ppb ozone National Ambient Air Quality Standard.[167]

This RACT SIP revision includes certification that RACT has been satisfied for VOC CTG source categories; VOC and NO_x ACT sources; and VOC and NO_x non-CTG/ACT major sources in New Jersey.

11.1 Background

On March 20, 2009, New Jersey adopted new rules and amendments at N.J.A.C. 7:27-16, Control and Prohibition of Air Pollution by Volatile Organic Compounds, and N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution by Oxides of Nitrogen, for 14 source categories. These rules fulfilled New Jersey's commitment to implement RACT to help attain the 85 ppb ozone National Ambient Air Quality Standard.[168] The USEPA approved the rules as a revision to New Jersey's SIP on August 3, 2010.[169] These rules were also adopted to make progress towards achieving the 75 ppb and 70 ppb ozone National Ambient Air Quality Standard. The rule requirements for the 14 source categories continue to be RACT for the 75 ppb and 70 ppb ozone standards. The adopted RACT rule categories are listed in Table 11-1:

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[164] 78 FR 34192, June 6, 2013 and 83 FR 63007, December 6, 2018
[165] 44 FR 53762, September 17, 1979
[166] 78 FR 34192, June 6, 2013 and 83 FR 63007, December 6, 2018
[167] Ibid. and 83 FR 63007 December 6, 2018
[168] http://www.nj.gov/dep/baqp/8hrsip/8hrsip.html#final
[169] 75 FR 45483, August 3, 2010

Table 11-1: Summary of New Jersey Source Categories and Amended RACT Rules (2009)

Source Category	Applicable Rule Section
Subchapter 16 Control and Prohibition of Air Pollution by Volatile Organic Compounds (VOC)	
1. VOC stationary storage tanks	N.J.A.C. 7:27-16.2
2. Flat wood paneling	N.J.A.C. 7:27-16.7
3. Flexible package printing	N.J.A.C. 7:27-16.7
4. Offset lithographic printing and letterpress printing	N.J.A.C. 7:27-16.7
5. Alternative VOC control requirements	N.J.A.C. 7:27-16.17
6. Application of cutback and emulsified asphalts	N.J.A.C. 7:27-16.19
Subchapter 19 Control and Prohibition of Air Pollution by Oxides of Nitrogen (NO_x)	
7. Boilers serving electric generating units (EGUs)	N.J.A.C. 7:27-19.4
8. Stationary combustion turbines	N.J.A.C. 7:27-19.5
9. Industrial/commercial/institutional (ICI) boilers and other indirect heat exchangers	N.J.A.C. 7:27-19.7
10. Asphalt pavement production plants	N.J.A.C. 7:27-19.9
11. Glass manufacturing furnaces	N.J.A.C. 7:27-19.10
12. Municipal solid waste (MSW) incinerators	N.J.A.C. 7:27-19.12
13. Alternative and facility-specific NO_x emission limits	N.J.A.C. 7:27-19.13
14. Sewage sludge incinerators	N.J.A.C. 7:27-19.28

On June 11, 2015, New Jersey submitted to USEPA a RACT SIP revision to meet the requirements of the 2008 75 ppb ozone NAAQS that included a certification that existing sources continue to meet RACT requirements, a commitment to adopt new rules, and negative declarations for those categories where no sources exist in New Jersey. As part of this SIP, New Jersey adopted rule revisions to address the following four CTGs, and two NO_x ACT categories:

1. Industrial Cleaning Solvents (2006 CTG);
2. Paper, Film, and Foil Coatings (2007 CTG);
3. Fiberglass Boat Manufacturing Materials (2008 CTG);
4. Misc. Metal and Plastic Parts Coatings (2008 CTG);
5. Stationary RICE (NO_x ACT) and Stationary gas turbines (NO_x ACT) as they relate to natural gas compressors.

NJDEP proposed rules addressing these categories on January 3, 2017. A copy of the rule proposal can be found at http://www.state.nj.us/dep/aqm/curformp.html. The final rules were effective November 6, 2017 (49 N.J.R. 3518.) A copy of the rule adoption can be found at: http://www.state.nj.us/dep/aqm/adopt.html.

