NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Office of Climate Air & Energy
625 Broadway, 14th Floor, Albany, New York 12233-1010
P: (518) 402-2794 | F: (518) 402-9016
www.dec.ny.gov

MAY 08 2020

Mr. Peter D. Lopez
Regional Administrator
United States Environmental Protection Agency
Region 2
290 Broadway
New York, New York 10007-1866

Dear Mr. Lopez:

The New York State Department of Environmental Conservation (DEC) is hereby submitting for approval by the United States Environmental Protection Agency (EPA) a revision to the New York State Implementation Plan (SIP) entitled "New York State Implementation Plan Revision for Regional Haze; Second Implementation Period."

This SIP revision has been developed pursuant to 40 CFR Section 51.308 to meet the requirements of the EPA's Regional Haze rules as mandated by the Clean Air Act. This SIP revision addresses all of the elements required by 40 CFR Section 51.308, including the establishment of reasonable progress goals and the long-term strategy. In addition, this SIP revision addresses regional planning and State and Federal Land Manager coordination, and contains a commitment to provide future plan revisions and adequacy determinations as necessary.

As required pursuant to 40 CFR Section 51.308(i) regarding coordination between States, Tribes and the Federal Land Managers, a draft of the proposed SIP revision was provided to the Federal Land Managers at the National Park Service, the U.S. Forest Service and the U.S. Fish and Wildlife Service for review and comment prior to holding any public hearing.

This document has undergone the required public review process in which the opportunity for public comment was held. The following documents are enclosed:

1. Copies of the Public Notices published in Environmental Notice Bulletin on August 7, 2019 and September 4, 2019 for the start and extension of the public comment period, respectively;
2. Response to Public Comments; and,
3. New York's Final Implementation Plan for Regional Haze: Second Implementation Period

Should you have any questions regarding this submission, please do not hesitate to contact Mr. Steven Flint, Director of DEC's Division of Air Resources at (518) 402-8452.

Sincerely,

J. Jared Snyder
Deputy Commissioner
Office of Climate, Air & Energy

Enclosures

c: S. Flint
C. LaLone
M. Sheehan
R. Ruvo, EPA Region 2

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

ENB - Statewide Notices 8/7/2019

Notice of Complete Application

Applicant:

New York State Department of Environmental Conservation (NYS DEC)

Project Description:

NYS DEC proposes to issue General Permit GP-0-19-002 (Utility Rights of Way (ROW) Vegetation Management) to authorize vegetation management of existing utility ROWs located within state regulated freshwater wetlands, regulated adjacent areas, and tidal wetlands, for the purposes of maintaining integrity of service, reliability and safety of electrical and natural gas systems.

The GP will authorize electric and gas utility companies to manage vegetation by selective pruning, mowing and cutting and the application of registered pesticides. Pesticide use will be limited to low volume foliar spray from a backpack sprayer, cut stem and/or stump treatment. Large scale use of pesticides is not authorized by this GP.

Applicable Permits:

Article 24 Freshwater Wetlands; Article 25, Tidal Wetlands and Section 401 Water Quality Certification.

Project Location:

Statewide

State Environmental Quality Review:

Project is a Type I action and will not have a significant effect on the environment. A Negative Declaration is on file.

SEQR Lead Agency: NYS DEC

Opportunity for Public Comment:

The draft General Permit is available on NYS DEC's website at: http://www.dec.ny.gov/permits/6061.html. **Comments on this GP must be submitted in writing to: Michael Higgins, NYS DEC - Division of Environmental Permits, 625 Broadway, Albany, NY 12233-1750, or at: depprmt@dec.ny.gov no later than Friday, September 6, 2019, or 30 days after the publication date of this notice, whichever is later.**

Contact: Kristen Cady-Poulin, NYS DEC - Division of Environmental Permits, 625 Broadway, Albany, NY 12233-1750, E-mail: depprmt@dec.ny.gov

Public Notice

New York State Implementation Plan Revision for Regional Haze: Second Implementation Period

Notice is hereby given that the New York State Department of Environmental Conservation (NYS DEC) plans to submit a Regional Haze State Implementation Plan (SIP) revision to the United State Environmental Protection Agency (US EPA). This revision evaluates progress made in implementing the measures included in New York's Regional Haze SIP that was approved by US EPA in a final rule dated August 28, 2012 (77 Federal Register 51915) and discusses additional measures that will be implemented by 2028.

Regional haze is caused by air pollutant emissions from numerous sources over a broad area, and it obscures vistas integral to the value of our parks and wilderness areas. The predominant causes of haze pollution in the Mid-Atlantic/Northeast region are sulfate and nitrate particles. The Clean Air Act (CAA) mandates actions to protect visibility, especially in Class I Federal areas. In 1999, US EPA finalized the Regional Haze Rule (64 FR 35714, 40 CFR 51.300 et seq.). The federal rule calls for state, tribal, and federal agencies to work together to improve visibility in 156 national parks and wilderness areas designated as Class I Federal areas. US EPA amended the Regional Haze Rule on December 14, 2016 (effective January 10, 2017, 82 FR 3078). The revisions streamline, strengthen, and clarify aspects of US EPA's Regional Haze Program.

States are required to develop and implement comprehensive SIP revisions every ten years to continue to reduce the pollution that causes visibility impairment. These revisions establish reasonable progress goals for visibility improvement and include strategies to reduce air pollutant emissions from sources contributing to visibility impairment.

As a member of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) regional planning organization, New York State is committing to implement MANE-VU's long term strategy to improve visibility. The MANE-VU strategy for 2028 includes: running existing controls on EGUs with a capacity of 25MW or greater, performing four-factor analyses on sources within MANE-VU with the potential to contribute 3.0 inverse megameters of visibility impairment or greater at any MANE-VU Class I Area, controlling NO_X from peaking combustion turbines, and implementing energy efficiency and combined heat and power when reasonable.

Pursuant to 40 CFR 51.308(i)(2), New York provided each affected Federal Land Manager (FLM) with an opportunity for consultation and to comment on the proposed SIP revision via correspondence dated February 22, 2019. Pursuant to 40 CFR 51.308(a)(2)(ii), the public can inspect a copy of comments received by affected FLMs in Appendix A of the SIP revision.

NYS DEC is now providing a 30 day period for the public to comment on the proposed revision to the Regional Haze SIP or to request a hearing. The public can inspect a copy of the proposed SIP revision by visiting the NYS DEC website at: http://www.dec.ny.gov/chemical/8403.html. **Written comments or request for public hearing should be submitted by 5:00 PM on September 6, 2019 to:** Amanda Chudow, NYS DEC - Division of Air Resources, 625 Broadway, 11th Floor, Albany, NY 12233-3251, or by e-mail to: dar.sips@dec.ny.gov

Amanda Chudow can be reached at: (518) 402-8396 with any questions regarding the proposed SIP revision.

Contact: Amanda Chudow, NYS DEC - Division of Air Resources, 625 Broadway, 11th Floor, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: dar.sips@dec.ny.gov

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Data Solicitation for 2020 CWA Section 303(d) List

Section 303(d) of the Federal Clean Water Act (CWA) requires States to compile every two years, a list of impaired waters that do not meet water quality standards, where designated uses are not fully supported and where a Total Maximum Daily Load (TMDL) plan is necessary to address the impairment. States are scheduled to submit their next Section 303(d) List to the United State Environmental Protection Agency (US EPA) by April 1, 2020. To support the development of the Section 303(d) Lists, States are required to assemble and consider existing, readily available water quality related data and information. New York State is currently soliciting and accepting water quality data and information that may be useful in compiling the 2020 Section 303(d) List.

Background: Water quality assessment of New York State's waters is a continuous process. Participation and input from a wide range of state, federal and local agencies and non-governmental water quality partners (watershed groups, lake associations, academic researchers, etc.) is encouraged.

Every two years, corresponding to the development of the State's Section 303(d) List, the public is solicited to provide water quality data and information for any waterbody or basin. This allows for a more comprehensive updating of the List. Solicited data and information may result in changes to the List or may be incorporated into water quality assessments.

In order to be included for consideration in the compiling of the 2020 CWA Section 303(d) List, data and information must be received by September 27, 2019.

Data submissions should be accompanied by a completed Waterbody Inventory/Priority Waterbodies List (WI/PWL) Assessment Worksheet, which may be found at: http://www.dec.ny.gov/chemical/36730.html. This worksheet allows for the capture of water quality information based on available data or on general observation of conditions and/or local knowledge of designated use support/non-support of a waterbody absent specific, numeric monitoring data.

Worksheet information can also be obtained by contacting: Sarah Rickard, NYS DEC - Division of Water, Bureau of Watershed Assessment and Management, 625 Broadway, 4th Floor, Albany, NY 12233-3502, Phone: (518) 402-8179. Completed WI/PWL worksheets, supporting water quality monitoring data, corresponding Quality Assurance/Quality Control (QA/QC) documentation, QA/QC results summary and a description of measures used in the collection of data should sent to the address above, or forwarded via e-mail to: 4pwlinfo@dec.ny.gov.

Guidance regarding the use of water quality data and information to conduct assessments and make listing decisions is outlined in the New York State Consolidated Assessment and Listing Methodology. Additional information regarding Section 303(d) List development can be found on the NYS DEC website at: http://www.dec.ny.gov/chemical/31290.html.

For questions regarding the information in this notice please contact: Sarah Rickard, NYS DEC - Division of Water, 625 Broadway, Albany, NY 12233, Phone: (518) 402-8179, E-mail: 4pwlinfo@dec.ny.gov.

Negative Declaration

Statewide - The New York State Department of Environmental Conservation (NYS DEC), as lead agency, has determined that the proposed Issuance of a General Permit for Vegetation Management in Regulated Freshwater Wetlands and Adjacent Areas in Existing Electric and Gas Utility Rights-of-Ways will not have a significant adverse environmental impact. The action involves the vegetation management within regulated Freshwater wetlands and 100 foot regulated adjacent areas of existing utility Rights-of-Ways (ROW). The management will include pruning, trimming, mowing, cutting and other approved methods of removal of trees and vegetation and the application of registered pesticides and approved surfactants to maintain integrity of service, reliability and safety of electric and gas systems. Utility ROWs including bulk transmission and distribution lines for electric (wire, border zones, and danger tree rights) and natural gas are included in this authorization. The project is located throughout New York State.

Contact: Kristen Cady-Poulin, NYS DEC - Division of Environmental Permits, 625 Broadway, Albany, NY 12233-1750, E-mail: depprmt@dec.ny.gov

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ENB - Statewide Notices 9/4/2019

Public Notice

Notice of Proposed Rulemaking
6 NYCRR Part 218, Emission Standards for Motor Vehicles and Motor Vehicle Engines

Pursuant to Sections 1-0101, 1-0303, 3-0301, 19-0103, 19-0105, 19-0107, 19-0301, 19-0303, 19-0305, 19-1101, 19-1103, 19-1105, 71-2103, 71-2105 of the Environmental Conservation Law (ECL) and Section 177 of the federal Clean Air Act (42 USC 7507), the New York State Department of Environmental Conservation (NYS DEC) hereby gives notice of the following:

NYS DEC is proposing to amend Part 218 to incorporate revisions to the standards for new California certified aftermarket catalytic converters (AMCCs). The proposed amendments prohibit the sale and installation of federal AMCC in New York State absent a waiver from NYS DEC. The proposed amendments also include provisions pertaining to AMCC installation requirements; AMCC installer recordkeeping requirements; recordkeeping requirements for AMCC manufacturers, distributors, wholesalers, and retailers; and clarification of AMCC manufacturer reporting requirements. Further, the NYS DEC proposes to submit the Part 218 as well as the revisions to Part 200 to the United States Environmental Protection Agency (US EPA) as a revision to the State Implementation Plan (SIP) for New York State.

Documents pertaining to this proposed rulemaking can be found on NYS DEC's website at: http://www.dec.ny.gov/regulations/propregulations.html#public.

Written comments on the proposed rule may be submitted until 5:00 p.m. on November 13, 2019.

For further information, contact:
Jeff Marshall
NYS DEC - Division of Air Resources
625 Broadway
Albany, NY 12233-3250
Phone: (518) 402-8292
E-mail: air.regs@dec.ny.gov

Requests for information and comments related to the SIP revision may be obtained from: Robert D. Bielawa, NYS DEC - Division of Air Resources, 625 Broadway, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: air.regs@dec.ny.gov

Written statements may be submitted until 5:00 p.m. on November 13, 2019.

Hearings for the proposed rule and attendant revisions to existing rules described above will be held as follows and are scheduled in places that are reasonably accessible to persons with impaired mobility:

Date: November 8, 2019
Time: 11:00 a.m.
Location: NYSDEC
625 Broadway, Public Assembly Room 129A/B
Albany, NY 12233

NYS DEC will provide interpreter services for deaf persons at no charge. Written requests for interpreter services are required and should be submitted by 5:00 p.m. November 1, 2019, to Richard McAuley, NYS DEC, 625 Broadway, Albany NY 12233-3250, Phone: (518) 402-8438, E-mail: air.regs@dec.ny.gov

Notice of Proposed Rulemaking
6 NYCRR Subpart 225-2, Fuel Composition and Use - Waste Oil as a Fuel
6 NYCRR Part 200, General Provisions

Pursuant to Sections 1-0101, 3-0301, 19-0103, 19-0105, 19-0301, 19-0303, 19-0305, 19-0311, 71-2103, and 71-2105.of the Environmental Conservation Law (ECL), the New York State Department of Environmental Conservation (NYS DEC) hereby gives notice of the following:

NYS DEC proposes to repeal Existing 6 NYCRR Part 225-2 Fuel Composition and Use - Waste Fuel (Existing Subpart 225-2) and replace it with Proposed 6 NYCRR Subpart 225-2, Fuel Composition and Use - Waste Oils (Proposed Subpart 225-2). Proposed Subpart 225-2 will regulate the burning of waste oils in combustion, incineration, and process sources throughout New York State and establishes applicability criteria, composition limits, and permitting requirements for liquid and semi-liquid waste oils; establishes monitoring, recordkeeping, and reporting requirements for facilities that are determined eligible to burn waste oil; and allows for the burning of waste oils in space heaters at automotive maintenance/service facilities. NYS DEC is adding the definition for "residual oil" to 6 NYCRR Part 200 (Part 200).

Proposed Subpart 225-2 will be included as a component of the State Implementation Plan (SIP) for New York State (NYS), as required by the Clean Air Act.

Documents pertaining to this proposed rulemaking can be found on NYS DEC's website at: http://www.dec.ny.gov/regulations/propregulations.html#public.

Written comments on the proposed rule may be submitted until 5:00 p.m. November 13, 2019.

For further information, contact:
Mike Jennings
NYS DEC - Division of Air Resources
625 Broadway
Albany, NY 12233-3250
Phone: (518) 402-8403
E-mail: air.regs@dec.ny.gov

Requests for information and comments related to the SIP revision may be obtained from Robert D. Bielawa, NYS DEC - Division of Air Resources, 625 Broadway, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: air.regs@dec.ny.gov

Written statements may be submitted until 5:00 p.m. November 13, 2019.

Hearings for the proposed rule and attendant revisions to existing rules described above will be held as follows and are scheduled in places that are reasonably accessible to persons with impaired mobility:

Date: November 8, 2019
Time: 11:00 a.m.
Location: NYSDEC
625 Broadway, Public Assembly Room 129A/B
Albany, NY 12233

NYS DEC will provide interpreter services for deaf persons at no charge. Written requests for interpreter services are required and should be submitted by, 5:00 p.m., November 1, 2019 to Richard McAuley, NYS DEC, 625 Broadway, Albany, NY 12233-3250, Phone: (518) 402-8438, E-mail: air.regs@dec.ny.gov.

Notice of Proposed Rulemaking
6 NYCRR Part 200, General Provisions
6 NYCRR Part 227-1 Stationary Combustion Installations

Pursuant to Sections 1-0101, 3-0301, 3-0303, 19-0103, 19-0105, 19-0107, 19-0301, 19-0302, 19-0303, 19-0305, 19-0311, 71-2103, and 71-2105 of the Environmental Conservation Law (ECL), the New York State Department of Environmental Conservation (NYS DEC) hereby gives notice of the following:

The New York State Department of Environmental Conservation (NYS DEC) is proposing to repeal and replace 6 NYCRR Subpart 227-1, "Stationary Combustion Installations" as well as attendant provisions under Part 200, "General Provisions" (collectively, Subpart 227-1). NYS DEC is revising Subpart 227-1 to lower PM emission limits for existing and new stationary combustion installations that either predate, or are not subject to, a federal new source performance standard (NSPS) and/or national emissions standard for hazardous air pollutants (NESHAP). These revisions will also correct minor typographical errors and update the regulation to incorporate changes to the air permitting regulations that have occurred over the past twenty years. In addition, NYS DEC is revising Part 200 to incorporate by reference the applicable federal rule provisions. As required by the Clean Air Act (CAA), NYS DEC will incorporate the revisions to Subpart 227-1 and the attendant revisions to Part 200 into New York's State Implementation Plan (SIP) and provide the revised SIP to United States Environmental Protection Agency (US EPA) for review and approval. The SIP is directed at maintaining the PM national ambient air quality standard (NAAQS) and fulfilling NYS DEC's obligations under the regional haze SIP submitted to the US EPA on March 15, 2010.

Documents pertaining to this proposed rulemaking can be found on the NYS DEC's website at: http://www.dec.ny.gov/regulations/propregulations.html#public.

Written comments on the proposed rule may be submitted until 5:00 p.m. November 13, 2019.

For further information, contact:
Mike Jennings
NYS DEC - Division of Air Resources
625 Broadway
Albany, NY 12233-3254
Phone (518) 402-8403
E-mail: air.regs@dec.ny.gov

Requests for information and comments related to the SIP revision may be obtained from Robert D. Bielawa, NYS DEC - Division of Air Resources, 625 Broadway, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: air.regs@dec.ny.gov

Written statements may be submitted until 5:00 p.m. November 13, 2019.

Hearings for the proposed rule and attendant revisions to existing rules described above will be held as follows and are scheduled in places that are reasonably accessible to persons with impaired mobility:

Date: November 8, 2019
Time: 11:00 a.m.
Location: NYS DEC
625 Broadway, Public Assembly Room 129A/B
Albany, NY 12233

NYS DEC will provide interpreter services for deaf persons at no charge. Written requests for interpreter services are required and should be submitted by 5:00 p.m. November 1, 2019 to Richard McAuley, NYS DEC, 625 Broadway, Albany NY 12233-3250, (518) 402-8438, air.regs@dec.ny.gov

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Notice of Proposed Rulemaking
6 NYCRR Part 200, "General Provisions"
6 NYCRR Part 222, "Distributed Generation Sources"

Pursuant to Sections 1-0101, 3-0301, 19-0103, 19-0105, 19-0107, 19-0301, 19-0302, 19-0303, 19-0305, 19-0311, 71-2103, and 71-2105 of the Environmental Conservation Law (ECL), the New York State Department of Environmental Conservation (NYS DEC) hereby gives notice of the following:

NYS DEC adopted 6 NYCRR Part 222, "Distributed Generation Sources," on November 1, 2016. That rule took effect on December 1, 2016. On March 1, 2017, an Article 78 Petition was filed challenging various aspects of Part 222. On July 26, 2017, a Stipulation and Order was issued whereby NYS DEC agreed to stay the adopted rule and propose a new rule pursuant to the State Administrative Procedure Act to replace the adopted rule. The purpose of this rule making is to promulgate a new Part 222.

Distributed generation (DG) sources are engines used by host sites to supply electricity outside that supplied by distribution utilities. This on-site generation of electricity by DG sources is used by a wide-range of commercial, institutional and industrial facilities. DG applications range from supplying electricity during blackouts to all of a facility's electricity demand year-round.

In the new Part 222, the sources affected by the rule are more narrowly defined than in the adopted rule. The proposed rule will apply only in the New York City metropolitan area as defined at 6 NYCRR Part 200.1(au). DG sources enrolled in demand response programs sponsored by the New York Independent System Operator or transmission utilities as well as sources used during times when the cost of electricity supplied by utilities is high (defined separately in Part 222 as price-responsive generation sources) will be subject to the new rule.

In addition, NYS DEC proposes to submit the new Part 222 as well as the attendant revisions to Part 200 to the United States Environmental Protection Agency (US EPA) as a revision to the State Implementation Plan (SIP) for New York State.

Documents pertaining to this proposed rulemaking can be found on NYS DEC's website at: http://www.dec.ny.gov/regulations/propregulations.html#public.

Written comments on the proposed rule may be submitted until 5:00 p.m. on November 25, 2019.

For further information, contact:
John Barnes
NYS DEC - Division of Air Resources
625 Broadway
Albany, NY 12233-3251
Phone (518) 402-8396
E-mail: air.regs@dec.ny.gov

Requests for information and comments related to the SIP revision may be obtained from Robert D. Bielawa, NYSDEC Division of Air Resources, 625 Broadway, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: air.regs@dec.ny.gov.

Written statements may be submitted until 5:00 pm on November 25, 2019.

Hearings for the proposed rule and attendant revisions to existing rules described above will be held as follows and are scheduled in places that are reasonably accessible to persons with impaired mobility:

Date: November 12, 2019
Time: 11:00 a.m.
Location: NYSDEC
625 Broadway, Public Assembly Room 129A/B
Albany, NY 12233

Date: November 20, 2019
Time: 2:00 p.m.
Location: 1 Hunter's Point Plaza

47-40 21st Street, Room 834 NYSDOT
Long Island City, NY 11101

NYS DEC will provide interpreter services for deaf persons at no charge. Written requests for interpreter services are required and should be submitted by November 6, 2019, to Richard McAuley, NYS DEC, 625 Broadway, Albany NY 12233-3250, (518) 402-8438, air.regs@dec.ny.gov

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Proposed Approval of the Clerane 180 dry cleaning solvent for use in New York State

The New York State Department of Environmental Conservation (NYS DEC) proposes to approve the Clerane 180 solvent for use in alternative solvent dry cleaning machines regulated under 6 NYCRR Part 232, Dry Cleaning Facilities**. Unless the NYS DEC receives significant adverse comments by October 4, 2019,** the Clerane 180 solvent will be approved for use after publication on the NYS DEC website at**:** http://www.dec.ny.gov/chemical/72273.html. Safety Data Sheets (SDSs) for alternative dry cleaning solvents that are proposed for approval, or currently approved for use, are posted on this website. Only approved alternative solvents may be used in alternative solvent dry cleaning machines which operate in New York State after September 6, 2018.

Manufacturers requesting approval of an alternative solvent must submit to the NYS DEC the information specified in 6 NYCRR Part 232-3.8 of the Dry Cleaning Facilities regulation. The NYS DEC will then propose to approve the solvent if it meets the approval criteria stated in the regulation. After approval, should the chemical formulation of the solvent be modified, the re-formulated alternative solvent must be resubmitted and approved by the NYS DEC prior to use in New York State. The NYS DEC will issue all proposed determinations of approval within 90 days of receipt of a complete submission.

The following alternative dry cleaning solvents are currently approved for use in New York State:

- SB-32 Green Earth®: decamethylcyclopentasiloxane (CAS 541-02-6) by General Electric
- DF-2000: aliphatic refined hydrocarbon (CAS 64742-48-9) by ExxonMobil
- EcoSolv®: aliphatic refined hydrocarbon (CAS 68551-17-7) by Chevron Philips
- Rynex 3™: dipropylene glycol tert-butyl ether (CAS 132739-31-2) by Rynex Technologies
- LPA-142: aliphatic refined hydrocarbon (CAS 64742-47-8) by Sasol
- Solvair®: dipropylene glycol n-butyl ether (CAS 29911-28-2) by R.R. Streets
- SolvonK4™: dibutoxymethane (CAS 2568-90-3) by Kreussler
- GEC-5 Green Earth®: decamethylcyclopentasiloxane (CAS 541-02-6) by Shin-Etsu
- DC-142: aliphatic refined hydrocarbon (CAS 64742-88-7) by Essential Solvents
- SenseneTM: aliphatic refined hydrocarbon (CAS 64742-48-9) and modified alcohol mixture by SAFECHEM
- KtexTM: aliphatic refined hydrocarbon (CAS 64742-48-9), propylene glycol monobutyl ether (CAS 5131-66-8), and orange terpenes (CAS 68647-72-3) mixture by R.R. Streets/BARDAHL
- Intense®: aliphatic refined hydrocarbon (CAS 68551-19-9) and propylene glycol ether mixture by Seitz

The HC BoostTM solvent was previously proposed for approval in the Environmental Notice Bulletin on August 14, 2019. Unless the NYS DEC receives significant adverse comments by September 13, 2019 this solvent will be approved for use after publication on the NYS DEC website as noted below:

- HC BoostTM: aliphatic refined hydrocarbon (CAS 64742-48-9) and propylene glycol ether mixture by R.R. Streets

The Clerane 180 solvent is being proposed for approval in this public notice. If approved, it will be listed and published on the NYS DEC website as noted below:

- Clerane 180: aliphatic refined hydrocarbon (CAS 64742-48-9) by R.R. Streets

Comments on the proposed approval of the Clerane 180 alternative dry cleaning solvent should be emailed to: DAR.Web@dec.ny.gov **by October 4, 2019.**

Contact: Thomas Gentile, NYS DEC - Division of Air Resources, 625 Broadway, 9th Floor, Albany, NY 12233-3259, Phone: (518) 402-8402.

Data Solicitation for 2020 CWA Section 303(d) List

Section 303(d) of the Federal Clean Water Act (CWA) requires States to compile every two years, a list of impaired waters that do not meet water quality standards, where designated uses are not fully supported and where a Total Maximum Daily Load (TMDL) plan is necessary to address the impairment. States are scheduled to submit their next Section 303(d) List to the United State Environmental Protection Agency (US EPA) by April 1, 2020. To support the development of the Section 303(d) Lists, States are required to assemble and consider existing, readily available water quality related data and information. New York State is currently soliciting and accepting water quality data and information that may be useful in compiling the 2020 Section 303(d) List.

Background: Water quality assessment of New York State's waters is a continuous process. Participation and input from a wide range of state, federal and local agencies and non-governmental water quality partners (watershed groups, lake associations, academic researchers, etc.) is encouraged.

Every two years, corresponding to the development of the State's Section 303(d) List, the public is solicited to provide water quality data and information for any waterbody or basin. This allows for a more comprehensive updating of the List. Solicited data and information may result in changes to the List or may be incorporated into water quality assessments.

In order to be included for consideration in the compiling of the 2020 CWA Section 303(d) List, data and information must be received by September 27, 2019.

Data submissions should be accompanied by a completed Waterbody Inventory/Priority Waterbodies List (WI/PWL) Assessment Worksheet, which may be found at: http://www.dec.ny.gov/chemical/36730.html. This worksheet allows for the capture of water quality information based on available data or on general observation of conditions and/or local knowledge of designated use support/non-support of a waterbody absent specific, numeric monitoring data.

Worksheet information can also be obtained by contacting: Sarah Rickard, NYS DEC - Division of Water, Bureau of Watershed Assessment and Management, 625 Broadway, 4th Floor, Albany, NY 12233-3502, Phone: (518) 402-8179. Completed WI/PWL worksheets, supporting water quality monitoring data, corresponding Quality Assurance/Quality Control (QA/QC) documentation, QA/QC results summary and a description of measures used in the collection of data should sent to the address above, or forwarded via e-mail to: 4pwlinfo@dec.ny.gov

Guidance regarding the use of water quality data and information to conduct assessments and make listing decisions is outlined in the New York State Consolidated Assessment and Listing Methodology. Additional information regarding Section 303(d) List development can be found on the NYS DEC website at: http://www.dec.ny.gov/chemical/31290.html.

For questions regarding the information in this notice please contact: Sarah Rickard, NYS DEC - Division of Water, 625 Broadway, Albany, NY 12233, Phone: (518) 402-8179, E-mail: 4pwlinfo@dec.ny.gov

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New York State Implementation Plan Revision for Regional Haze: Second Implementation Period - Comment Period Extension

On August 7, 2019 the New York State Department of Environmental Conservation (NYS DEC) published a Public Notice in the Environmental Notice Bulletin (ENB) indicating that the NYS DEC plans to submit a Regional Haze State Implementation Plan (SIP) revision to the United State Environmental Protection Agency that included a public comment period deadline of September 6, 2019. The full notice may be found at: https://www.dec.ny.gov/enb/20190807_not0.html

This Public Notice hereby extends the public comment period on the proposed Regional Haze SIP revision, or to request a hearing, to October 7, 2019. The public can inspect a copy of the proposed SIP revision by visiting the NYS DEC website at: http://www.dec.ny.gov/chemical/8403.html.

Written comments or requests for a public hearing should be submitted by 5:00 p.m. on October 7, 2019 to: Amanda Chudow, NYS DEC - Division of Air Resources, 625 Broadway, 11th Floor, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: dar.sips@dec.ny.gov.

Contact: Amanda Chudow, NYS DEC - Division of Air Resources, 625 Broadway, 11th Floor, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: dar.sips@dec.ny.gov.

Response to Public Comments

Comments Received from August 7, 2019 to October 7, 2019

1. Comment: The 2064/65-year date is an analytical benchmark, as opposed to a goal. The objective of the RHR is to establish a regulatory framework for states to address regional haze with the goal of remedying existing and preventing future visibility impairment in mandatory Class I areas. [U.S. Environmental Protection Agency, Region 2 (EPA R2)]

   Response: The SIP has been revised to remove references to 2064 being a goal.

2. Comment: On page 9-1, second paragraph, the state appears to describe the requirements contained in 51.308(f)(3)(ii)(A). Please note that this requirement only applies to states containing Class I areas. The section applicable to states without Class I areas is 51.308(f)(3)(ii)(B), and EPA further notes that that this demonstration is only required in situations where the state containing the Class I area has established a reasonable progress goal providing for a slower rate of improvement in visibility than the URP (i.e., RPG above the glidepath). [EPA R2]

   Response: The reference and discussion in the SIP has been changed to 51.308(f)(3)(ii)(B).

3. Comment: On page 9-12, re: the MANE-VU Ask of upwind states, the following statement appears: "These measures and other measures identified were evaluated prior to and during the consultation process and the above course of action was determined to be reasonable. Assumptions about the implementation of these measures are represented by the inventory and modeling assumptions described in this section. This long-term strategy to reduce and prevent regional haze will allow each state up to 10 years to pursue adoption and implementation of reasonable and cost-effective NO_X and SO_2 control measures as appropriate and necessary." Does this statement indicate that the upwind states were consulted about these measures and that the upwind states determined them to be reasonable? If not, at a minimum, additional modeling or calculations should be performed to determine visibility outcomes with upwind state activities that have not been agreed to removed. See 51.308(f)(2)(ii) and 51.308(f)(3)(i). [EPA R2]

   Response: Yes, the statement indicates that the upwind states were consulted, but the upwind states outside of MANE-VU are on a delayed schedule and have not made their final commitments to the measures. The technical work done to develop the Ask determined that the measures were reasonable to the MANE-VU states, but the states outside of MANE-VU must still evaluate if they believe the measures are reasonable for their states. Even without the modeled measures, all of the Class I areas that New York contributes to are below the glidepath for 2028 at current conditions based on visibility on the 20% most impaired days from 2013-2017.

4. Comment: Page 9-19: See above comment re: removing unagreed to measures from the modeling. [EPA R2]

Response: The modeling determined the reasonableness of the Ask. It is the upwind states' obligation to determine if the measures are reasonable. The Class I states within MANE-VU tried to resolve any disagreement about reasonableness of the Ask during the consultation period.

5. Comment: On page 10-39, Table 10-6 contains information re: four factor analysis of several different source types, but is informational only in nature and the subsequent sections do not appear to include a discussion of how the four statutory factors were weighed in order to determine whether the measures were necessary for reasonable progress. Please include such a discussion and analysis. See 51.308(f)(2)(i). [EPA R2]

   Response: These were the criteria used to perform the four factor analyses performed for Finch Paper and Lafarge Building Materials to determine the reasonability of controls installed. The language was revised to clarify the four-factor analysis that was applied to the applicable facilities.

6. Comment: On page 10-42, there is a discussion of a proposed rule that would limit emissions from peaking combustion turbines in New York State. In light of 51.308(f)(2)'s requirement that a state's long-term strategy "must include the enforceable emissions limitations, compliance schedules, and other measures that are necessary to make reasonable progress," along with the fact that the public comment period on this proposed rule does not close until October 7, please explain how a final rule resulting from this proposal will become a part of New York's long-term strategy, if that is indeed the state's intention. [EPA R2]

   Response: The regulation has been adopted, effective January 16, 2020. DEC will submit the regulation as a separate SIP revision.

7. Comment: New York must require additional pollution controls for any source that is contributing to regional haze pollution. Revisit this assessment and issue requirements that will result in less pollution. [National Parks Conservation Association (NPCA)]

   Response: The Regional Haze Rule grants Class I states the responsibility to determine what pollution control measures will be adopted within Class I states and in contributing states. The MANE-VU States worked together to determine what controls were reasonable and these controls were what became the Ask from the Class I States. New York is complying with the Ask and implementing these measures to reduce pollution to an extent that will satisfy the state's obligations under the Regional Haze Rule.

8. Comment: New York must make requirements enforceable through the plan to limit pollution, fuel switch or retire Cayuga Operating Company Unit 2 and Somerset (Kintigh) coal-fired power plants by 2020. [NPCA]

   Response: The adoption of Part 251 created enforceable conditions that would then reside in each facility's permit. Since Cayuga Operating Company and Somerset are no longer operating, no further actions are required.

9. Comment: We understand that Cayuga is no longer operating and Cayuga Unit 2 per its Title V permit is enforceably shut down barring repowering or installation of an SCR. Under New York's coal CO2 regulation, even if the facility were to come out of mothball status, it cannot burn coal post-2020. However, these requirements are not specified in the state's haze plan. NYSDEC must specify how Part 251 would require Cayuga Unit 2 to shut down or repower with natural gas, and indicate that if repowered with natural gas, the EGU would be required to be subject to a BACT/LAER determination. Thus, NYSDEC's explanation of why it ignored an emission control analysis for this source is inadequate. [NPCA]

   Response: Facility requirements are addressed through a facility's permit, which may or may not be required to be submitted to EPA as a single source SIP revision. Furthermore, New York's rules and regulations are enforceable without being part of the SIP, including Part 251 which has been adopted. Note that SIP section 10.4.16 has been updated to indicate the revisions to Part 251 were finalized, and that Cayuga has ceased operations.

10. Comment: We understand that Somerset (Kintigh) is likewise subject to the coal SO_2 regulations and that NYSDEC made a similar claim for the Somerset EGU regarding Part 251, but again, NYSDEC failed to explain how Part 251 would require such actions and, if the unit is converted to natural gas, whether the EGU would be subject to a BACT/LAER determination. [NPCA]

    Response: SIP section 10.4.13 has been updated to include the revisions to Part 251 were finalized and the closure of Somerset.

11. Comment: New York must conduct a more thorough evaluation and a four-factor reasonable progress analysis as necessary for the following coal plants: E.F. Barrett, East River, Northport and Ravenswood as suggested by the National Park Service. These facilities were specifically identified as being of concern by the federal land managers and merit a careful analysis and likely emission reducing requirements. [NPCA]

    Response: All of these facilities were below the threshold for performing a four-factor analysis established by the Class I States, they are also not coal-fired power plants. In developing this SIP, New York reviewed the controls on these facilities and notes that the review of their Reasonably Available Control Technology (RACT) compliance plans will be completed per their respective permitting schedules.

12. Comment: We believe that E.F. Barrett, East River, Northport, and Ravenswood EGUs are all covered by New York's NO_X peaker regulations, however this is not clearly specified in the state's haze plan. [NPCA]

    Response: All, simple cycle and regenerative combustion turbines, including those at E.F. Barrett, East River, Northport, and Ravenswood, are subject to the requirements of New York's NO_X peaker regulation, Subpart 227-3, "Ozone Season Oxides of Nitrogen (NO_X) Emission Limits for Simple Cycle and Regenerative Combustion Turbines." DEC's recent adoption of Subpart 227-3 will be submitted to EPA as a separate SIP revision.

13. Comment: NYSDEC summarized the pollution controls employed at East River Units 1 and 2 (which include SCR) but ignored the fact that (according to data in EPA's Air Markets Program Database) East River Units 60 and 70 have no NO_X controls. [NPCA]

    Response: Units 60 and 70 do not have emission controls, but they do comply with DEC's RACT regulation because of fuel-switching during the ozone season. The units burn low sulfur fuel oil and at least 90% natural gas during the ozone season.

14. Comment: NYSDEC made similar claims that the Ravenswood plant was equipped with SCR, but Units 10 and UCC001 are not equipped with SCR according to EPA's Air Markets Program Database. [NPCA]

    Response: The commenter is correct about Unit 10, according to a recent review of the permit, UCC001 is equipped with SCR, but Unit 10 is not.

15. Comment: NYSDEC claims that emissions have decreased in recent years at Northport due to burning less #6 high sulfur fuel oil and because the sulfur content in #6 fuel oil having decreased in recent years due to a New York sulfur-in-fuel limitation rule (Section 225-1.2). A review of emissions data in EPA's Air Markets Program Database shows increases in both SO_2 and NO_X emissions for Units 1, 2 and 4 in 2018 compared to 2017. [NPCA]

    Response: Emissions did increase from 2017 to 2018 due to economics and variation in how much electricity the facility was called on to produce, but overall emissions are trending downwards. According to EPA's Air Markets Program Database, in 2019, total SO_2 emissions from Northport were lower than both 2017 and 2018 emissions. DEC will evaluate these emissions again as part of the progress report halfway through the implementation period.

16. Comment: NYSDEC must consider year-round prohibitions on burning oil at EGUs to ensure permanent reductions in SO_2. NYSDEC must also consider add-on NO_X controls to ensure the most effective reductions in NO_X emissions. [NPCA]

    Response: EGUs are required to burn oil at different points throughout the year during natural gas curtailment events to maintain reliability of the grid, so this request is not feasible. The reasonableness of add-on NO_X controls for these units will be reassessed when their permits are renewed.

17. Comment: NYSDEC claimed Roseton's units burn natural gas, but the EPA's Air Markets Program Database indicates that the primary fuel is residual oil and shows SO_2 emissions in 2018 of 764 tons per year. Thus, NYSDEC's statement seems to be in error. NYSDEC also claims that the units operate with burners out of service (BOOS), low NO_X fuel burners, oil steam atomization, and windbox flue gas recirculation, but the EPA data does not list any NO_X controls. [NPCA]

Response: Units 1 & 2 are capable of firing natural gas and No. 6 fuel oil as primary fuels. Both units are also capable of firing natural gas or No. 2 fuel oil as their ignition fuel during warm-up. Units 1 & 2 control NO_X emissions when burning natural gas with the use of "burners out of service" (BOOS) controls and windbox flue gas recirculation. These units also use fuel oil steam atomization, in addition to the previously mentioned controls, when burning No. 6 fuel oil. Units 1 & 2 only fire natural gas during the ozone season, except during natural gas curtailment events, in accordance with NO_X RACT requirements. The auxiliary boiler is natural gas-fired and is equipped with low NO_X burners.

18. Comment: NYSDEC must consider requiring Oswego Harbor Power to permanently switch to natural gas, or alternatively a lower oil sulfur content limit. NYSDEC also must consider requiring add-on NO_X controls to ensure that these units are the most effectively controlled. [NPCA]

    Response: Oswego Harbor Power was subject to BART in the first implementation period and implemented their controls accordingly. Emissions from this facility fell below the threshold in the Ask that would require a four-factor analysis. This unit runs very little and it would be very expensive to control emissions. This facility currently has a RACT variance because additional controls were determined to not be reasonable. RACT will be reassessed when their permit is renewed in 2021.

19. Comment: New York must lower the threshold for identifying and requiring controls from polluters harming our parks. The current threshold is unreasonably high, so high in fact that if the threshold were kept in place it would exclude most sources of pollution across the state from review for pollution reductions and is therefore contrary to the Clean Air Act, contrary to the Regional Haze Rule and contrary to the 2019 Regional Haze Guidance for the second planning period. [NPCA]

    Response: DEC implements control programs, with accompanying applicability thresholds, through its regulations, not the SIPs in response to national ambient air quality standards for criteria pollutants; as well as other standards and requirements for other pollutants. DEC disagrees that the threshold used in the plan is unreasonably high. DEC used the threshold agreed to by the Class I states after many years of collaboration and it is being used by all the MANE-VU states in their plans. If the Class I states felt that further reductions were necessary to meet the regional haze goals for the 2018 - 2028 planning period, they would have insisted upon a lower threshold.

20. Comment: New York must make the MANE-VU measures enforceable. Referencing the measures requested by other Northeast states (MANE-VU regional planning organization) will not result in actual pollution reductions. Requiring power plants over 25 megawatts to consistently minimize emissions, adopt ultra-low sulfur fuel oil standards and update permits are likely to limit emissions, but they can only be relied upon if New York makes them enforceable through the plan. [NPCA]

    Response: Requirements in permits are based on rules and regulations, which are enforceable on their own once adopted. In addition they become federally enforceable when the regulations

are approved into the SIP. Most of New York's regulations are already in the SIP, and are listed in 40 CFR Part 52 Subpart HH.