11.2 Reasonably Available Control Technology (RACT) Determination of Major Sources of VOC and NOx in New Jersey

This Reasonably Available Control Technology (RACT) SIP revision for the 70 ppb ozone National Ambient Air Quality Standard includes a RACT evaluation of the State's major sources. This was done by researching the New Jersey Environmental Management System (NJEMS) permitting and emission inventory database, comparing the existing New Jersey RACT rules with the USEPA CTGs and ACTs, and evaluating other states' regulations for stringency. For all categories, previously adopted RACT limits in New Jersey continue to be RACT for 70 ppb ozone National Ambient Air Quality Standard implementation purposes. A detailed analysis of New Jersey's RACT rule requirements and justification for recertification of New Jersey's current NOx RACT requirements for existing source categories is provided in Appendix-11-1.

11.2.1 Control Techniques Guidelines and Alternative Control Techniques

States within the Ozone Transport Region must require RACT for all source categories of VOC covered by a Control Techniques Guidelines (CTG), and for all other major sources of VOC and NO_x.[170] The CTGs were developed by the USEPA to help states identify VOC RACT requirements for certain source categories and are considered presumptive RACT.[171] There are no CTGs for NO_x sources.

The USEPA also issued technical documents that identify controls for certain categories of stationary sources of NO_x and VOC. Known as Alternative Control Techniques (ACTs), these documents describe available control techniques and their cost effectiveness, but do not define presumptive RACT levels as the CTGs do.[172] These are to assist states in evaluating RACT for select sources of NO_x or VOC not covered by a CTG.

New Jersey amended N.J.A.C. 7:27-16 and N.J.A.C. 7:27-19 on March 20, 2009, to update RACT for the following CTG/ACT categories:

1. External Floating Roof Tanks [N.J.A.C. 7:27-16.2];
2. Offset Lithographic Printing and Letterpress Printing [N.J.A.C. 7:27-16.7]
3. Flexible Package Printing [N.J.A.C. 7:27-16.7]
4. Flat Wood Paneling Coatings [N.J.A.C. 7:27-16.7]
5. Cutback Asphalt [N.J.A.C. 7:27-16.19];
6. Utility Boilers [N.J.A.C. 7:27-19.4];
7. Stationary Gas Turbines [N.J.A.C. 7:27-19.5];
8. ICI Boilers and Process Heaters [N.J.A.C. 7:27-19.7];
9. Glass Manufacturing [N.J.A.C. 7:27-19.10];

On November 6, 2017, New Jersey amended N.J.A.C. 7:27-16 and N.J.A.C. 7:27-19 to update RACT for the following CTG/ACT categories:

1. Paper, Film, and Foil Coatings [N.J.A.C. 7:27-16.7];
2. Fiberglass Boat Manufacturing Materials [N.J.A.C. 7:27-16.14];
3. Misc. Metal and Plastic Parts Coatings [N.J.A.C. 7:27-16.15];
4. Industrial Cleaning Solvents [N.J.A.C. 7:27-16.24];
5. Stationary Combustion Turbines compressing gaseous fuel [N.J.A.C. 7:27-19.5], and
6. Stationary Reciprocating Engines compressing gaseous fuel [N.J.A.C. 7:27-19.8].

In determining if these RACT rule revisions still represent RACT for the 70 ppb ozone standard, New Jersey reevaluated the most recent RACT analysis dated June 11, 2015,[173] and reviewed the applicable rules compiled in N.J.A.C. 7:27-16 and 19. Table 11-2 lists all the CTG and ACT documents[174] and identifies the rules adopted by the State and approved by the USEPA.