21. Comment: NYSDEC has failed to adequately address the MANE-VU asks and NYSDEC has failed to include all recommended measures in its SIP revision or propose alternative measures that would provide equivalent visibility benefits. [NPCA]

    Response: New York is in the process of adopting all of the measures in the Ask and will continue to do so throughout the implementation period. New York's implementation of the Ask is documented in SIP sections 10.6.2-10.6.7. Progress will be documented in the progress report submitted halfway through the implementation period. It should be noted that all of the Class I areas New York contributes to are ahead of schedule on improved visibility conditions.

22. Comment: NYSDEC did not provide any evaluation of the EGUs in New York to determine if the EGUs were using the most effective NO_X and SO_2 control technologies on a year-round basis. Instead, NYSDEC interpreted this recommendation as only focused on controls not operated on a year-round basis, which NYSDEC assumed would only apply to NO_X controls that are not run during the non-ozone season. [NPCA]

    Response: Most control requirements in permits and regulations are on a year-round basis, with an exception being for control requirements that are more stringent during the ozone season, which is why DEC specified implementing these NO_X controls on a year-round basis.

23. Comment: NYSDEC must provide a more detailed evaluation of the EGUs in New York to determine if the EGUs were using the most effective NO_X and SO_2 control technologies on a year round basis and either justify any such EGUs that it determines do not warrant further evaluation or adopt equivalent emission reduction measures. [NPCA]

    Response: New York EGUs are already well controlled. These controls have resulted in a 50 percent reduction in emissions in recent years. New York has very stringent sulfur in fuel regulations and there are no coal units remaining in New York, so SO_2 emissions are very low. DEC's RACT threshold of $5,000 per ton of NO_X reduced results in NO_X emissions that are quite low as well. Some NO_X controls were only run in the past during the ozone season to meet New York's obligations under the ozone NAAQS, but as the permits come up for renewal, DEC will require controls to be run year-round. Averaging times on NO_X limits are 24 hours during the ozone season and 30 days during the non-ozone season.

24. Comment: NYSDEC has not even provided a list of the EGUs in New York with capacity of 25 MW or greater in its proposed regional haze plan revisions. NYSDEC must provide more information on each of its EGUs with capacity of 25 MW or greater, including fuels burned, controls in place (including measures to burning lower-polluting fuels), enforceable emissions or operational restrictions, and a justification of why NYSDEC has determined that it has met the MANE-VU Ask. [NPCA]

Response: Control measures that are determined to be RACT for major EGUs are continuously operated to fulfill the stringent emission limits contained in Part 227-2. As previously noted, RACT is re-evaluated upon permit renewal and DEC has begun updating permits to make annual operation an enforceable requirement. Because of this, DEC believes it is not necessary to include a list to meet the Ask requirement.

25. Comment: Even for sources with recent pollution controls installed or that are otherwise effectively controlled, EPA's guidance still requires that a state that does not select such a source for evaluation of controls to meet reasonable progress "should explain why the decision is consistent with the requirement to make reasonable progress, i.e., why it is reasonable to assume for the purposes of efficiency and prioritization that a full four-factor analysis would likely result in the conclusion that no further controls are necessary." [NPCA]

    Response: Due to all the Class I areas in MANE-VU already being below the glidepath, additional measures will be evaluated during the next implementation period. Furthermore, the four-factor analysis threshold was established by the Class I states for the purposes of efficiency and prioritization.

26. Comment: NYSDEC did not demonstrate that the sulfur-in-fuel limitations would limit the oil burned at EGUS to no more than 0.0015%. [NPCA]

    Response: Pursuant to NYCRR Subpart 225-1, all distillate oil sold and burned in NY must be below 0.0015% sulfur by weight.

27. Comment: NYSDEC did not clearly state in its proposed SIP revision whether it had adopted rules to implement limits on sulfur in #4 and #6 residual oil. It is also not clear if the distillate oil limits met with the Diesel Emissions Reductions Act of 2006 and with 6 NYCRR Part 248 are part of the EPA-approved SIP. [NPCA]

    Response: New York fully adopted the ultra-low sulfur fuel oil standard requested by MANE-VU in 2007 during the first implementation period. 6 NYCRR Subpart 225-1, "Fuel Composition & Use – Sulfur Limitations," became effective April 5, 2013. EPA approved subpart 225-1 as a SIP revision, making it also federally enforceable, on August 23, 2018.

28. Comment: Emission projections relied on by New York in developing its plan appear to be based in part on federal regulations that were in existence or known to be a future requirement including rules related to power plants, vehicles and oil and gas. Several of those regulations (e.g. the Clean Power Plan) have been or will likely be repealed, revised or ignored by the Trump administration. New York must evaluate how these changes impact the 2028 projections and to the extent they compromise the state's obligation and plans for making reasonable progress, it must revisit and revise the plan so that adequate emission reductions occur by the end of the planning period or earlier. [NPCA]

Response: New York agrees that the emission projections are based on the federal regulations in effect at the time, and that this SIP revision includes the information available at the time.

29. Comment: The proposed plan appears to be a hybrid of its last Regional Haze State Implementation Plan and a newer template of a Class I area state plan. New York's lack of alignment to the requirements and framework of the amended Regional Haze Rule is concerning; the state must revise the plan to ensure conformity with the current regulatory parameters. [NPCA]

    Response: DEC developed this SIP revision to meet the requirements and framework of the amended Regional Haze Rule, consistent with all the other MANE-VU states. Portions of the last SIP were included to demonstrate that DEC followed up on measures from the last implementation period and complied with the Progress Report requirements.

30. Comment: Analyze the climate and environmental justice impacts of the plan and ensure the plan will reduce greenhouse gas emissions where possible to align with stated New York climate action goals and minimize harms to disproportionately impacted communities. [NPCA]

    Response: While the Regional Haze Rule does not require states to address environmental justice or greenhouse gas emissions reductions, the measures DEC has adopted will have greenhouse gas emission reduction co-benefits and will result in emission reductions in environmental justice areas. These topics will be more fully addressed through other programs, such as the Climate Leadership and Community Protection Act (CLCPA).

31. Comment: NYSDEC should analyze the climate and environmental justice impacts of its second planning period haze SIP. Although the Regional Haze Rule does not define "non-air quality environmental impacts," the Best Available Retrofit Technology (BART) Guidelines, which inform a state's reasonable progress analysis, explain that the term should be interpreted broadly. Climate change and environmental justice impacts are the types of non-air quality impacts that DEC should consider when it sets New York's reasonable progress goals for Class I areas and determines reasonable progress measures for specific sources. [NPCA]

    Response: BART was a one-time requirement for the first implementation period; NY followed up on the measures taken to meet the BART requirements in Section 8 of this plan. While the Regional Haze Rule does not require states to address environmental justice or greenhouse gas emissions reductions or impacts, DEC is analyzing the impacts of state measures through other regulatory efforts and initiatives such as the CLCPA. NPCA is welcome to comment on those processes as they proceed.

32. Comment: When NYSDEC determines "the emissions reduction measures that are necessary to make reasonable progress," it should assess how those measures will either reduce or exacerbate greenhouse gas emissions. [NPCA]

Response: The Regional Haze Rule does not require states to address greenhouse gas emissions reductions, but the measures DEC has adopted will have greenhouse gas emission reduction co-benefits. These topics will be more fully addressed through other programs, such as CLCPA.

33. Comment: NYSDEC should analyze how the reasonable progress measures, or the lack thereof, in its haze SIP will affect disproportionately impacted communities. Incorporating environmental justice impacts into the reasonable progress analysis will further the goal of assessing the broader environmental implications of DEC's regional haze actions, and will help maximize the environmental benefits of the regional haze program. EPA will review the haze plan that DEC submits, and EPA will be required to ensure that its action on New York's haze plan addresses any disproportionate environmental impacts of the pollution that contributes to haze. DEC can facilitate EPA's compliance with Executive Order No. 129898 by considering environmental justice in its SIP submission. [NPCA]

    Response: The measures DEC has adopted will result in emission reductions in environmental justice areas. These topics will be more fully addressed through other programs, such as the CLCPA which has a large environmental justice component.

34. Comment: We encourage NYSDEC to acknowledge the additional gains from the CLCPA legislation to our public lands and the appropriate consideration of climate and environmental justice as part of the reasonable progress analysis. [NPCA]

    Response: DEC has undertaken a number of GHG reduction and environmental justice measures, but the Regional Haze Rule does not require states to address environmental justice or greenhouse gas emissions reductions or impacts.

35. Comment: Under the Clean Air Act, states are permitted to include in a SIP measures that are authorized by state law but go beyond the minimum requirements of federal law. Here, setting aside whether the Clean Air Act requires states to consider climate impacts when developing haze plans, New York law directs DEC to address climate change in its programs. New York can ensure that its climate policies are reflected in its regional haze plan, and EPA must approve such a plan so long as it meets the minimum requirements of the Clean Air Act.

    Response: DEC is analyzing the impacts of climate change through a variety of regulatory efforts and initiatives such as the CLCPA.

36. Comment: NYSDEC is required to develop its own long-term strategy through reasoned decision making to achieve the necessary reductions in emissions from sources within New York separate from the MANE-VU Asks. [NPCA]

    Response: DEC's LTS for this implementation period is documented in Section 10 of this SIP.

37. Comment: For the second implementation period, the revised RHR does not require a state to consider "the uniform rate of improvement" or require a state to consider the measures that would be needed to meet the uniform rate of progress. [NPCA]

    Response: The uniform rate of progress is defined in 40 CFR 51. 308(f)(1)(vi) for periodic comprehensive revisions to the regional haze plans and needs to be recalculated if baseline visibility conditions change (which they did since the first implementation period).

38. Comment: There is a repeated reference to the concept of setting a reasonable progress goal (RPGs) for each Class I area and then a state developing a strategy to achieve it. This is backwards. The state must determine what additional emission reductions measures are needed to make reasonable progress, considering the four statutory reasonable progress factors along with the factors specified in the revised RHR. [NPCA]

    Response: The Class I States set the reasonable progress goals (RPG) based on the four statutory factors used to determine reasonable progress. New York as a non-Class I State developed strategies to help Class I States achieve their goal. This plan identifies the strategies in response to the "Ask" from the Class I states.

39. Comment: It appears that the RPGs calculated by MANE-VU and presented in the draft SIP have been projected based on assumptions that upwind states outside of MANE-VU will eventually comply with the MANE-VU Ask. That is, the RPGs reflect emission control measures that the MANE-VU states hope will be in place by 2028 in upwind states but that are not presently enforceable measures. Further, as discussed below in this section, and not exhaustively, a number of emission reducing regulations relied upon in the 2028 projection are being rolled back by the Trump administration. Because the New York draft SIP's approach is reliant on a number of unenforceable measures in the projection of "RPGs" we ask that the state clarify in its SIP submission the measures which it is relying upon as enforceable under 40 CFR 51.308(f)(3)(ii)(B) such that [downwind] states with Class I areas can duly rely upon projected New York reductions. [NPCA]

    Response: New York is not a Class I State and therefore did not set the RPGs. MANE-VU decided to implement the RH SIPs in a timely manner. To wait to perform modeling, which sets the RPGs, until every state has a SIP would significantly delay the implementation of our LTS. Per the Regional Haze Rule, each state decides its own LTS, so the MANE-VU states would have to wait until every SIP is finalized and each LTS is enforceable before modeling. Since MANE-VU modeling for the baseline and inclusion of Ask measures both demonstrate meeting rate of progress guidelines, it's not critical to know exactly what each state is going to agree to in their SIPs in order to present modeling. If the LTS is different than the Asks but target the same pollutants, get like reductions and has modeling that supports the RPGs it is not a problem. The modeling was a reasonable assessment of the future to inform the Ask. The RPG is met based on both modeling scenarios, which act more as a goal range than a specific must-meet goal number. DEC will be addressing roll-backs by other means such as formal comment submissions and if necessary, through litigation.

40. Comment: It appears that New York has examined its impact on only the three non-MANE-VU Class I areas in Virginia and West Virginia. The draft SIP does not show any consideration of possible impacts on other non-MANE-VU Class I areas. New York reasons that the non-MANE-VU states are lagging in their SIP development, however the state must nevertheless itself consider whether its sources affect Class I areas in the non-MANE-VU states, and if so New York must determine what additional emission control measures are needed to make reasonable progress at those areas. [NPCA]

    Response: Based on trajectory analyses and emissions over distance calculations completed, New York does not reasonably contribute to any other Class I areas outside of MANE-VU, besides Shenandoah National Park, Dolly Sods Wilderness Area, and Otter Creek Wilderness Area. It is fair to presume that measures New York takes to reduce visibility impairment in the listed Class I areas would further reduce its minimal visibility impacts in any other downwind Class I areas. Class I States outside of MANE-VU are welcome to contact New York during their consultation period if their analyses show significant contributions from New York, and New York will address such findings in its Progress Report that will be submitted halfway through the current implementation period.

41. Comment: For several source categories, the projection of 2028 emissions are presumably based on a federal regulatory scheme that was in existence or known to be a future requirement, but several of those regulations have been repealed, revised, and/or allowed to be ignored due to regulatory changes and/or policy changes enacted in the past two years. While the NPCA recognize that these changes in the federal regulatory scheme are beyond the control of New York or any other state, and we likewise recognize New York's forward thinking, protective regulatory scheme it is still extremely important to evaluate whether these revised regulations could impact the 2028 emissions projections relied on for New York's (and other MANE-VU states) regional haze plan. To the extent that the changes in air pollution regulations compromise emission reductions needed for New York to make reasonable progress and/or impact MANE-VU's 2028 emission projections, these changes call into question the emissions relied upon in New York's haze plan and the mechanisms for delivering reductions. [NPCA]

    Response: This SIP revision relied on the information available at the time. New York will keep their commitments under the Ask despite regulatory changes at the federal level, so emissions from New York are not expected to be higher than the projections.

42. Comment: NYSDEC should estimate the potential increases or decreases in its 2028 emissions projections for EGUs, discuss how rule changes (federal, peaking turbines, eliminating coal, etc.) could impact its regional haze plan, and determine whether and what additional emission reductions are necessary to assure New York is making reasonable progress towards the restoration of natural visibility at all Class I areas affected by its emissions. [NPCA]

    Response: This SIP revision relied on the information available at the time both with the Ask and the projections without the Ask. New York addressed the Ask in this SIP and DEC has been

successful in adopting and implementing rules to address coal plants and limit emissions from peaking turbines. NY is implementing the Regional Greenhouse Gas Initiative, which is stricter than the Clean Power Plan and Affordable Clean Energy rule, and emissions continue to decrease under this program. The cap and the RGGI region's commitment to lower that cap through 2030, ensures that regional emissions continue to decline into the future.

43. Comment: The 2028 MANE-VU projections indicate that VOC, NO_X, and $PM_{2.5}$ emissions from the On-Road mobile source sector would decrease by 69.33%, 76.88%, and 66.04%, respectively, compared to 2011 emissions. However, based on the regulatory changes and unknowns, it seems very likely that these reductions will not be realized in 2028. As such, New York cannot rely upon them as enforceable emission reductions to make reasonable progress. NYSDEC should estimate the potential increases in its 2028 emissions projections for onroad mobile sources, discuss how these rule changes are anticipated to impact its planned reductions of visibility impairing pollution, and determine what additional measures are necessary to assure compliance with the Clean Air Act and Regional Haze Rule. [NPCA]

    Response: This SIP revision relied on the information available at the time. The 2028 modeling includes NY's LEV and I/M programs, which are more stringent than federal requirements. The 2028 projections do offer a reasonable prediction of emissions in the future as a result of fleet turnover, but DEC will evaluate emissions again as part of the progress report halfway through the implementation period.

44. Comment: MANE-VU's 2028 projection of emissions from oil and gas is likely understated given the current administration's apparent plan to increase oil and gas development. NYSDEC must estimate the potential increases in its 2028 emissions projections for VOCs from oil and gas sources due to these changes in policy and regulation, as well as to project the potential increases in the other haze impairing pollutants associated with oil and gas development (including NO_X, SO_2, and ammonia) assuming greater development of such resources as so clearly seems to be the plan with the current administration. [NPCA]

    Response: This SIP revision relied on the information available at the time. The 2028 modeling represents a reasonable projection of New York's oil and gas emissions. Emissions from this sector will be assessed as part of the Progress Report submitted halfway through the implementation period.

45. Comment: The draft SIP presents a lot of analysis, mostly prepared by MANE-VU, but does not clearly identify a set of sources that New York has reasonably selected for four-factor analyses, does not present information characterizing those four factors for those sources and potential additional emission controls (i.e., controls that are not currently required and enforceable), and does not clearly conclude what specific additional control of each selected source is needed to make reasonable progress. There appears to be no source for which New York has conducted a source-specific cost analysis as additional emission control measure. The draft SIP also does not clearly demonstrate that NYSDEC has include all measures recommended by MANE-VU or measures that will provide equivalent reductions. For many sources, there are brief descriptions

of the existing controls, but these descriptions are not specific as to the current emission rate or the current degree of control achieved, and these descriptions do not address the potential for additional control. It appears that New York has decided that no additional controls for any sources are needed to make reasonable progress, as there do not appear to be any new enforceable emission limitations in the draft SIP. It is not sufficient to merely recite the history and current level of control at numerous sources. [NPCA]

Response: DEC agreed to the MANE-VU determination in accordance with the Class I States' Ask and addressed the two sources above the threshold stated in the MANE-VU Ask in Section 10.6.3 of the SIP. DEC also addressed the additional sources identified where requested, but the additional sources are not part of DEC's plan to reduce visibility impairment.

46. Comment: NYSDEC's proposed regional haze plan indicates that the most recent NEI submission by New York was for the year 2014. However, NYSDEC should have already compiled and submitted 2017 emission inventory information to EPA as part of its development of the 2017 NEI. The SIP must explain how this information was used in the development of the strategy and not merely assert that because emissions for some sources have decreased no further evaluation is needed. The SIP must also explain why it is reasonable that 2017 emission information has not been used for any source category besides AMPD sources. [NPCA]

    Response: The 2017 NEI has not been finalized for a number of emission sectors. The 2017 AMPD data was included because AMPD sources are required to submit their emissions data by January 31 for the previous calendar year. The AMPD inventory is for electric generating units which only captures a subset of all emission sources in New York. Therefore, the SIP includes the 2014 NEI because it is the most recent, complete inventory available.

47. Comment: New York must clarify what sources have been selected for four-factor analysis; it must be clearer in the characterization of those factors; and it must reach clear, reasoned conclusions about whether and what type of additional controls are needed to make reasonable progress. The SIP must document New York's own reasoned conclusion that the controls in the Ask are all that are necessary to make reasonable progress. [NPCA]

    Response: New York performed a four-factor analysis for Finch Paper and Lafarge Building Materials; the language in the plan has been clarified.

48. Comment: NYSDEC did not directly address 40 C.F.R. 51.308(f)(2)(i), instead relying on the MANE-VU ask for targeting sources to conduct a four-factor analysis and then proceeding not to undertake any four-factor analysis for such MANE-VU targeted sources. [NPCA]

    Response: New York performed a four-factor analysis for Finch Paper and Lafarge Building Materials; the language has been clarified. New York also assessed the level of control on other facilities in other sectors with MANE-VU and determined they are all reasonably controlled because the Class I areas New York contributes to being significantly below the URP. Looking at the components of visibility impairing pollutants, DEC assessed the ability for sources to provide

additional meaningful emission reductions and determined that there are no additional sources of for meaningful SO_2 reductions. DEC also concluded that by ensuring sources comply with NO_X and VOC RACT, at a minimum, will provide the necessary reductions in impairment. New York has adopted RACT-level controls on NO_X and VOC sources statewide on the largest source categories and fully complies with the Ask developed by the Class I States to identify the RPGs.

49. Comment: New York state emissions are the top MANE-VU state contributor for Lye Brook, Acadia, Great Gulf, and Moosehorn Class I areas based on a trajectory analysis of where winds carry emissions from on the 20% most-impaired days. Emissions from New York sources also are the second highest contributor to mass-weighted sulfate and nitrate contribution of all of the MANE-VU states for the Acadia, Great Gulf, Lye Brook, and Moosehorn Class I areas. Yet, despite having such a significant impact on visibility at MANE-VU Class I areas, NYSDEC decided to default to MANE-VU's 3.0 Mm-1 threshold for defining sources to target for regional haze control measures. [NPCA]

    Response: New York's sulfur dioxide emissions are now a fraction of what they were when the data for the Ask was collected. Being the largest contributor does not automatically make additional controls cost effective or reasonable. All of the Class I areas New York contributes significantly to are far below the URP, so "drastic" measures do not need to be taken during this implementation period. New York adopted the threshold established for significant sources determined by the Class I States as federally required.

50. Comment: NYSDEC does not explain how the 3.0 Mm^{-1} or greater visibility impact threshold was selected. Conservation Organization urges NYSDEC to replace this generic threshold with Class I specific figures that will provide the contours through which the state may identify sources to assess for a four-factor analysis. NYSDEC must implement and document a reasoned basis for any extinction level used for selecting sources for a four-factor analysis of controls, in addition to making clear how each source's visibility impacts are to be determined. [NPCA]

    Response: The Class I States in MANE-VU decided that this threshold was reasonable to capture the most polluting facilities that were upwind of their areas. The four-factor analysis was applied to the sources that were identified. EPA empowers states to determine long term strategies no matter the threshold. DEC has fulfilled the federal requirements by utilizing the threshold established by the Class I States.

51. Comment: NYSDEC did not put together a four-factor analysis for either Lafarge Building Materials or Finch Paper, nor did NYSDEC explain or adequately document why a four-factor analysis would not lead to emission reduction strategies being adopted to achieve reasonable progress. NYSDEC also has not proposed equivalent emission reduction strategies. NYSDEC must make such an evaluation available for a public review and comment period. [NPCA]

    Response: New York performed a four-factor analysis for Finch Paper and Lafarge Building Materials in the SIP that went out for public comment; the language has been clarified.

52. Comment: The Federal Land Managers (FLMs) identified sources beyond Finch Paper and LaFarge Building Materials that it requested NYSDEC evaluate for pollution controls, but NYSDEC failed to conduct any four-factor analyses. NYSDEC's brief descriptions of the recent emission reductions/controls installed do not sufficiently justify that a full four-factor analysis would not result in additional controls to make reasonable progress. NPCA requests that NYSDEC provide a four-factor analysis of controls, or explanations to justify why such a four-factor analysis of controls is not warranted for each of these facilities, with a new period for public review and comment. [NPCA]

    Response: New York agreed with MANE-VU's analysis that these additional facilities did not require four factor analyses, but New York did reassess the controls on the facilities identified by the NPS anyway and determined that more controls were not needed. NY will reconsider the additional sources identified by the NPS and Forest Service during the next implementation period knowing that these facilities are required to re-analyze RACT controls whenever a permit is renewed (i.e., every five years for major sources).

53. Comment: We recognize that New York's regulations on greenhouse gas emissions and nitrogen oxides will lead to enforceable requirements for many if not all of [the units identified by the FLMs] however NYSDEC must specify enforceable requirements for each of these subject sources, timeframe for compliance as well as expected and relied upon outcome. Should any of the facilities specified by the FLMs escape reduction requirements, we ask NYSDEC to provide a thorough four-factor analysis of controls for these facilities, or provided adequate justification as to why a four-factor analysis would not likely lead to a determination that additional controls are needed to make reasonable progress towards the national visibility goal. For any of these facilities that NYSDEC claims already has adequate controls or justifies for other reasons that a four-factor analysis of controls would not result in additional controls, NYSDEC must document in this SIP revision why it makes this finding. To the extent such justification is relying on other regulatory or permit requirements, we request that NYSDEC document those regulatory or permit requirements in detail and indicate whether such requirements are already or will be submitted to EPA as part of the SIP. [NPCA]

    Response: See response to Comment 52. Enforceable requirements are contained in the regulations and included in the permits for regulated facilities.

54. Comment: NYSDEC must identify which facilities/units have switched to lower polluting fuels and identify whether those switches had been made into enforceable requirements through permit updates or other means. If such sources' fuel switches have not been made into enforceable requirements, then NYSDEC should adopt a rule as part of this regional haze SIP revision to require such fuel switches become permanent through revisions to a source's Title V or Air State Facility permit. [NPCA]

    Response: The Ask requires DEC to pursue making fuel switching an enforceable requirement. The reasonableness of permanently switching fuels for applicable units will be assessed when their permits are up for renewal. Facilities are required to burn oil at different points

throughout the year during natural gas curtailment events to maintain reliability of the grid, so it may not be feasible to permanently switch fuels.

55. Comment: NYSDEC should submit NYCRR Part 251 for approval as part of this regional haze plan revision since it is relying on the rule for a regional haze control measure. [NPCA]

    Response: As noted above, in response to comments 8 through 10, the requirements in Part 251 are enforceable under state law.

56. Comment: NYSDEC should adopt the limits specified in the MANE-VU Ask relating to peaking combustion turbines or provide alternative emission reduction measures that will result in equivalent emissions control. NYSDEC must also disclose what emissions were modeled for these units in MANE-VU's 2028 modeling and determine if any adjustments to the RPGs are necessary. Last, given that this rule being proposed by NYSDEC is a regional haze control measure, NYSDEC must adopt and submit its rule implementing the NO_X reductions for peaking combustion units as part of this regional haze plan revision. [NPCA]

    Response: Subpart 227-3, adopted on December 11, 2019, "Ozone Season Oxides of Nitrogen (NO_X) Emission Limits for Simple Cycle and Regenerative Combustion Turbines" set a NO_X limit of 100 ppm_{vd} that simple cycle combustion turbines must meet by May 1, 2023. This emission limit will be reduced again to 25 ppm_{vd} for gaseous fuels and 42 ppm_{vd} for distillate oil or other liquid fuels by May 1, 2025, which are the most stringent limits specified in the MANE-VU Ask. 6 NYCRR 227-3 will be submitted as a separate SIP revision.

57. Comment: To ensure permanence of measures to decrease energy demand through energy efficiency and to increase use of combined heat and power, fuel cells, wind, and solar, NYSDEC should explore whether these provisions can be made part of the enforceable SIP. [NPCA]

    Response: Thank you for your comment. DEC continually explores the appropriateness of these and other measures into the SIP.

58. Comment: In Section 10.3.6 NYSDEC should indicate whether these rules have been submitted to EPA as part of the New York SIP. For those rules that have not yet been submitted, New York should commit to submit those rules to EPA as part of its regional haze SIP submittal. [NPCA]

    Response: The regulations indicated as existing have been submitted to the New York SIP previously, but not all of the new or revised regulations have been submitted to EPA yet. Regulations that have not been submitted will be submitted individually, as SIP revisions, when they are finalized.

59. Comment: NYSDEC must provide for a "description of the status of implementation of all measures included in the implementation plan for achieving RPGs for mandatory Class I Federal areas…outside the State" as required by 40 CFR 51.308(g)(1) and (g)(2). [NPCA]

Response: The status of implementing measures is included in Section 10 as part of the LTS.

60. Comment: The draft SIP refers to the next progress report but does not explicitly commit to submit that progress report to the EPA. [NPCA]

    Response: States do not need to "commit" to submitting the 5-year progress report at this time and in context of this regional haze plan. New York intends to comply with 40 CFR Section 51.308(g) by to submitting the next progress report to EPA.

61. Comment: Ammonia emissions from nonroad sources are projected to increase by almost 26% in 2028 compared to 2011. Further, emissions of all visibility-impairing pollutants from oil and gas and from a category labelled “other” are projected to increase quite significantly between 2011 and 2028. NYSDEC should explain what these emissions sources are within the state and discuss the programs it has in place to address these future increases in emissions. [NPCA]

    Response: Section 7.3.6 details the sources included in the “Other” sector. Emissions from the oil and gas sector are being addressed in a regulation under development and so any ensuing reductions will be included in future modeling. Nonroad sources of ammonia make up a negligible amount of anthropogenic ammonia projected in 2028. The projected emissions are a conservative estimate, as is common with modeling for SIPs. It is important to note that the use of and reference to any and all future emission projections/inventories in this SIP and its appendices are for regional haze planning purposes only and they are not to be construed as permissible emission limits, caps or similar allowance. Emissions will be assessed as part of the Progress Report submitted halfway through the implementation period. It should also be noted that the CLCPA was not in effect at the time of this analysis and will contribute to lowering emissions beyond what was projected for 2028.

DEC received 423 identical form letters including the comments below and an additional 47 letters that deviated slightly, but none of the changes to the letter template directly addressed deficiencies in this SIP. These comments, while outside the scope of the SIP, are identified below.

62. Comment: Because air pollution knows no boundaries, New York State's actions must reduce emissions that harm people and places like Shenandoah National Park in Virginia and Acadia National Park in Maine, as well as parks throughout New York State. New York's Regional Haze Plan should reinforce the state's ambitious climate actions plans, which I support. [NPCA Form Letter]

    Response: New York is continually reviewing and revising its regulations to be protective of public health. The Regional Haze SIP does not include an exhaustive list of all the state’s environmental programs that protect air quality.

63. Comment: The plan's requirements must be enforceable, must include the most effective strategies for reducing emissions, and must include all sources that contribute significantly to harmful pollution in our protected parks and wilderness areas. Plans to reduce pollution from power plants and other sources of pollution must be specified and the strongest mechanisms for

reducing emissions required. In addition, the state must revisit its threshold at which polluters are considered for needing reductions. [NPCA Form Letter]

Response: Thank you for your comment. The DEC believes that the Regional Haze SIP addresses these concerns.

64. Comment: Besides harming parks, haze pollution also threatens human health with seniors, children, pregnant women, and people of all ages with existing heart or lung diseases most vulnerable to harm from dirty air so strengthening the Haze Plan means cleaner air for everyone and our national parks. As a proud supporter of our national parks and clean air, I urge New York State to strengthen the Regional Haze Plan to genuinely reflect the state's express environmental priorities and ensure that pollution reductions will happen. [NPCA Form Letter]

    Response: Thank you for your comment. DEC has addressed all comments and modified the SIP as indicated in the individual responses above. DEC further believes that the Regional Haze SIP satisfies all of the requirements of the federal Haze rule.

65. Comment: We in the Town of Dover, NY, and all the residents of the Harlem Valley in eastern Dutchess, live within close proximity of a 1,100 megawatt power plant which comes on line early next year. This is a project Governor Cuomo backed and has held up as progress. Not for us, the poorest town in Dutchess County. Emissions from Cricket Valley Energy, an inappropriately sited project approved by NYS DEC, will cross right over our forested uplands of the Appalachians along which the Appalachian Trail travels, right on over into western CT where residents have set up air quality monitors along the border. Our population includes relative newcomers who suffer from asthma, many of whom attend the Dover Middle School/High School less than a mile away. [Constance DuHamel]

    Response: Thank you for your comment. This is outside the scope of the Regional Haze SIP.

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

NEW YORK STATE IMPLEMENTATION PLAN REVISION FOR REGIONAL HAZE

Second Implementation Period

March 2020

DIVISION OF AIR RESOURCES
Bureau of Air Quality Planning

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Contents

List of Tables

List of Figures

List of Appendices

Acronyms and Abbreviations

AMPD	Air Markets Program Division
APU	Auxiliary Power Unit
AQI	Air Quality Index
BART	Best Available Retrofit Technology
BOOS	Burners Out Of Service
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CALPUFF	California Puff Model
CAMD	Clean Air Markets Division
CARB	California Air Resources Board
CDB	County Database
CEM	Continuous Emissions Monitoring
CENSARA	Central States Air Resource Agencies Association
CFR	Code of Federal Regulations
CHP	Combined Heat and Power
CMAQ	Congestion Mitigation and Air Quality
CMV	Commercial Marine Vessel
CO	Carbon Monoxide
CoST	Control Strategy Tool
CSAPR	Cross-State Air Pollution Rule
DERA	Diesel Emissions Reduction Act of 2006
DG	Distributed Generation
DV	Deciview
ECL	Environmental Conservation Law
EGU	Electric Generating Unit
EPA	Environmental Protection Agency
ERTAC	Eastern Regional Technical Advisory Committee
FGD	Flue Gas Desulfurization
FLM	Federal Land Manager
FR	Federal Register
GSE	Ground Support Equipment
GVWR	Gross Vehicle Weight Rating
HAP	Hazardous Air Pollutant
HDDV	Heavy-Duty Diesel Vehicles
HEDD	High Electric Demand Day
I/M	Inspection and Maintenance
ICI	Industrial/Commercial/Institutional
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPM	Integrated Planning Model
LADCO	Lake Michigan Air Directors Consortium
LEV	Low Emission Vehicle
LSD	Low Sulfur Diesel
MACT	Maximum Achievable Control Technology

MANE-VU	Mid-Atlantic/Northeast Visibility Union
MARAMA	Mid-Atlantic Regional air Management Association
MOVES	Motor Vehicle Emissions Simulator
MY	Model Year
NAAQS	National Ambient Air Quality Standards
NCD	National County Database
NEI	National Emissions Inventory
NESCAUM	Northeast States for Coordinated Air Use Management
NH_3	Ammonia
NMHC	Non-Methane Hydrocarbons
NMOG	Non-Methane Organic Gases
NNSR	Nonattainment New Source Review
NO_X	Oxides of Nitrogen
NSPS	New Source Performance Standards
NSR	New Source Review
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSERDA	New York State Energy Research and Development Authority
ORVR	On-board Refueling Vapor Recovery
OTC	Ozone Transport Commission
PM	Particulate Matter
$PM_{2.5}$	Fine Particulate Matter less than 2.5 microns
PM_{10}	Particulate Matter less than 10 microns
PTE	Potential to Emit
RACT	Reasonably Available Control Technology
RPG	Reasonable Progress Goal
RPO	Regional Planning Organization
SBC	System Benefits Charge
SCC	Source Classification Code
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernel Emissions (Inventory Data Analyzer)
SO_2	Sulfur Dioxide
SOA	Secondary Organic Aerosols
TIP	Tribal Implementation Plan
TOR	Thermal/Optical Reflectance
TOT	Thermal/Optical Transmission
TPY	Tons Per Year
TSC	Technical Support Committee
TSD	Technical Support Document
ULSD	Ultra-Low Sulfur Diesel
URP	Uniform Rate of Progress
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	Volatile Organic Compound
WRAP	Western Regional Air Partnership

Executive Summary

This State Implementation Plan (SIP) revision was developed pursuant to 40 Code of Federal Regulations (CFR) section 51.308 “Regional Haze Program Requirements” and demonstrates how reductions in the emissions of visibility-impairing pollutants in New York State will result in a decrease in the degree of visibility impairment in downwind mandatory Class I Federal areas. The primary visibility-impairing pollutants are sulfates, nitrates, particulate matter, ammonia, and volatile organic compounds.

40 CFR section 51.308(f) requires a state to revise its regional haze implementation plan and submit it to the Environmental Protection Agency (EPA) by July 31, 2021 (originally July 31, 2018), July 31, 2028, and every ten years thereafter. This plan addresses the second 10-year planning period that starts in 2018 and ends in 2028.

Although New York State has no mandatory Class I Federal areas, emissions in the state contribute to visibility degradation in downwind mandatory Class I Federal areas in several other states. These mandatory Class I Federal areas are: Lye Brook Wilderness Area, VT; Brigantine Wildlife Refuge, NJ; Presidential Range-Dry River Wilderness Area and Great Gulf Wilderness Area, NH; Roosevelt-Campobello International Park, Acadia National Park and Moosehorn Wildlife Refuge, ME; Dolly Sods Wilderness Area and Otter Creek Wilderness Area, WV; and Shenandoah National Park, VA.

This SIP revision satisfies the requirements of 40 CFR Section 51.308 by evaluating the current and future projected inventory of sources, assessing the measures necessary to reduce emissions from these sources during the implementation period, providing for consultation with other states, tribes and federal land managers (FLMs) in establishing progress goals, and establishing a plan by which New York’s share of regional emission reductions will be implemented.

The State of New York commits to implement this plan that was developed in consultation with other states and tribes, FLMs and EPA.

1. Background and Overview of the Federal Regional Haze Rule

1.1. Haze Characteristics and Effects

Haze refers to the presence of light-inhibiting pollutants in the atmosphere where particles and gases scatter or absorb light to cause a net effect referred to as "light extinction." This scattering and absorbing occur across the sight path of an observer, thus leading to a hazy condition. The primary contributors to reductions in visibility are pollutants such as particulate matter (PM), especially fine particulate matter (particles with a diameter 2.5 microns and smaller) ($PM_{2.5}$), sulfur dioxide (SO_2), and nitrogen oxides (NO_X). PM can be emitted directly from stationary sources or comprised in part of nitrate and sulfate particles formed through reactions involving NOx and SO_2 in the atmosphere. These constituents of haze are capable of being transported great distances while in the atmosphere. Consequently, sources may contribute to visibility impairment in mandatory Class I Federal areas far downwind of their location, necessitating a regional solution to reducing haze.

Reductions in visibility-impairing pollutant emissions such as NO_x (a precursor to ground-level ozone formation) also lead to a reduction in ozone. Ozone can diminish the ability for plants to produce and store food, making them more susceptible to disease, cause crop yield and forest growth to decline, and result in damage to leaves and trees in urban or other recreational areas. NO_x and SO_2 can both contribute to the formation of “acid rain,” which damages forests and crops, acidifies waterways, and, long-term, alters the natural variety of plant and animal life in an ecosystem. In the Adirondack Mountains of New York State, mineral acidification from atmospheric deposition is responsible for ecosystem damage, including loss of fish populations. A major effect of acid rain on forest health and productivity is a reduction in the available supply of calcium and other base cations (positively charged ions) in soil that are needed for forest growth.

The reduction of visibility-impairing pollutant emissions will also be inherently protective of public health. While the presence of PM is among the major cause of regional haze, ongoing studies reveal its contribution to many health issues, including respiratory irritation; decreased lung function; development or aggravation of respiratory conditions such as bronchitis; irregular heartbeat; and premature mortality.

Ozone formed from NO_x emissions, along with SO_2 and sulfate particles, cause similar respiratory impairment, especially among children whose respiratory systems are still developing, the elderly, and adults who are active outdoors. By regulating SO_2, NO_x and particulate matter, severe respiratory and cardiovascular diseases can be avoided. Reducing NO_x emissions that contribute to the formation of ozone is of great importance to New York State given the persistent inability to attain the ozone National Ambient Air Quality Standards (NAAQS) in the New York City area. Improved visibility will also benefit the

economy through increased tourism in the “forever wild” areas in the Adirondack Park.

1.2. General Background / History of Federal Regional Haze Rule

EPA’s Regional Haze Rule was adopted on July 1, 1999 (64 FR 35714). Its overall objective is for all areas of the country to reach national visibility goals within approximately 65 years. This rule addressed the combined visibility effects of various pollution sources over a wide geographic region. This wide-reaching rule means that many states – even those like New York without mandatory Class I Federal areas – are required to participate in haze reduction efforts. The EPA designated five Regional Planning Organizations (RPOs) to assist with the coordination and cooperation needed to address the regional nature of haze. The Mid-Atlantic and Northeast states, including the District of Columbia, were designated as part of the Mid-Atlantic/Northeast Visibility Union (MANE-VU). The other RPOs are Lake Michigan Air Directors Consortium (LADCO), Western Regional Air Partnership (WRAP), Central States Air Resource Agencies Association (CenSARA), and Visibility Improvement State and Tribal Association of the Southeast (VISTAS).

Significant visibility improvements have been achieved in mandatory Class I Federal areas since adoption of the Regional Haze Rule. Average visual range in the eastern parks and wilderness areas as of 2015 had improved to 70 miles from 50 miles in 2000. The average visual range has improved from 90 miles to 120 miles over the same period in western parks and wilderness areas.[1]

EPA amended the Regional Haze Rule on December 14, 2016 (effective January 10, 2017, 82 FR 3078). The revisions streamline, strengthen, and clarify aspects of EPA’s Regional Haze Program. One amendment changes the federal land manager (FLM) consultation requirements to ensure that concerns are addressed earlier in the planning process, before State Implementation Plans (SIPs) or progress reports are submitted to EPA. The FLMs are program coordinators for the National Park Service, U.S. Fish and Wildlife Service, and the U.S. Forest Service.

40 CFR Section 51.308(f) originally required that this SIP revision be submitted by July 31, 2018. The revisions to the Regional Haze Rule effective January 10, 2017 changed the deadline to July 31, 2021. 40 CFR Section 51.308(f) requires states to submit the next SIP revision by July 31, 2028 and every ten years thereafter.

40 CFR Section 51.308(g) requires states to submit a progress report five years after a SIP revision in order to evaluate progress toward the RPG for each applicable mandatory Class I Federal area. Future progress reports are due by

[1] *Protecting Our Nation’s Treasured Vistas.* U.S. Environmental Protection Agency, 2016.

January 31, 2025, July 31, 2033, and every 10 years thereafter. EPA also removed the requirement for progress reports to be submitted as SIP revisions. The progress reports will be reviewed by EPA, but EPA will not formally approve or disapprove them. States must still consult with FLMs and obtain public comment on the progress reports. The amendments also clarify certain requirements such as the requirements that RPGs be set based on the long-term strategy, obligations of states with mandatory Class I Federal areas and other states contributing to impairment at those areas, and obligations for states setting RPG that provide for a slower rate of progress than that needed to attain natural conditions by 2064.