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[170] 78 FR 34192, June 6, 2013 and 83 FR 63007, December 6, 2018
[171] 78 FR 34192, June 6, 2013 and 83 FR 63007, December 6, 2018
[172] Ibid.
[173] https://www.nj.gov/dep/baqp/ozoneco2011inv.html
[174] http://www.epa.gov/ttn/caaa/t1/memoranda/ractqanda.pdf

Table 11-2 also indicates if New Jersey has determined that previously adopted RACT controls still represent RACT for the 70 ppb ozone standard, or whether the State intends to propose more up-to-date controls and lower allowable emission rates subject to public comment. For many sources, the 2009 and 2017 New Jersey rules go beyond the recommendations contained in the CTG/ACT documents in terms of more stringent emission rates and lower thresholds of applicability.[175, 176] This is in part attributed to the State's fulfillment of its commitment to adopt rulemakings consistent with OTC guidelines,[177] and New Jersey's 2009 goal to make progress to achieve the 85 ppb ozone standard and the more protective ozone standards that followed. A "Y" in the RACT column indicates that the New Jersey Department of Environmental Protection (NJDEP) has determined that currently effective emission limits for that particular source category still represents RACT in 2021 for the 70 ppb ozone standard.

To better understand the results of the NJDEP's CTG/ACT evaluation, the following is a list of acronyms used in summarizing the results shown in Table 11-2.

- Y indicates that rules were adopted by the State, approved by USEPA, or that previously adopted RACT controls still represent RACT;
- Pend. indicates that RACT is being further evaluated and rule revisions may be proposed;
- N indicates that rules have not yet been adopted;
- NS indicates no sources;
- NA indicates not applicable because CTG is superseded; and
- NR indicates National rule was issued after the CTG/ACT.

[175] Beyond Volatile Organic Compound-Reasonably Available Control Technology-Control Technology Guidelines Requirements, EPA-453/R-95-010, April 1995.
[176] http://www.epa.gov/air/pdfs/MenuOfControlMeasures.pdf
[177] http://www.otcair.org/upload/Documents/Formal%20Actions/RES%2006-02_Concerning%20Coordination%20and%20Implementation%20of%20Control%20Strategies_061115.pdf

Table 11-2: RACT Certifications Based on Existing USEPA Guidance

a. List of the USEPA's Control Techniques Guidelines (CTG) for Control of VOC Emissions from Stationary Sources

Pre 1990 CTG Documents	Rules Adopted by NJ	USEPA Approved	N.J.A.C. 7:27	Meets RACT (70 ppb NAAQS)
Group 1				
1. Stage I Vapor Control Systems	Y	Y	16.3	Y
2. Surface Coating of Cans	Y	Y	16.7	Y
3. Surface Coating Metal Coils	Y	Y	16.7	Y
4. Surface Coating Paper Products	Y	Y	16.7	Y
5. Surface Coating Fabrics	Y	Y	16.7	Y
6. Surface Coating Auto/Light trucks	Y	Y	16.7	NA
7. Misc. Refinery Sources	Y	Y	16.6	Y
8. Solvent Metal Cleaning	Y	Y	16.6	Y
9. Gasoline Loading Terminals	Y	Y	16.3	Y
10. Surface Coating Metal Furniture	Y	Y	16.7	NA
11. Surface Coating Magnet Wire	Y	Y	16.7	Y
12. Surface Coating Large Appliances	Y	Y	16.7	NA
13. Bulk Gasoline Plants	Y	Y	16.3	Y
14. Fixed Roof Petroleum Tanks	Y	Y	16.2	Y
15. Use of Cutback Asphalt	Y	Y	16.19	Y
Group II				
16. Surface Coating Misc. Metal Parts	Y	Y	16.7	NA
17. Surface Coating Flat Wood Panel	Y	Y	16.7	NA
18. Manufacture Vegetable Oils	NS	--	--	NS
19. Leaks from Refinery Equipment	Y	Y	16.18	Y
20. Synthetic Pharmaceutical Product	Y	Y	16.16	Y
21. Pneumatic Rubber Tires	NS	--	--	NS
22. Graphic Arts – Roto & Flex	Y	Y	16.7	NA
23. External Floating Roof Tanks	Y	Y	16.2	Y
24. Perchloroethylene Dry Cleaning	NA	--	--	NA
25. Leaks from Gasoline Tank Trucks and Vapor Collection System	Y	Y	16.3	Y
Group III				
26. Large Petroleum Dry Cleaners	Y	Y	16.20	Y
27. High-Density Polyethylene	Y	Y	16.16	Y
28. Nat.Gas/Gasoline Process Leaks	Y	Y	16.18	Y
29. Synthetic Chemical Mfg. Equip Fugitives	Y	Y	16.18	Y
30. Air Oxidation Processes in Synthetic Organic Chemical Mfg. Industry (SOCMI)	Y	Y	16.16	Y