1.3. Area of Influence for MANE-VU Mandatory Class I Federal Areas

There are no mandatory Class I Federal areas in New York State. However, as required by the haze rule, states that contribute to visibility impairment in mandatory Class I Federal areas in other states must be identified and implement measures to reduce the emissions of visibility-impairing pollutants. MANE-VU concluded that it was appropriate to define an area of influence that included all MANE-VU states plus other states that modeling indicated contributed at least 2% of the sulfate ion at MANE-VU mandatory Class I Federal areas in 2011. These states are shown in Table 1-1. The 2% threshold was chosen after back-trajectory and modeling results showed that states contributing at least 2% make up about 90-95% of total light extinction. Alternatively, a 5% contribution threshold would only account for 75-80% of total light extinction. New York supports MANE-VU's 2% sulfate threshold and the requirement that contributing states assess mitigation strategies. Failure to use a 2% threshold could result in mandatory Class I Federal areas being unable to reach their RPG and ultimately delay needed improvements in air quality.

Table 1-1 - States That Contribute at least 2% of sulfate and nitrate ions in the MANE-VU Mandatory Class I Federal Areas of Acadia, Moosehorn, Great Gulf, Lye Brook and/or Brigantine

State	RPO	State	RPO
Connecticut	MANE-VU	North Carolina	VISTAS
Delaware	MANE-VU	Florida	VISTAS
Maine	MANE-VU	Tennessee	VISTAS
Maryland	MANE-VU	Virginia	VISTAS
Massachusetts	MANE-VU	West Virginia	VISTAS
New Hampshire	MANE-VU	Illinois	LADCO
New Jersey	MANE-VU	Indiana	LADCO
New York	MANE-VU	Michigan	LADCO
Pennsylvania	MANE-VU	Ohio	LADCO
Rhode Island	MANE-VU	Texas	CenSARA
Vermont	MANE-VU	Missouri	CenSARA
Kentucky	VISTAS	Louisiana	CenSARA
Alabama	VISTAS		

1.4. Mandatory Class I Federal Areas Affected by New York State

40 CFR Section 51.308(f)(2) requires states with no mandatory Class I Federal areas to determine their contribution of emissions to mandatory Class I federal areas in other states. Based on analyses included in Appendix C of this document, sources in New York have been found to contribute to visibility impairment in the following mandatory Class I Federal areas:

Acadia National Park, Maine
Brigantine Wildlife Refuge, New Jersey
Great Gulf Wilderness Area, New Hampshire
Lye Brook Wilderness Area, Vermont
Moosehorn National Wildlife Refuge, Maine
Presidential Range-Dry River Wilderness Area, New Hampshire
Roosevelt-Campobello International Park, Maine/Canada
Shenandoah National Park, Virginia
Dolly Sods Wilderness Area, West Virginia
Otter Creek Wilderness Area, West Virginia

2. General Planning Provisions

This SIP revision meets the requirements of the EPA's Regional Haze rules and the CAA. Elements of this SIP address the core elements required by 40 CFR Section 51.308(f)(3), the establishment of RPGs and measures that New York will take to meet the RPGs. This SIP revision also addresses 40 CFR 51.308(f)(2), Long-term Strategy, and 40 CFR 51.308(i)(2), State and Federal Land Manager coordination; and commits to develop future plan revisions and adequacy determinations as necessary.

2.1. SIP Submission Dates

40 CFR Section 51.308(f) originally required that this SIP revision be submitted by July 31, 2018. Revisions to the Regional Haze Rule published January 10, 2017 changed the deadline to July 31, 2021. 40 CFR Section 51.308(f) requires states to submit the next SIP revision by July 31, 2028 and every ten years thereafter.

40 CFR Section 51.308(g) requires states to submit a progress report five years after a SIP revision in order to evaluate progress toward the RPG for each applicable mandatory Class I Federal area. New York's first progress report was submitted on June 16, 2015 as a formal SIP revision and approved by EPA effective October 30, 2017 (82 FR 45499; September 29, 2017). Future progress reports are due by January 31, 2025, July 31, 2033, and every 10 years thereafter.

2.2. New York Statutory Authority

New York Environmental Conservation Law (ECL) Section 19-0305 authorizes the Commissioner of DEC to enforce the codes, rules and regulations of DEC established in accordance with Article 19. The SIP is a compilation of rules and regulations that have been duly promulgated by DEC in accordance with its statutory authority and consistent with the State Administrative Procedures Act. Therefore, DEC has the authority to enforce all rules and regulations.

3. Regional Planning

EPA and affected states and tribes created five RPOs to facilitate interstate coordination on Regional Haze SIP/TIPs. The State of New York is a member of the MANE-VU RPO. Members of MANE-VU are listed in Table 3-1.

Table 3-1 - MANE-VU RPO Members

Connecticut	Pennsylvania
Delaware	Penobscot Nation
District of Columbia	Rhode Island
Maine	St. Regis Mohawk Tribe
Maryland	Vermont
Massachusetts	U.S. Environmental Protection Agency*
New Hampshire	National Park Service*
New Jersey	U.S. Fish and Wildlife Service*
New York	U.S. Forest Service*

* Non-voting members

By coordinating with MANE-VU and other RPOs, New York State ensures that its long-term strategy (LTS), control measures and BART determinations sufficiently mitigate impacts of sources located in New York State on affected mandatory Class I Federal areas.

MANE-VU has established two committees that address both technical and non-technical issues related to regional haze: The Technical Support Committee (TSC) is charged with:

- Assessing the nature and magnitude of the regional haze problem within MANE-VU
- Interpreting the results of technical work
- Reporting on such work to the MANE-VU Board.

The Communications Committee is charged with:

- Developing approaches to inform the public about visibility issues in the region

- Making any recommendations to the MANE-VU Board to facilitate that goal.

The Communications Committee has become an effective means to develop outreach tools both for stakeholders and the public regarding regional issues within MANE-VU's member states. Ultimately, policy decisions are made by the MANE-VU Board. In addition to the formal working committees, there are also three standing working groups of the TSC: Emissions Inventory, Modeling, and Monitoring/Data Analysis Workgroups.

MANE-VU has also established a Policy Advisory Group to facilitate communication with FLMs, between the Technical and Communications Committees, and with MANE-VU staff. The Policy Advisory Group provides advice to decision-makers on policy questions.

MANE-VU's work is managed by the Ozone Transport Commission (OTC) and is carried out by the OTC, the Mid-Atlantic Regional Air Management Association (MARAMA) and the Northeast States for Coordinated Air Use Management (NESCAUM). The states, along with federal agencies and professional staff from OTC, MARAMA and NESCAUM, are members of the various committees and workgroups.

The following are highlights of the many ways MANE-VU member states and tribes, including New York, cooperatively address regional haze.

- Budget Prioritization: MANE-VU coordinates MARAMA, OTC and NESCAUM staff in developing budget priorities, project rankings, and the eventual federal grant requests.
- Issue Coordination: MANE-VU has a set conference call and meeting schedule for each of its committees and workgroups. In addition, its Air Directors regularly discuss pertinent issues.
- SIP Policy and Planning: MANE-VU tracks the key milestones needed for SIP development and developed a SIP template with the assistance of MANE-VU states/tribes.
- Capacity Building: To educate its staff and members, MANE-VU includes technical presentations on conference calls and organized workshops with nationally recognized experts. Presentations on data analysis, inventory topics, modeling, control measures etc. have been an effective education and coordination tool.
- Routine Operations: MANE-VU staff at OTC, MARAMA and NESCAUM have routine operations to address the following topics: budget, grant deliverables/ due dates, workgroup meetings, inter-RPO feedback, haze rule development, etc.

4. Federal Land Manager Coordination

40 CFR 51.308(i) requires coordination between states, tribes and the FLMs. The consultations must be coordinated with the designated visibility protection program coordinators for the National Park Service, U.S. Fish and Wildlife Service and the U.S. Forest Service. As a part of the development of this SIP, MANE-VU provided opportunities for FLMs to review and comment on each of the technical documents developed by MANE-VU, and New York provided an opportunity for the FLMs to comment on this document.

In compliance with 40 CFR 51.308(i)(2), New York provided the FLMs with an opportunity for an in-person consultation prior to holding the public hearing on this SIP revision. The FLMs were given the opportunity to provide their assessment of the impairment of visibility in any mandatory Class I Federal areas, and to provide their recommendations on the development and implementation of strategies to address visibility impairment.

A copy of the draft SIP was provided to the FLMs on February 22, 2019. New York received comments from the Forest Service on April 22, 2019 and from the National Park Service on May 11, 2019. The FLM's comments and New York's responses are included in Appendix A, *Summary of Federal Land Manager Comments and Responses*, in accordance with 40 CFR 51.308(i)(3).

40 CFR 51.308(i)(4) contains procedures for continuing consultation between the state and FLMs on the implementation of the Regional Haze programs. The FLMs must be consulted in the following instances:

- Development and review of implementation plan revisions,
- Review of progress reports, and
- Development and implementation of other programs that may contribute to impairment of visibility in mandatory Class I Federal areas.

New York will coordinate and consult with the FLMs pursuant to 40 CFR 51.308(i)(4) as necessary.

5. Assessment of Baseline and Natural Conditions

Pursuant to CAA Section 169A(b)(2)(B), the Regional Haze SIP revision for each planning period must contain measures to achieve reasonable progress toward the goal of achieving natural visibility. Comparing natural visibility levels to current baseline conditions helps determine how much progress should be made in the next five to 10 years. Determining natural visibility conditions is a SIP element and each state containing a mandatory Class I Federal area (in consultation with FLMs and other states) was required to estimate natural visibility levels. New York State contains no mandatory Class I Federal areas and, as such, this assessment is not required. However, it is presented here for informational purposes.

Additionally, 40 CFR Section 51.308(f)(6)(iii) of the EPA's Regional Haze Rule requires the SIP to describe the procedures by which monitoring data and other information are used in determining the contribution of emissions from within the state to visibility impairment at mandatory Class I Federal areas both within and outside the state. The Interagency Monitoring of Protected Visual Environments (IMPROVE) program was developed in 1985 to establish current visibility conditions, track changes in visibility, and help determine the causes and sources of visibility impairment in mandatory Class I Federal areas.

IMPROVE data were used to calculate baseline and natural conditions for MANE-VU mandatory Class I Federal areas. Data from the IMPROVE monitors (see Table 5-1) are representative of mandatory Class I Federal areas in and near the MANE-VU region.

New York State does not contain any mandatory Class I Federal areas and therefore is not required to estimate a reasonable progress goal (RPG). However, as described in Section 3, DEC has coordinated with states containing mandatory Class I Federal areas that are affected by emissions from sources located in New York as those states assessed baseline, natural and current visibility conditions in their respective mandatory Class I Federal areas. The results of this work were used to determine the control measures whose implementation would be necessary by New York and other contributory states to meet RPG for each mandatory Class I Federal area.

Table 5-1 - IMPROVE Information for MANE-VU and nearby Mandatory Class I Federal Areas

Mandatory Class I Federal Area	IMPROVE Site	Location (latitude and longitude)	State
Acadia National Park	ACAD1	44.38, -68.26	Maine
Moosehorn National Wildlife Refuge	MOOS1	45.13, -67.27	Maine
Roosevelt/Campobello International Park	MOOS1	45.13, -67.27	Maine
Great Gulf Wilderness Area	GRGU1	44.31, -71.22	New Hampshire
Presidential Range/Dry River Wilderness	GRGU1	44.31, -71.22	New Hampshire
Lye Brook Wilderness Area	LYBR1/ LYEB1	43.15, -73.13	Vermont
Brigantine Wilderness Area	BRIG1	39.47, -74.45	New Jersey
Dolly Sods Wilderness	DOSO1	39.11, -79.43	West Virginia
Otter Creek Wilderness	DOSO1	39.11, -79.43	West Virginia
Shenandoah National Park	SHEN1	38.52, -78.43	Virginia

Source: IMPROVE (http://vista.cira.colostate.edu/IMPROVE/), prepared on December 5, 2017

Some of the mandatory Class I Federal areas are located in close proximity to each other and therefore one monitor represents more than one area. The monitor at Moosehorn National Wildlife Refuge is also the monitor for Roosevelt Campobello International Park, as well as the monitor at Great Gulf Wilderness Area representing Presidential Range/Dry River Wilderness and the monitor at Dolly Sods Wilderness also representing Otter Creek Wilderness.

5.1. Natural Conditions

In September 2003, the EPA issued guidance for a calculation of natural background and baseline visibility conditions. EPA guidance gives states a “default” method to estimate natural visibility. Natural visibility represents the visibility for each mandatory Class I Federal area that is representative of existing conditions before human activities affected air quality in the area. Natural haze levels are calculated for both 20% clearest days and 20% most impaired days, because changing natural processes lead to variability in

natural visibility. MANE-VU states have agreed for the second implementation planning period to use 20% clearest days' natural levels (IMPROVE Natural Haze Levels II version 2 (4/18/2018 update)) and 15-year (2000-2014) derived 20% most impaired days natural levels in USEPA's 2016 draft guidance (U.S.EPA 2016). The "uniform rate of progress" (URP), or "glidepath," refers to the achievement of these goals through constant annual incremental improvement in the Haze Index (in deciviews (dv)) such that natural conditions will be reached by 2064. Natural background haze levels are not available for some mandatory Class I Federal areas without monitoring data, i.e., Presidential Range/Dry River Wilderness Area, Roosevelt Campobello International Park and Otter Creek Wilderness Area.

5.2. Baseline Visibility

A five-year average (2000 to 2004) baseline visibility in dv was calculated by MANE-VU for each mandatory Class I federal area for the 20% clearest days and 20% most impaired days in accordance with 40 CFR Section 51.308(f)(1) and as detailed in the document entitled *Tracking Visibility Progress 2004-2016* (MANE-VU, November 2018). Table 5-2 presents these values for each IMPROVE monitoring site at MANE-VU mandatory Class I federal areas.

Table 5-2 - Baseline Visibility for the 20% Most Impaired Days and 20% Best Days (2000-2004) in MANE-VU Mandatory Class I Federal Areas

Mandatory Class I Federal Area	Clearest Days (dv)	Most Impaired Days (dv)
Acadia National Park (ACAD1)	8.78	22.01
Moosehorn Wilderness Area and Roosevelt Campobello International Park (MOOS1)	9.16	20.66
Great Gulf Wilderness Area and Presidential Range/Dry River Wilderness Area (GRGU)	7.66	21.93
Lye Brook Wilderness Area (LYBR1/LYEB1)	6.37	23.57
Brigantine Wilderness Area (BRIG1)	14.33	27.43
Dolly Sods Wilderness Area and Otter Creek Wilderness Area (DOSO1)	12.28	28.29
James River Face Area (JARI1)	14.21	28.08
Shenandoah National Park (SHEN1)	10.93	28.32

Source: *Mid-Atlantic/Northeast U.S. Visibility Data, 2004-2016 (2nd RH SIP Metrics)* (https://otcair.org/MANEVU/Upload/Publication/Reports/MANEVU_Trends_2004-16_Report_2nd_SIP_Metrics_05_22_2018_revision.docx), prepared on August 23, 2018

5.3. Comparison of Natural and Baseline Conditions

Table 5-3 compares the baseline visibility for the 20% most impaired and the 20% clearest visibility days based on the five-year average for 2000-2004, natural visibility for the 20% most impaired and the 20% clearest days, and the difference between baseline and natural visibility conditions for each MANE-VU mandatory Class I Federal area. These differences provide the beginning and endpoints of the "glide path" that indicates the progress to be strived for over the term of the Regional Haze Program out to 2064. The uniform rate of progress is used as a starting point to help determine the RPG that will be established for the term of this SIP extending out to 2028, as well as the control measures that contributing states like New York will need to implement to meet these goals. RPG are further discussed in Section 9 of this SIP revision.

Table 5-3 - Summary of Baseline Visibility and Natural Conditions for the 20% Worst and 20% Best Visibility Days

Mandatory Class I Federal Area	2000-2004 Baseline (dv)		Natural Conditions (dv)		Difference (dv)	
	20% Most Impaired	20% Clearest	20% Most Impaired	20% Clearest	20% Most Impaired	20% Clearest
Acadia National Park	22.01	8.78	10.9	4.66	11.11	4.12
Moosehorn National Wildlife Refuge	20.66	9.16	10.3	5.02	10.36	4.14
Roosevelt-Campobello International Park	20.66	9.16	10.3	5.02	10.36	4.14
Great Gulf Wilderness Area	21.93	7.66	10.1	3.73	11.83	3.93
Presidential Range/Dry River Wilderness	21.93	7.66	10.1	3.73	11.83	3.93
Lye Brook Wilderness Area	23.57	6.37	11.3	2.79	12.27	3.58
Brigantine Wilderness Area	27.43	14.33	10.8	5.52	16.63	8.81
Dolly Sods Wilderness Area	28.29	12.28	9.0	3.64	19.29	8.64
Otter Creek Wilderness Area	28.29	12.28	9.0	3.64	19.29	8.64
Shenandoah National Park	28.32	10.93	9.7	3.15	18.62	7.78
James River Face Area	28.08	14.21	9.5	4.39	18.58	9.82

Source: *Mid-Atlantic/Northeast U.S. Visibility Data, 2004-2016 (2nd RH SIP Metrics)* (https://otcair.org/MANEVU/Upload/Publication/Reports/MANEVU_Trends_2004-16_Report_2nd_SIP_Metrics_05_22_2018_revision.docx), prepared on August 23, 2018

5.4. Progress to Date

A five-year average (2012 to 2016) of the most recent visibility in dv was calculated by MANE-VU for each mandatory Class I federal area for the 20% clearest and 20% most impaired days in accordance with 40 CFR Section 51.308(f)(1). The dv visibility for these most impaired and clearest days is based on calculations included in and as detailed in Appendix B, *Technical Guidance on Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program* (EPA, December 2018) of this SIP submission.

Table 5-4 presents the IMPROVE program calculations for the 20% most impaired and clearest days baseline (2000-2004) and current (2012-2016) visibility conditions for each IMPROVE monitoring site at MANE-VU mandatory Class I federal areas and mandatory Class I federal areas that New York contributes to outside of MANE-VU. These values are posted on the FLM Environmental Database, available online at http://views.cira.colostate.edu/fed/DataWizard/Default.aspx.

Table 5-4 - Summary of Baseline Visibility and Current Conditions for the 20% Most Impaired and 20% Clearest Visibility Days

Mandatory Class I Federal Area	Baseline		Current		Difference		Visibility Needed by 2018 to Meet URP	
	20% Most Impaired (dv)	20% Clearest (dv)	20% Most Impaired (dv)	20% Clearest (dv)	20% Most Impaired (dv)	20% Clearest (dv)	20% Most Impaired (dv)	20% Clearest (dv)
Acadia National Park	22.01	8.78	15.28	6.64	6.73	2.14	19.42	7.82
Moosehorn National Wildlife Refuge	20.66	9.16	14.07	6.69	6.59	2.47	18.24	8.19
Roosevelt/ Campobello International Park	20.66	9.16	14.07	6.69	6.59	2.47	18.24	8.19
Great Gulf Wilderness Area	21.93	7.66	13.92	5.32	8.01	2.34	19.17	6.74
Presidential Range/Dry River Wilderness	21.93	7.66	13.92	5.32	8.01	2.34	19.17	6.74
Lye Brook Wilderness Area	23.57	6.37	16.07	5.17	7.50	1.20	20.71	5.53
Brigantine Wilderness Area	27.43	14.33	20.44	11.59	6.99	2.74	23.55	12.27
Dolly Sods Wilderness Area	28.29	12.28	18.88	7.87	9.41	4.41	23.79	10.26
Otter Creek Wilderness Area	28.29	12.28	18.88	7.87	9.41	4.41	23.79	10.26
Shenandoah National Park	28.32	10.93	18.40	7.79	9.92	3.14	23.96	9.11

Source: *Mid-Atlantic/Northeast U.S. Visibility Data, 2004-2016 (2nd RH SIP Metrics)* (https://otcair.org/MANEVU/Upload/Publication/Reports/MANEVU_Trends_2004-16_Report_2nd_SIP_Metrics_05_22_2018_revision.docx), prepared on August 24, 2018

Based on the URP, all mandatory Class I federal areas exceeded the visibility improvement on the 20% most impaired days expected by 2018, to remain on the glidepath, in 2016. In fact, all the MANE-VU mandatory Class I federal areas have already reached the visibility that would be necessary to satisfy the URP in 2028. Improvements to visibility levels since the baseline period represents approximately half of the improvement needed by 2064 to reach natural conditions, as shown in Table 5-5, for all the mandatory Class I Federal areas to which New York contributes. MANE-VU states, including New York, expect future visibility improvements to become more difficult and will continue to implement measures that will reduce visibility impairment, despite being below the URP.

Table 5-5 - Summary of Current Visibility and Natural Conditions for the 20% Most Impaired Visibility and 20% Clearest Days

Mandatory Class I Federal Area	Current		Natural (dv)		Difference (dv)	
	20% Most Impaired (dv)	20% Clearest (dv)	20% Most Impaired (dv)	20% Clearest (dv)	20% Most Impaired (dv)	20% Clearest (dv)
Acadia National Park	15.28	6.64	10.9	4.66	4.38	1.98
Moosehorn National Wildlife Refuge	14.07	6.69	10.3	5.02	3.77	1.67
Roosevelt/ Campobello International Park	14.07	6.69	10.3	5.02	3.77	1.67
Great Gulf Wilderness Area	13.92	5.32	10.1	3.73	3.82	1.59
Presidential Range/Dry River Wilderness	13.92	5.32	10.1	3.73	3.82	1.59
Lye Brook Wilderness Area	16.07	5.17	11.3	2.79	4.77	2.38
Brigantine Wilderness Area	20.44	11.59	10.8	5.52	9.64	6.07
Dolly Sods Wilderness Area	18.88	7.87	9.0	3.64	9.88	4.23
Otter Creek Wilderness Area	18.88	7.87	9.0	3.64	9.88	4.23
Shenandoah National Park	18.40	7.79	9.7	3.15	8.7	4.64

Source: *Mid-Atlantic/Northeast U.S. Visibility Data, 2004-2016 (2nd RH SIP Metrics)* (https://otcair.org/MANEVU/Upload/Publication/Reports/MANEVU_Trends_2004-16_Report_2nd_SIP_Metrics_05_22_2018_revision.docx), prepared on August 24, 2018

6. Monitoring Strategy

Visibility conditions in the mandatory Class I Federal areas are monitored through the IMPROVE program. The IMPROVE program was established in 1985 to measure visibility impairment in mandatory Class I Federal areas throughout the United States. The monitoring sites are operated and maintained through a formal cooperative relationship between the EPA, National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management, and U.S. Forest Service. In 1991, several additional organizations joined the effort: State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (which now is called the National Association of Clean Air Agencies), Western States Air Resources Council, MARAMA, and NESCAUM.

6.1. IMPROVE Program Objectives

Data collected at these sites are used by land managers, industry planners, scientists, public interest groups, and air quality regulators to understand and protect the visual air quality resource in mandatory Class I Federal areas. Most importantly, the IMPROVE program scientifically documents the visual air quality of wilderness areas and national parks. Program objectives include:

- Establish current visibility and aerosol conditions in mandatory Class I Federal areas,
- Identify chemical species and emission sources responsible for existing anthropogenic visibility impairment,
- Document long-term trends for assessing progress toward the national visibility goals, and
- Provide regional haze monitoring representing all visibility-protected mandatory Class I Federal areas where practical, as required by the EPA's Regional Haze Rule.

6.2. New York's Monitoring Responsibilities

New York does not contain any mandatory Class I Federal areas. Therefore, a monitoring plan is not required with this SIP revision pursuant to EPA's Regional Haze Rule.

However, New York must account for its emissions that impact visibility in mandatory Class I Federal areas in downwind states. 40 CFR Section 51.308(f)(6)(iii) requires states without mandatory Class I Federal areas to include procedures by which monitoring data and other information are used in determining the contribution of emissions to regional haze visibility impairment at mandatory Class I Federal areas outside the state. MANE-VU and New York State accept the contribution assessment analysis, published by MANE-VU on its website September 5, 2017, entitled, *Selection of States for MANE-VU Regional*

Consultation (2018), included as Appendix C of this document. New York State agrees that MANE-VU is providing appropriate technical information by using the IMPROVE program data. Information about the use of the default and alternative approaches to the calculation of baseline and natural background conditions can be found in Section 5 of this SIP revision.

6.3. Monitoring Information for MANE-VU Mandatory Class I Federal Areas[2]

Although New York does not contain any mandatory Class I Federal areas, this section provides a description and location for the IMPROVE monitors in the mandatory Class I Federal areas to which New York contributes to regional haze, as required in 40 CFR Section51.308(f)(6)(iii).

6.3.1. Acadia National Park, Maine (Figures 6-1 and 6-2)

Visibility data for Acadia National Park is collected by an IMPROVE monitor (ACAD1) that is operated and maintained by the National Park Service. The monitor is located at Acadia National Park Headquarters in Maine at an elevation of 157 meters, a latitude of 44.38˚ and a longitude of -68.26˚.

Monitoring Strategy

The ACAD1 site is considered to be adequate for assessing RPG of the Acadia National Park by the State of Maine and no additional monitoring sites or equipment are necessary at this time. Maine routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

[2]All maps in this section are derived from maps found at: https://nationalmap.gov/small_scale/printable/fedlands.html#list

Figure 6-1- Locational Map of Acadia National Park, Moosehorn National Wildlife Refuge, and Roosevelt Campobello International Park

Figure 6-2 - Detailed Map of Acadia National Park

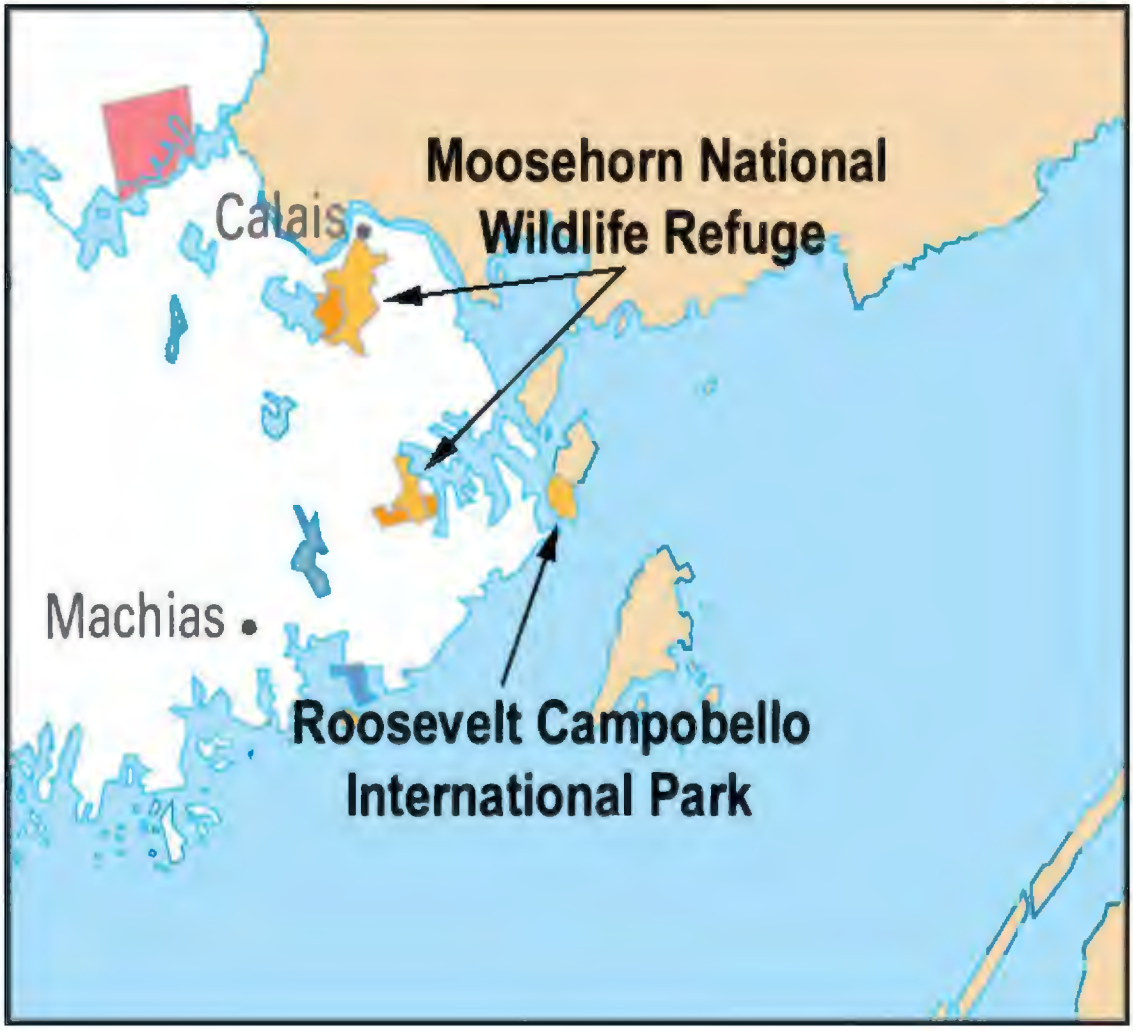
6.3.2. Moosehorn Wilderness Area and Roosevelt/Campobello International Park, Maine (Figures 6-1 and 6-3)

Visibility data for Moosehorn Wilderness Area (located within the Moosehorn National Wildlife Refuge) and Roosevelt/Campobello International Park are collected by an IMPROVE monitor (MOOS1) that is operated and maintained by the U.S. Fish & Wildlife Service. This monitor is located near McConvey Road, about one mile northeast of the National Wildlife Refuge Baring Unit Headquarters in Maine at an elevation of 78 meters, a latitude of 45.13˚ and a longitude of -67.27˚.

Monitoring Strategy

The State of Maine considers the MOOS1 site as the only current IMPROVE monitoring site in Maine adequate for assessing RPG of the Moosehorn National Wildlife Refuge and Roosevelt/Campobello International Park. No additional monitoring sites or equipment are necessary at this time. Maine routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings. This monitor also represents the Roosevelt/Campobello International Park in New Brunswick, Canada.

Figure 6-3 - Detailed Map of the Moosehorn National Wildlife Refuge Areas and Roosevelt Campobello International Park



6.3.3. Brigantine Wilderness Area, New Jersey (Figures 6-4 and 6-5)

Visibility data for Brigantine Wilderness Area (located in the E.B. Forsythe National Wildlife Refuge) is collected by an IMPROVE monitor (BRIG1) that is operated and maintained by the U.S. Fish & Wildlife Service. This monitor is located at the Edwin B. Forsythe National Wildlife Refuge Headquarters in Oceanville, New Jersey at an elevation of 5 meters, a latitude of 39.47˚ and a longitude of -74.45˚.

Monitoring Strategy

The State of New Jersey considers the BRIG1 site as adequate for assessing RPGs of the Brigantine Wilderness Area and no additional monitoring sites or equipment are necessary at this time. New Jersey routinely participates in the

IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

Figure 6-4 - Locational Map of the Brigantine Wilderness Area

Figure 6-5 - Detailed Map of the Brigantine Wilderness Area

6.3.4. Great Gulf and Presidential Range/Dry River Wilderness Areas, New Hampshire (Figures 6-6 and 6-7)

Visibility data for Great Gulf Wilderness Area Presidential Range/Dry River Wilderness Area are collected by an IMPROVE monitor (GRGU1) that is operated and maintained by the U.S. Forest Service. This monitor is located at Camp Dodge, which is located in the mid-northern area of Greens Grant, just east and south of where Route 16 crosses the Greens Grant/Martins Location boundary in the White Mountain National Forest, South of Gorham, New Hampshire, at an elevation of 454 meters, a latitude of 44.31˚ and a longitude of -71.22˚.

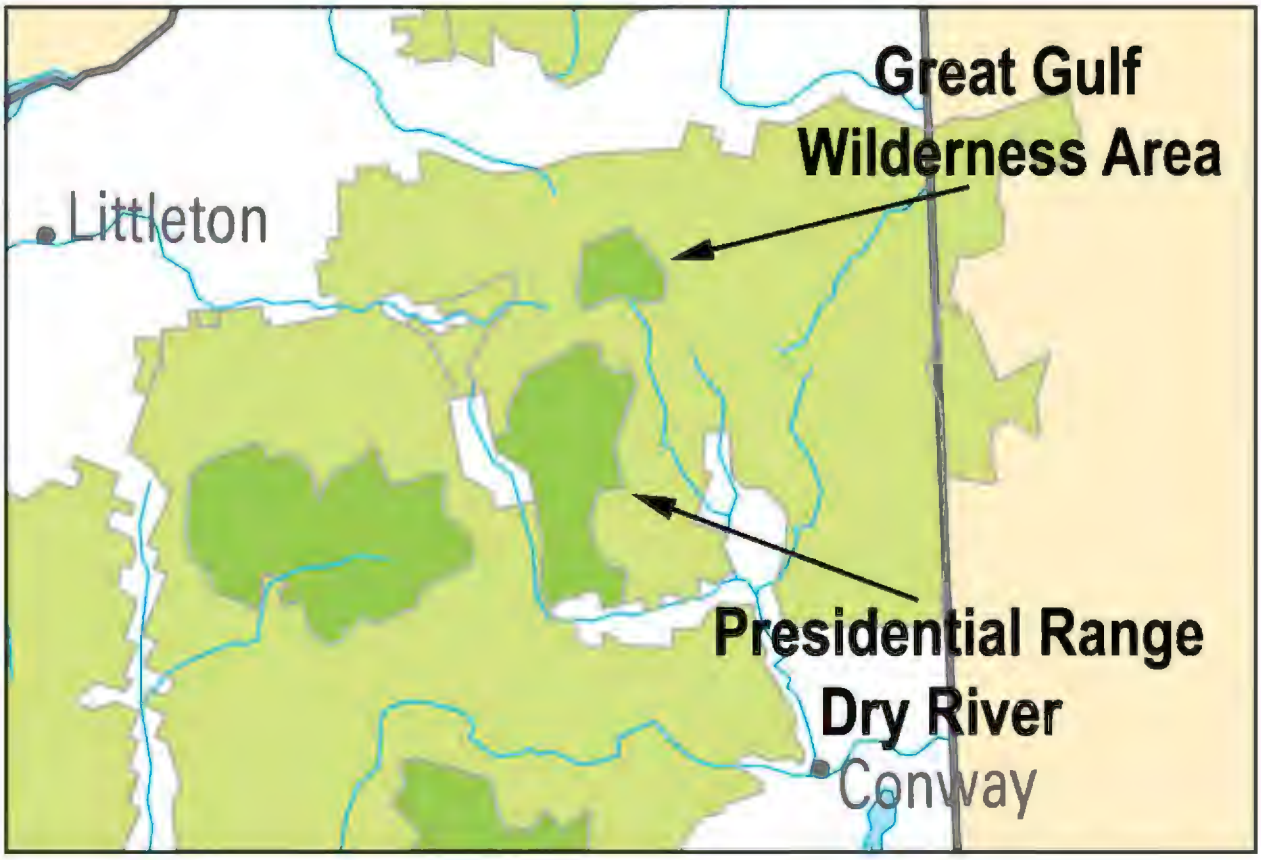
Monitoring Strategy

The State of New Hampshire considers the GRGU1 site as adequate for assessing RPGs of the Great Gulf and Presidential Range/Dry River Wilderness Areas within the White Mountain National Forest. No additional monitoring sites

or equipment are necessary at this time. New Hampshire routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

Figure 6-6 - Locational Map of the Great Gulf Wilderness and Presidential Range Dry River Areas

Figure 6-7 - Detailed Map of the Great Gulf Wilderness and Presidential Range Dry River Areas



6.3.5. Lye Brook Wilderness, Vermont (Figures 6-8 and 6-9)

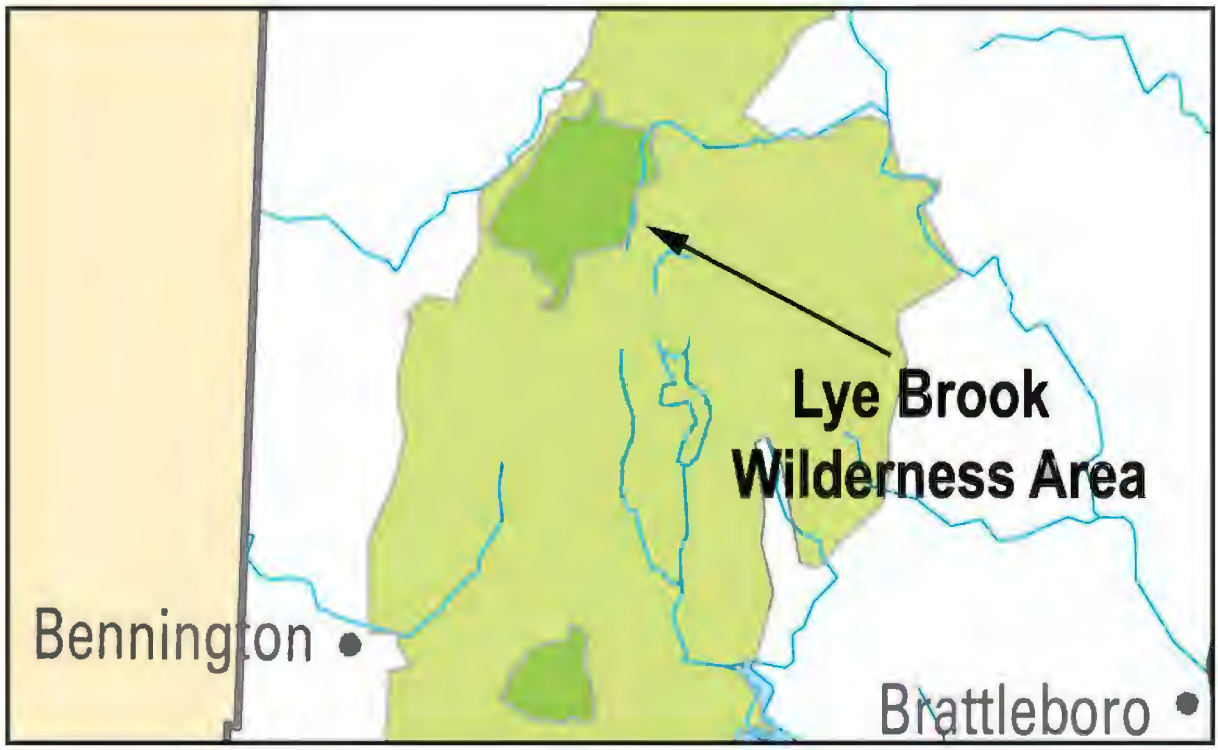
Visibility data for Lye Brook Wilderness Area (located in the Green Mountain National Forest) was collected by IMPROVE monitor LYBR1 until September 2012 and IMPROVE monitor LYEB1 from January 2012 to present. These monitors are operated and maintained by the U.S. Forest Service. There was a 9 month overlap (3 calendar quarters representing Winter, Spring, and Summer), when both sites were operating between Jan 2012- September 2012. The LYBR1 monitor was located on Mount Equinox at the windmills in Manchester, Vermont. The monitor was not in the Wilderness Area but located on a mountain peak across the valley to the west of the wilderness area. The Lye Brook Wilderness Area is at high elevation in the mountains and the LYBR1 site across the valley was at about the same height as the Wilderness Area at an elevation of 1,015 meters, a latitude of 43.15˚ and a longitude of -73.13˚. While changing long term sites is obviously not a preferred option, in this case the Forest Service had to move the site and feel relatively confident (based on collected data) that both sites are similarly representative of the Lye Brook Wilderness area. LYEB1 is located on the SE shoulder of Mount Snow in Dover, VT. Elevation of LYEB1 is 936 m, a latitude of 42.57° and a longitude of -72.54°.

Monitoring Strategy

The State of Vermont considers the LYEB1 site as adequate for assessing RPGs of the Lye Brook Wilderness Area and no additional monitoring sites or equipment are necessary at this time. Vermont routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

Figure 6-8 - Locational Map of the Lye Brook Wilderness Area

Figure 6-9 – Detailed Map of the Lye Brook Wilderness Area



7. Emission Inventory

Section 51.308(f)(6)(v) of EPA's Regional Haze Rule requires the establishment of a statewide emission inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I Federal area. New York has developed inventories for VOCs, NO_X, $PM_{2.5}$, PM_{10}, ammonia (NH_3), carbon monoxide (CO) and SO_2. This section provides information on the development of baseline and future emission inventories that were used in modeling visibility for the purposes of this SIP. This section is also intended to satisfy paragraphs 40 CFR 51.308(g)(4) and 40 CFR 51.308(g)(5) of the Regional Haze Program Requirements.