1990 - 2005 CTG Documents	Rules Adopted in NJ	USEPA Approved	N.J.A.C. 7:27	Meets RACT (70 ppb NAAQS)
1. Reactors and Distillation SOCMI	Y	Y	16.16	Y
2. Offset Lithographic Printing	NA	--	--	NA
3. Wood Furniture Manufacturing	Y	Y	16.7	Y
4. Ship Building and Repair*	NS	--	--	NS
5. Aerospace Coatings	NS	--	--	NS

2006 CTG Documents	Rules Adopted In NJ	USEPA Approved	N.J.A.C. 7:27	Meets RACT (70 ppb NAAQS)
1. Flat Wood Paneling Coatings	Y	Y	16.7	Y
2. Lithographic Printing Materials and Letterpress Printing Materials	Y	Y	16.7	Y
3. Flexible Packaging Printing Materials	Y	Y	16.7	Y
4. Industrial Cleaning Solvents	Y	--	16.24	Y

2007 CTG Documents	Rules Adopted in NJ	USEPA Approved	N.J.A.C. 7:27	Meets RACT (70 ppb NAAQS)
1. Paper, Film, and Foil Coatings	Y	--	16.7	Y
2. Metal Furniture Coatings	NS	--	--	NS
3. Large Appliance Coatings	NS	--	--	NS

2008 CTG Documents	Rules Adopted in NJ	USEPA Approved	N.J.A.C. 7:27	Meets RACT (70 ppb NAAQS)
1. Fiberglass Boat Manufacturing Materials*	Y	--	16.14	Y
2. Auto and Light Duty Truck Original Equipment Manufacturer (OEM) Assembly Coatings	NS	--	--	NS
3. Misc. Metal and Plastic Parts Coatings*	Y	--	16.15	Y
4. Misc. Industrial Adhesives	Y	Y	26	Y

b. List of the USEPA's Alternative Control Techniques (ACT) for Control of VOC Emissions from Stationary Sources

Pre 1990 ACT Documents	Rules Adopted in NJ	USEPA Approved	N.J.A.C. 7:27	Meets RACT (70 ppb NAAQS)
1. Traffic Markings (NR)	Y	Y	23.3	Y
2. Auto Refinishing (NR)	NA	--	--	NA
3. Halogenated Solvent Cleaners	Y	Y	16.6	Y

Post 1990 ACT Documents	Rules Adopted in NJ	USEPA Approved	N.J.A.C 7:27	Meets RACT (70 ppb NAAQS)
1. Agricultural Pesticide Application	Y	--	**	Y
2. Batch Processes	Y	Y	16.16	Y
3. Volatile Organic Liquids Storage	Y	Y	16.2	Y
4. Industrial Cleaning Solvents	Y	Y	16.6	NA
5. Surface Coating Plastic Parts	Y	Y	16.7	NA
6. Automobile Refinishing (NR)	Y	Y	16.12	Y
7. Ship Building and Repair	NA	--	--	NA
8. Industrial Wastewater	Y	Y	16.6	Y
9. Offset Lithographic Printing	NA	--	--	NA

c. List of USEPA's Alternative Control Techniques (ACT) for Control of NO_x Emissions from Stationary Sources

Post 1990 ACT Documents	Rules Adopted in NJ	USEPA Approved	N.J.A.C 7:27	Meets RACT (70 ppb NAAQS)
1. Iron and Steel Mills	NS	--	--	NS
2. ICI Boilers	Y	Y	19.7	Y
3. Glass Manufacturing	Y	Y	19.10	Y
4. Stationary RICE	Y	Y	19.8	Y
5. Process Heaters	Y	Y	19.7	Y
6. Stationary Gas Turbines	Y	Y	19.5	Y
7. Utility Boilers	Y	Y	19.4	Y
8. Cement Manufacturing	NS	--	--	NS
9. Nitric and Adipic Mfg. Plants	NS	--	--	NS