7.1. Trends in Emissions of Visibility Impairing Pollutants

Paragraph 51.308(g)(4) of the Regional Haze Rule requires periodic progress reports to contain the following element:

> *An analysis tracking the change over the period since the period addressed in the most recent plan required under paragraph (f) of this section in emissions of pollutants contributing to visibility impairment from all sources and activities within the State. Emissions changes should be identified by type of source or activity. With respect to all sources and activities, the analysis must extend at least through the most recent year for which the state has submitted emission inventory information to the Administrator in compliance with the triennial reporting requirements of subpart A of this part as of a date 6 months preceding the required date of the progress report…The State is not required to backcast previously reported emissions to be consistent with more recent emissions estimation procedures, and may draw attention to actual or possible inconsistencies created by changes in estimation procedures.*

Paragraph 51.308(g)(5) requires periodic progress reports to contain the following element:

> *An assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred since the period addressed in the most recent plan required under paragraph (f) of this section including whether or not these changes in anthropogenic emissions were anticipated in that most recent plan and whether they have limited or impeded progress in reducing pollutant emissions and improving visibility.*

New York has therefore provided a summary of emissions of visibility impairing pollutants from all sources and activities within the state for the period from 2002 to 2014. Data categories include point sources, nonpoint sources, nonroad mobile sources, and on-road mobile sources. A brief description of each of these categories is provided below:

- Point sources are distinct facilities that generally report emissions directly via state and/or federal permitting and reporting programs. Point sources usually represent larger facilities such as electric generating units (EGUs), factories, and heating plants for large schools and universities. In the tables and charts that follow, point source NO_X and SO_2 are further broken down into EPA's Air Markets Program Division (AMPD) sources and non-AMPD sources. Most sources that report to one or more of EPA's AMPD programs are EGUs. Therefore, the AMPD point category is a reasonable representation of emissions from EGUs.
- Nonpoint sources are emissions sources that are too small, widespread, or numerous to be inventoried individually. Therefore, emissions are estimated using aggregate activity data such as population, employment, and statewide fuel use (after accounting for the fuel used by point sources). There are many nonpoint emission source categories, but examples include residential fuel combustion and commercial & consumer solvent use.
- Nonroad mobile sources include vehicles and equipment that are not designed to operate on roadways. Examples include aircraft, ships, locomotives, construction equipment, recreational vehicles, and lawn & garden equipment (note, however, that emissions from airports and some large rail yards are inventoried as point sources since these emissions occur at discrete locations).
- On-road mobile sources include vehicles that operate on roadways, including cars, trucks, buses, and motorcycles.

The summary data were taken from EPA's NEI for 2002, 2008, and 2014. Data for 2011 is from New York's base year emission inventory to be consistent with other SIP submissions. Under EPA's Air Emissions Reporting Rule, states are required to submit estimates for all emissions categories to EPA on a three-year cycle. The state submittals are combined with EPA's own estimates to form the NEI. Note that 2005 was a limited effort NEI, so that year is not included in the summary. A brief discussion of the trends in emissions is provided in the section for each pollutant. Inconsistencies due to changes in estimation procedures are also identified, where applicable.

Paragraph 51.308(g)(4) also states, "With respect to sources that report directly to a centralized emissions data system operated by the Administrator, the analysis must extend through the most recent year for which the Administrator has provided a State-level summary of such reported data or an internet-based tool by which the State may obtain such a summary as of a date 6 months preceding the required date of the progress report." Therefore, New York has also provided a summary of NO_X and SO_2 emissions for AMPD sources for the years 2016 and 2017 in Table 7-2 and Table 7-14.

In addition to the New York-specific data, summaries of 2002-2014 emissions from all sectors, and summaries of 2016 and 2017 NO_X and SO_2 emissions from AMPD sources are provided for all MANE-VU states, including Connecticut (CT), Delaware (DE), the District of Columbia (DC), Maine (ME), Maryland (MD), Massachusetts (MA), New Hampshire (NH), New Jersey (NJ), New York (NY), Pennsylvania (PA), Rhode Island (RI), and Vermont (VT). Similar summaries are also provided for the states listed in the MANE-VU Inter-RPO Ask[3] as having the potential to contribute to visibility impairment in MANE-VU mandatory Class I Federal areas. These states include Alabama (AL), Florida (FL), Illinois (IL), Indiana (IN), Kentucky (KY), Louisiana (LA), Michigan (MI), Missouri (MO), Ohio (OH), Tennessee (TN), Texas (TX), Virginia (VA), and West Virginia (WV). This group of states is referred to hereinafter as the "Ask states."

7.1.1. Nitrogen Oxides

NO_X emissions contribute to visibility impairment in the eastern U.S. by forming light-scattering nitrate particles. Nitrates generally account for a substantially smaller fraction of fine particle mass and related light extinction than sulfates and organic carbon at northeastern Class I sites. Notably, nitrates may play a more important role at urban sites and in the wintertime.[4] In addition, NO_X may have an indirect effect on summertime visibility by virtue of its role in the formation of ozone, which in turn promotes the formation of secondary organic aerosols.[5] Table 7-1 provides a summary of NO_X emissions from all data categories – point, nonpoint, nonroad, and on-road – for the period from 2002 to 2014 in New York. This summary is also shown graphically in Figure 7-1.

NO_X emissions have steadily declined in New York from 2002 to 2014, particularly in the nonroad and on-road mobile sectors. Reductions in nonroad emissions are due to many federal rules that result in emissions reductions from nonroad vehicles and equipment. A few examples of regulatory programs that have reduced, and/or will continue to reduce, emissions from nonroad vehicles and equipment include Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel,[6] Control of Emissions from Air Pollution From

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[3] Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) States Concerning a Course of Action in Contributing States Located Upwind of MANE-VU Toward Assuring Reasonable Progress for the Second Regional Haze Implementation Period (2018 – 2018), http://otcair.org/MANEVU/Upload/Publication/Formal%20Actions/MANE-VU%20Inter-Regional%20Ask%20Final%208-25-2017.pdf

[4] MANE-VU Technical Support Committee. *Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions.* November 20, 2017. Retrieved from: https://otcair.org/MANEVU/Upload/Publication/Reports/Winter%20NOX%20Control%20Report%20171120.pdf

[5] NESCAUM (for OTC) (2001, January 31). Regional Haze and Visibility in the Northeast and Mid-Atlantic States. Retrieved from https://www.nescaum.org/documents/regional-haze-and-visibility-in-the-northeast-and-mid-atlantic-states/

[6] "Control of Emissions From Nonroad Diesel Engines and Fuel 69 FR" 38958 (US EPA, June 29, 2004).

Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters Per Cylinder,[7] and Control of Emissions from Nonroad Spark-Ignition Engines and Equipment.[8] On-road mobile emissions reductions are due in part to federal requirements for on-road vehicles such as the Tier 2 motor vehicle emissions standards.[9] It should also be noted that federal requirements for on-road mobile sources and fuels were strengthened with the Tier 3 requirements[10] starting with model year 2017. More information on federal programs to control emissions from mobile sources can be found on EPA's Transportation, Air Pollution, and Climate Change website.[11] New York's Low Emission Vehicle (LEV) program, 6 NYCRR Part 218, has lowered NO_X emissions in the state. More details on Part 218 can be found in Section 10.3.6 of this document. For both nonroad and on-road mobile sources, NO_X emissions are expected to continue to decrease as fleets turn over and older more polluting vehicles and equipment are replaced by newer, cleaner vehicles. Nonpoint emissions of NO_X have been variable from 2002 to 2014 due to year to year variation, as well as changes to the tools used to estimate nonpoint emissions.

Table 7-1 - NO_X Emissions in New York for all Source Categories, 2002 – 2014 (Tons)

Category	2002	2008	2011	2014
AMPD Point	85,989	47,556	31,075	22,214
Non-AMPD Point	37,655	31,881	19,973	27,532
Nonpoint	32,643	104,493	65,602	84,469
Nonroad	90,526	71,121	59,491	53,071
On-road	290,698	187,043	173,269	143,495
Total	**537,513**	**442,093**	**349,410**	**330,782**

[7] "Control of Emissions of Air From Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder; Republication" 73 FR 37096 (US EPA, June 30, 2008)
[8] "Control of Emissions From Nonroad Spark-Ignition Engines and Equipment" 73 FR 59034 (US EPA, October 8, 2008)
[9] Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements, Final Rule (https://www.gpo.gov/fdsys/pkg/FR-2000-02-10/pdf/00-19.pdf)
[10] Tier 3 Motor Vehicle Emission and Fuel Standards, Final Rule (https://www.gpo.gov/fdsys/pkg/FR-2014-04-28/pdf/2014-06954.pdf)
[11] https://www.epa.gov/air-pollution-transportation

Figure 7-1 - NO_X Emissions in New York for all Source Categories, 2002 – 2014

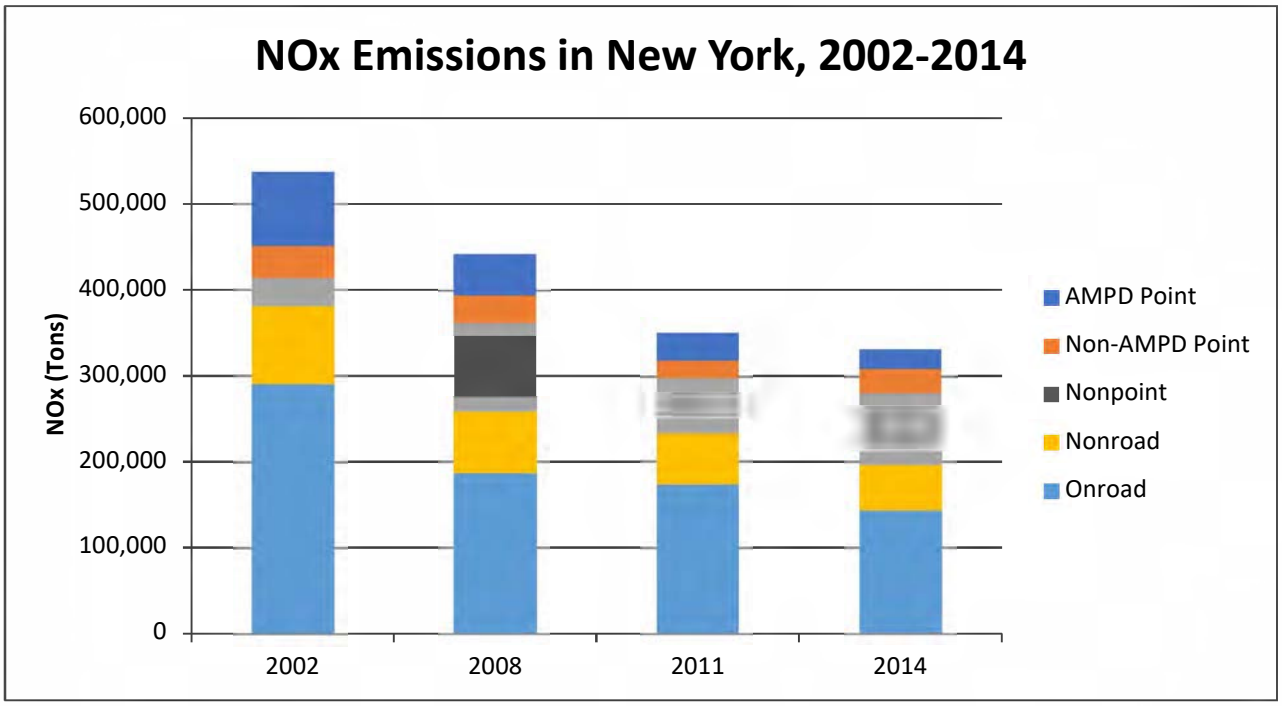


Table 7-2 demonstrates that NO_X emissions from AMPD sources in New York have also declined from 2016 to 2017. AMPD NO_X emissions in 2016 and 2017 have also declined relative to the 2002 to 2014 data shown in Table 7-1.

Table 7-2 - NO_X Emissions from AMPD Sources in New York, 2016 – 2017 (Tons)

2016	2017
16,222	11,422

In general, power plants have historically accounted for more than one-quarter of national NO_X emissions, but mobile sources dominate the NO_X emissions in the more urbanized MANE-VU states. In MANE-VU, on-road mobile sources represent the most significant NO_X source category. Emissions from nonroad mobile sources, primarily diesel-fired engines, also represent a substantial fraction of the inventory. Table 7-3 and Figure 7-2 show total NO_X emissions from all source categories for the MANE-VU states for the period from 2002 to 2014. Table 7-4 and Figure 7-3 show the same data for the Ask states.

Tables 7-3 and 7-4 and Figures 7-2 and 7-3 show a steady decline in NO_X emissions from 2002 to 2014 for almost all of the MANE-VU states and the Ask states. Much of this decline in NO_X emissions is due to the federal control programs for nonroad and on-road mobile sources described earlier. Other

sources of NO_X emissions reductions include individual states' rules for Reasonably Available Control Technology for NO_X (NO_X RACT).

Table 7-3 - Total NO_X Emissions in the MANE-VU States from all Source Categories, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
CT	115,012	93,080	72,828	63,003
DE	57,345	42,790	29,436	27,684
DC	15,169	13,189	9,403	8,566
ME	85,995	71,606	59,785	52,346
MD	291,299	205,239	165,185	138,496
MA	287,077	168,599	136,892	127,304
NH	69,036	66,595	47,947	49,880
NJ	330,369	244,552	168,297	155,826
NY	537,513	442,093	349,410	330,782
PA	718,261	616,320	561,928	492,755
RI	29,917	18,963	22,489	24,716
VT	28,764	20,903	19,635	15,697
Total	**2,565,756**	**2,003,930**	**1,643,233**	**1,487,054**

Figure 7-2 - Total NO_X Emissions in the MANE-VU States from all Source Categories, 2002 – 2014

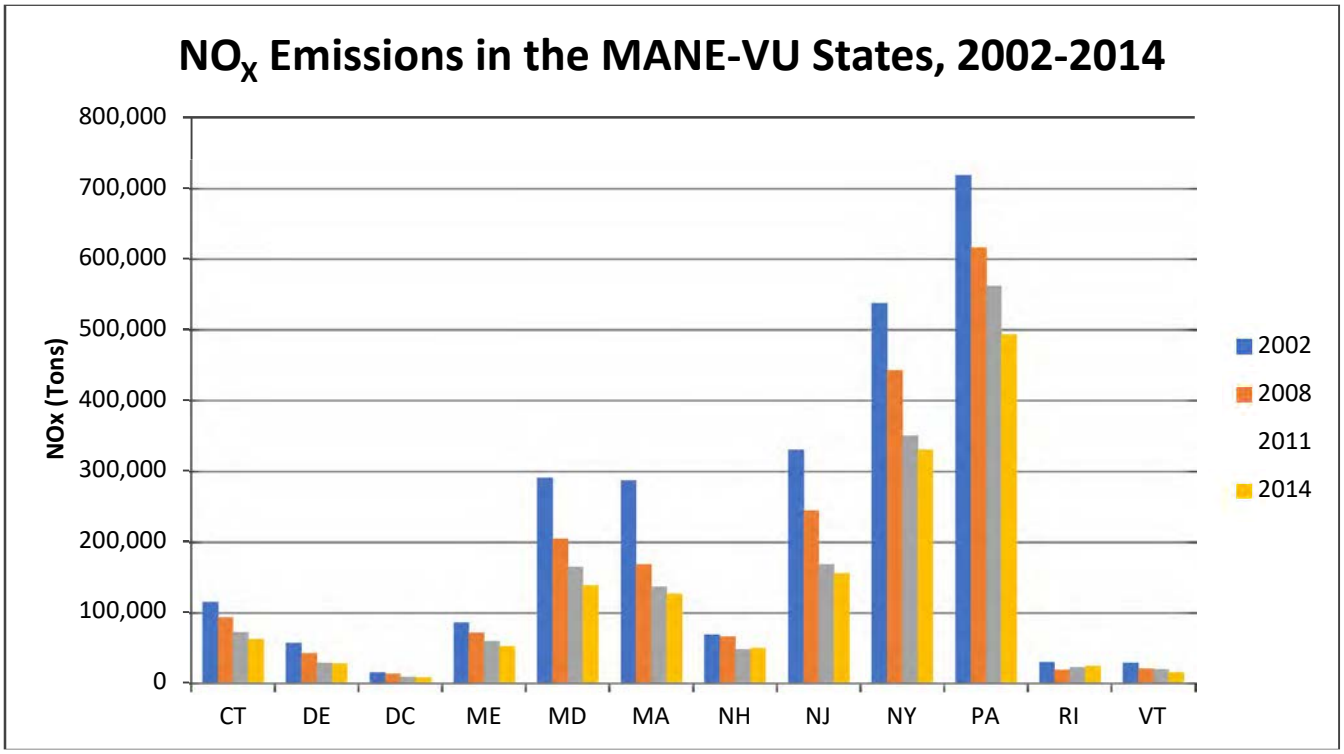


Table 7-4 - Total NO_X Emissions in the Ask States from all Source Categories, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
AL	494,699	369,943	345,285	314,187
FL	1,092,044	853,858	609,704	558,725
IL	847,488	638,926	507,075	453,108
IN	723,294	545,953	443,116	395,719
KY	484,708	378,216	324,803	281,468
LA	723,164	496,880	519,018	361,543
MI	684,627	628,254	444,088	382, 946
MO	542,019	425,645	365,593	357,946
NC	596,536	434,596	366,131	305,674
OH	948,927	740,029	583,802	429,038
TN	557,649	416,702	320,085	265,631
TX	1,894,041	1,515,796	1,268,310	1,225,152
VA	511,048	373,229	310,821	273,733
WV	381,774	213,495	171,715	184,782
Total	**10,482,019**	**8,031,520**	**6,579,545**	**5,789,653**

Figure 7-3 – Total NO_X Emissions in the Ask States from all Source Categories, 2002 – 2014

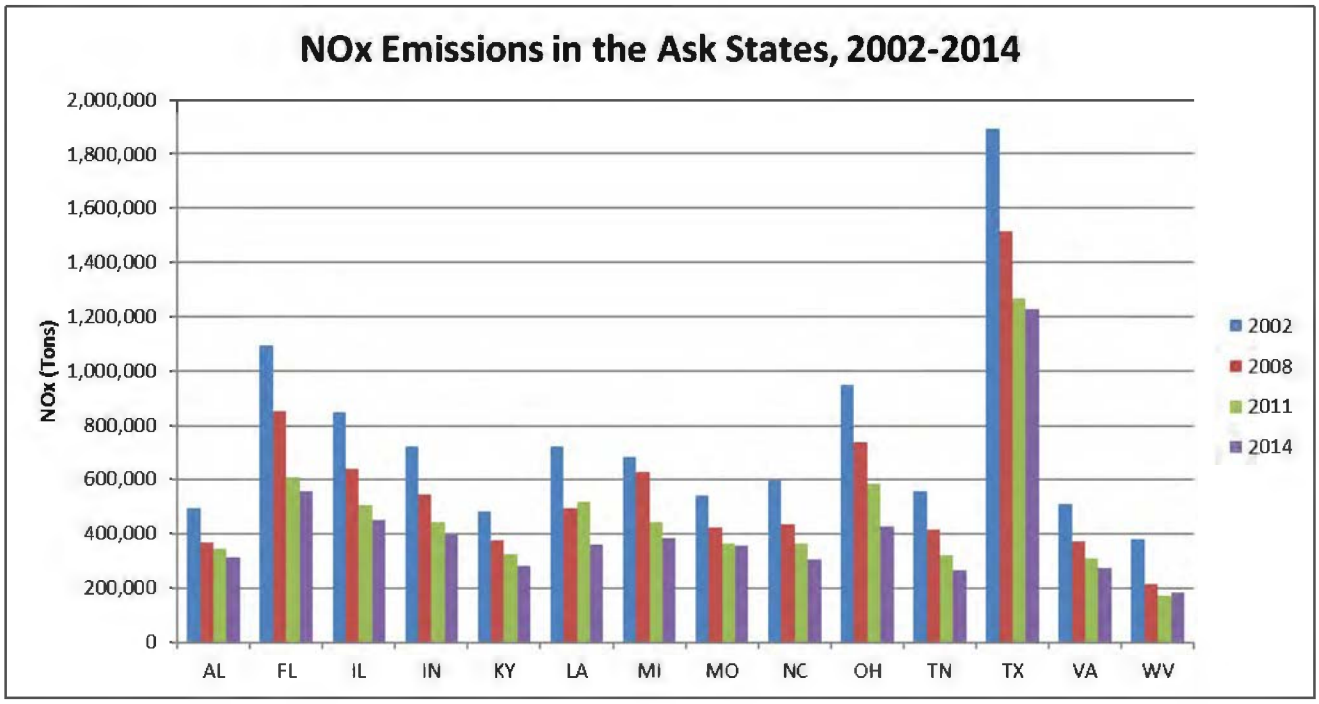


Table 7-5 and Figure 7-4 show AMPD NO_X data for the MANE-VU states for 2016 and 2017, and Table 7-6 and Figure 7-5 show AMPD NO_X data for the Ask states for 2016 and 2017. Tables 7-5 and 7-6 and Figures 7-4 and 7-5 show decreases in NO_X emissions for the AMPD sources between 2016 and 2017 for all states in MANE-VU as well as almost all of the Ask states. For applicable states, some of the reduction in AMPD NO_X since 2002 is attributable to a series of federal regional allowance trading programs – i.e., the NO_X Budget Trading Program,[12] the Clean Air Interstate Rule (CAIR),[13] and, currently, the Cross-State Air Pollution Rule (CSAPR).[14] Other reductions are attributable to source retirements and fuel switching due to the availability of less expensive natural gas in recent years.

[12] https://www.epa.gov/airmarkets/nox-budget-trading-program
[13] https://archive.epa.gov/airmarkets/programs/cair/web/html/index.html
[14] https://www.epa.gov/csapr

Table 7-5 - NO_X Emissions from AMPD Sources in the MANE-VU States, 2016 – 2017 (Tons)

State	2016	2017
CT	1,058	1,052
DC	68	42
DE	1,308	889
MA	2,883	2,372
MD	9,395	6,112
ME	288	263
NH	1,326	1,070
NJ	4,382	3,443
NY	16,222	11,422
PA	79,450	36,967
RI	448	470
VT	167	139
Total	**116,995**	**64,240**

Figure 7-4 - NO_x Emissions from AMPD Sources in the MANE-VU States, 2016 – 2017

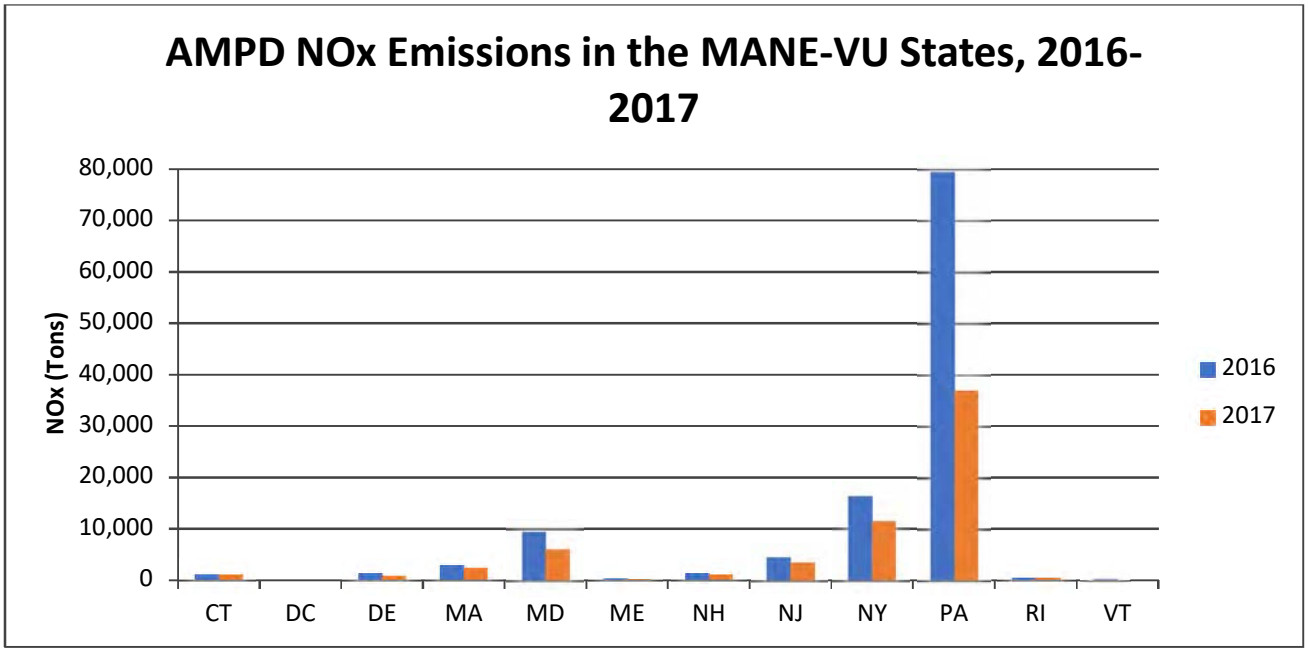
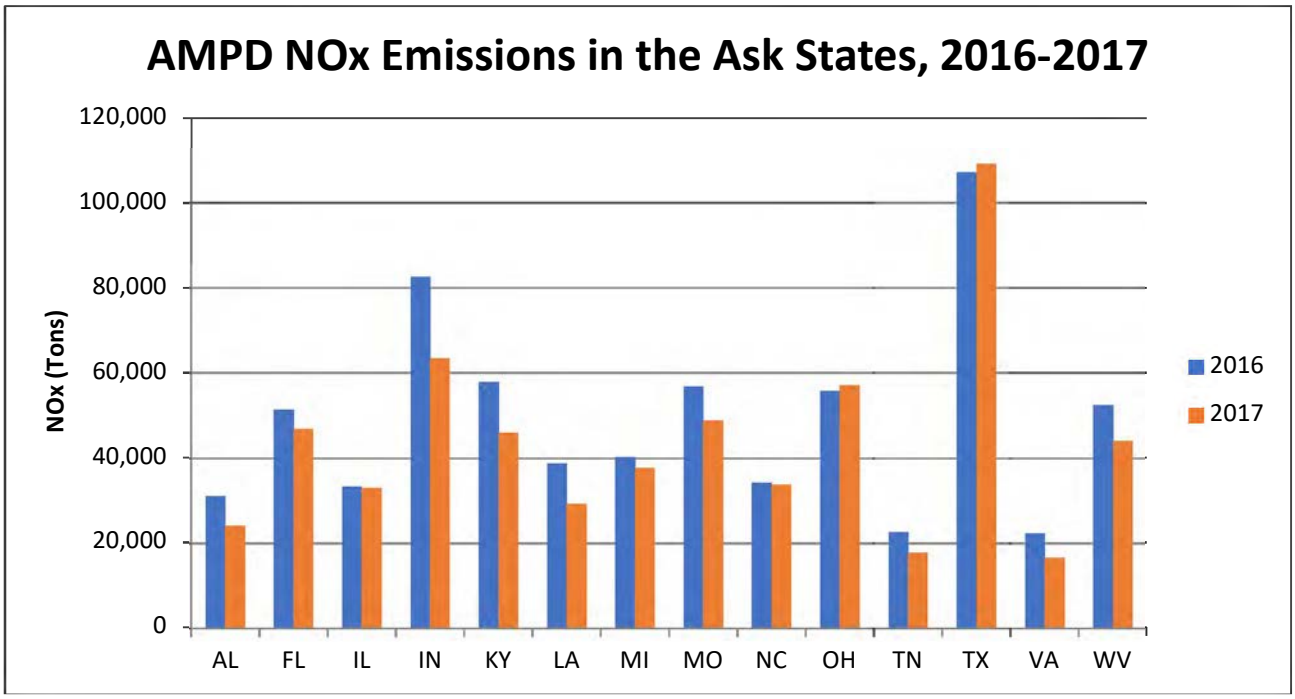


Table 7-6 - NO_X Emissions from AMPD Sources in the Ask States, 2016 – 2017 (Tons)

State	2016	2017
AL	31,127	24,121
FL	51,442	46,907
IL	33,298	33,066
IN	82,615	63,421
KY	57,764	46,053
LA	38,836	29,249
MI	40,354	37,724
MO	56,692	48,964
NC	34,287	33,761
OH	55,756	57,018
TN	22,610	17,883
TX	107,158	109,167
VA	22,278	16,537
WV	52,584	44,079
Total	**686,801**	**607,951**

Figure 7-5 - NO_X Emissions from AMPD Sources in the Ask States, 2016 – 2017



7.1.2. Particulate Matter Less Than 10 Microns

Directly-emitted or "primary" particles can also contribute to regional haze. Table 7-7 shows a summary of PM_{10} emissions from all data categories – point, nonpoint, nonroad, and on-road – for the period from 2002 to 2014 in New York. This summary is also shown graphically in Figure 7-6. Generally, changes in PM_{10} emissions from 2002 to 2008 and 2011 to 2014 are likely due to changes to the methods used for estimating residential wood combustion emissions.

Table 7-7 - PM_{10} Emissions in New York for all Source Categories, 2002 – 2014 (Tons)

Category	2002	2008	2011	2014
Point	22,820	10,761	7,481	6,088
Nonpoint	346,232	294,408	187,835	205,769
Nonroad	9,271	7,469	6,145	5,578
On-road	8,059	12,402	17,099	15,006
Total	**386,381**	**325,041**	**218,559**	**232,441**

Figure 7-6 - PM_{10} Emissions in New York for all Source Categories, 2002 – 2014

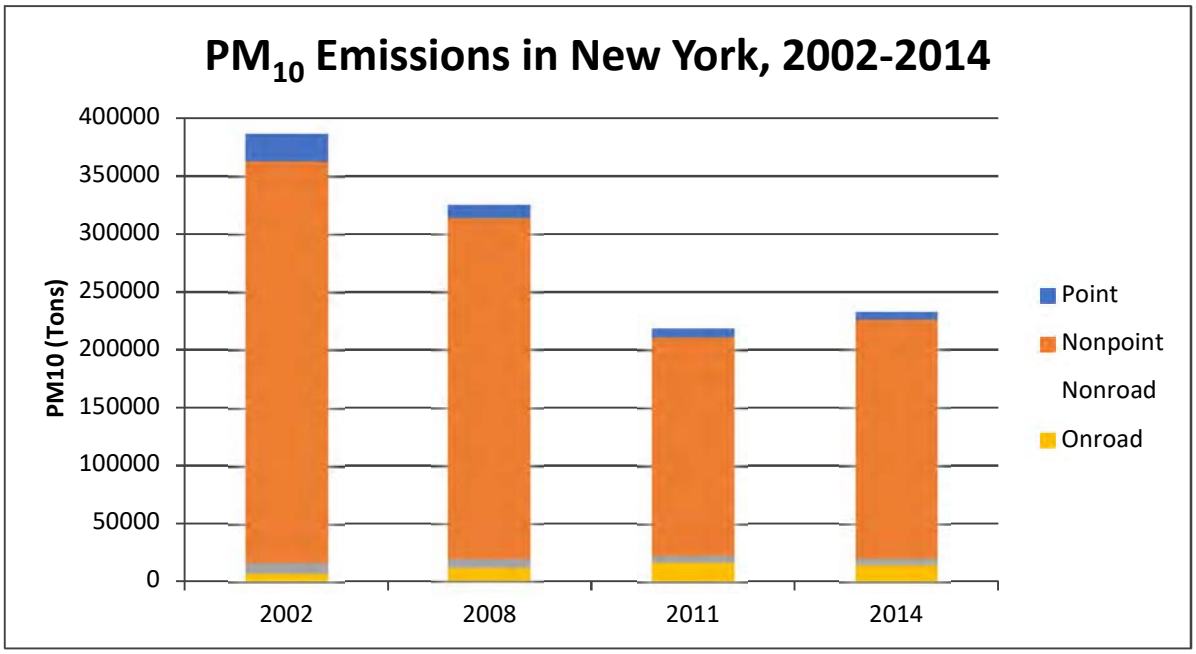


Table 7-8 and Figure 7-7 show total PM_{10} emissions from all source categories in the MANE-VU states. Similarly, Table 7-9 and Figure 7-8 show total PM_{10} emissions from all source categories in the Ask states. PM_{10} emissions in the MANE-VU and Ask states show no particular pattern over the 2002 to 2014 period. Some of the large declines in PM_{10} emissions from 2002 to subsequent years, as well as some of the increases in 2014, could be due to changes in estimation methodologies for categories such as yard waste burning, paved and unpaved road dust, and residential wood combustion.

Table 7-8 - Total PM_{10} Emissions in the MANE-VU States from all Source Categories, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
CT	53,267	39,048	39,097	28,842
DE	17,165	21,544	15,071	14,896
DC	6,839	5,211	3,410	3,865
ME	69,543	52,311	49,526	35,606
MD	126,986	92,156	74,522	114,097
MA	209,076	165,801	162,952	109,218
NH	46,551	33,814	33,379	21,985
NJ	77,723	70,431	49,742	46,093
NY	386,381	325,041	218,559	232,441
PA	465,435	352,392	273,067	278,725
RI	9,103	10,267	8,387	8,400
VT	55,937	53,130	38,373	23,422
Total	**1,524,005**	**1,221,145**	**966,086**	**917,589**

Figure 7-7 - Total PM_{10} Emissions in the MANE-VU States from all Source Categories, 2002 – 2014

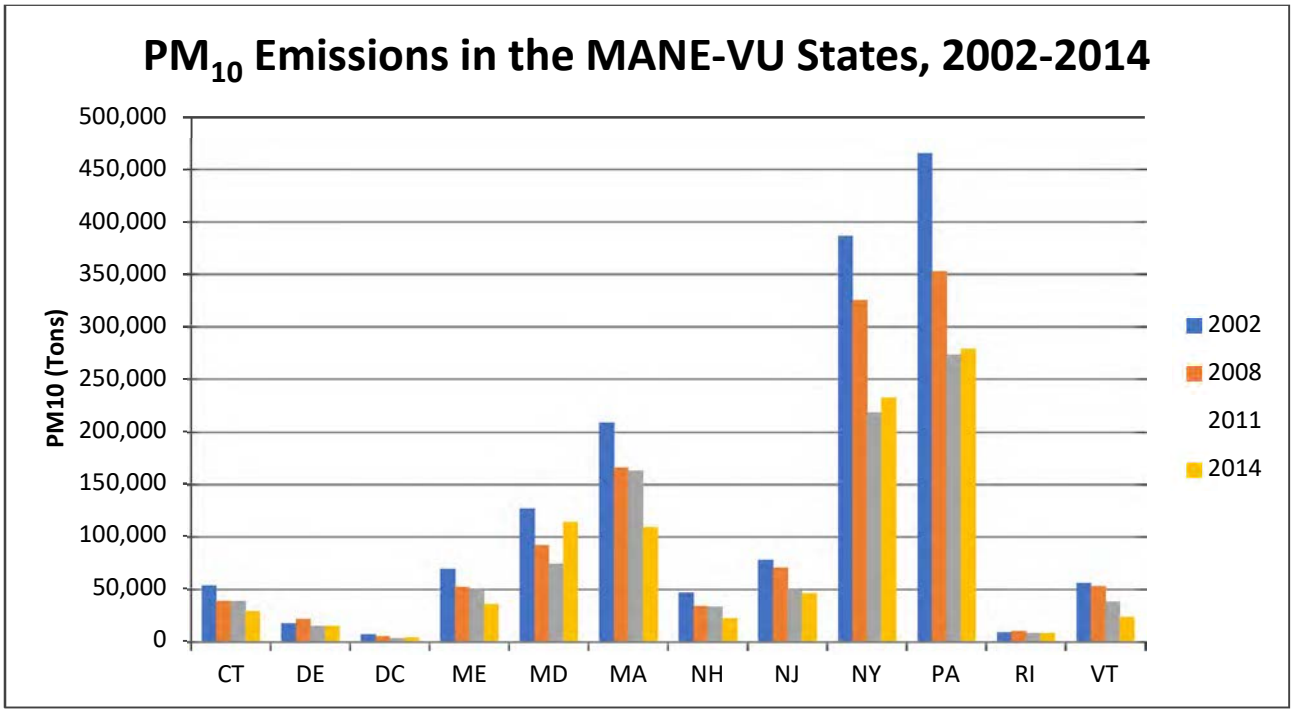
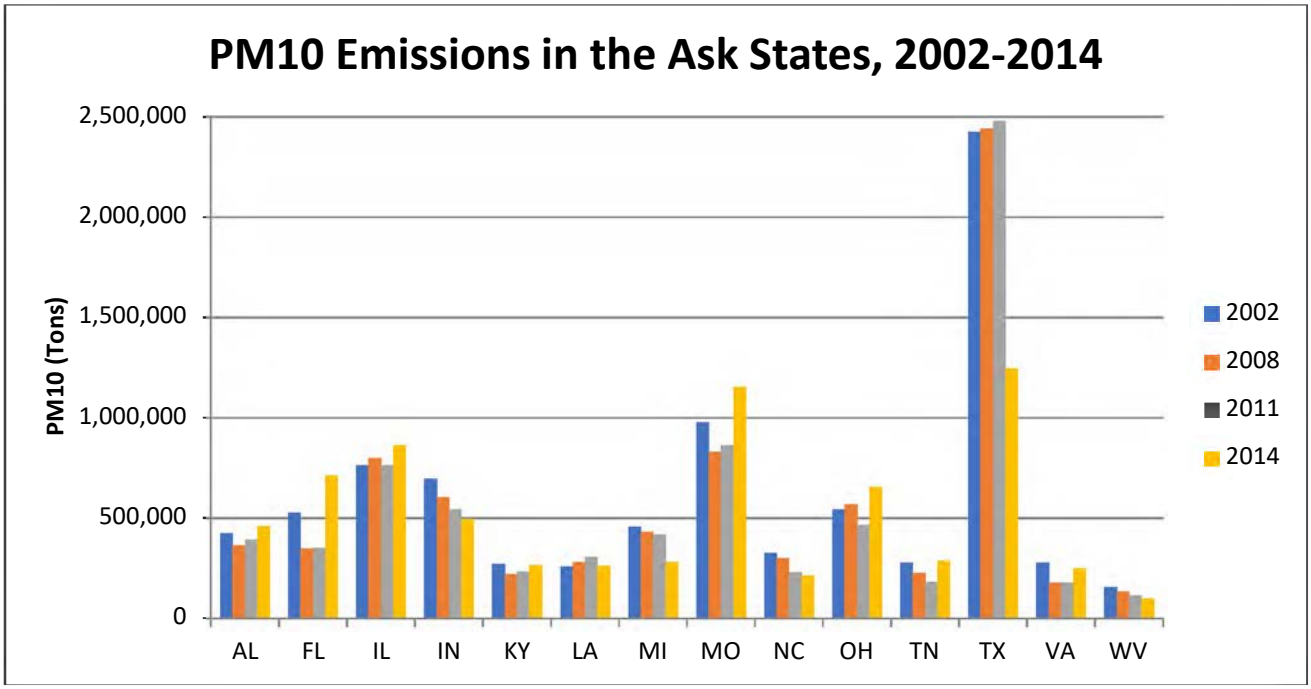


Table 7-9 - Total PM_{10} Emissions in the Ask States from all Source Categories, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
AL	425,221	363,195	393,530	460,695
FL	527,753	348,091	351,483	713,703
IL	764,273	797,788	762,584	863,923
IN	696,591	602,105	544,131	495,961
KY	270,051	219,956	232,735	265,370
LA	259,793	281,998	307,928	263,360
MI	455,348	431,311	418,847	282,519
MO	977,691	831,795	861,980	1,153,343
NC	327,059	300,866	230,453	213,800
OH	544,239	568,210	467,023	655,947
TN	278,733	227,616	182,467	286,276
TX	2,424,752	2,440,498	2,478,052	1,245,310
VA	277,684	179,593	179,646	249,306
WV	156,682	133,479	115,661	99,561
Total	**8,385,869**	**7,726,500**	**7,526,521**	**7,249,074**

Figure 7-8 - Total PM_{10} Emissions in the Ask States from all Source Categories, 2002 – 2014



7.1.3. Particulate Matter Less Than 2.5 Microns

Table 7-10 shows a summary of $PM_{2.5}$ emissions from all data categories for the period from 2002 to 2014 in New York. This summary is also shown graphically in Figure 7-9. Similar to PM_{10}, $PM_{2.5}$ emissions have remained constant in New York, with 2008 being an outlier.