* These control measures are based on the coating VOC limits from NESHAP subpart VVVV
** N.J.A.C. 7:30, New Jersey Pesticide Control Rules

11.2.2 Certifications of VOC and NO_x RACT for Major Non-CTG/ACT Sources

In 2009, the NJDEP adopted VOC and NO_x RACT for major non-CTG sources located in the State. Those sources for which guidance was not published, but for which the NJDEP established RACT, include:

1. High Electric Demand Day boilers serving EGUs [N.J.A.C. 7:27-19.4];
2. High Electric Demand Day turbines serving EGUs [N.J.A.C. 7:27-19.5];
3. Asphalt paving production plants [N.J.A.C. 7:27-19.9];
4. Alternative VOC control requirements [N.J.A.C. 7:27-16.7];
5. Alternative and facility-specific NO_x emission limits [N.J.A.C. 7:27-19.13];
6. Municipal solid waste (MSW) incinerators [N.J.A.C. 7:27-19.12]; and
7. Sewage sludge incinerators [N.J.A.C. 7:27-19.28].

The NJDEP has determined that currently effective emission limits for these source categories still represent RACT in 2021 for the 70 ppb ozone standard. A detailed analysis of New Jersey's RACT rule requirements and justification for recertification of New Jersey's current NOx RACT requirements for existing source categories is provided in Appendix 11-1.

11.2.3 Negative Declarations

By comparing the list of existing CTGs and ACTs with the NJDEP's effective rules and researching the emission statements and permitting databases for source categories by the North American Industry Classification System (NAICS), the NJDEP has determined that the following source-specific categories either do not exist in this State or fall below significant emission unit applicability thresholds in the CTGs and ACTs.

1. Manufacture of Vegetable Oils;
2. Manufacture of Pneumatic Rubber Tires;
3. Aerospace Coatings;
4. Iron and Steel Mills;
5. Cement Manufacturing;
6. Nitric and Adipic Manufacturing Plants;
7. Shipbuilding and Ship Repair Operations;
8. Metal Furniture Coatings;
9. Large Appliance Coatings;
10. Auto and Light Duty Truck Original Equipment Manufacturer (OEM) Assembly Coatings;
11. Oil and Gas Industry

On May 13, 2019, NJDEP submitted a SIP revision to USEPA consisting of a negative declaration for the USEPA 2016 Oil and Gas CTG. On May 18, 2020, USEPA issued final approval of New Jersey negative declaration (See 85 FR 29629).

11.2.4 Update of New Jersey's Facility-Specific Emission Limits, Alternative Emission Limits and Alternative Control Plans

The requirement to review and update RACT also applies to all source-specific RACT limits. In New Jersey, facilities that have sources with potential to emit NO_x or VOC above major source thresholds, and for which no RACT limit has been established, are required to develop facility-specific emission limits (FSELs). Similarly, facilities that are not reasonably able to comply with RACT limits in the rules may request alternative emission limits (AELs) for NO_x or alternative control plans (ACPs) for VOC. If approved by the NJDEP after public notice and comment, these are submitted to USEPA as SIP revisions.

The amended 2009 RACT rules, N.J.A.C. 7:27-16.17[178] and N.J.A.C. 7:27-19.13[179] required any facility with an AEL, ACP or FSEL to meet the revised RACT rules if applicable for a given piece of equipment or source operation or reapply for a new source-specific limit. Many of these facilities subsequently met the adopted RACT standards after the original AEL or ACP and did not need to reapply. Other sources with FSELs, such as municipal waste combustors and sewage sludge incinerators, complied with new RACT limits. Equipment such as process heaters and fluid catalytic cracking units (FCCUs) at petroleum refineries became subject to more stringent emission limits due to a Federal enforcement initiative. Consequently, the number of case-by-case RACT limits has been reduced from 40[180] to 13.