Table 7-10 - $PM_{2.5}$ Emissions in New York from all Source Categories, 2002 – 2014 (Tons)

Category	2002	2008	2011	2014
Point	16,938	6,776	5,163	4,026
Nonpoint	50,146	70,458	63,514	65,584
Nonroad	8,796	7,101	5,828	5,282
On-road	5,547	8,692	8,117	6,807
Total	**81,427**	**93,027**	**82,621**	**81,699**

Figure 7-9 - $PM_{2.5}$ Emissions in New York from all Source Categories

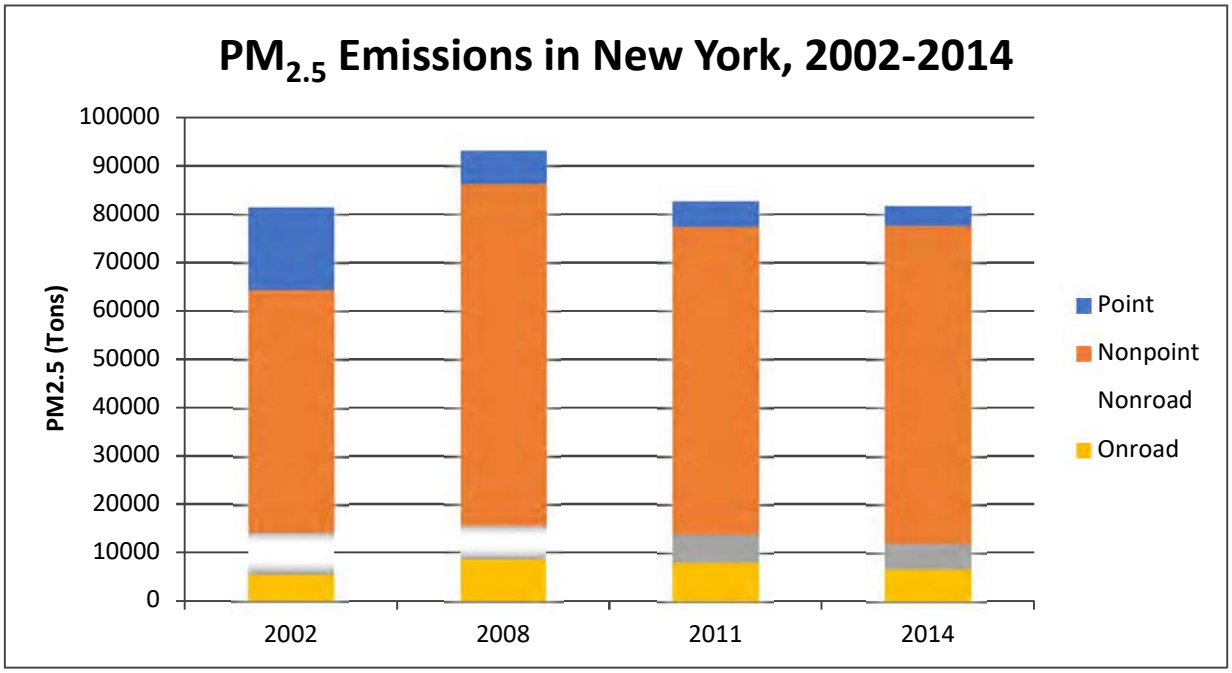


Table 7-11 and Figure 7-10 show total $PM_{2.5}$ emissions from all source categories in the MANE-VU states. Similarly, Table 7-12 and Figure 7-11 show total $PM_{2.5}$ emissions from all source categories in the Ask states. $PM_{2.5}$ emissions in the MANE-VU and Ask states show an overall decrease over the 2002 to 2014 period, although this trend did not occur in all states. As with PM_{10}, some of the large declines in $PM_{2.5}$ emissions from 2002 to subsequent years, as well as some of the increases in 2014, could be due to changes in estimation methodologies for categories such as yard waste burning, paved and unpaved road dust, and residential wood combustion.

Table 7-11 - Total $PM_{2.5}$ Emissions in the MANE-VU States from all Source Categories, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
CT	17,183	16,190	16,545	13,088
DE	6,288	6,838	5,549	4,174
DC	1,343	1,694	1,361	1,263
ME	24,515	19,930	19,045	16,270
MD	51,465	32,947	28,499	29,848
MA	54,140	36,965	37,770	32,192
NH	19,207	16,257	14,710	11,358
NJ	29,976	26,966	25,785	23,317
NY	81,427	93,027	82,621	81,699
PA	124,964	145,016	108,748	108,665
RI	2,433	4,163	3,949	4,310
VT	10,167	14,280	13,351	11,593
Total	**423,107**	**414,275**	**357,934**	**337,777**

Figure 7-10 - Total $PM_{2.5}$ Emissions in the MANE-VU States from all Source Categories, 2002 – 2014

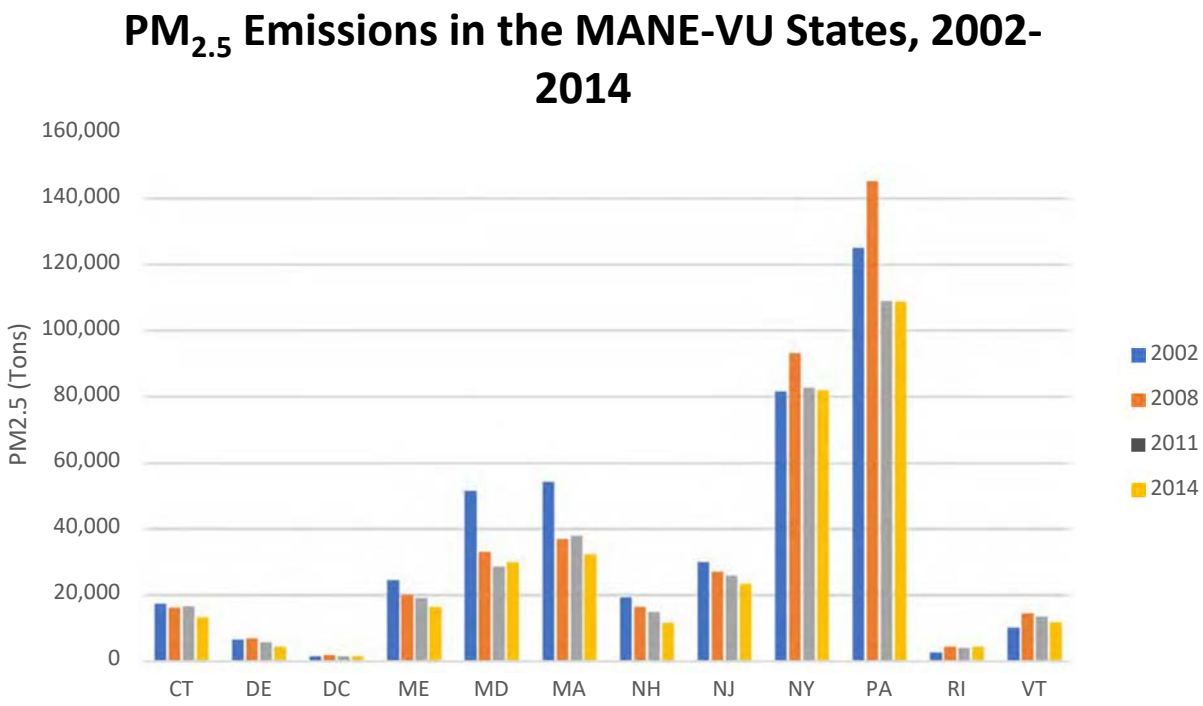
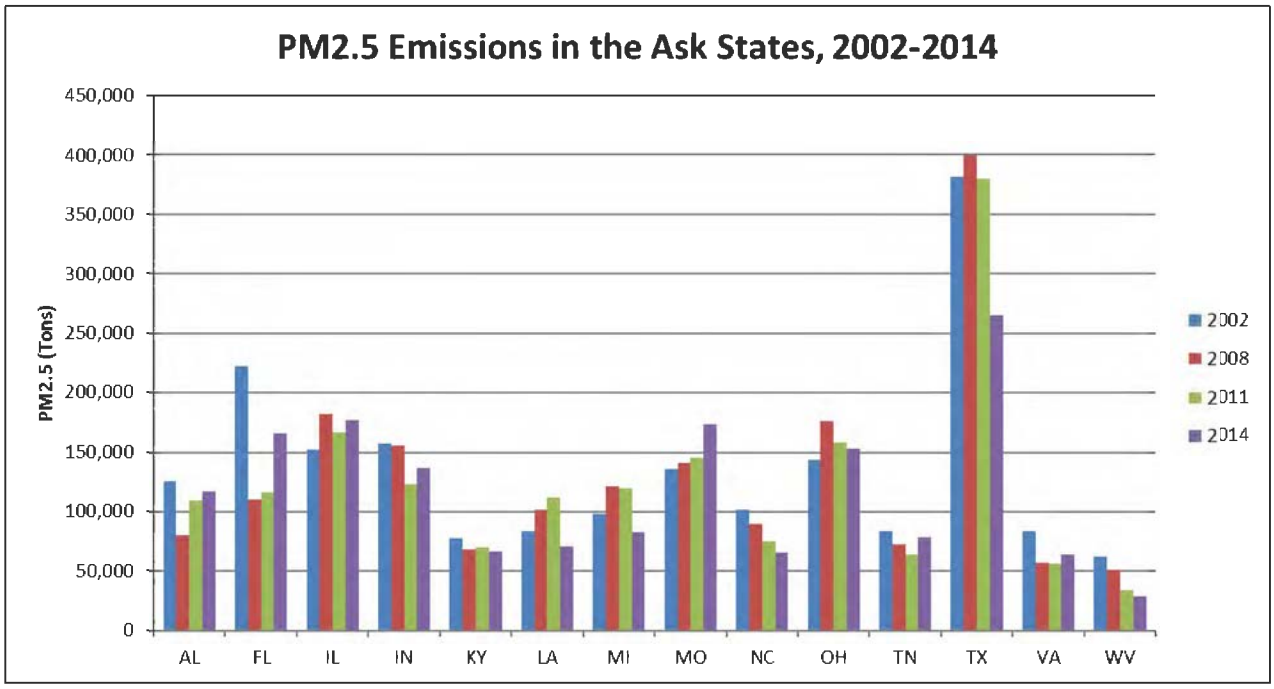


Table 7-12 - Total $PM_{2.5}$ Emissions in the Ask States from all Source Categories, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
AL	125,441	80,622	109,345	117,272
FL	222,204	109,965	116,396	165,534
IL	152,316	182,344	166,699	176,836
IN	157,078	155,982	123,193	136,613
KY	77,952	68,484	69,665	66,812
LA	83,989	101,593	112,415	70,884
MI	98,713	121,710	120,121	82,780
MO	135,832	140,955	145,230	173,260
NC	101,965	89,613	74,844	66,023
OH	143,671	176,599	157,995	153,291
TN	84,176	72,333	63,949	79,020
TX	381,212	399,176	379,886	264,976
VA	83,567	57,083	56,157	64,340
WV	62,269	50,936	33,712	28,929
Total	**1,910,383**	**1,807,395**	**1,729,607**	**1,646,569**

Figure 7-11 - Total $PM_{2.5}$ Emissions in the Ask States from all Source Categories, 2002 – 2014



7.1.4. Sulfur Dioxide

SO_2 is the primary precursor pollutant for sulfate particles. Sulfate particles commonly accounted for up to 41% of particle-related light extinction at northeastern mandatory Class I Federal areas on the clearest days, and 39-68% on the haziest days during the baseline period. In the previous planning period, the effect of sulfate decreased, but still accounted for up to 58% of the light extinction on the most impaired days. This makes SO_2 emissions an obvious target of opportunity for reducing regional haze in the eastern United States. Combustion of coal and, to a lesser extent, of certain petroleum products accounts for most anthropogenic SO_2 emissions. Table 7-13 shows SO_2 emissions in New York for all data categories for the period from 2002 to 2014; these data are also shown graphically in Figure 7-12.

Table 7-13 - SO_2 Emissions in New York from all Source Categories, 2002 – 2014 (Tons)

Category	2002	2008	2011	2014
AMPD Point	231,985	65,427	40,756	16,676
Non-AMPD Point	65,469	52,699	23,434	25,052
Nonpoint	135,454	74,185	43,042	9,545
Nonroad	14,256	3,385	171	98
On-road	8,075	1,532	1,475	1,486
Total	**455,239**	**193,703**	**108,877**	**52,857**

*2002 Nonpoint data from NYS 2002 inventory

Figure 7-12- SO2 Emissions in New York from all Source Categories, 2002 – 2014

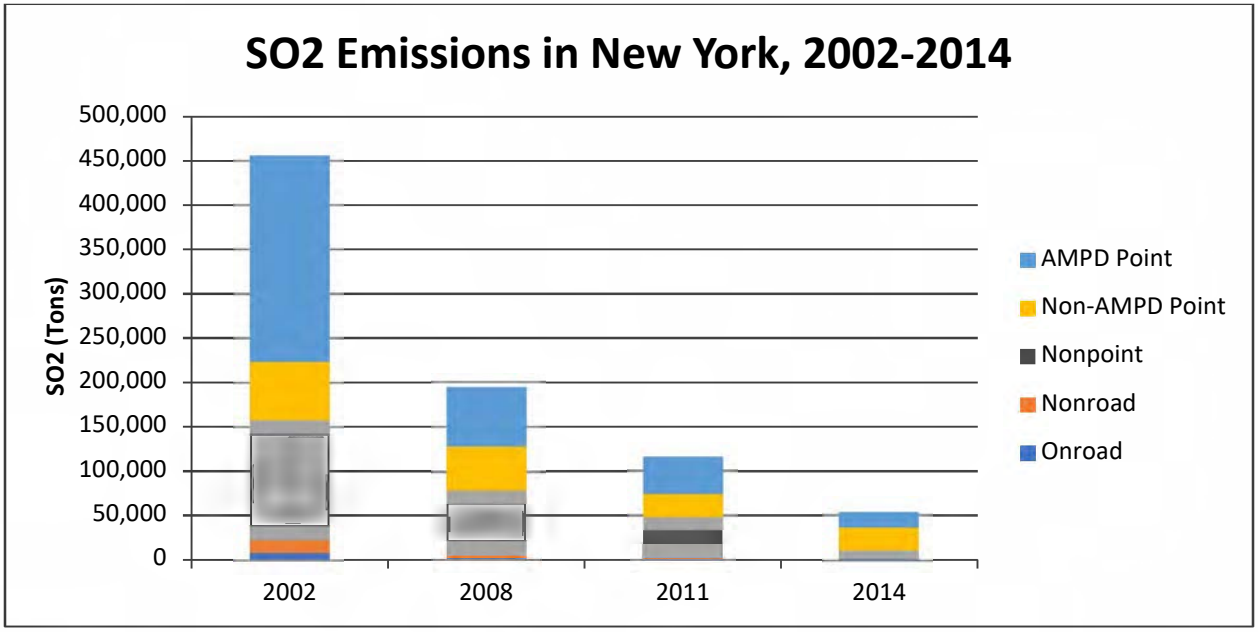


Table 7-14 demonstrates that SO_2 emissions from AMPD sources in New York have also declined from 2016 to 2017. AMPD SO_2 emissions in 2016 and 2017 have also declined relative to the 2002 to 2014 data shown in Table 7-13.

Table 7-14 - SO_2 Emissions for AMPD Sources in New York, 2016 – 2017 (Tons)

2016	2017
4,533	2,561

Table 7-15 and Figure 7-13 show total SO_2 emissions from all source categories in the MANE-VU states for 2002 to 2014. A steady decrease in SO_2 emissions was observed for each MANE-VU state over this period. Some of these decreases are attributable to the low sulfur fuel strategy and the 90% or greater reduction in SO_2 emissions at 167 EGU stacks (both inside and outside of MANE-VU) requested in the MANE-VU "Ask" for states within MANE-VU for the first regional haze planning period.[15] Since some components of the MANE-VU low sulfur fuel strategy have milestones of 2014, 2016, and 2018, and as MANE-VU states continue to adopt rules to implement the strategy, SO_2 emissions reductions are expected to continue well beyond the 2002 to 2014 timeframe shown in Table 7-15 and Figure 7-13. Other SO_2 emissions decreases are due to source shutdowns and fuel switching due to the availability of less expensive natural gas in recent years.

Table 7-15 - Total SO_2 Emissions in the MANE-VU States for all Source Categories, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
CT	38,102	19,443	15,334	12,445
DE	86,999	44,282	13,883	4,330
DC	4,051	1,273	1,829	252
ME	33,585	23,362	15,528	11,242
MD	324,015	264,487	71,751	48,490
MA	156,778	76,256	51,338	18,890
NH	55,246	45,666	31,257	8,554
NJ	96,967	44,370	17,907	10,951
NY	455,239	193,703	108,877	52,857
PA	1,015,732	987,671	398,497	329,804
RI	8,158	4,345	4,689	3,406
VT	4,988	4,044	3,445	1,503
Total	**2,151,071**	**1,708,903**	**734,334**	**502,723**

[15] Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Course of Action within MANE-VU Toward Assuring Reasonable Progress (http://otcair.org/MANEVU/Upload/Publication/Formal%20Actions/Statement%20on%20Controls%20in%20MV_072007.pdf)

Figure 7-13 - Total SO2 Emissions in the MANE-VU States for all Source Categories, 2002-2014

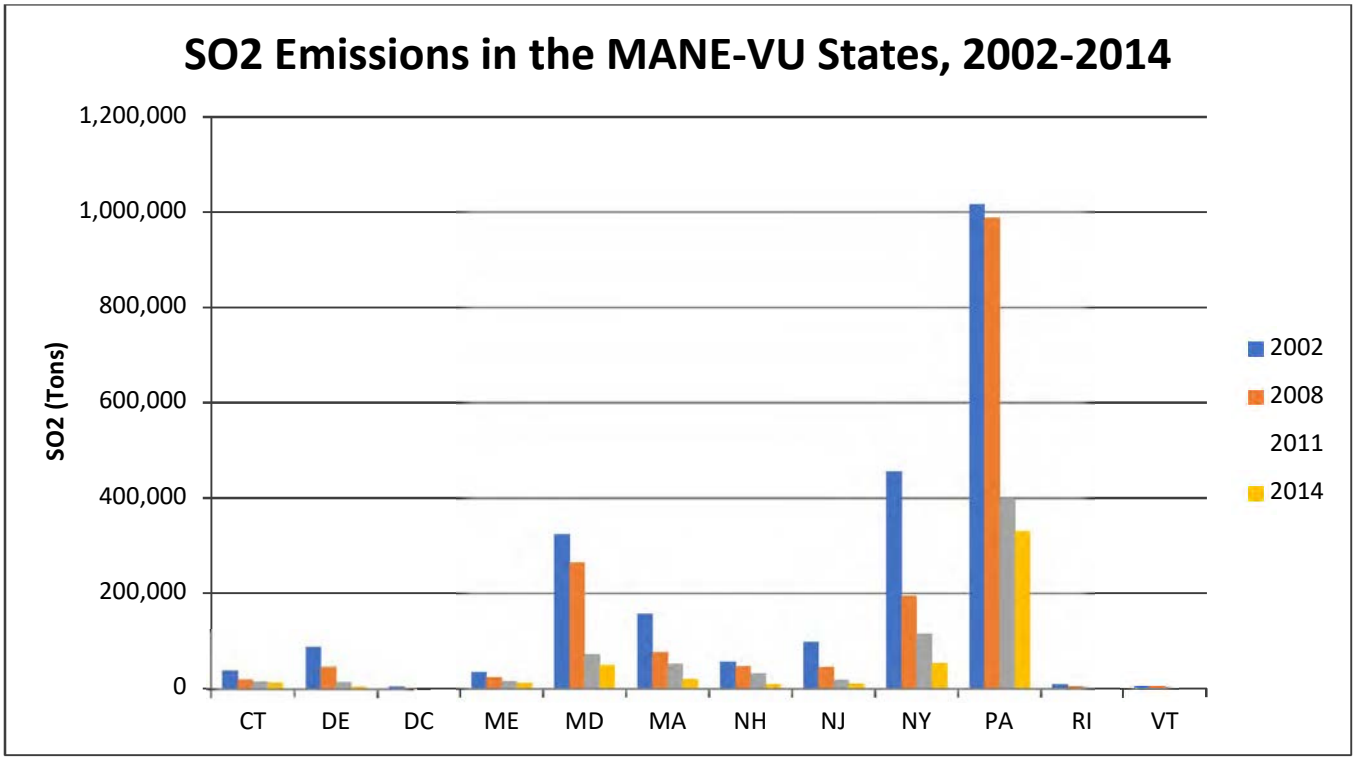


Table 7-16 and Figure 7-14 show total SO_2 emissions from all source categories in the Ask states for 2002 to 2014. Similar to the MANE-VU states, decreases in SO_2 can be seen for all the Ask states over this time period. Some of these decreases are attributable to the control measures requested in the MANE-VU Ask for states outside of MANE-VU for the first regional haze planning period,[16] including timely implementation of BART requirements and a 90% or greater reduction in SO_2 emissions at the identified 167 stacks inside and outside of MANE-VU.

[16] Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Request for a Course of Action by States Outside of MANE-VU Toward Assuring Reasonable Progress (http://otcair.org/MANEVU/Upload/Publication/Formal%20Actions/Statement%20on%20controls%20outside%20MV_072007.pdf)

Table 7-16 - Total SO_2 Emissions in the Ask States for all Source Categories, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
AL	606,778	438,066	271,687	193,886
FL	926,576	485,705	231,895	236,648
IL	536,620	385,948	287,312	191,331
IN	960,539	690,040	424,984	345,279
KY	533,614	382,044	271,432	222,090
LA	359,641	249,149	228,997	171,510
MI	490,487	415,620	273,393	185,320
MO	421,708	414,816	257,510	168,808
NC	585,453	290,648	117,772	70,067
OH	1,286,023	877,070	680,338	376,573
TN	432,890	324,690	159,164	92,498
TX	989,242	637,591	540,665	456,508
VA	362,478	200,581	106,386	75,660
WV	580,073	349,331	122,109	112,405
Total	**9,072,123**	**6,141,298**	**3,973,644**	**2,898,583**

Figure 7-14 - Total SO_2 Emissions in the Ask States for all Source Categories, 2002 – 2014

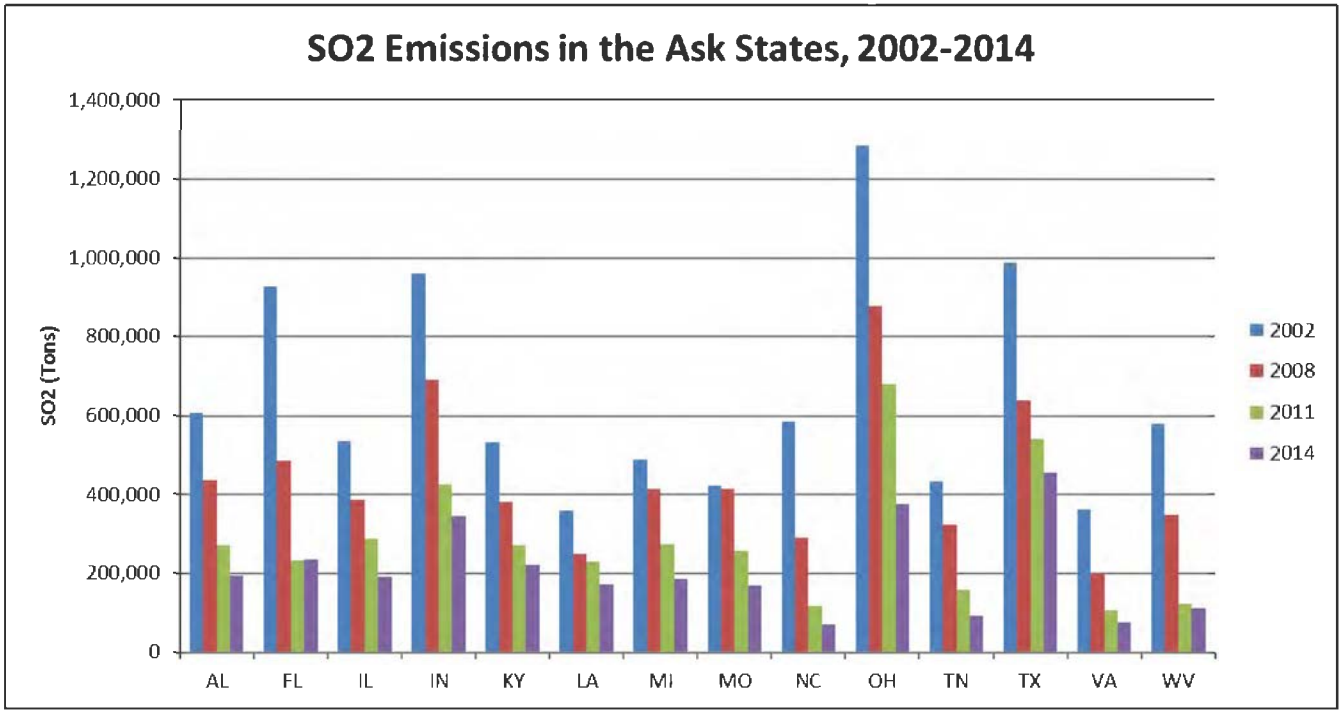


Table 7-17 and Figure 7-15 show 2016 and 2017 SO_2 emissions for AMPD sources in the MANE-VU states, and Table 7-18 and Figure 7-16 show 2016 and 2017 SO_2 emissions for AMPD sources in the Ask states. 2017 AMPD SO_2 emissions are lower than the corresponding 2016 emissions for all but a few MANE-VU and Ask states. Despite the handful of state increases, total AMPD SO_2 emissions for 2017 are well below the corresponding 2016 total for both the MANE-VU states and the Ask states. For applicable states, some of the SO_2 reduction for AMPD sources is attributable to CSAPR (formerly CAIR), which requires NO_X and/or SO_2 emissions reductions from EGUs in 27 states in the eastern and central U.S.

Table 7-17 - SO_2 Emissions from AMPD Sources in the MANE-VU States, 2016 – 2017 (Tons)

State	2016	2017
CT	362	421
DC	0	0
DE	513	545
MA	1,718	1,083
MD	16,729	8,087
ME	369	444
NH	573	473
NJ	1,725	1,722
NY	4,533	2,561
PA	98,006	69,790
RI	15	18
VT	1	1
Total	**124,543**	**85,145**

Figure 7-15 - SO_2 Emissions from AMPD Sources in the MANE-VU States, 2016 – 2017

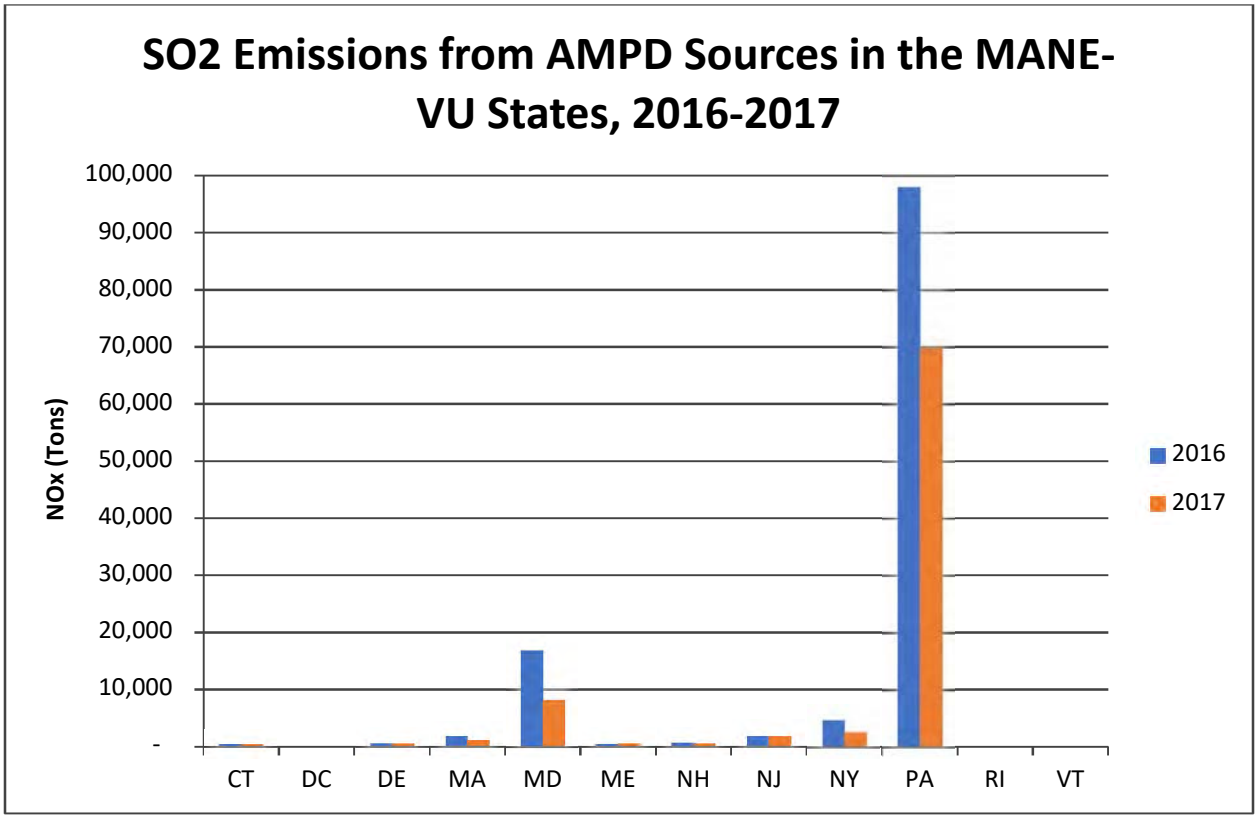
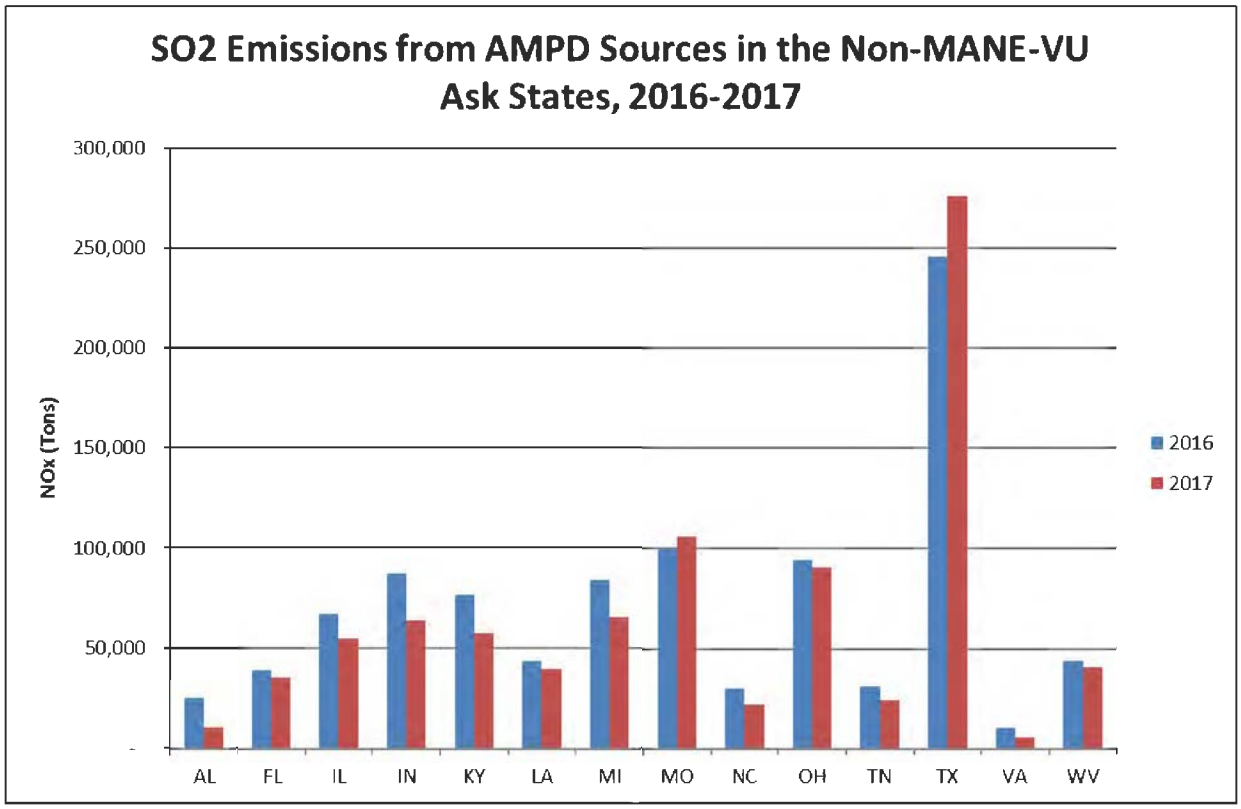


Table 7-18 - SO_2 Emissions from AMPD Sources in the Ask States, 2016 – 2017 (Tons)

State	2016	2017
AL	25,034	10,478
FL	39,186	35,700
IL	66,993	54,511
IN	87,083	63,735
KY	76,424	57,119
LA	43,328	39,699
MI	84,019	65,369
MO	99,451	105,993
NC	30,136	22,265
OH	94,486	90,751
TN	31,270	24,312
TX	245,799	275,993
VA	10,316	5,791
WV	43,693	40,545
Total	**977,218**	**892,262**

Figure 7-16 - SO_2 Emissions from AMPD Sources in the Ask States, 2016 – 2017



7.1.5. Volatile Organic Compounds

From a regional haze perspective, there is less concern with the volatile organic gases emitted directly to the atmosphere than with the secondary organic aerosols (SOA) that the VOCs form after condensation and oxidation processes. Thus, the VOC inventory category is of interest primarily from the organic carbon perspective of $PM_{2.5}$. After sulfate, organic carbon generally accounts for the next largest share of fine particle mass and particle-related light extinction at northeastern Class I sites. Table 7-19 shows VOC emissions from all data categories in New York over the 2002 to 2014 period. The data is shown graphically in Figure 7-17. VOC emissions have generally declined during this period. Changes in nonpoint VOC emissions in New York could be from changes in the residential wood combustion models. The sharp drop in nonpoint VOC emissions between previous years and 2014 could be due to a new consumer products tool being used for the 2014 emissions inventory.

Table 7-19 - VOC Emissions from all Source Categories in New York, 2002 – 2014 (Tons)

Category	2002	2008	2011	2014
Point	8,225	7,724	8,638	9,995
Nonpoint	171,150	262,438	221,174	236,790
Nonroad	151,712	159,275	102,516	85,444
On-road	212,929	90,130	86,980	78,344
Total	**544,016**	**519,566**	**419,309**	**410,573**

Figure 7-17 - VOC Emissions from all Source Categories in New York, 2002 – 2014

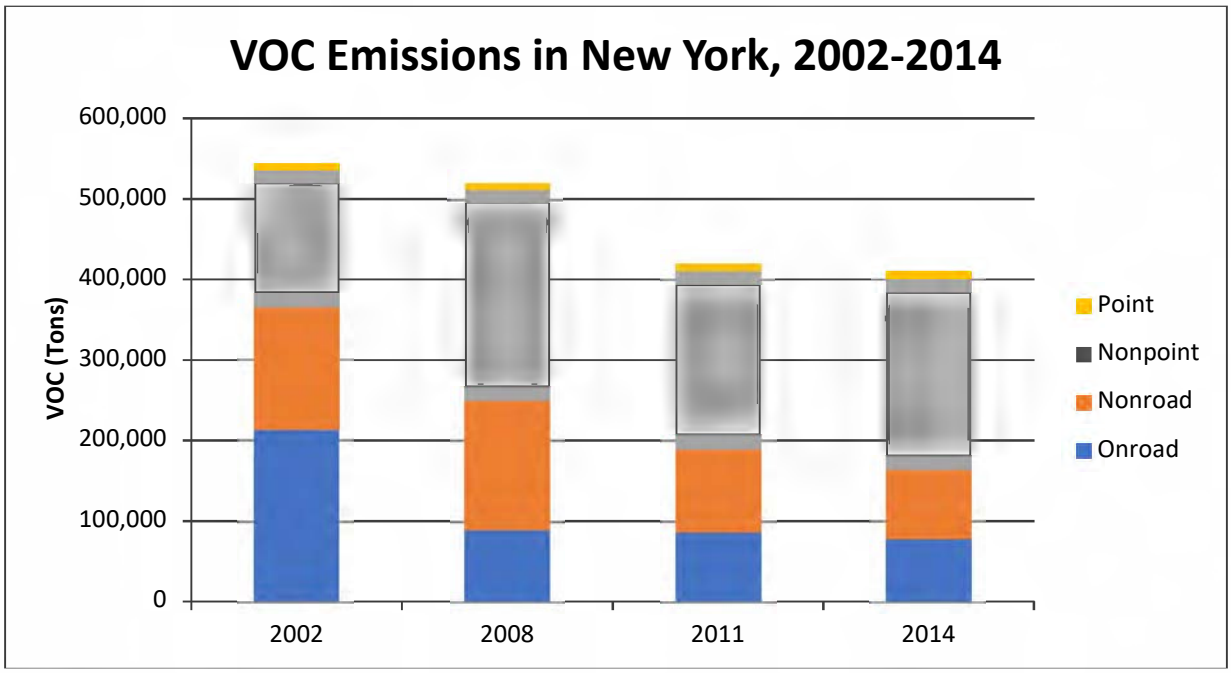


Table 7-20 and Figure 7-18 show total VOC emissions from all source categories for the MANE-VU states during the period from 2002 to 2014. Except for CT, PA, and RI, VOC emissions have declined in all MANE-VU states during this period. Similar to New York, the decrease between 2002 and subsequent years is likely artificially overstated for many states because of changes in estimation methodologies for nonpoint categories such as residential wood combustion and yard waste burning.

Much of the decrease in VOC is attributable to federal and state rules for evaporative sources of VOC emissions such as portable fuel containers; architectural, industrial, and maintenance coatings; consumer products; and

solvent degreasing. Many states' rules for these types of categories are based on the OTC Model Rules.[17] Evaporative VOC emissions from these types of sources are expected to continue to decline as more states adopt rules based on the OTC Model Rules. Other decreases are due to states' VOC RACT rules. Evaporative VOC emissions from on-road mobile sources have decreased due to state motor vehicle Inspection & Maintenance (I&M) programs and the permeation of more on-board refueling vapor recovery (ORVR) equipped vehicles into the fleet. VOC emissions from nonroad and on-road mobile sources are expected to continue to decrease as older, more polluting vehicles are replaced by newer, cleaner vehicles.

Table 7-21 and Figure 7-19 show total VOC emissions from all source categories from the Ask states. In general, VOC emissions have declined in the Ask states, although some states show little change, or even increases, in total VOC emissions from 2002 to 2014. Some of these increases, or the sharp decreases evident in AL and FL between 2002 and subsequent years, could be caused by changes to inventory methodologies. Despite increases in some states, overall total VOC emissions in the Ask states have declined from 2002 to 2014.

Table 7-20 - Total VOC Emissions from all Source Categories in the MANE-VU States, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
CT	189,223	86,024	79,809	82,350
DE	38,921	28,705	22,830	20,153
DC	11,388	10,467	7,950	8,939
ME	145,157	76,423	64,086	57,527
MD	259,266	145,138	118,309	116,512
MA	309,210	166,086	146,068	144,016
NH	106,185	55,344	45,884	40,767
NJ	341,276	224,688	177,043	154,589
NY	544,016	519,566	419,309	410,573
PA	449,637	432,590	372,135	477,338
RI	41,448	23,770	23,186	23,499
VT	47,157	29,131	27,869	27,366
Total	**2,482,884**	**1,797,935**	**1,504,479**	**1,563,628**

[17] https://otcair.org/document.asp?fview=modelrules

Figure 7-18 - Total VOC Emissions from all Source Categories in the MANE-VU States, 2002 – 2014

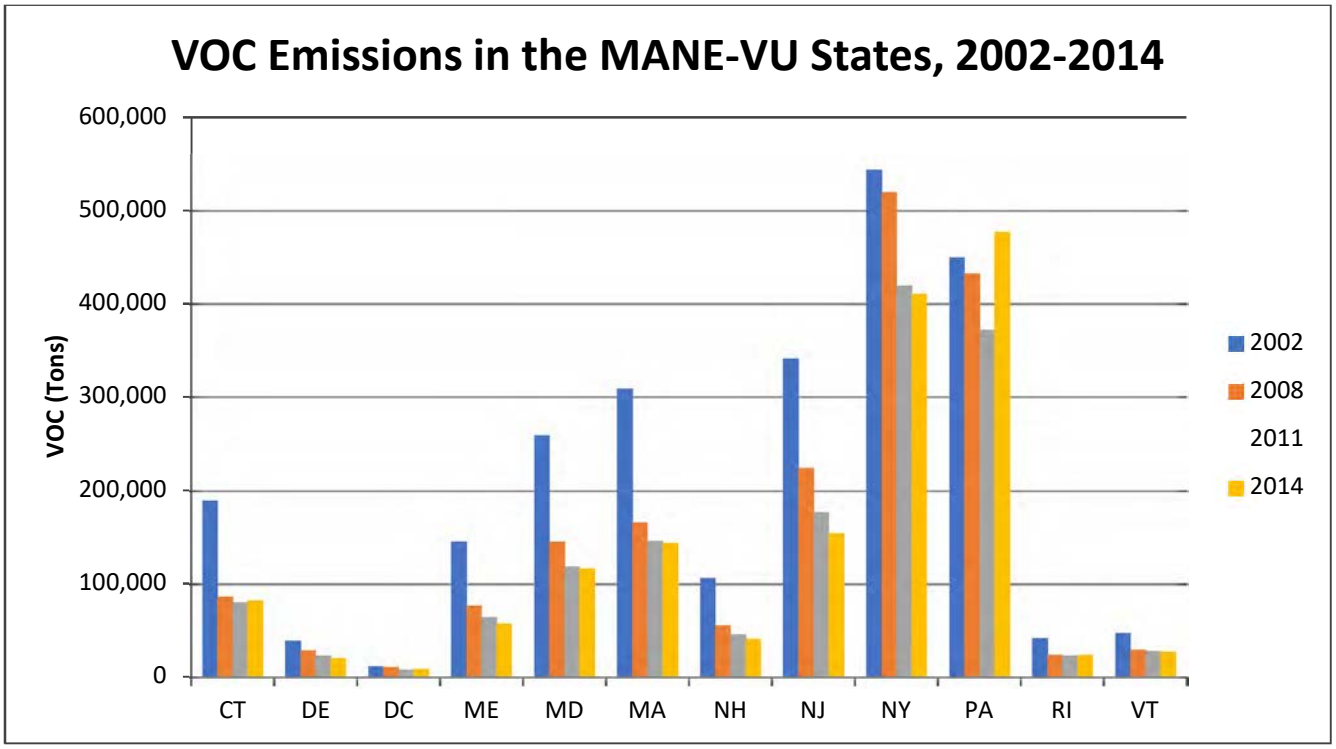
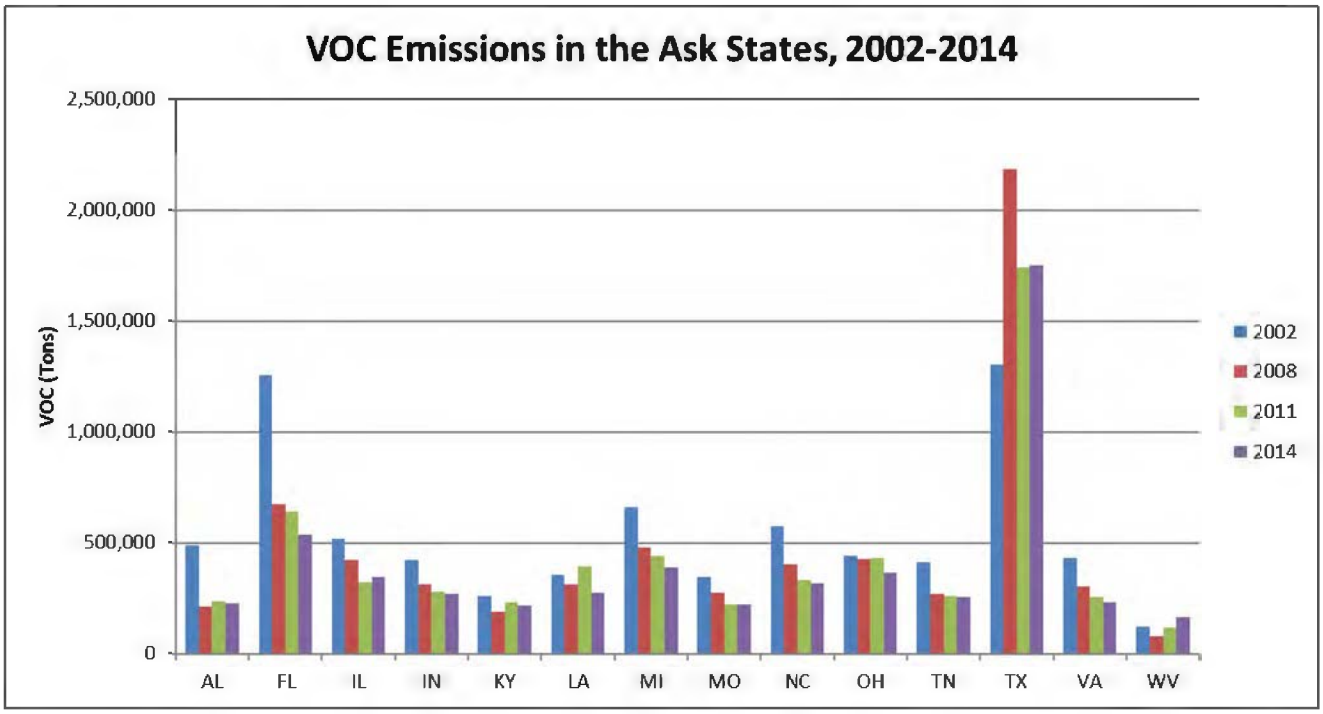


Table 7-21 - Total VOC Emissions from all Source Categories in the Ask States, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
AL	488,790	210,676	235,609	227,680
FL	1,254,948	676,019	639,752	534,554
IL	518,945	422,491	324,726	346,254
IN	421,835	314,899	279,108	268,058
KY	262,126	189,340	231,570	215,759
LA	356,148	313,255	395,575	275,798
MI	660,704	478,335	443,805	388,431
MO	344,183	274,335	223,847	222,869
NC	574,306	405,366	330,121	318,555
OH	441,791	425,224	433,846	363,164
TN	413,803	270,776	262,588	255,189
TX	1,306,082	2,185,097	1,743,762	1,752,968
VA	430,319	301,131	256,981	234,222
WV	124,621	77,182	119,437	165,676
Total	**7,598,602**	**6,544,127**	**5,920,726**	**5,569,177**

Figure 7-19 - Total VOC Emissions from all Source Categories in the Ask States, 2002 – 2014



7.1.6. Ammonia

Table 7-22 shows NH_3 emissions for all source categories in New York. This is shown graphically in Figure 7-20. Although some year to year variability was observed, there is still a general downward trend in NH_3 emissions in New York. This is particularly true when comparing 2014 with earlier years.

Table 7-22 - NH_3 Emissions from all Data Categories in New York, 2002 – 2014 (Tons)

Category	2002	2008	2011	2014
Point	3,680	3,033	2,002	1,142
Nonpoint	50,195	42,104	44,714	27,812
Nonroad	79	87	87	96
On-road	14,582	5,512	4,785	4,060
Total	**68,536**	**50,737**	**51,588**	**33,110**

Figure 7-20 - NH_3 Emissions from all Source Categories in New York, 2002 – 2014

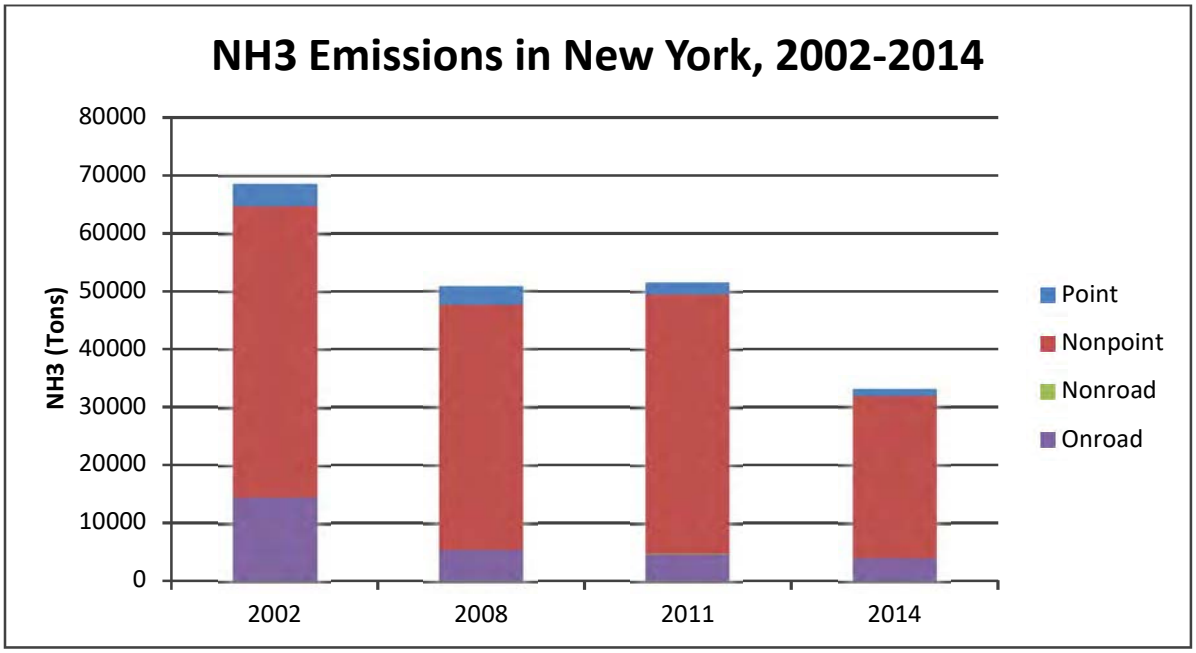
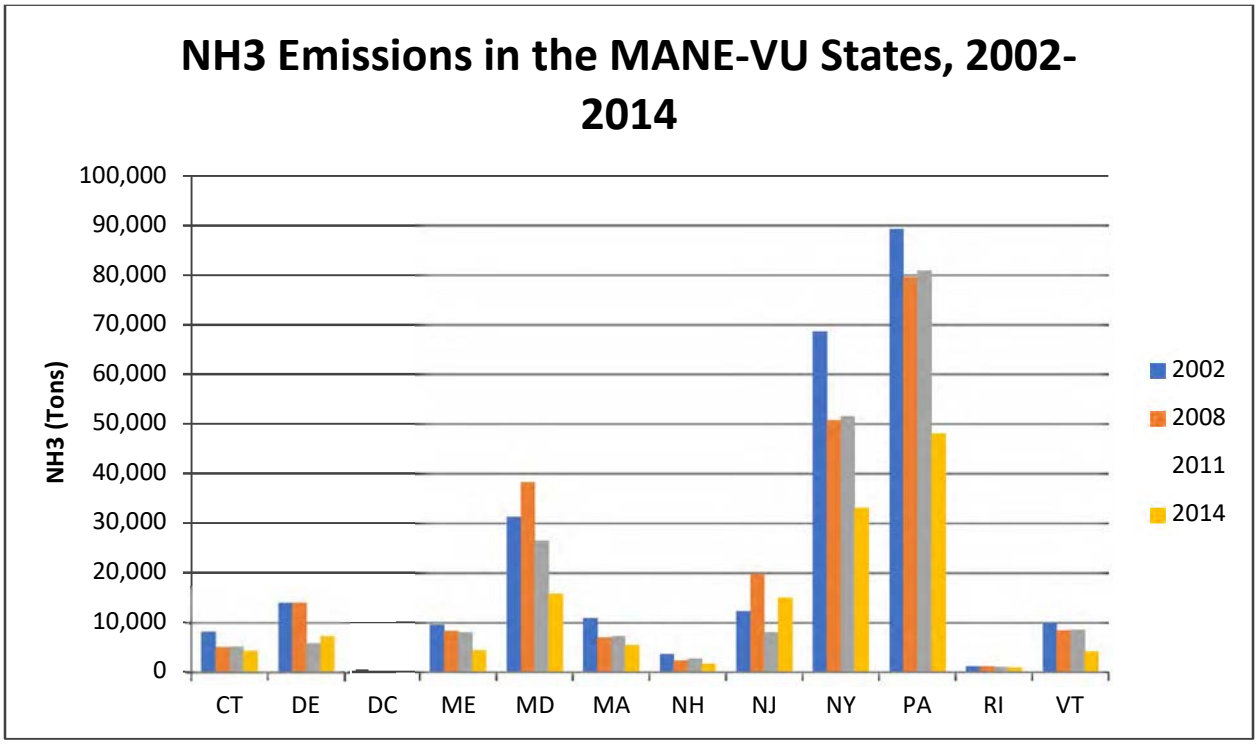


Table 7-23 and Figure 7-21 show aggregate total NH_3 emissions for all source categories for the MANE-VU states. Some year to year variability was observed in the MANE-VU states.

Table 7-23 - Total NH_3 Emissions from all Source Categories in the MANE-VU States, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
CT	8,194	4,989	5,200	4,194
DE	13,920	13,975	5,771	7,252
DC	421	354	330	317
ME	9,557	8,207	8,024	4,356
MD	31,278	38,288	26,429	15,746
MA	10,794	6,929	7,177	5,411
NH	3,567	2,311	2,684	1,645
NJ	12,290	19,790	8,057	14,952
NY	68,536	50,737	51,588	33,110
PA	89,263	79,588	80,871	48,000
RI	1,202	1,092	1,075	862
VT	9,810	8,379	8,567	4,148
Total	**258,833**	**234,639**	**162,959**	**139,993**

Figure 7-21 - Total NH_3 Emissions from all Source Categories in the MANE-VU States, 2002 – 2014

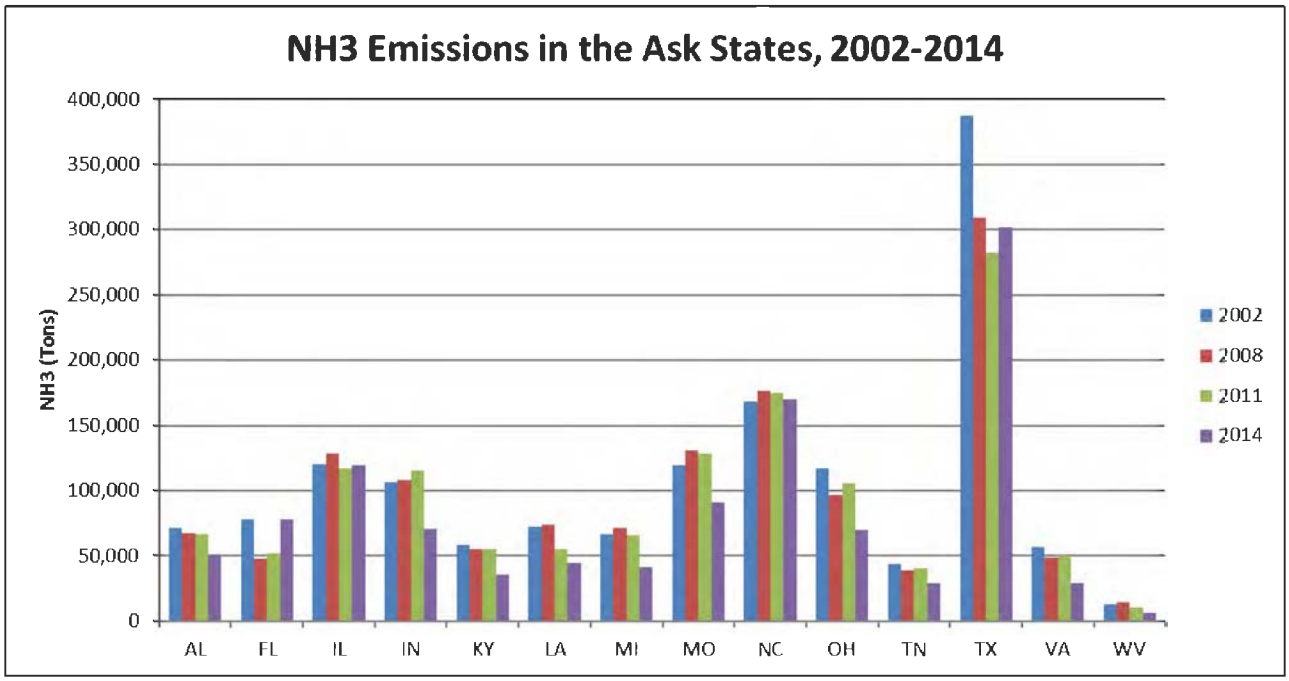


Total NH_3 emissions for all source categories for the Ask states are shown in Table 7-24 and Figure 7-22. Again, some year to year variability in NH_3 emissions was observed. In most of the Ask states, 2014 emissions are lower than they were for previous years. For every Ask state, 2014 emissions are lower than they were for at least one of the earlier years.

Table 7-24 - Total NH_3 Emissions from all Source Categories in the Ask States, 2002 – 2014 (Tons)

State	2002	2008	2011	2014
AL	71,627	67,454	66,494	51,329
FL	77,959	48,211	52,218	77,637
IL	120,222	128,348	117,209	119,481
IN	106,354	108,301	115,038	71,036
KY	58,406	55,558	55,265	35,476
LA	72,094	74,188	55,272	44,703
MI	66,954	71,406	65,507	41,500
MO	119,101	131,113	128,753	90,853
NC	168,398	176,143	175,127	169,777
OH	117,152	96,512	105,793	69,854
TN	43,831	39,213	40,364	29,237
TX	387,228	309,529	282,413	301,772
VA	57,150	48,462	49,935	29,151
WV	12,832	14,100	10,668	6,162
Total	**1,479,309**	**1,368,541**	**1,320,058**	**1,137,969**

Figure 7-22 - Total NH_3 Emissions from all Source Categories in the Ask States, 2002 – 2014



7.2. Baseline and Future Year Emission Inventories for Modeling

Section 51.308(f)(2)(iii) of EPA's Regional Haze Rule requires New York and other states to identify a base year emission inventory upon which future emission projections will be based and from which the emission reductions from implementing the LTS can be determined.

MANE-VU's *Future Modeling Platform Base Year Determination* identified 2011 as "the best candidate year for a future multi-pollutant modeling platform."[18] MANE-VU's and New York State's regional haze progress reports are using the 2011 base emission inventory year, and from this, future year inventories have been developed for 2018 and 2028. These future year emission inventories include emissions growth due to projected increases in population and economic activity as well as the emissions reductions due to the implementation of control measures.

It is important to note that the use of and reference to any and all future emission projections/inventories in this report and its appendices are for regional haze planning purposes only and they are not to be construed as permissible emission limits, caps or similar allowance.

[18] http://www.otcair.org/MANEVU/Upload/Publication/Reports/Future%20Modeling%20Platform%20Base%20Year%20Selection%20Analysis%20-%20Oct%209%202013%20Final.pdf

7.2.1. Base Year Inventory

The 2011 Gamma emissions inventory is the base year inventory for this report. The emission inventories include CO, but it is not considered in this SIP as it does not contribute to visibility impairment. The MANE-VU regional haze emissions Gamma inventory was also used for modeling purposes. This inventory was developed by MARAMA, the Eastern Regional Technical Advisory Committee (ERTAC) EGU Workgroup, and EPA.

The guiding philosophy behind the development of the 2011 inventory was to rely as much as possible on the collaborative work performed by the state, local, and tribal air agencies and EPA in developing a 2011-based Modeling Platform.

For the 2028 inventory, the guiding philosophy was to use a combination of state, local, and tribal data and methods for projecting emissions from stationary sources and to rely on EPA's 2028 Modeling Platform for mobile source emission projections. More detailed information regarding the Gamma Inventory and projections can be found in Appendix D, *Technical Support Document for 2011 for the Northeastern U.S. Gamma Inventory* (January 2018) and *Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document* (October 2018).

The 2011 emission inventory relies extensively on the 2011 NEI. The NEI is prepared every three years by the EPA based primarily upon emission estimates and emission model inputs provided by State, local, and tribal air agencies for sources in their jurisdictions. EPA supplements the State, Local, and Tribal data with data from emissions trading programs such as the Acid Rain Program and other data collected as part of EPA regulatory development projects. The inventories include annual emissions for NO_X, VOC, CO, NH_3, PM_{10}, and $PM_{2.5}$.

EPA released Version 1 of the 2011 NEI (referred to as 2011NEIv1) on November 27, 2013. EPA published extensive documentation and asked State, local, and tribal agencies and stakeholders to provide any necessary updates to the inventory or the model inputs used to develop mobile source emission inventories. EPA addressed comments and released a preliminary Version 2 (NEI2011v2) for most stationary source categories in October 2014. They then updated this preliminary Version 2 and provided updated files to MARAMA in December 2014.

7.2.2. Future Year Base Case Emission Inventories

MANE-VU and MARAMA developed the portions of the 2028 Alpha, Alpha 2, and Gamma inventories based on 2011 inventories. As shown in Figure 23, the remaining sectors not developed through state processes were taken from EPA.

EPA developed emission projections for EGUs using the Integrated Planning Model (IPM), but in recent years, State, Local, and Tribal agencies have developed an alternative EGU modeling approach under the direction of ERTAC.

Figure 7-23 - Inventories Used for Each Stage of OTC 2011 Base Year Modeling

SECTOR	Alpha/Alpha 2	Beta/Beta 2	Gamma 2023	Gamma 2020	Gamma 2028
Ag. Fugitive Dust	EPA v6.2 eh	EPA v6.2 eh	EPA v6.3 el	2011 ek - 2023 el v6.3 Interpolation	EPA v6.3 el
Agricultural	EPA v6.2 eh	EPA v6.3 ek	EPA v6.3 el	2011 ek - 2023 el v6.3 Interpolation	EPA v6.3 el
Agricultural Fire	2011 EPA v6.2 eh	2011 EPA v6.3 ek	2011 EPA v6.3 ek	2011 EPA v6.3 ek	2011 EPA v6.3 ek
Biogenics	EPA v6.2 eh	EPA v6.3 ek	EPA v6.3 ek	EPA v6.3 ek	EPA v6.3 ek
C1C2 Marine	EPA v6.2 eh	EPA v6.2 eh	EPA v6.3 en	2011-23 en v6.3 Interpolation	EPA v6.3 el
C3 Marine	EPA v6.2 eh (α) EPA v6.3 ej (α 2)	EPA v6.3 ek	EPA v6.3 en	2011-23 en v6.3 Interpolation	EPA v6.3 el
ERTAC EGU	ERTAC v2.3	ERTAC v2.5L	ERTAC v2.7	ERTAC v2.7	ERTAC v2.7
Ethanol	MARAMA α	MARAMA β	EPA v6.3 el	EPA v6.3 el	EPA v6.3 el
Non-EGU Point	MARAMA α	MARAMA β	MARAMA γ	MARAMA γ	EPA v6.3 el
Point source offsets	n/a	MARAMA β	MARAMA γ	MARAMA γ	MARAMA γ
Non-ERTAC IPM EGUs	MARAMA α	MARAMA β	MARAMA γ	MARAMA γ	2023 MARAMA β
Non-Point	MARAMA α	MARAMA β	MARAMA γ	MARAMA γ	EPA v6.3 el
Non-point Oil & Gas	EPA v6.2 eh	MARAMA β	EPA v6.3 el	MARAMA γ	EPA v6.3 el
Nonroad	EPA v6.2 eh	EPA v6.3 ek	EPA v6.3 en	2011 ek - 2023 el v6.3 Interpolation	EPA v6.3 el
Onroad	EPA v6.2 eh	EPA v6.3 ek	EPA v6.3 el	2011 ek - 2023 el v6.3 Interpolation	EPA v6.3 el
Point Oil &gas	EPA v6.2 eh	EPA v6.3 ek	EPA v6.3 en	MARAMA γ	EPA v6.3 el
Prescribed/Wild Fires	2011 EPA v6.2 eh	2011 MARAMA β	2011 MARAMA β	2011 MARAMA β	2011 MARAMA β
Rail	EPA v6.2 eh	EPA v6.3 ek	EPA v6.3 el	2011 ek - 2023 el v6.3 Interpolation	EPA v6.3 el
Refueling	MARAMA α	MARAMA β	EPA v6.3 el	2011 ek - 2023 el v6.3 Interpolation	EPA v6.3 el
RWC	EPA v6.2 eh	EPA v6.3 ek	EPA v6.3 el	2011 ek - 2023 el v6.3 Interpolation	EPA v6.3 el
Canadian	2011 EPA v6.2 eh	2011 EPA v6.3 ek	EPA v6.3 en	2011-23 en v6.3 Interpolation	2023 EPA v6.3 en

For the Gamma Inventory for 2028, the inventory sectors provided by EPA as part of its 2028 package were used and compared against the MARAMA Alpha 2 2028. This was possible since EPA relied on the same MARAMA projections discussed earlier when developing the 2028 EPA projections. Any units that were not in MARAMA 2028 Alpha 2, but were in EPA's 2028 haze modeling inventory, were removed using a closure packet, except ones confirmed by states to still be operating. The Gamma inventory for 2028 was taken from the EPA 'el' inventory.

MARAMA used the ERTAC EGU Forecasting Tool[19] to project electricity generation and emissions from EGUs. The methodology calculates future emissions of NO_X and SO_2 based on projections of future generation, the 2011

[19] ERTAC, 2017. Eastern Regional Technical Advisory Committee. ERTAC EGU Forecasting Tool Documentation web site (CONUS 2.7 CSAPR Compliant Scenario was used for this inventory). 2017. http://www.marama.org/2013-ertac-egu-forecasting-tool-documentation

base year emission rates, and known future year emission controls, fuel switches, retirements, and new units. The future year emissions for other pollutants, such as CO, NH_3, PM_{10}, $PM_{2.5}$, and VOCs, are calculated using the generation projections from the ERTAC tool and a file of emission factors for each unit. EGU emissions were processed using the ERTAC EGU tool v2.1.[20] The projections for the Gamma/Gamma 2 inventory were upgraded to the ERTAC v2.7 optimized case for 2020, 2023, and 2028, with the optimized case having emission rates that were optimized to comply with the CSAPR Update program.

For mobile sources, the Northeastern State, Local, and Tribal agencies have coordinated with EPA in developing the model inputs that EPA uses with the NONROAD and MOVES models to project future emissions.

MARAMA is using the Emissions Modeling Framework (EMF) software system to manage and assure the quality of emissions inventories and emissions modeling-related data. The Control Strategy Tool (CoST) module, developed by the University of North Carolina, is used to project emissions for future years using growth and control factors developed specifically for this effort. MARAMA also assembled the EMF Closure and Control packets. The Closure packet identified the facilities and emission processes that have closed or will be closed after 2011. Emissions from the closed facilities and/or emission processes are set to zero after the effective date of the closure. The Control packet reflects the expected emissions effects due to a variety of national, regional, and state rules, regulations, consent decrees and settlements. EPA provided control packets to account for national rules. MARAMA also developed control factors to account for implementation of OTC and MANE-VU emission control recommendations as well as state specific rules.

7.3. Inventories for Specific Source Types

The emission sector classifications in the emissions inventory are as follows: ERTAC EGU Point Sources, Non-EGU Point & Small EGU Sources, Nonroad (including Marine, Aircraft, and Rail), On-road, Nonpoint (including refueling and residential wood combustion), and Other (including biogenic).

7.3.1. Point Sources

Point source emissions are emissions from large individual sources. Generally, point sources have permits to operate and their emissions are individually calculated based on source specific factors on a regular schedule. State, local, and tribal agencies are primarily responsible for developing the point source inventory using annual emissions statement reports submitted by the owners of the sources of air pollution. Sources are considered to be major when they emit

[20] McDill, J and McCusker, S 2018, 'Technical Support Document: Emission Inventory Development for 2011 for the Northeastern U.S. Gamma Version'.

100 tons per year (TPY) of a criteria pollutant, 25 tpy of NOx or VOC in the New York City Metropolitan Area, 10 tpy of a single hazardous air pollutant (HAP), or 25 tpy total HAPs. Emissions from smaller sources are also calculated individually but less frequently. Point sources are grouped into EGU sources and other industrial point sources, termed as non-EGU point sources.

7.3.1.1. ERTAC Electric Generating Units

ERTAC EGUs include certain boilers, combustion gas turbines, combined cycle units, and reciprocating engines used to power an electrical generator that is connected to the electrical grid. Only units that report data to the USEPA Clean Air Markets Division (CAMD) are included in this subsector. MANE-VU states use the ERTAC tool to estimate base and future year EGU emissions. These estimates replace the estimates in the EPA modeling platform that are IPM-based forecasts.

7.3.1.2. Non-EGU and Small Point Sources

The point sources that are not in the oil and gas sector or ERTAC EGUs include ICI boilers and engines; industrial processes such as cement manufacturing; surface coating facilities; organic liquids storage and transfer; and waste disposal facilities. EPA includes certain mobile sources located at airports and rail yards as point sources to locate the emission sources geographically by latitude and longitude.

7.3.2. Nonroad Mobile Sources

Nonroad mobile sources are non-highway vehicles, equipment, and engines that are included in EPA's NONROAD model, such as construction equipment, railroad equipment, recreational vehicles, logging equipment, pleasure craft, underground mining equipment, and lawn and garden equipment. The NONROAD model estimates emissions from these sources for four fuel types: gasoline, diesel, compressed natural gas, and liquefied petroleum gas. Marine, air and rail sources are considered mobile sources, but they are not calculated by the NONROAD model.

The NONROAD model is currently embedded in EPA's MOVES (Motor Vehicle Emissions Simulator) and allows EPA to produce nonroad mobile emissions in a consistent and automated way for the entire country. The primary input to the NONROAD model is the National County Database (NCD), which contains all the county-specific information needed to run NONROAD. EPA initially populates the NCD with default inputs and distributes the NCD to State, Local, and Tribal agencies who are able to update the data within the NCD to create emissions estimates that accurately reflect local conditions and equipment usage. The

NONROAD model assumes that a certain number of off-road sources will be replaced every year by newer, less polluting off-road source that meet the new EPA standards for off-road sources.

The Air sector includes sources calculated by the FAA's Emissions and Dispersion Modeling System (EDMS, Version 5.1) model. These sources include exhaust emissions from aircraft by type, auxiliary power units (APUs) and ground support equipment (GSE) located at U.S. airports, including seaplane ports and heliports. This sector does not include other emissions from jet fuel storage or aircraft refueling or fuel combustion for airport heating or solvent use for aircraft maintenance. These other sources are included in the point source inventory.

The Rail sector includes railroad locomotives powered by diesel-electric engines. A diesel-electric locomotive uses 2-stroke or 4-stroke diesel engines and an alternator or a generator to produce the electricity required to power its traction motors. The locomotive source category is sub-divided into sub-categories based on railroad revenues and type of service. For the NEI2011v2, EPA developed 2011 national rail estimates by applying growth factors to the 2008 NEI values based on railroad freight traffic data from the 2008 and 2011 submitted by all Class I rail lines to the Surface Transportation Board and employment statistics from the American Short Lines and Regional Railroad Association for Class II and III. Class III and commuter railroads were only included in the inventory if states provided them. Emissions from specific rail yards are included in the point source inventory and all other emissions from locomotives are stored in the nonpoint inventory.

The commercial marine vessel (CMV) sector includes boats and ships used either directly or indirectly in the conduct of commerce or military activity. Most of the vessels in this category are powered by diesel engines that are fueled either with distillate or residual fuel oil blends. Category 1 and 2 (C1/C2) marine diesel engines typically are used to provide propulsion power on many kinds of vessels including tugboats, pushboats, supply vessels, fishing vessels, and other commercial vessels in and around ports. Category 3 (C3) marine engines includes vessels with engines having displacement above 30 liters per cylinder. The CMV source category does not include recreational marine vessels, which are generally less than 100 feet in length, most being less than 30 feet, and powered by either inboard or outboard engines. The MARAMA 2011 GAMMA inventory uses EPA 2011 v6.3 'ek' or 'el' where updated.

7.3.3. On-Road Vehicles

The on-road mobile source sector includes emissions from gasoline and diesel vehicles that normally operate on public roadways. This includes passenger cars, motorcycles, minivans, sport-utility vehicles, light-duty trucks, heavy-duty trucks, and buses. EPA also includes Stage 2 vapor recovery gasoline refueling

emissions, which have historically been treated as area source emissions, in their on-road sector. Stage 2 emissions are also in the on-road sector of the GAMMA inventory. EPA generated emissions using the EPA highway emissions model, MOVES2014a. The primary input to the MOVES model is the MOVES County Database (CDB), which contains county-specific information, such as vehicle miles travelled, vehicle type and age distributions, fuel types, emission inspection and maintenance programs, among other parameters. Most of the MANE-VU states submitted a subset of state specific CDB inputs, but EPA used national defaults when CDB data was not provided by states.

7.3.4. Nonpoint Sources

Nonpoint sources include sources whose individual emissions are relatively small but due to the large number of these sources, the collective emissions are significant. Some examples include the combustion of fuels for heating, dry cleaners, and service stations. The main reason they are not treated as point sources is that the effort required to gather data and estimate emissions for each individual source is great, while emissions per source are generally small. State, local, and tribal agencies, along with EPA, group emissions from these sources into broad categories, such as residential fuel combustion or consumer solvent usage. Each of these broad groups of processes contains several more specific subgroups that share similar emission processes and emission estimation methods. There are hundreds of area source processes included in the nonpoint source inventory.

7.3.5. Point Oil and Gas

Large oil and gas production facilities are also in the point source inventories. These facility emissions are subtracted from the total calculated using the nonpoint Oil and Gas tool to avoid double counting. The emissions and other source characteristics in the point oil and gas sector are entirely state-submitted data.

7.3.6. Other

Fire sources are pollution caused by the inadvertent or intentional burning of biomass including forest, rangeland, and agricultural vegetative residue. This sector is specifically categorized into three sub-sectors: wildfires, prescribed burning, and agricultural burning. Other types of fires, such as residential wood combustion and yard waste/refuse burning, are included in the nonpoint sector. EPA uses the SMARTFIRE2 system together with local activity data to make emission estimates for both wild and prescribed fires. All state, local, and tribal agencies in the Northeast relied upon EPA’s SMARTFIRE2 methodology for estimating emissions from wild and prescribed fires.

Biogenic emission sources are emissions that come from natural sources. They must be accounted for in photochemical grid models, 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.

7.4. Summary of 2002 and 2011 Emission Inventories and 2028 Emission Projections

Tables 7-25 through 7-34 represent the MANE-VU 2011 Gamma emissions inventories and 2028 Gamma emissions projections for MANE-VU and New York. 2002 emissions inventories are also provided to demonstrate progress made in 2011. Gamma inventory summaries are based on dust meteorologically and precipitation adjusted emissions processed through the Sparse Matrix Operational Kernel Emissions (SMOKE) processor, which results in lower totals for $PM_{2.5}$ and PM_{10} compared to the unadjusted totals shown earlier obtained from the NEI. Detailed information regarding the inventories and projections can be found in *Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018 Update*.

7.4.1. Summary of MANE-VU Emissions Inventories

Table 7-25 - MANE-VU 2002 Emissions Inventory Summary (TPY)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
Point	104,835	699,272	125,176	164,941	9,717	1,918,739
Area	1,043,834	262,620	240,471	1,290,122	198,327	236,856
On-Road	786,410	1,218,797	21,652	31,064	53,022	32,299
Nonroad	547,805	385,066	35,808	37,878	283	91,969
Anthropogenic Total	**2,482,884**	**2,565,756**	**423,107**	**1,524,005**	**263,352**	**2,279,862**
Biogenics	2,575,232	28,396	-	-	-	-
TOTAL	5,058,116	2,594,152	423,107	1,524,005	263,352	2,279,862

Source: MANE-VU TSC. "MANE-VU Emissions Inventory Data and Report Template," September 11, 2018. Retrieved from: https://otcair.org/MANEVU/Upload/Publication/Reports/MANE-VU_EI_NEI_NH3_09112018.zip

Table 7-26 - MANE-VU 2011 Emissions Inventory Summary (TPY)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
EGU Point	2,477	206,457	17,987	24,000	2,923	462,551
NonEGU Point	53,046	155,892	28,669	37,773	4,950	108,301
Area	703,086	194,924	160,501	177,343	14,552	135,783
On-Road	362,357	717,012	52,081	27,133	18,094	4,793
Nonroad	369,537	344,671	29,073	27,442	378	25,477
Oil/Gas	29,028	53,405	1,676	1,766	14	2,102
Other	21,570	1,165	27,816	846	165,673	668
Anthropogenic Total	**1,541,101**	**1,673,526**	**322,881**	**291,225**	**206,584**	**739,675**
Biogenics	2,064,088	30,564	-	-	-	-
TOTAL	3,605,189	1,704,090	322,881	291,225	206,584	739,675

Source: McDill and McCusker, 2018. “Technical Support Document: Emission Inventory Development for 2011 for the Northeastern U.S. Gamma Version,” January 29, 2018. Retrieved from: http://marama.org/technical-center/emissions-inventory/2011-gamma-inventory-and-projections

Table 7-27 - Change in MANE-VU Emissions 2002 to 2011 (Percent*)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
Point	-47.04%	-48.18%	-50.65%	-71.71%	-18.98%	-70.25%
Area	-32.64%	-25.78%	-26.25%	-87.56%	-92.66%	-42.67%
On-Road	-53.92%	-41.17%	140.54%	-12.65%	-65.87%	-85.16%
Nonroad	-32.54%	-10.49%	-18.81%	-27.55%	33.71%	-72.30%
Anthropogenic Total	**-37.93%**	**-34.77%**	**-23.69%**	**-80.89%**	**-21.56%**	**-67.56%**
Biogenics	-19.85%	7.64%				
TOTAL	-28.72%	-34.31%	-23.69%	-80.89%	-21.56%	-67.56%

*Negative percent indicates a decrease in emissions

Table 7-28 - MANE-VU 2028 Gamma Emissions Projection Summary (TPY)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
EGU	4,871	85,182	15,060	19,115	3,114	196,760
Non-EGU Point	54,371	148,416	28,329	37,522	5,123	82,813
Area	659,063	177,995	150,922	167,001	13,641	28,159
On-Road	111,151	165,746	9,216	35,845	12,632	1,642
Nonroad	219,807	193,233	13,773	14,752	475	1,967
Oil/Gas	49,830	70,737	3,101	3,196	16	6,369
Other	22,084	1,384	29,956	147,913	169,064	771
Anthropogenic Total	**1,121,177**	**842,691**	**250,357**	**425,343**	**204,066**	**318,481**
Biogenic	2,064,088	30,564	-	-	-	-
TOTAL	3,185,265	873,256	250,357	425,343	204,066	318,481

Source: OTC/MANE-VU. *Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018 Update*. October 18, 2018. Retrieved from: https://otcair.org/MANEVU/Upload/Publication/Reports/OTC%20MANE-VU%202011%20Based%20Modeling%20Platform%20Support%20Document%20October%202018%20-%20Final.pdf

Table 7-29 - Change in MANE-VU Emissions 2011 to 2028 (Percent*)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
EGU	96.63	-58.74	-16.27	-20.35	6.55	-57.46
Non-EGU Point	2.50	-4.80	-1.19	-0.66	3.50	-23.53
Area	-6.26	-8.69	-5.97	-5.83	-6.26	-79.26
On-Road	-69.33	-76.88	-66.04	-31.17	-30.19	-65.75
Nonroad	-40.52	-43.94	-49.81	-49.26	25.61	-92.28
Oil/Gas	71.66	32.45	85.00	80.97	12.72	202.98
Other	2.39	18.76	7.69	17374.81	2.05	15.39
Anthropogenic Total	**-27.25**	**-49.65**	**-14.03**	**31.73**	**-1.22**	**-56.94**
Biogenics	0.0	0.0	-	-	-	-
TOTAL	-11.65	-48.76	-14.03	31.73	-1.22	-56.94

*Negative percent indicates a decrease in emissions

7.4.2. Summary of New York Emissions Inventories

Table 7-30 - New York 2002 Emissions Inventory Summary (TPY)

Sector	VOC	NOx	$PM_{2.5}$	PM_{10}	NH_3	SO_2
Area	171,150	32,643	50,146	346,232	50,195	135,454
Point	8,225	123,644	16,938	22,820	3,680	297,454
Nonroad	151,712	90,526	8,796	9,271	79	14,256
On-road	212,929	290,698	5,547	8,059	14,582	8,075
Biogenic	492,483	8,313	-	-	-	-
Totals	1,036,499	545,826	81,427	386,381	68,536	455,239

Source: MANE-VU TSC. "MANE-VU Emissions Inventory Data and Report Template," September 11, 2018. Retrieved from: https://otcair.org/MANEVU/Upload/Publication/Reports/MANE-VU_EI_NEI_NH3_09112018.zip

Table 7-31 - New York 2011 Emissions Inventory Summary (TPY)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
EGU	744	31,075	1,480	2,164	1,293	39,210
Non-EGU Point	9,275	27,518	3,990	5,665	709	25,793
Area	221,174	65,602	42,569	45,385	44,714	43,042
Oil/Gas	8,627	2,117	129	140	0	102
On-road	86,980	173,269	8,117	17,099	4,785	1,475
Nonroad	103,275	74,713	6,275	6,628	94	317
Other	1,865	157	6,286	207	42,940	77
Anthropogenic Total	**431,940**	**374,451**	**68,844**	**77,287**	**94,534**	**110,014**
Biogenics	418,156	9,203	-	-	-	-
Total	850,097	383,655	68,844	77,287	94,534	110,014

Source: EGU, Oil/Gas, and Other: McDill and McCusker, 2018. “Technical Support Document: Emission Inventory Development for 2011 for the Northeastern U.S. Gamma Version,” January 29, 2018. Retrieved from: http://marama.org/technical-center/emissions-inventory/2011-gamma-inventory-and-projections

Non-EGU Point, Nonpoint, On-road, and Nonroad: New York 2011 Emission Inventory

Table 7-32 - Change in New York Emissions 2002 to 2011 (Percent*)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
Point	21.81	-52.61	-67.71	-65.70	-45.60	-78.15
Area	29.23	100.97	-7.15	-85.26	-10.92	-68.22
Nonroad	-31.93	-17.47	385.42	391.04	18.51	-97.78
On-road	-59.15	-40.40	48.64	113.91	-67.19	-81.74
Biogenic**	-15.09	10.71	-	-	-	-
Total	-17.98	-29.71	-92.29	-98.28	37.93	-75.83

*Negative percent indicates a decrease in emissions
** Changes in biogenic emissions reflects a change in EPA's methodology for calculating emissions from natural sources.

Table 7-33 – New York 2028 Gamma Emissions Projection Summary (TPY)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
EGU Point	876	12,246	2,026	2,451	1,234	22,810
Non-EGU Point	9,859	39,940	4,074	5,892	876	16,067
NonPoint	185,624	59,562	41,021	50,364	1,668	6,590
Oil/Gas	8,614	1,737	140	153	0	103
On-road	28,875	40,707	2,657	11,242	3,405	434
Nonroad	61,374	54,627	3,567	3,810	137	313
Other	2,047	267	7,080	40,707*	43,500	127
Anthropogenic Total	**297,269**	**209,086**	**60,565**	**114,618**	**50,821**	**46,443**
Biogenics	418,156	9,203	-	-	-	-
Total	715,425	218,289	60,565	114,618	50,821	46,443

Source: OTC/MANE-VU. *Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018 Update*. October 18, 2018. https://otcair.org/MANEVU/Upload/Publication/Reports/OTC%20MANE-VU%202011%20Based%20Modeling%20Platform%20Support%20Document%20October%202018%20-%20Final.pdf

*Projections predict an increase in agricultural fires and area fugitive dust in future years.