The NJDEP has reviewed the State's existing case-by-case determinations, or AELs, ACPs and FSELs. Based on the current data available from Title V operating permits, consent decrees, single-source NO_x RACT SIP files, and the State's RACT rules, New Jersey has determined that those facilities with a State-approved AEL, ACP, or FSEL meet RACT for the 70 ppb ozone standard. Those facilities with pending AEL or ACP applications will be evaluated and submitted as SIP revisions if approved by the NJDEP. Refer to Table II-3 for a summary of facilities in New Jersey with an existing, or pending, AEL, ACP or FSEL, and approval status.

Table 11-3: Status of NO_x and VOC Source-Specific RACT Determinations

Source	Type of Emissions Limits	Approval Status	Does NJ anticipate submitting SIP revision?
1. McWane Ductile (Formerly Atlantic States Cast Iron Pipe Co.) Warren County (PI#85441, BOP080003, cupola and annealing oven)	NO_x FSEL	NJ approved 10/25/2010	Under Review (a)
2. Johnson Matthey Gloucester County (PI#55788, PSP140001, furnace)	NO_x FSEL	Facility submitted updated plan in November 2020 (BOP 20-0001)	Under Review
3. Paulsboro (formerly Valero Refining Co) (formerly Mobil Oil Corp) Gloucester County (PI#55829, BOP130002, external floating roof tanks)	VOC ACP	NJ approved 12/21/2015. EPA approved 10/11/2019.	No
4. Phillips 66 (formerly Conoco Phillips) (formerly Bayway Refining) Union County (PI#41805, PSP130002, external floating roof tanks)	VOC ACP	NJDEP approved 7/12/2016. EPA approved 10/11/2019.	No
5. Buckeye Port Reading Terminal (formerly Amerada Hess) Middlesex County, and Buckeye Pennsauken Terminal Camden County (PI#17996, PSP130001, external floating roof tanks)	VOC ACP	NJ approved 08/21/2014. EPA approved 10/11/2019.	No

[178] An FSEL has no expiration date and remains in place unless source becomes subject to a new RACT rule.
[179] Any AEL or ACP approved by the Department after May 19, 2009, has a term of 10 years.
[180] http://www.nj.gov/dep/baqp/sip/8-hrRACT-Final.pdf

Table 11-4 (continued): Status of NO_x and VOC Source-Specific RACT Determinations

Source	Type of Emissions Limits	Approval Status	Does NJ anticipate submitting SIP revision?
6. CMC Steel NJ (Formerly Gerdau Ameristeel Corp of Sayreville) Middlesex County (PI#18052, PSP140001, electric arc furnace and billet reheat furnace) BOP150002	VOC FSEL NO_x FSEL	VOC FSEL NJDEP approved 4/30/2019. Submitted to EPA 6/6/2019. EPA approved 2/17/2021. NOx FSEL NJDEP approved 3/27/2018 EPA approved 5/30/2019 (c)	No
7. Vicinity Energy/Veolia (formerly Trigen-Trenton Energy) Mercer County (PI#61015, BOP040002, internal combustion engines).	NO_x AEL	NJ approved 01/11/2007 EPA approved 7/16/2008.	No (b)
8. Gold Bond Building Products (Formerly NGC Industries and GP Gypsum) Burlington County (PI#45980, PSP120001, board dryer)	NO_x FSEL	Approved on 8/15/2012	Under Review (a)
9. Georgia Pacific Gypsum Camden County (PI#51611, BOP140001, board dryer)	NO_x FSEL	Withdrawn (c)	No
10. Anheuser-Busch Essex County (PI#07551, PSP090001, can fillers)	VOC FSEL	Resubmittal under review by NJDEP	Yes
11. Naval Weapons Station Earle Monmouth County (PI#21138, PSP090002, two diesel engines)	NO_x AEL	NJ approved 11.3 Grams/BHP-Hr on 05/21/2009 EPA approved 11/14/2011	Under Review
12. Joint Base McGuire Dix Lakehurst Ocean County (PI#78897, PSP130001, boilers #2 & #3) BOP 150001	NO_x AEL	NJDEP approved 8/26/2016. EPA approved 8/10/2017	Under Review
13. Transcontinental Gas Pipelines Corp. LNG Station 240 Bergen County (PI#02626, BOP090001, four natural gas- fired water bath heaters)	NO_x AEL	NJ approved 07/10/2014 EPA approved 8/10/2017	Under Review