Table 7-34 - Change in New York Emissions 2011 to 2028 (Percent*)

Sector	VOC	NO_X	$PM_{2.5}$	PM_{10}	NH_3	SO_2
EGU Point	17.69	-43.19	36.87	13.29	-4.56	-41.83
Non-EGU Point	6.30	7.83	2.11	4.01	23.55	-37.71
NonPoint	-16.07	-9.21	-3.64	10.97	-96.27	-84.69
Oil/Gas	-0.14	-17.95	9.24	9.35	10.66	0.74
On-road	-66.80	-76.51	-67.27	-34.25	-28.83	-70.60
Nonroad	-40.57	-26.88	-43.15	-42.52	45.98	-1.17
Other	9.79	69.61	12.63	19526.86**	1.31	65.39
Anthropogenic Total	**-31.18**	**-44.16**	**-12.03**	**48.30**	**-46.24**	**-57.78**
Biogenics	0.00	0.00	-	-	-	-
Total	-15.84	-43.10	-12.03	48.30	-46.24	-57.78

*Negative percent indicates a decrease in emissions
**No area fugitive dust was reported in 2011, but projections for future years include a large fraction of area fugitive dust and an increase in agricultural fires.

8. Best Available Retrofit Technology (BART) Requirements

During the first Regional Haze planning period, 40 CFR Section 51.308(e) mandated that states, including New York, submit an implementation plan containing emission limitations representing BART and schedules for compliance with BART for each BART-eligible source that may reasonably be anticipated to cause or contribute to any impairment of visibility in any Class I Federal area. The BART determination process was a one-time requirement for the original Regional Haze SIP submission from states, but the BART requirements remain in effect and represent an important element of EPA's Regional Haze Rule. Initially promulgated in 1999 and revised most recently in 2012, the BART portion of EPA's rule required BART determinations to be part of the SIP. States were to require sources to comply with any BART determinations as expeditiously as practicable, but no later than five years after EPA approval of the SIP. Full implementation of BART in New York State occurred on February 16, 2018.

8.1. BART Determination Process

The first step in the BART process was to identify sources that are "BART-eligible." BART-eligible sources are those that:

- Fall into one of 26 specific source categories identified in the CAA;
- Have units that were in existence on August 7, 1977, but had not been in operation for more than fifteen years as of that date (i.e., prior to August 7, 1962); and
- Have a potential to emit (PTE) 250 tons per year (TPY) or more of any single visibility impairing pollutant. These pollutants include SO_2, NOx, VOCs, PM_{10} and NH_3. States were allowed flexibility in addressing NH_3 and VOC sources; New York State chose not to include controls for NH_3 and VOC's as a part of its BART and regional haze programs given the limited evidence of visibility contribution.

Once a source was found to be "eligible" under the BART program, states determined whether that facility caused or contributed to the formation of haze at any mandatory Class I Federal area. Three methods could be used to determine if a source reasonably causes or contributes to regional haze in any mandatory Class I Federal area, including:

- Individual source assessment (Exemption Modeling) – This assessment used CALPUFF or other EPA-approved modeling methods. Results of modeling would be compared to natural background conditions. The EPA defined "cause" as an impact of 1.0 deciview or more and "contribute" as an impact of 0.5 deciview or more. However, states had the discretion to

set lower thresholds for contribution.

- Cumulative assessment of all BART "eligible sources" – Under this approach, all eligible sources could be determined to be subject to BART. This method could also be used to analyze an area's contribution to visibility impairment and demonstrate that no sources are subject, based on cumulative modeling.
- Assessment based on model plants – This assessment allowed states to exempt sources with common characteristics that are determined not to impair visibility in mandatory Class I Federal areas.

Owners of sources that were identified as BART-eligible and were found to cause or contribute to haze in a mandatory Class I Federal area, conducted an engineering review to determine if the installation of new control requirements was appropriate. This review took into consideration five factors:

- Cost
- Energy and non-air environmental impacts
- Existing controls at the source
- Remaining useful life of source
- Visibility improvement reasonably expected from the technology

BART controls for each source were identified from the results of this assessment. In some cases, the installation of controls or other emission reduction measures were undertaken. In other instances, controls already in place were determined to qualify as BART, due, in most cases, to a higher-than-reasonable cost associated with installing additional controls. The remaining sources determined that the BART-eligible source would shut down or accept emission caps to lower the collective PTE of visibility-impairing pollutants to less than 250 TPY.

8.2. New York State's BART Regulation (6 NYCRR Part 249)

EPA provided the states with a great deal of flexibility in implementing the BART program. DEC's BART regulation, 6 NYCRR Part 249, "Best Available Retrofit Technology (BART) (Part 249)," provided for the assessment of individual source contributions (Option 1 above). New York identified several sources that were considered to be "BART-eligible" based on modeling conducted by MANE-VU. However, New York's BART regulation provided source owners with the opportunity to conduct "exemption modeling" to demonstrate that the candidate sources do not cause or contribute to visibility impairment in mandatory Class I Federal areas. Part 249 established a 0.1 dv threshold by which a source may be shown to cause or contribute to visibility impairment.

As provided in 40 CFR §51.308(e)(1)(iv), BART must be applied to each applicable source as expeditiously as practicable but in no event later than five years after approval of the Regional Haze SIP revision by EPA. DEC's BART regulation required that each source subject to BART had to submit its plan detailing how it would comply with the BART requirements by October 1, 2010. The plan had to show that the required BART controls would be installed by the January 1, 2014 deadline. January 1, 2014 was also the date by which sources that wished to avoid BART controls had to "cap out" or shut down. Full implementation of BART in New York State occurred on February 16, 2018, as technical issues delayed compliance dates for particular units (see Table 8-1).

Requirements for implementing BART controls or achieving emission reductions from a BART-eligible source, along with compliance schedules, were included in each source's air quality permit. All BART-eligible sources operate under Title V permits per 6 NYCRR Part 201 and 40 CFR Part 70. Under New York's Title V permitting program, conditions placed in permits must have a basis in a regulation containing the requirements for BART controls, necessitating the promulgation of a BART regulation as mentioned above. State-level BART rulemaking provided New York with the necessary authority to require sources to perform BART analyses, install controls, develop compliance schedules, recordkeeping, reporting and other elements required under the Regional Haze Rule. The BART control analysis requirement of Part 249 mirrors the five factors established in the federal BART rule. As provided in 40 CFR §51.308(e)(1)(v), the Title V operating permits for BART sources must include a requirement that each source maintain the control equipment and establish procedures to ensure such equipment is properly operated and maintained. This requirement is included in the Title V operating permit for each source subject to BART.

8.3. Final BART Determinations and EPA Approval

The following table lists New York State sources subject to BART controls and provides a summary of the control requirements for the subject emission units at each facility. Emission limits or alternate compliance methods (i.e. shutdowns and capping provisions) for these facilities were approved as SIP revisions by EPA on August 28, 2012, except for the Roseton and Danskammer Generating Stations. EPA issued FIP limits for the BART-eligible sources at these facilities, which were later adopted into the respective Title V permits and resubmitted as SIP revisions. Danskammer's BART measures were approved as SIP revisions effective January 3, 2018 (82 FR 57126), and Roseton's BART measures received approval on February 16, 2018 (83 FR 6970).

Table 8-1 - Status of BART Controls at New York State Facilities

Facility	Emission Unit(s)	Control Requirements	
EF Barrett Power Station	Boiler 2	NO_X	Limits of 0.20 lb/mmBtu on oil and 0.10 lb/mmBtu on gas, 24-hr avg basis.
		SO_2	Existing 0.37% fuel sulfur limit.
		PM	Current operation with no control. Limit of 0.1 lb/mmBtu.
Northport Power Station	Boilers 1-4	NO_X	Installation of SOFA with limits of 0.20 lb/mmBtu on oil and 0.10 lb/mmBtu on gas on 24-hr avg basis.
		SO_2	0.7% fuel sulfur limit (currently 1% for Units 1-3, 0.75% for Unit 4).
		PM	Existing ESP for each unit. Limit of 0.1 lb/mmBtu.
Con Ed 59th St. Station	Steam Boilers 114 + 115	NO_X	Current use of off-stoichiometric firing. Limit of 0.32 lb/mmBtu on 30-day rolling avg for both boilers.
		SO_2	Existing 0.3% fuel sulfur limit.
		PM	Current operation with low-sulfur oil. Limit of 0.1 lb/mmBtu.
Arthur Kill Gen. Station	Boiler 30	NO_X	Commit to firing natural gas exclusively; Limit of 0.15 lb/mmBtu (24-hr avg during ozone season, 30-day avg during non-ozone season).
		SO_2	Firing natural gas exclusively; Accepting BART limit of 0.15 lb/mmBtu.
		PM	Current operation and firing natural gas exclusively. 359 tpy limit.
Ravenswood Gen. Station	Boilers 10, 20, 30	NO_X	Existing LNB+CCOFA; Limit of 0.15 lb/mmBtu on a 30-day rolling avg
		SO_2	Existing 0.3% fuel sulfur limit.
		PM	Current operation with low-sulfur oil. Limit of 0.1 lb/mmBtu.
Ravenswood Steam Plant	Boiler 2	NO_X	No controls; Limit of 0.32 lb/mmBtu on a 30-day rolling avg
		SO_2	Existing 0.3% fuel sulfur limit.
		PM	Current operation with low-sulfur oil. Limit of 0.1 lb/mmBtu.

Bowline Pt. Gen. Station	Boilers 1 + 2	NO_X	Current use of off-stoichiometric firing (Blr1), off-stoichiome44tric firing + OFA + FGR (Blr2). Limit of 0.15 lb/mmBtu (gas) and 0.25 lb/mmBtu (oil) (24-hr avg during ozone season, 30-day avg non-ozone season). Limited to burning oil in amounts no more than 3.1M barrels (ozone season) or 4.6M barrels (non-ozone season). Effective July 1, 2014.
		SO_2	Existing 0.37% fuel sulfur limit.
		PM	Current operation with no control. Limit of 0.1 lb/mmBtu.
Danskammer Gen. Station	Boiler 4	NO_X	Limit of 0.12 lb/mmBtu (24-hr avg during ozone season, 30-day avg during non-ozone season). Effective July 1, 2014. Fire natural gas exclusively. Effective February 24, 2015
		SO_2	Limit of 0.09 lb/mmBtu (24-hr avg) Effective April 30, 2015.
		PM	Existing ESP. Limit of 0.06 lb/mmBtu (1-hour avg). Effective July 1, 2014.
Roseton Gen. Station	Boilers 1 + 2	NO_X	Limit of 0.20 lb/mmBtu (24-hr avg during ozone season, 30-day avg during non-ozone season).
		SO_2	0.55 lb/mmBTU (24-hr avg).
		PM	Existing mechanical dust collectors. Limit of 0.1 lb/mmBtu.
Holcim Inc. Catskill Plant	Wet Process Kiln	-	Facility has closed permanently; permit expired effective February 13, 2012.
Lafarge Building Materials	Two Wet Process Kilns	-	Retired BART units as per consent order.
Owens Corning - Feura Bush	Units 2, 3, 12, 13, 14	-	Accepted combined 249 tpy cap on eligible units for NOx, SO2, PM10. Cap went into effect on May 18, 2012.
International Paper Ticonderoga Mill	Power Boiler	NO_X	Existing low NOx burners, FGR. Limit of 0.25 lb/mmBtu (24-hr avg during ozone season; 30-day rolling avg otherwise).
		SO_2	Existing wet scrubber with sodium hydroxide injection. Limits of 309 lb/hr (rolling 24-hr avg) and 435 lb/hr (rolling 3-hr avg). Additional compliance with Boiler MACT acid gas requirements.
		PM	Existing multicyclone and wet scrubber; Compliance with major source Boiler MACT (40 CFR 63 Subpart DDDDD). Currently subject to particulate emission rate of 0.10 lb/mmBtu.
	Recovery Furnace	NO_X	Current operation with staged combustion system. Limit of 100 ppmdv @8% O2.
		SO_2	Existing 1.5% sulfur fuel oil and staged combustion system. Limit for total reduced sulfur of 4 ppmdv @8% O2 on daily average.
		PM	Existing ESP; Continued compliance with MACT (40 CFR 63.862(a)(ii) Subpart MM) limit of 0.03 grains/dscf@8% O2.

Lehigh Northeast Cement	Wet Process Kiln + Clinker Cooler	NO_X	Installation of SNCR; Limit of 2.88 lb NOx per ton of clinker on a 30-day rolling avg. Effective July 1, 2012.
		SO_2	Lime slurry injection via existing lime spray dryer; permitted for max.opacity of 20%. Additional SO2 emission limit of 1.50 lb/mmBtu (weighted avg of 3 1-hr runs in both roller mill on & off conditions).
		PM	Kiln: Existing ESP; limit 0.3 lb/ton feed (1-hr avg). Clinker Cooler: Existing baghouse, compliance with 6 NYCRR Part 225-1, 40 CFR 63.1343, and upcoming PC MACT. Limit 0.1 lb/ton dry feed (1-hr avg)
ALCOA Massena Operations (West Plant)	Potline	NO_X	Current operation. Existing limit of 3.0 lb/hr; additional BART limit of 50 tpy.
		SO_2	Existing scrubber + dry alumina injection. Sulfur level in coke limited to 2.5% by weight.
		PM	Existing baghouse. Emission limit of 168 tpy.
	Baking Furnace	NO_X	Current operation. Emission limit of 203 tpy.
		SO_2	Current operation. Sulfur level in coke limited to 2.5% by weight.
		PM	Existing baghouse. Emission limit of 24 tpy.
	Package Boilers	NO_X	Existing low NOx burners and FGR. Existing limit of 0.30 lb/mmBtu.
		SO_2	Existing 1.5% fuel sulfur limit.
		PM	Current operation. Limit of 0.10 lb/mmBtu.
Oswego Harbor Power	Boilers 5 + 6	NO_X	Existing controls (LNB, LN-REACH, OFA, and FGR). Emission limit of 383 tons (Unit 5) and 665 tons (Unit 6) as 12-month rolling totals.
		SO_2	0.75% fuel sulfur limit, measured as 0.80 lb/mmBtu on 3-hour rolling avg future oil purchases of no greater than 0.5% sulfur.
		PM	Existing ESP. Permit limit = 0.10 lb/mmBtu.
Syracuse Energy Corp.	Boiler 1	-	Eligible unit shut down September 2013.
Kodak (Now 'RED Rochester LLC')	Boilers 41, 42, 43	-	Boiler 41 shut down by December 31, 2013; Boilers 42 and 43 shut down and decommissioned by March 2018.
S.A. Carlson Gen. Station	Boiler 12	-	Eligible unit shut down early 2013.

9. Reasonable Progress Goals (RPGs)

40 CFR Section 51.308(f)(3) of EPA's Regional Haze Rule requires each state containing a mandatory Class I Federal area to establish, for each mandatory Class I Federal area within the state, visibility goals (expressed in deciviews) that provide for reasonable progress toward achieving natural visibility. New York does not have any mandatory Class I Federal areas, but the MANE-VU states of New Jersey, New Hampshire, Maine, and Vermont set goals that will rely, in part, on measures taken in New York to attain.

9.1. Consultation and Agreement with Other States' Goals

New York has no mandatory Class I Federal areas, but the MANE-VU states with mandatory Class I Federal areas asked for New York State's continued participation in further consultation in 2017 and 2018. Consistent with the Regional Haze Rule requirements, New York State has consulted, and continues to consult, with states containing mandatory Class I Federal areas that are or may be impacted by emission sources within New York State as they established RPGs for each mandatory Class I Federal area within their state. MANE-VU consultation meetings that New York participated in and conference calls for this planning period are summarized in Appendix E. New York State's coordination with FLMs on long-term strategy development is described in Section 4 of this SIP.

As a result of the consultation process, DEC expected that each RPO whose mandatory Class I Federal areas are affected by emissions in New York would formally notify the state of the measures expected to be taken in order to meet the RPGs for 2018-2028 as well as attaining natural haze conditions by 2064. States outside of MANE-VU that have mandatory Class I Federal areas that New York potentially contributes to have not yet begun their consultation processes. These states may potentially ask for additional measures in the New York SIP to reduce the state's contributions to those mandatory Class I Federal areas, although the control measures adopted through the MANE-VU planning process should be sufficiently stringent so as not to require additional measures.

With the implementation of the measures described in Section 9.4, New York will meet the RPGs and long-term strategy requirements developed for New York's regional haze SIP at MANE-VU's mandatory Class I Federal areas. New York commits to satisfying its responsibilities under the Regional Haze Program, the Act, and this SIP.

In establishing their RPGs, states must consider the URP and the emission reduction measures needed to achieve this level of improvement in visibility for

the time period covered by the implementation plan. URP is based on an analysis of visibility conditions, including a comparison of current conditions to natural visibility conditions, which quantifies the improvement necessary to achieve natural visibility conditions by the year 2064 (Appendix B, *Technical Guidance on Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program*). The uniform rate of improvement per year needed to achieve natural background visibility conditions is also shown in Table 9-1.

Table 9-1 - Uniform Rate of Progress

Mandatory Class I Federal Area (2000-2004)	2000-2004 Baseline Visibility for 20% Most Impaired Days (deciviews)	Current Visibility for 20% Most Impaired Days (2012-2016) (deciviews)	Natural Visibility Condition for 20% Most Impaired Days (deciviews)	Deciview Improvement Needed by 2028 from 2016	Deciview Improvement Needed for Natural Visibility Conditions	Uniform Rate of Improvement Annually
Acadia National Park, Maine	22.01	15.28	10.9	-2.29	4.38	0.185
Moosehorn National Wildlife Refuge, Maine	20.66	14.07	10.3	-2.45	3.77	0.173
Roosevelt/Campobello International Park, Maine & New Brunswick, Canada	20.66	14.07	10.3	-2.45	3.77	0.173
Great Gulf Wilderness Area, New Hampshire	21.93	13.92	10.1	-3.28	3.82	0.197
Presidential Range/Dry River Wilderness Area, New Hampshire	21.93	13.92	10.1	-3.28	3.82	0.197
Lye Brook Wilderness Area, Vermont	23.57	16.07	11.3	-2.60	4.77	0.205
Brigantine Wilderness Area, New Jersey	27.43	20.44	10.8	-0.32	9.64	0.278
Dolly Sods Wilderness Area, West Virginia	28.29	18.88	9.0	-1.70	9.88	0.322
Otter Creek Wilderness Area, West Virginia	28.29	18.88	9.0	-1.70	9.88	0.322
Shenandoah National Park, Virginia	28.32	18.40	9.7	-2.47	8.70	0.310

Source: *Mid-Atlantic/Northeast U.S. Visibility Data, 2004-2016 (2nd RH SIP Metrics)* (https://otcair.org/MANEVU/Upload/Publication/Reports/MANEVU_Trends_2004-16_Report_2nd_SIP_Metrics_05_22_2018_revision.docx), prepared on August 30, 2018

States containing mandatory Class I Federal areas are required to show that visibility improvements will reach natural visibility conditions by 2064 or justify why it is reasonable that they will not. States without mandatory Class I Federal areas contribute to visibility in these areas as well, and so their emissions must be included in the analysis. The State of New York does not contain any mandatory Class I Federal areas.

In determining the RPG for each mandatory Class I Federal area, both natural conditions and baseline visibility for the 5-year period from 2000 through 2004 were calculated in conformance with *Draft Guidance on Progress Tracking Metrics, Long-term Strategies, Reasonable Progress Goals and Other Requirements for the Regional Haze State Implementation Plans for the Second Implementation Period* (EPA, 2016). As explained below, the RPGs established for the mandatory Class I Federal areas affected by emissions from New York provide for at least as much visibility improvement by 2028 as would be achieved by the URP shown above.

9.2. Reasonable Progress Goals for Mandatory Class I Federal Areas

In accordance with the requirements of 40 CFR Section 51.308(f)(2), this Regional Haze SIP addresses the necessary measures that New York State must take to meet the RPGs for each mandatory Class I Federal area located in MANE-VU for 2018-2028. Tables 9-2 and 9-3 provide a summary of RPGs for MANE-VU states in which mandatory Class I Federal areas are located.

Table 9-2 - Reasonable Progress Goals—20% Most Impaired Days

Mandatory Class I Federal Area	Baseline Visibility (20% most impaired days 2000-2004) (deciviews)	2028 Most Impaired Days Base Case Visibility (deciviews)	2028 Reasonable Progress Goal (deciviews)	Natural Visibility Conditions (20% most impaired days) (deciviews)
Acadia National Park	22.01	13.44	13.35	10.9
Roosevelt/Campobello International Park	20.66	13.20	13.12	10.3
Moosehorn National Wildlife Refuge	20.66	13.20	13.12	10.3
Presidential Range/Dry River Wilderness Area	21.93	12.13	12.00	10.1
Great Gulf Wilderness Area	21.93	12.13	12.00	10.1
Lye Brook Wilderness Area, Vermont	23.57	13.89	13.68	11.3
Brigantine Wilderness Area, New Jersey	27.43	18.16	17.97	10.8
Dolly Sods Wilderness Area	28.29	15.30	15.09	9.0
Otter Creek Wilderness Area	28.29	15.30	15.09	9.0
Shenandoah National Park	28.32	14.54	14.25	9.7

Table 9-3 - Reasonable Progress Goals—20% Best Days

Mandatory Class I Federal Area	Baseline Visibility (20% Best Days) (deciviews)	2028 Best Days Base Case Visibility (deciviews)	2028 Best Days Control Case Visibility (deciviews)	Natural Visibility (20% best days) (deciviews)
Acadia National Park	8.78	6.33	6.33	4.7
Roosevelt/Campobello International Park	9.16	6.46	6.45	5.0
Moosehorn National Wildlife Refuge	9.16	6.46	6.45	5.0
Presidential Range/Dry River Wilderness Area	7.66	5.11	5.06	3.7
Great Gulf Wilderness Area	7.66	5.11	5.06	3.7
Lye Brook Wilderness	6.37	3.9	3.86	2.8
Brigantine Wilderness	14.33	10.55	10.47	5.5
Dolly Sods Wilderness Area	12.28	7.33	7.27	3.6
Otter Creek Wilderness Area	12.28	7.33	7.27	3.6
Shenandoah National Park	10.93	7.00	6.83	3.1

To determine the RPG in deciviews, MANE-VU conducted modeling with certain control measure assumptions, in regards to the Ask, described in Section 9 of *Ozone Transport Commission/MidAtlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document* (October 2008) and Sections 9.7-9.10 of this report. In establishing the RPGs for 2028, contributing states will submit SIP revisions between now and 2028 as they adopt and make enforceable control measures to implement these goals. This long-term strategy to reduce and prevent regional haze will allow each state up to 10 years to pursue adoption and implementation of reasonable and cost-effective NO_X and SO_2 control measures as appropriate and necessary.

9.2.1. Rationale for Determining Reasonable Controls

40 CFR 51.308(f)(2)(i) of EPA's Regional Haze Rule requires that, in establishing

RPGs for each mandatory Class I Federal area, the state must consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources. The SIP must include a demonstration showing how these factors were taken into consideration in setting the RPGs. These factors are sometimes termed the “four statutory factors,” since their consideration is required by the CAA.

A conceptual model was developed in *$PM_{2.5}$ and Regional Haze Air Quality Problems in the MANE-VU Region: A Conceptual Description* (Appendix F) that showed the dominant contributor to visibility impairment during all seasons at all MANE-VU mandatory Class I Federal areas is particulate sulfate formed from emissions of SO_2. Nitrate formed from NO_X emissions is a significant contributor to visibility impairment during the winter. While other pollutants, including organic carbon, will need to be addressed to achieve the national visibility goals, MANE-VU’s *Technical Memorandum: Contribution Assessment Preliminary Inventory Analysis* (Appendix G) suggested that an emphasis on SO_2 and wintertime NO_X would yield the greatest near-term benefit. These are reasonable measures designed to meet our RHR obligations. Therefore, it is reasonable to conclude that the additional measures considered in setting RPGs require reductions in SO_2 and NO_X emissions. It has been determined that the control measures and the costs of compliance are reasonable, based on available control technologies. New York State is committed to reducing emissions at least equal to those predicted in the model, through the measures described in Section 10 Long-term Strategy.

New York’s LTS includes additional measures to control sources of SO_2 and NO_X within the MANE-VU region and in other states that were determined to contribute to regional haze at MANE-VU mandatory Class I Federal areas. The *Technical Memorandum: Contribution Assessment Preliminary Inventory Analysis* documented the source categories most responsible for visibility degradation at MANE-VU mandatory Class I Federal areas. As described in Section 10, Long Term Strategy, New York evaluated several potential control measures, some of which were identified for further study.

New York reviewed the four-factor analyses performed by MANE-VU, consulted with the other MANE-VU states about possible control measures, and concluded by adopting the statements known as the MANE-VU Ask. These statements identify the control measures that would be pursued toward improving visibility in the region.

9.3. Determining Reasonable Controls Within MANE-VU

In accordance with draft EPA guidance, states must establish baselines from which reasonable progress will be measured. The progress sought is in visibility improvement. However, emission reductions are effectively used as a surrogate for this progress, with visibility improvement assessed over the first half of the implementation of the haze SIP. If mid-course adjustments are appropriate at that time, the SIP will be revised to provide for any necessary corrections. The baseline year for emissions reductions used by MANE-VU is 2011.

In 2015, MARAMA issued a contract for SRA International, Inc. to conduct appropriate analysis to update the cost information in the following categories of the "Assessment of Reasonable Progress for Regional Haze In MANE-VU Class I Areas"[21] report from the first implementation period:

- Coal and oil-fired Electric Generating Units (EGUs);
- Point and area source industrial, commercial and institutional boilers (ICI boilers);
- Cement kilns;
- Lime kilns;
- The use of heating oil;
- Residential wood combustion; and
- Outdoor Wood-fired Boilers.

In assessing each of these categories, MANE-VU conducted an analysis of economic and environmental impacts of potential control scenarios that could be implemented by MANE-VU states. The purpose of this analysis was to develop information that could be used by the states in producing implementation plans to address regional haze. Each category was evaluated with respect to the four factors described in Section 169A of the CAA. The factors are:

1. Cost;
2. Compliance timeframe;
3. Energy and non-air quality environmental impacts; and
4. Remaining useful life for affected sources.

The results of this analysis were used to develop the final list of measures that were recommended by states with mandatory Class I Federal areas in MANE-VU as being necessary to establish the LTS. These measures focus primarily on the reduction of sulfates and nitrates during the second planning period toward reducing visibility impairment to pre-industrial levels.

[21] MACTEC Federal Programs, Inc., "Assessment of Reasonable Progress for Regional Haze In MANE-VU Class I Areas: Methodology for Source Selection, Evaluation of Control Options, and Four Factor Analysis." (July 9, 2007).

9.4. Controls for MANE-VU States Selected by States with Mandatory Class I Federal Areas to Achieve the Reasonable Progress Goals

The RPGs shown above in Tables 9-2 and 9-3 represent implementation of the regional strategy adopted by MANE-VU on August 25, 2017 entitled, *Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Course of Action Within MANE-VU Toward Assuring Reasonable Progress for the Second Implementation Period (2018-2028)* (Appendix H). These actions, consisting of control and other measures intended to reduce the emissions of visibility impairing pollutants and their precursors, are referred to in the SIP as the "Ask." As such, these goals are intended to reflect the pursuit by MANE-VU States, including New York, of a course of action including pursuing the adoption and implementation of the following "emission management" strategies, as appropriate and necessary:

1. EGUs with a nameplate capacity larger than or equal to 25MW with already installed NOx and/or SO_2 controls: ensure the most effective use of control technologies on a year-round basis to consistently minimize emissions of haze precursors, or obtain equivalent alternative emission reductions;
2. Emission sources modeled by MANE-VU that have the potential for 3.0 Mm^{-1} or greater visibility impacts at any MANE-VU mandatory Class I Federal area, as identified by MANE-VU contribution analyses (see attached listing): perform a four-factor analysis for reasonable installation or upgrade to emission controls;
3. Each MANE-VU State that has not yet fully adopted an ultra-low sulfur fuel oil standard as requested by MANE-VU in 2007: pursue this standard as expeditiously as possible and before 2028, depending on supply availability, where the standards are as follows:
    a. distillate oil to 0.0015% sulfur by weight (15 ppm),
    b. #4 residual oil within a range of 0.25 to 0.5% sulfur by weight,
    c. #6 residual oil within a range of 0.3 to 0.5% sulfur by weight.
4. EGUs and other large point emission sources larger than 250 MMBTU per hour heat input that have switched operations to lower emitting fuels: pursue updating permits, enforceable agreements, and/or rules to lock-in lower emission rates for SO_2, NOx and PM. The permit, enforcement agreement, and/or rule can allow for suspension of the lower emission rate during natural gas curtailment;

5. Where emission rules have not been adopted, control NOx emissions for peaking combustion turbines that have the potential to operate on high electric demand days (HEDD)[22] by:
    a. Striving to meet NOx emissions standard of no greater than 25 ppm at 15% O_2 for natural gas and 42 ppm at 15% O_2 for fuel oil, but at a minimum meeting NOx emissions standard of no greater than 42 ppm at 15% O_2 for natural gas and 96 ppm at 15% O_2 for fuel oil; or,
    b. Performing a four-factor analysis for reasonable installation or upgrade to emission controls; or,
    c. Obtaining equivalent alternative emission reductions on high electric demand days.
6. Each State should consider and report in their SIP measures or programs to: a) decrease energy demand through the use of energy efficiency, and b) increase the use within their state of Combined Heat and Power (CHP) and other clean Distributed Generation technologies including fuel cells, wind, and solar.

As stated above, this long-term strategy to reduce and prevent regional haze will allow each state up to 10 years to pursue adoption and implementation of reasonable and cost-effective NO_X and SO_2 control measures as appropriate and necessary. See Section 9.5 for a description of how these assumptions were modeled to estimate the visibility impact of the MANE-VU "Ask."

9.5. Visibility Impacts of Additional Reasonable Controls

MANE-VU conducted modeling to estimate the impact of various elements of the MANE-VU "Ask" as described above. This modeling is described in *Ozone Transport Commission/MidAtlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document* (October 2008).

MANE-VU evaluated the visibility benefits of the potential control strategies that go beyond expected controls already required by other CAA provisions. This section explains assumptions used to model the impact of potential control strategies and describes the combined potential visibility benefits of all the strategies based on CMAQ modeling. As with all modeling, emissions estimates and modeling results for 2028 entail uncertainty, and further evaluation may be

[22] High electric demand days are days when higher than usual electrical demands bring additional generation units online, many of which are infrequently operated and may have significantly higher emission rates than the rest of the generation fleet. A peaking combustion turbine is defined for the purposes of this "Ask" as a turbine capable of generating 15 megawatts or more, that commenced operation prior to May 1, 2007, is used to generate electricity (all or part of which is delivered to the electric power distribution grid for commercial sale), and that operated less than or equal to an average of 1752 hours (or 20%) per year during 2014 to 2016.

conducted as part of the SIP report required in five years under 40 CFR Section 51.308(g). If reasonable progress requirements are not met, New York will submit a revision of its Regional Haze SIP with the necessary corrections as prescribed in the federal rule.

9.5.1. Model Performance

CMAQ modeling was conducted through cooperative modeling efforts by OTC, MANE-VU, and member states. Performance of the model for $PM_{2.5}$ species and visibility were examined. Composite daily average predicted and observed concentrations of $PM_{2.5}$ FRM mass were compared to determine the validity of the modeling results prior to evaluating individual species needed for haze model validation. Annually, $PM_{2.5}$ is over-predicted, with the greatest over-prediction occurring during the winter months, and the summer months leaning towards a slight under-prediction. As a first step in geographic evaluation, the differences between observed and predicted values were studied and some areas of MANE-VU are achieving different results annually. The greatest error for $PM_{2.5}$ in MANE-VU occurs in northern New England and decreases towards the southern portion of MANE-VU, though there are also some higher error values along the coast. The same areas in New England are biased towards over-prediction as well, with under-prediction occurring in more populated portions of MANE-VU.

This study found that sulfate was under-predicted consistently throughout the year by 1 $\mu g/m^3$ with slightly higher under-prediction during summer. Nitrate was over-predicted by small margins during the winter months and very slightly under-predicted during summer. Ammonium was under-predicted throughout most of the year, although there was over-prediction during fall. Elemental carbon was over-predicted the entire year compared to thermal/optical reflectance (TOR) observations, though the over-prediction was less during the summer than other times of year. Organic carbon was over-predicted in the winter and under predicted in the summer but compared well during the shoulder months compared to TOR observations. Soil was over-predicted throughout the year with the least amount of over-prediction during the spring. Elemental carbon was over-predicted even more when compared to thermal/optical transmission (TOT) observations than TOR. Organic carbon was over-predicted less in the winter and under-predicted more in the summer compared to TOT observations than TOR. The pattern of over and under-prediction more closely resembles that of organic carbon since the magnitude of organic carbon is much higher than that of elemental carbon.

A state-specific assessment of the performance of the models that were used is not available and would not be meaningful given the role that transport plays over very long distances. All modeling was done on a regional basis. However, it is

possible to infer each states' contributions in a general sense by examining the relative emissions in New York to the total for the region. Section 7 presents the relative emissions from New York State sources compared to MANE-VU sources in total.

9.6. Controls Outside of MANE-VU Selected to Meet RPGs

The previously-discussed RPGs represent implementation of the statement adopted by MANE-VU on August 25, 2017 and entitled, *Statement of the MANE-VU States Concerning a Course of Action in Contributing States Located Upwind of MANE-VU toward Assuring Reasonable Progress for the Second Regional Haze Implementation Period (2018-2028)* (Appendix I).

The states outside MANE-VU to whom this request was addressed were identified in the *Selection of States for MANE-VU Regional Haze Consultation (2018)* as those states contributing at least two percent of the sulfates at MANE-VU mandatory Class I Federal areas in 2015. This includes the following states outside MANE-VU: Alabama, Florida, Illinois, Indiana, Kentucky, Louisiana, Michigan, Missouri, North Carolina, Ohio, Tennessee, Texas, Virginia, and West Virginia.

The MANE-VU August 25, 2017 Statement requested that the above-listed states outside MANE-VU pursue the adoption and implementation of the following control strategies, as appropriate and necessary:

1. EGUs with a nameplate capacity larger than or equal to 25MW with already installed NO_X and/or SO_2 controls: ensure the most effective use of control technologies on a year-round basis to consistently minimize emissions of haze precursors, or obtain equivalent alternative emission reductions;
2. Emission sources modeled by MANE-VU that have the potential for 3.0 Mm^{-1} or greater visibility impacts at any MANE-VU mandatory Class I Federal area, as identified by MANE-VU contribution analyses: perform a four-factor analysis for reasonable installation or upgrade to emission controls;
3. Each MANE-VU State that has not yet fully adopted an ultra-low sulfur fuel oil standard as requested by MANE-VU in 2007: pursue this standard as expeditiously as possible and before 2028, depending on supply availability, where the standards are as follows:
    a. distillate oil to 0.0015% sulfur by weight (15 ppm),
    b. #4 residual oil within a range of 0.25 to 0.5% sulfur by weight,
    c. #6 residual oil within a range of 0.3 to 0.5% sulfur by weight.

4. EGUs and other large point emission sources larger than 250 MMBTU per hour heat input that have switched operations to lower emitting fuels: pursue updating permits, enforceable agreements, and/or rules to lock-in lower emission rates for SO_2, NOx and PM. The permit, enforcement agreement, and/or rule can allow for suspension of the lower emission rate during natural gas curtailment; and
5. Each State should consider and report in their SIP measures or programs to: a) decrease energy demand through the use of energy efficiency, and b) increase the use within their state of CHP and other clean Distributed Generation technologies including fuel cells, wind, and solar.

These measures and other measures identified were evaluated prior to and during the consultation process and the above course of action was determined to be reasonable. Assumptions about the implementation of these measures are represented by the inventory and modeling assumptions described in this section. This long-term strategy to reduce and prevent regional haze will allow each state up to 10 years to pursue adoption and implementation of reasonable and cost-effective NO_X and SO_2 control measures as appropriate and necessary.

9.7. Running Existing Controls on EGUs

There were no expectations of a change in SO_2 emissions from running controls year-round due previous significant reductions in SO_2 emissions, so only NO_X emissions were controlled. NO_X emissions were projected using ERTAC and the emissions were compared for the period from January 1 – April 30 and November 1 – December 31, the period considered the non-ozone season. Results were compared between the v2.7 base case results and the run where the best observed rates were applied. MANE-VU found that states in the four eastern RPOs would see a drop of NO_X emissions of ~55,000 tons (10%) when best observed rates were applied during non-ozone season, or approximately 307 tons per day, respectively.

Figure 9-1 shows the change in non-ozone season emissions that occur when best observed rates are used during the non-ozone season months. It also shows which back trajectories occurred on days where nitrate impairment outweighs the sulfate impairment at Brigantine. Many of the back trajectories on the 20% most impaired days traverse the locations of the EGUs that are seeing some of the greatest reductions in emissions in the analysis. Emission reductions occurring at power plants in Pennsylvania, Michigan, and along the Ohio River Valley are observed. Since the emissions from these power plants are released into air masses that are likely to travel to Brigantine, these emissions reductions should have a significant benefit at Brigantine.

Figure 9-1- Change in non-ozone season NOX emissions (tons) due to optimization of emission rates with 2011 and 2015 back trajectories for the 20% most-impaired winter days where nitrates impacted visibility more than sulfates at Brigantine Wilderness Area

9.8. Emission Sources that Contribute 3.0 Mm^{-1} or Greater to MANE-VU Mandatory Class I Federal Areas

Thirty-six stacks were found to impair visibility by $3Mm^{-1}$ or more based on CALPUFF modeling and are subject to the Ask. Of these stacks, 22 are in MANE-VU States and 14 are outside of the region. Thirty of the stacks are in ERTAC and were projected using the ERTAC process; the remaining 6 are non-EGU sources and were projected using EMF. Of the 6 non-EGU sources, 2 are in New York, Lafarge Building Materials and Finch Paper.

ERTAC Sources

Retirements occurred for all units at six stacks and one unit at another stack, leaving 30 stacks that had emission reductions applied. Model units were used to define the rates to utilize for units identified in Ask 2 to reduce their contribution. Model units were defined as units whose maximum impact on visibility was less than 1.0 Mm^{-1}, which was chosen as to maintain a buffer between the Ask level of 3.0 Mm^{-1} and the “modeling units.”

To begin development of the model unit emission rates, MANE-VU relied on Appendix B.3 and Appendix F of the *2016 MANE-VU Source Contribution Modeling Report* (Mid-Atlantic Northeast Visibility Union, April 4, 2017) and data collected on individual EGUs. These data sets were all joined based on a one-to-one relationship using CAMD identifiers and were also linked to impairment values from CALPUFF modeling and other pertinent EGU attributes including retirement date estimations, fuel switch year, primary fuel type, and CAMD unit type. This resulted in 217 units. Units that lacked matches between the datasets were also determined.

First, units were eliminated if the CALPUFF results showed that they impaired visibility by greater than 1.0 Mm^{-1}. Filters were created looking at fuel type and two geographies: (1) all MANE-VU states and states with units in Ask 2 and (2) all MANE-VU States and states included in the Inter-RPO consultation. The former filter was needed so that the model emission rate could be applied to a unit burning a similar fuel. The latter was needed so the best determination could be made as to what distance away should model units be. Units that are further away may be emitting at a higher emission rate than what is achievable but are not impairing visibility nearly as much due to the distance from the source. Average emission rates were calculated for SO_2 and NO_X and are found in Table 9-2.

The Technical Support Committee chose to use the geography of the MANE-VU states and states with units in the Ask for determining model unit emission rates in terms of lbs./hour. These rates were then converted to a rate in terms of lbs./MMBtu to later be compared to already projected emission rates in ERTAC using the following formula:

$$\text{Emission Rate (lbs MMBtu)} = \frac{Generation\ Capacity\ (MW) \times Emission\ Rate\left(\frac{lbs}{hour}\right) \times 1000}{ERTAC\ Heat\ Rate\left(\frac{Btu}{kW \times hour}\right)}$$

After unit-specific emission rates were calculated, a search of the control file that included Ask 1, Ask 3, and Ask 5 was completed for any units that needed the model unit emission rate applied. Any entries in the control file that needed its emission rate adjusted were then removed, which resulted in a control file with 2,850 entries. Then entries with the model unit emission rates were appended to the control file which added 31 entries. Additionally, the emission rate for Brunner Island (ORISPL Code - 3140) in PA was updated to reflect an emission rate of 0.12 lb. NO_X/MMBtu annually and 0.14 lb. SO_2 MMBtu during non-ozone season for this analysis, which was due to a consent decree that occurred after ERTAC v. 2.7 was finalized.