Notes:
NJDEP is reviewing if the source is altered, modified or reconstructed. Any FSEL approved by NJDEP after May 19, 2009 shall not have an expiration date pursuant to N.J.A.C. 7:27-19.13(b)1. However, N.J.A.C. 7:27-19.13(b)6 states that the FSEL shall be terminated upon start-up of the modified, altered or reconstructed source operation or item of equipment.
NJDEP does not anticipate submitting SIP revision. The Operation is limited to 200 hour per year during startup, shutdown injector cleanout and major component breaking. No additional reduction can be achieved.

Georgia Pacific (PI#51611, BOP140001, board dryer) FSEL has been withdrawn.

The facilities listed in Table 11-4 no longer require an AEL, ACP or a FSEL due to, plant closings, equipment shutdown, equipment replacement, or affected equipment now operating in compliance with adopted RACT limits.

Table 11-5: List of Terminated Source-Specific Limits and Control Plans

	Plant PI #	**Facility (Name)**	**Location (County)**
1.	26239	Algonquin Gas Transmission Hanover	Morris
2.	12202	PSEG Hudson	Hudson
3.	26187	Texas Eastern Hanover	Union
4.	45954	Griffin Pipe Co	Burlington
5.	45904	Hoeganaes Corp	Burlington
6.	55793	Gloucester County Resource Recovery Facility	Camden
7.	85455	Warren County Resource Recovery Facility	Warren
8.	51614	Camden County Resource Recovery Facility	Camden
9.	07736	Essex County Resource Recovery Facility	Essex
10.	41814	Union County Resource Recovery Facility	Union
11.	17767	PQ Corporation	Middlesex
12.	26173	Novartis Pharmaceuticals	Morris
13.	61036	Stony Brook Regional Sewerage Treatment Authority	Mercer
14.	65491	Dupont	Salem
15.	26209	Parsippany-Troy Hills Sewage Treatment Plant	Morris
16.	35884	3M	Somerset
17.	73242	RC Cape May (BL England)	Cape May
18.	18048	Air Products & Chemicals	Gloucester
19.	41708	Schering	Union
20.	65498	US Generating Co, Carneys Point	Salem
21.	55834	US Generating Co, Logan	Gloucester
22.	45968	US Pipe & Foundry	Burlington
23.	35857	Somerset Raritan Valley Sewerage Authority	Somerset
24.	65495	Conectiv Atlantic Generation, Deepwater Station	Salem
25.	30436	Twp. of Wayne, Mountain View Water Pollution Control Facility	Passaic
26.	65530	Oxyvinyls LP (formerly Geon Co.)	Salem
27.	18005	Amerada Hess Corp	Middlesex
28.	55781	Sunoco Eagle Point (formerly Coastal Eagle Point Oil)	Gloucester
29.	18045	Gerdau Ameristeel Corp Perth Amboy (formerly Co-Steel Raritan Corp) – terminated on August 17, 2009 by rule	Middlesex
30.	60976	Homasote Company	Mercer
31.	07906	Lafarge Gypsum (formerly Continental Gypsum) Port Newark	Essex
32.	80337	Texas Eastern Lambertville	Hunterdon
33.	07726	University of Medicine and Dentistry of New Jersey	Essex
34	41722	Linden Compressor Station	Union
35	18058	Buckeye Perth Amboy Terminal	Middlesex

11.2.5 Regional Reasonably Available Control Technology Principles

On June 11, 2014, the Ozone Transport Commission adopted a Statement of Reasonably Available Control Technology Principles. The Principles can be found in Appendix 11-1. The Statement calls for:

1. Existing requirements in states provide a benchmark for other states to use to define RACT;
2. Sources with air pollution controls must operate the controls year-round and minimize daily emissions during the ozone season;
3. For power plants, compliance with the USEPA Clean Air Interstate Rule is not a substitute for RACT, and peaking units need to be assessed; and
4. The averaging time for the RACT emission limits should be as short as practicable and consistent with the ozone standard and operation of the source.

The existing New Jersey RACT rules at that time were considered in the development of these principles and the sources in New Jersey meet these principles.

The Ozone Transport Commission is a multi-state organization established by the Clean Air Act to address the transport of ozone in the Mid-Atlantic–Northeast region of the United States. All states in the Ozone Transport Region must include RACT in its rules.

11.2.6 New Jersey RACT Conclusions

As summarized in Table 11-2, all New Jersey source categories continue to meet the necessary RACT requirements.

11.2.7 USEPA Responsibilities

New Jersey does not yet meet the federal ozone NAAQS. Therefore, the federal Clean Air Act requires new sources of NO_x (e.g., power plants) and VOCs (e.g., gasoline refineries) to offset their NO_x and VOC emissions by buying emissions "credits" that are sold by other facilities. Emissions offset credits can be costly and time-consuming to obtain, which is an added burden on new businesses or existing businesses that want to expand. Some upwind neighbors contribute significantly to New Jersey's ozone problem, but they do not have to comply with the "offset" requirements that sources in New Jersey do if those states meet the ozone standard. Thus, a company that wants to build a facility in the Northeast might find states upwind of New Jersey more economically attractive.

In addition, EPA's final rule "Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements" allows "area wide average emission rates" for NOx RACT SIP submission. Under this provision, the states are not required to demonstrate RACT-level controls on a source-by-source basis (83 FR 63007, December 6, 2018)).

New Jersey recognizes USEPA's recent April 30, 2021[181] Revised CSAPR Update final rule to address ozone transport from upwind states for the 75 ppb ozone NAAQS. This rule requires the optimization of existing controls on power plants by limiting the allowable emissions of NOx over the ozone season for states in Group 3. While this is a step in the right direction, it is not as stringent as New Jersey's current rules that control NOx emissions based on a daily average. USEPA should promulgate an interstate transport rule for the 2015 70 ppb ozone standard similar to the level of stringency in New Jersey and in a timely basis to achieve reductions before the attainment deadline associated with downwind nonattainment areas.

[181] 86 Fed. Reg. 23054 (April 30, 2021)

New Jersey is meeting its responsibilities by working with other states and the federal government to remedy these RACT inconsistencies among states and to ensure that all states do their part to reduce ozone levels throughout the Northeast; USEPA needs to do its part.

To establish a level playing field among states in the region, USEPA must ensure that more stringent RACT emission limits already adopted by regulation and achieved in practice in downwind states, including New Jersey, are presumptive RACT for all states. USEPA's December 6, 2018 70 ppb Ozone Implementation Rule (83 FR 63007, December 6, 2018) retained existing RACT requirements that sources without modern air pollution control could not rely on a previous RACT determination and would need a thorough RACT evaluation with the presumption that modern controls that other states have already required would be RACT for the 70 ppb NAAQS. As a condition of approval, USEPA should ensure that up-to-date RACT is required for all SIPs in all states in the ozone transport region (OTR), and all states significantly affecting a nonattainment area.

In its ongoing evaluation of new measures to reduce ozone transport, USEPA should require the following:

1. Sources with air pollution controls must operate the controls year-round and minimize daily emissions during the ozone season;
2. For power plants, the Revised CSAPR Update (RCU) rule is not as stringent as current RACT standards in New Jersey and other states within the Ozone Transport Region. The RCU rule limits for emissions of NO_x from electric generating units, including peaking units, are averaged over the ozone season or the facilities can purchase allocations to comply with the rule ; and
3. The averaging time for the RACT emission limits should be as short as practicable and consistent with the ozone standard and operation of the source. The averaging time is critical in evaluating the emission limits. Most states in the ozone transport region (OTR) determine compliance with NOx RACT emission limits on a calendar-day basis in recognition of the persistent ozone nonattainment issues in the OTR. However, certain states provide longer averaging time (e.g., 30-day rolling in Pennsylvania) which is unreasonable and lenient to be protective of an 8-hour average ozone standard. New Jersey's RACT rule N.J.A.C. 7:27-19.15(a) (available at https://www.nj.gov/dep/aqm/currentrules/Sub19.pdf) requires compliance with the limit over each calendar day during ozone season.