Non-EGU Sources

In the case of non-EGU sources, all the sources that were modeled to not meet the Ask had some type of change of operation planned or implemented following the base year of 2011 intended to meet the Ask. As a result, the approach was taken to elicit feedback from the individual states concerning the appropriate emission rate to use in the control scenario. The units in Maine were found to be lowering their emissions due to low sulfur fuel oil rules in the 2028 base case projections and no additional reductions were included. The units in Maryland and New York were either switching to natural gas or installing scrubbers but had not included these reductions in the base case inventories. 2028 emissions for SO_2 and NO_X were then used to calculate control efficiencies to apply to the units in Maryland and New York. These control efficiencies were then included in a control packet run through EMF.

9.9. Full Adoption of Ultra-low Sulfur Fuel Oil Standards

ERTAC Sources

To model oil-fired EGUs in the ERTAC system, control entries were developed and incorporated in the control file that was created to model HEDD units. Only changes to SO_2 emissions as the result of switching to low sulfur fuel oil were modeled. All states in MANE-VU and all the upwind states included in the Inter-RPO consultation had emission rates evaluated in their units.

To develop the control file first, a search of the control file that included Ask 1 and Ask 5 was completed for any units that needed an adjusted emission rate. Any entries in the control file that needed their emission rate adjusted were then removed, which totaled 2,868. Then new emission rates were appended to the control file.

Non-EGU Sources

EMF was employed to apply controls to the non-point, non-EGU point, and non-ERTAC IPM point files to model the impact of low sulfur fuel oil rules that would be implemented by 2028 to meet the ask. To perform this task a control packet was developed to apply using EMF.

One issue is that the reductions associated with low sulfur fuel oil rules need to be added on to other control factors, since, for instance, an oil-fired unit could have a scrubber for SO_2 and switch to burning low sulfur fuel oil, resulting in two separate “controls.” To further complicate the development of the control packet,

low sulfur fuel oil controls were already applied in the base case projections so different FIPS will have to be treated differently.

Connecticut, Delaware, Maine, Massachusetts, New Jersey, New York, Rhode Island, Vermont, and Philadelphia County, Pennsylvania had no reductions applied since they were already meeting the requirements of the Ask and were controlled in the inventory. The remaining counties in Pennsylvania had a control packet with adjusted control efficiencies applied for #2 distillate oil and no additional reductions since they were already meeting the Ask for #4 and #6 residual oil and were controlled in the inventory. The remaining states either were meeting the Ask through on the books rules, though had not included the reductions in the inventory or did not have on the books rules that met the Ask. In both cases they had a default control packet applied.

To develop control efficiency estimates for the default control packet, the control efficiencies in the packet for existing rules were used as the starting point. The maximum reduction for a pollutant and source classification code (SCC) was chosen as the default control efficiency. Reductions associated with going beyond 0.25% sulfur by weight for #4 fuel oil were not considered. The control packet was also configured so each control would be an add-on control, have a rule effectiveness and penetration of 100%, and have a start date of December 31, 2027.

Following the development of the default control efficiency packet, adjusted control efficiencies were calculated for any entries in the base case control packet for the state of Pennsylvania or any of its counties, excepting Philadelphia County. Only SCCs corresponding to the use of distillate oil were adjusted. The control efficiency applied in the base case was adjusted by the default control efficiency. The control packets were then merged and applied using the EMF system prior to applying the control packets for Ask 2 and Ask 5.

9.10. Controlling Emissions from Peaking Combustion Turbines

ERTAC Sources

To model HEDD Units in the ERTAC system, control entries were developed and incorporated in the control file that was created to model HEDD units. Only changes to NO_X emissions as the result of meeting “the Ask” were modeled. The Ask included two emission rates each for gas-fired and oil-fired HEDD units, one that must be met and one that should be strived to be met. The former was used in modeling. All states in MANE-VU had emission rates evaluated in their units.

To determine which units should be modeled as HEDD units, the SCCs found in the SMOKE-ready post-processed ERTAC ff10 (Flat File 10) files for the 2011 base case were compared to the list of SCCs in Table 9-4.

Table 9-4 - SCCs considered to be potential HEDD units in ERTAC

SCC	Level One	Level Two	Level Three	Level Four
20100101	Internal Combustion Engines	Electric Generation	Distillate Oil (Diesel)	Turbine
20100109	Internal Combustion Engines	Electric Generation	Distillate Oil (Diesel)	Turbine: Exhaust
20100201	Internal Combustion Engines	Electric Generation	Natural Gas	Turbine
20100209	Internal Combustion Engines	Electric Generation	Natural Gas	Turbine: Exhaust
20100901	Internal Combustion Engines	Electric Generation	Kerosene/Naphtha (Jet Fuel)	Turbine
20100909	Internal Combustion Engines	Electric Generation	Kerosene/Naphtha (Jet Fuel)	Turbine: Exhaust
20101302	Internal Combustion Engines	Electric Generation	Liquid Waste	Waste Oil - Turbine

The units were then evaluated based on nameplate capacity, 2014-2016 average operating hours, and whether the unit went online after May 1, 2007. This resulted in the removal of 162 units.

Following this, all states in MANE-VU with units considered to be potential HEDD units reviewed the file to confirm that the universe of units was correct. This resulted in the removal of Rensselaer Cogen and AG Energy. This also resulted in the reintroduction of two units in New Jersey due to incomplete information about online dates in ERTAC and five units in New York due to state feedback on how they consider the units for regulatory purposes.

To calculate the emission rates in lbs./MMBtu, MANE-VU used formulas where the measured O_2 is 15% and 42 ppm and 96 ppm are the stack gas concentrations for natural gas and oil, respectively. This resulted in calculations of emission rates of 0.154 lbs./MMBtu and 0.371 lbs./MMBtu for natural gas and oil respectively. The 2028 annual NO_X emission rates from the non-OS emission rate run for the remaining 344 units were then compared against the must-meet emission rates in the ask of 0.154 lb./MMBtu for gas-fired units and 0.371 lb./MMBtu for oil-fired units. 172 of the units were found to meet the applicable emission rate in 2028 already, leaving 171 units that needed additional control. Connecticut provided emission rates to use instead of either the ERTAC v2.7 base case 2028 projected emission rate or the emission rate calculated to meet the ask. In all cases an emission rate of 0.19 lb./MMBtu was applied since these

units are required to meet a stricter ozone season limit due to RCSA section 22a-174-22e. The new standard began on June 1, 2018, but trading is allowed until June 1, 2023 and for this modeling we expect the sources to individually meet that rate by 2028.

To develop the control file, first a search of the control file that included Ask 1 was completed for any units that needed an adjusted emission rate. Any entries in the control file that needed their emission rate adjusted were then removed. A total of 118 entries were then added to account for adjusted emission rates due to Ask 5. Then new emission rates were appended to the control file resulting in a control file with 2,782 entries.

Non-EGU Sources

To model HEDD units that were not in the ERTAC system, control entries were developed to be processed as a control packet using EMF. Only changes to NO_X emissions as the result of meeting the Ask were modeled. The ask included two emission rates each for gas-fired and oil-fired HEDD units, one that must be met and one that should be strived to be met. The former was used in modeling. All states in MANE-VU had emission rates evaluated in their units.

To determine which units should be modeled as HEDD units, the SCCs found in the SMOKE-ready ff10 files for the non-ERTAC IPM EGUs and non-EGU Point for the 2011 base case were compared to the list of SCCs above.

The units were then evaluated based on design capacity, 2014-2016 average operating hours, whether the unit went online after May 1, 2007, and whether the unit supplied electricity to the grid. The latter three traits were based on feedback from the state in which the unit was located. This results in the removal of 139 units. The same emission rate calculations described above in the section on EGUs were used to determine appropriate emission rates for oil- and gas-fired HEDDs. 2011 and 2028 emission rates were calculated for each unit that had a design capacity denoted in MMBtu/hour by dividing the annual emissions by the design capacity and then by the number of hours the unit operated in 2011. For units without known operating hours in 2011, state-supplied 2011 emission rates were used. For units with a design capacity in MW, conversion factors were obtained from states to convert the design capacity to MMBtu/hour. The SCCs for each unit were then used to compare the 2028 emission rate to the “must meet” emission rate for HEDDs defined in the Ask. If the “must meet” Ask emission rate was lower than the chosen emission rate, a control efficiency was calculated for the unit to be included in the EMF control packet. The control efficiencies were included as an add-on control in the EMF control packet.

9.11. Results of 2028 Modeling

To estimate the visibility impacts of the measures discussed above, MANE-VU conducted regional modeling using the CMAQ chemical transport model. Documentation of this modeling is contained in the report *Ozone Transport Commission/MidAtlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018 Update* (MANE-VU, October 2018). Based on currently available information and up-to-date modeling tools, this modeling provides an estimate of visibility improvement that could be achieved by 2028 through the reasonable measures described above based on currently available information and up-to-date modeling tools.

Figures 9-2 through 9-8 show the URP for each MANE-VU and nearby mandatory Class I Federal areas as well as the estimated combined visibility benefits of the strategies described in Section 9.5 above. All areas are expected to achieve sufficient visibility improvement by 2028 to meet or exceed the minimum improvements to achieve the URP. As a contributing state implementing the emissions measures under the “Ask” developed by the mandatory Class I Federal area states, New York will therefore meet its obligation under this SIP and the Regional Haze Program.

Figure 9-2 - Projected Visibility Improvement at Acadia National Park by 2028

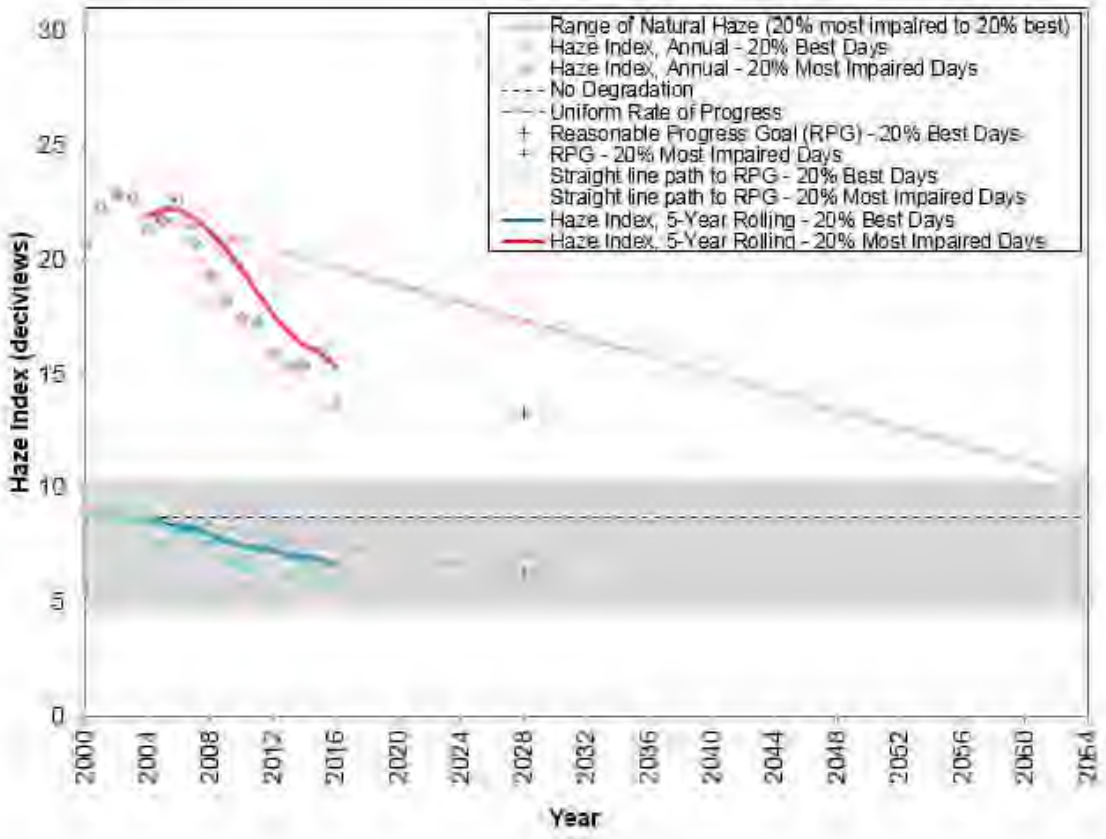


Figure 9-3 - Projected Visibility Improvement at Brigantine National Wildlife Refuge by 2028

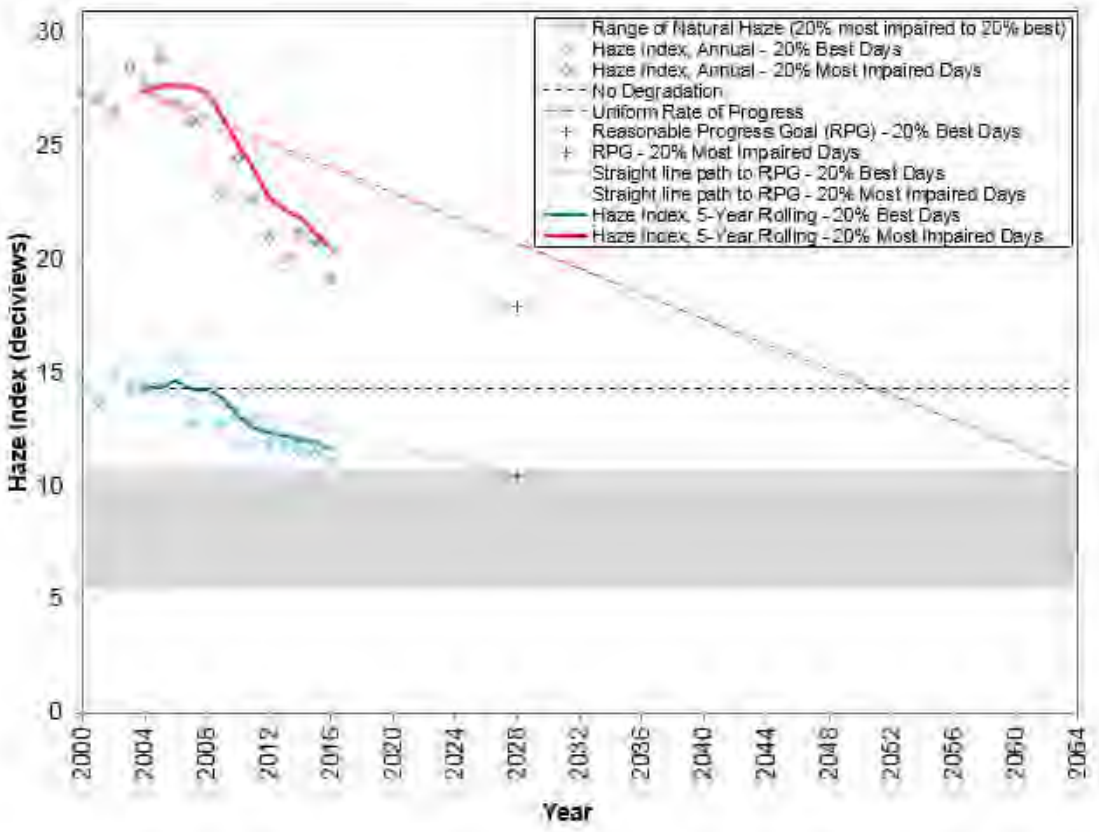
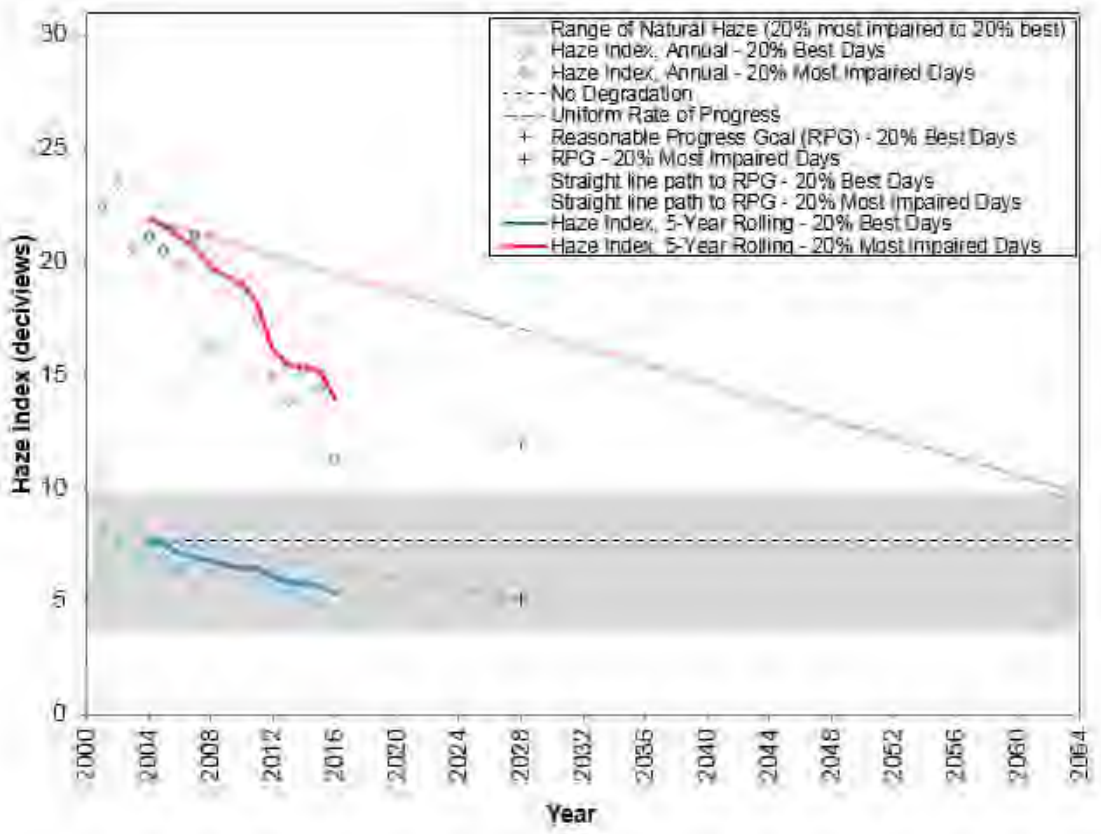


Figure 9-4 - Projected Visibility Improvement at Great Gulf Wilderness Area by 2028[23]



[23] The estimate for Great Gulf Wilderness Area also serves to provide an estimate for the Presidential Range/Dry River Wilderness Area

Figure 9-5 - Projected Visibility Improvement at Lye Brook Wilderness Area by 2028

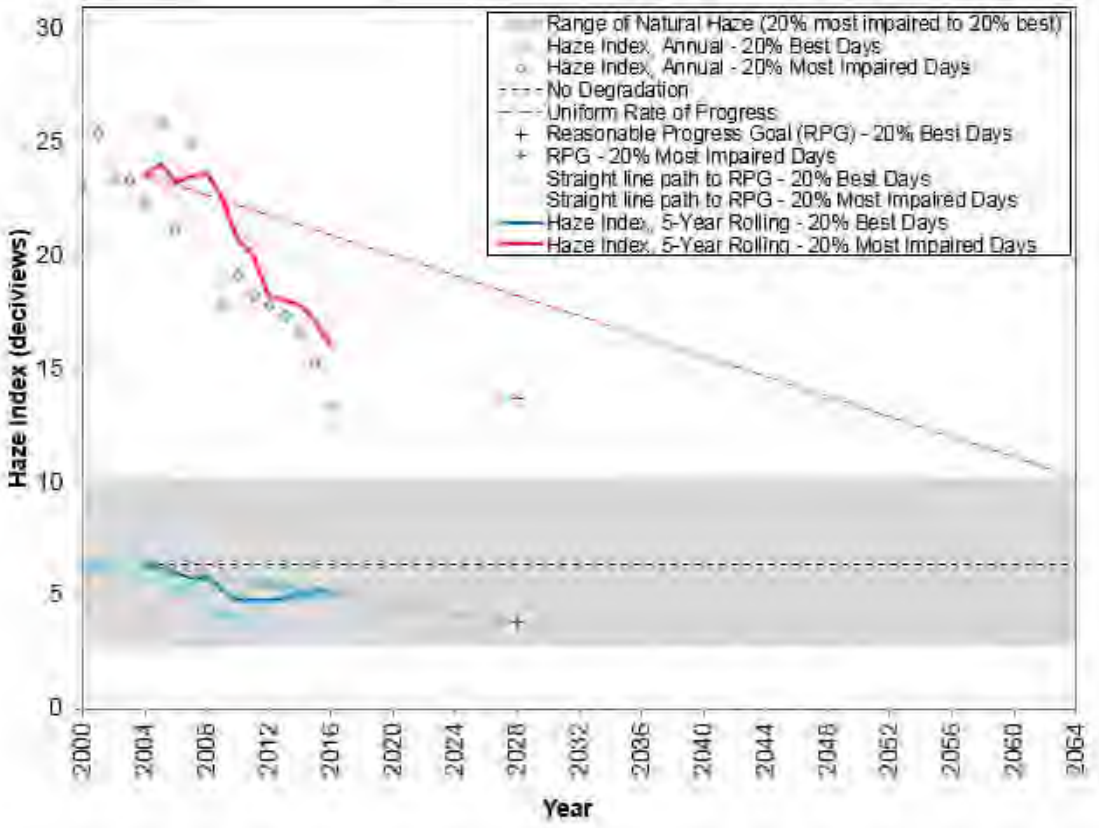
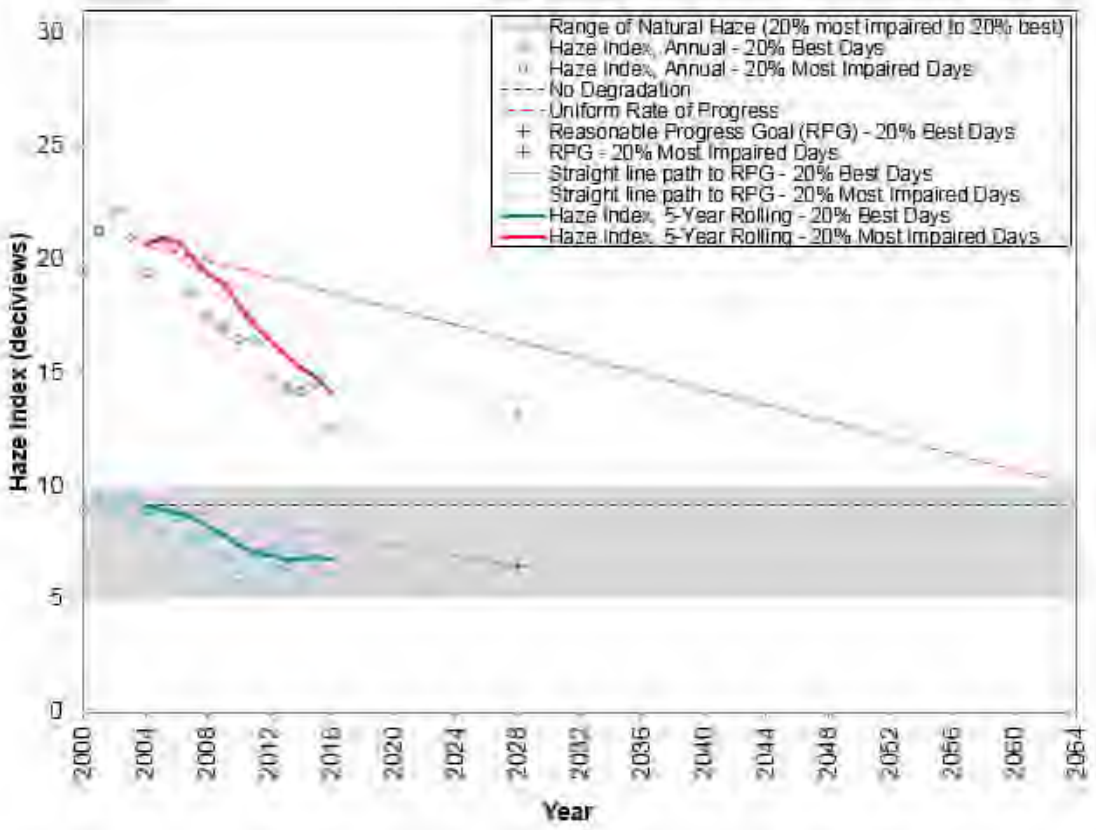
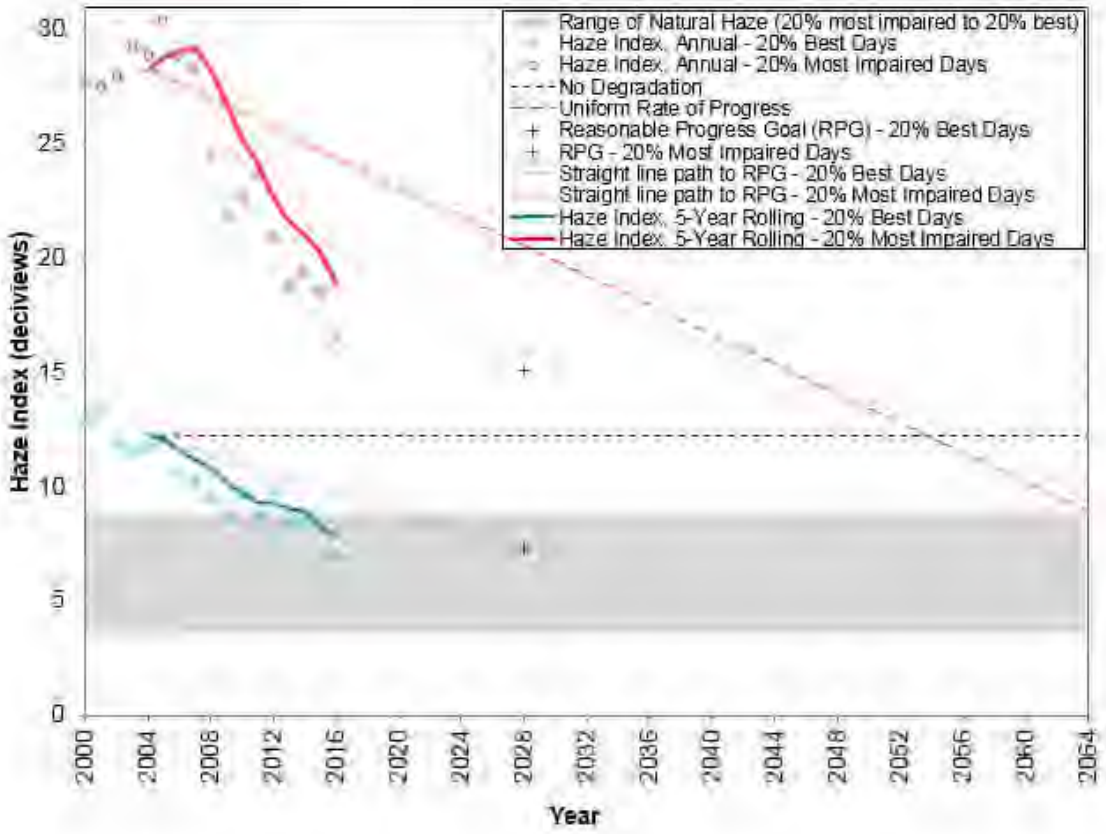


Figure 9-6 - Projected Visibility Improvement at Moosehorn National Wildlife Refuge and Roosevelt/Campobello International Park by 2028[24]



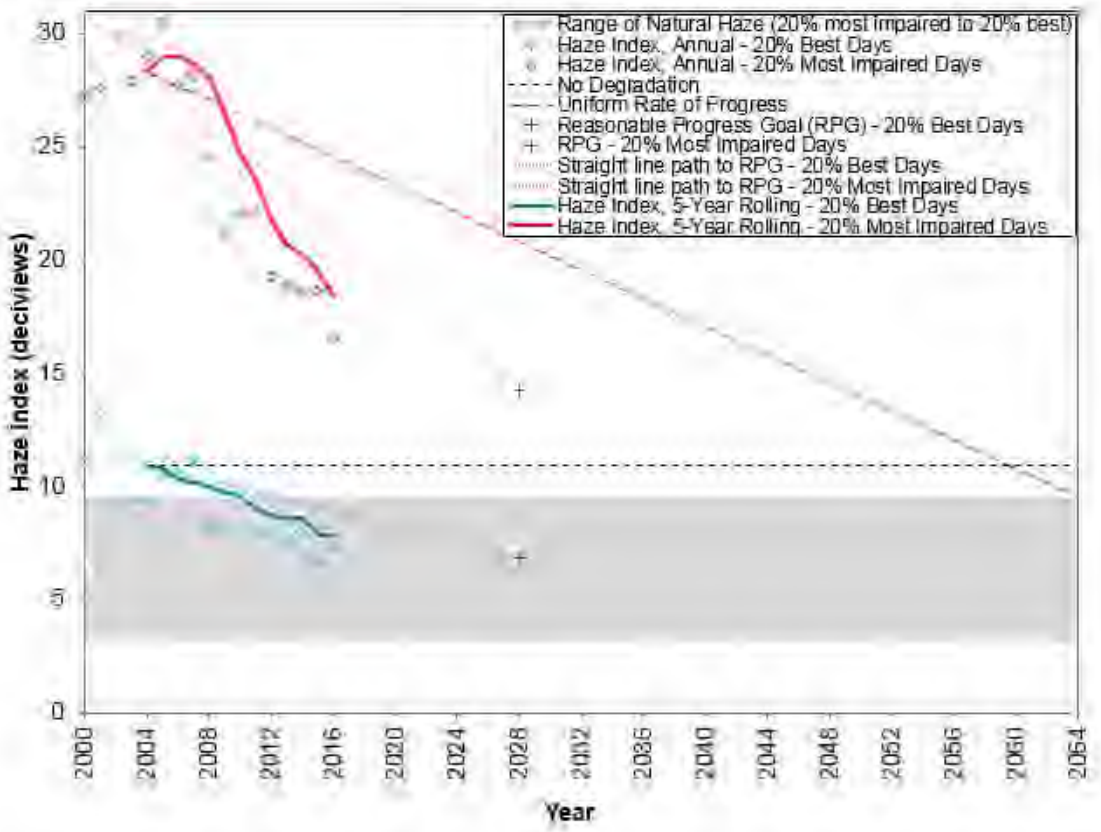
[24] The estimate for Moosehorn National Wildlife Refuge also serves to provide an estimate for Roosevelt/Campobello International Park.

Figure 9-7 - Projected Visibility Improvement at Dolly Sods Wilderness Area by 2028[25]



[25] The estimate for Dolly Sods Wilderness Area also serves to provide an estimate for Otter Creek Wilderness Area

Figure 9-8 – Projected Visibility Improvement at Shenandoah National Park by 2028



9.12. Reporting

Progress will be reported to the EPA every five years in accordance with 40 CFR Section 51.308(g). If reasonable progress requirements are not met, New York will submit a revision of the haze SIP with the necessary corrections.

10. Long Term Strategy

40 CFR Section 51.308(f)(2) requires states to submit long-term strategies that address regional haze visibility impairment for each Class I Federal area located within the state, and, for cases like New York, each Class I Federal area located in a downwind state that may be affected by emissions from within the upwind states. The LTS must include enforceable emissions limitations, compliance schedules and other measures necessary to make reasonable progress and achieve the RPGs established by the states where the mandatory Class I Federal areas are located. While much of the material in this section describes MANE-VU's development of a regional long-term strategy, this section also describes how New York will meet the long-term strategy requirement and demonstrates that the programs to be implemented in New York meet reasonable control levels to address progress.

This LTS addresses visibility impairment for each of the following mandatory Class I federal areas: Acadia National Park, Maine; Brigantine Wilderness, New Jersey; Great Gulf Wilderness, New Hampshire; Lye Brook Wilderness, Vermont; Presidential Range/Dry River Wilderness, New Hampshire; Moosehorn National Wildlife Refuge, Maine; Dolly Sods Wilderness Area, West Virginia; Otter Creek Wilderness Area, West Virginia; and Roosevelt/Campobello International Park, Maine/New Brunswick Canada. As explained in the sections that follow, these are the mandatory Class I federal areas whose visibility has been determined to be affected by emissions from within New York. There are no mandatory Class I Federal areas in New York.

The LTS outlined in this section includes descriptions of how enforceable emissions limitations, compliance schedules, and other measures necessary to achieve the RPGs established for the above mandatory Class I Federal areas will be used to achieve the visibility goals in each of these mandatory Class I Federal areas. In developing the long-term strategy, states with mandatory Class I Federal areas must consider four factors: cost, time needed, energy and non-air quality environmental impacts, and remaining useful life. Some have already been adopted by New York, while others are either planned for adoption or will be adopted as determined to be reasonable after further consideration and review at the time of progress report submittal.

10.1. Overview of the Long-Term Strategy Development Process

As a participant in MANE-VU, New York State supported an approach to determine which control measures to pursue that was based on technical analyses documented in several reports including the following:

- Selection of States for MANE-VU Regional Haze Consultation (prepared by the MANE-VU Technical Support Committee, September 25, 2017) (Appendix C),
- Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions (prepared by the MANE-VU Technical Support Committee, November 20, 2017),
- 2016 Updates to the Assessment of Reasonable Progress for Regional Haze in MANE-VU Class I Areas (prepared by Edward Sabo for MARAMA, January 31, 2016) (Appendix M), and
- Technical Memorandum: Four Factor Data Collection (prepared by MANE-VU Technical Support Committee March 30, 2017).

The regional strategy development process identified reasonable measures that would reduce emissions contributing to visibility impairment at mandatory Class I Federal areas affected by emissions from within the MANE-VU region by 2028 or earlier. The technical basis for the long-term strategy is discussed in Section 10.2. This section describes the process of identifying potential emission reduction strategies.

10.1.1. Regional Process of Identifying Potential Strategies

MANE-VU reviewed a wide range of potential control measures to reduce emissions from sources contributing to visibility impairment in affected mandatory Class I Federal areas. The process by which MANE-VU arrived at a set of proposed regional haze control measures to reduce visibility impairment by 2028 started in late 2012. MANE-VU's analysis started with examining how upwind states implemented control programs to address the Ask from the first planning period,[26] including to what extent they reduced emissions from the 167 stacks identified in the first planning period.[27] MANE-VU also collected updated information on the six sectors identified in the first planning period to have emissions that were reasonably anticipated to contribute to visibility degradation in MANE-VU and information needed to assess the four factors to determine reasonable controls.[28]

[26] Miller, Paul. *Overview of state and federal actions relative to MANE-VU Asks* (March 28, 2013)
[27] MANE-VU Technical Support Committee. *Status of the Top 167 Electric Generating Units (EGUs) that Contributed to Visibility Impairment at MANE-VU Class I Areas during the 2008 Regional Haze Planning Period*, (July 25, 2016).
[28] MANE-VU Technical Support Committee. *Technical Memorandum: Four-Factor Data Collection.* (March 30, 2017)

10.2. Technical Basis for Emission Reduction Obligations

40 CFR Section 51.308(f)(2)(iii) requires states/tribes to document the technical basis on which the State is relying to determine the emission reduction measures that are necessary to make reasonable progress in each mandatory Class I Federal area it affects. DEC relied on technical analyses developed by MANE-VU to demonstrate that emission reductions in New York, along with those of other States and Tribes, are sufficient to achieve reasonable progress in mandatory Class I Federal areas affected by New York. MANE-VU's technical documentation of the emission reductions necessary to meet RPGs in each mandatory Class I Federal area affected by New York is summarized in the following sections of this SIP and in additional documentation referenced in those sections and below:

- 2016 MANE-VU Source Contribution Modeling Report-CALPUFF Modeling of Large Electrical Generating Units and Industrial Sources (MANE-VU, April 2017), Appendix K,
- Regional Haze Metrics Trends and HYSPLIT Trajectory Analyses (MANE-VU, May 2017), Appendix L,
- Selection of States for MANE-VU Regional Haze Consultation (2018) (MANE-VU Technical Support Committee, September 2017), Appendix C,
- 2016 Updates to the Assessment of Reasonable Progress for Regional Haze in MANE-VU Class I Areas (MARAMA, January 2016), Appendix M, and
- Technical Support Document for the 2011 Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union Modeling Platform (Ozone Transport Commission, September 2018).

To assess the degree to which specific geographic regions or states are contributing to visibility impairment at MANE-VU mandatory Class I Federal areas, a weight-of-evidence approach was used that relies on several independent methods to determine the sources of visibility impairing pollutants. A weight-of-evidence assessment is intended to support analytical results that might otherwise have relied on the use of a single model by itself. The weight-of-evidence analysis included the use of models, including Eulerian (grid-based) source models and Lagrangian (air pollution-based) source dispersion models. Additionally, other data analysis techniques were applied, such as source apportionment models, back trajectory calculations, and the use of monitoring and inventory data. The modeling efforts provided a definitive basis for a weight-of-evidence assessment of state contributions. The weight-of-evidence analysis conducted for this submission can be found in "2016 MANE-VU Source Contribution Modeling Report-CALPUFF Modeling of Large Electrical Generating Units and Industrial Sources."

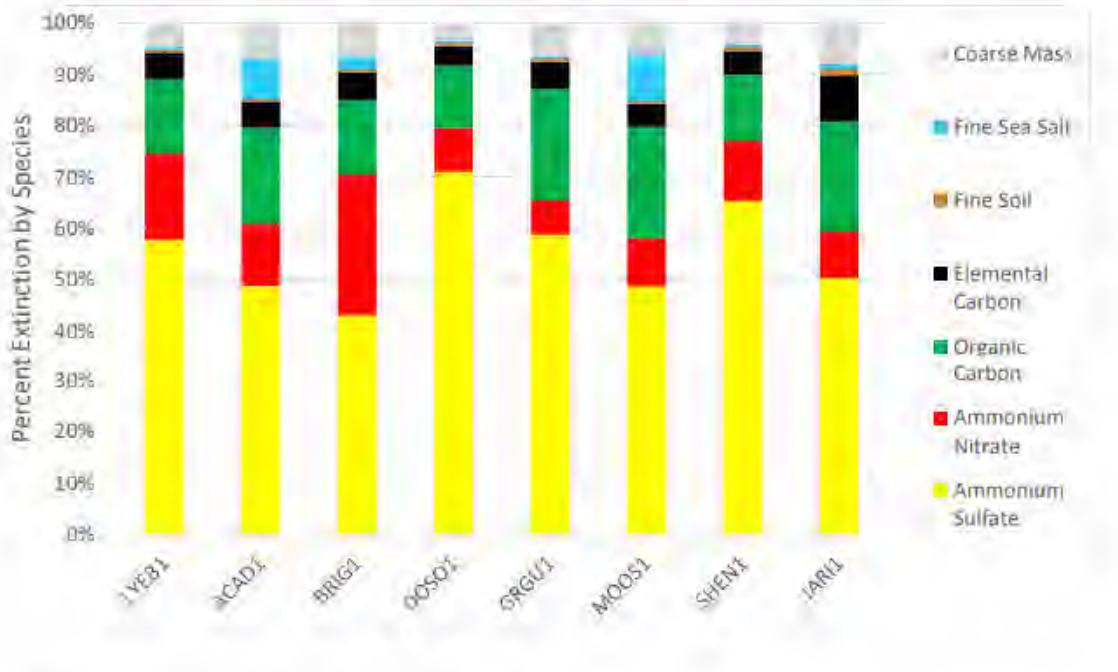
The MANE-VU technical report on current visibility conditions is found in Appendix N, "MANE-VU Visibility Trends 2004-2017 (2nd RH SIP Metrics)." The inventories and supporting data that were prepared included: county-level, mass emissions and modeling inventories of 2011 emissions for the state and local agencies; temporal, speciation, and spatial allocation profiles; and inventories for other RPOs. The inventory includes emissions for SO_2, NO_x, VOC, CO, NH_3, PM_{10}, and $PM_{2.5}$. The modeling methodology and details on the development of the projected inventories appears in "Technical Support Document for the 2011 Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union Modeling Platform."[29] The following sections discuss the pollutants, source regions, and types of sources considered in developing this long-term strategy.

10.2.1. Visibility Impairing Pollutants

40 CFR Section 51.308(f)(2)(i) requires states to identify all anthropogenic sources of visibility impairment considered by the state in developing its long-term strategy. Finalized April 6, 2016, the "MANE-VU Updated Q/d*C Contribution Assessment" reflects a conceptual model in which sulfate is still the most important single constituent of haze-forming fine particle pollution and the principal cause of visibility impairment across the region. Sulfate alone accounts for anywhere from 45-75% of total fine particle mass on the 20 percent most impaired days at MANE-VU Class I sites. Organic carbon was shown to be the second largest contributor to haze, but the effect that nitrate has on visibility has been increasing since the first planning period. Nitrate has become the driver of visibility impairment on some of the most impaired days, especially in winter months.[30] This seasonal relationship exists because many EGUs only run NO_X controls during the ozone season, leaving NO_X uncontrolled in the winter. Because of the role of sulfate and nitrate in the formation of regional haze in the Northeast and Mid-Atlantic region, MANE-VU concluded that an effective emissions management approach would rely on regional SO_2 and NO_X control efforts in the eastern United States. Figure 10-1 shows the dominance of sulfate and nitrate in the extinction from 2013-2014.

[29] Ozone Transport Committee. *Ozone Transport Commission/MidAtlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018 Update.* (October 18, 2018)
[30] MANE-VU Technical Support Committee. *Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions*. November 20, 2017. Retrieved from https://otcair.org/MANEVU/Upload/Publication/Reports/Winter%20NOX%20Control%20Report%20171120.pdf

Figure 10-1 - 2013-2014 Extinction on the 20% Haziest Days, Expressed as Percentage of Extinction

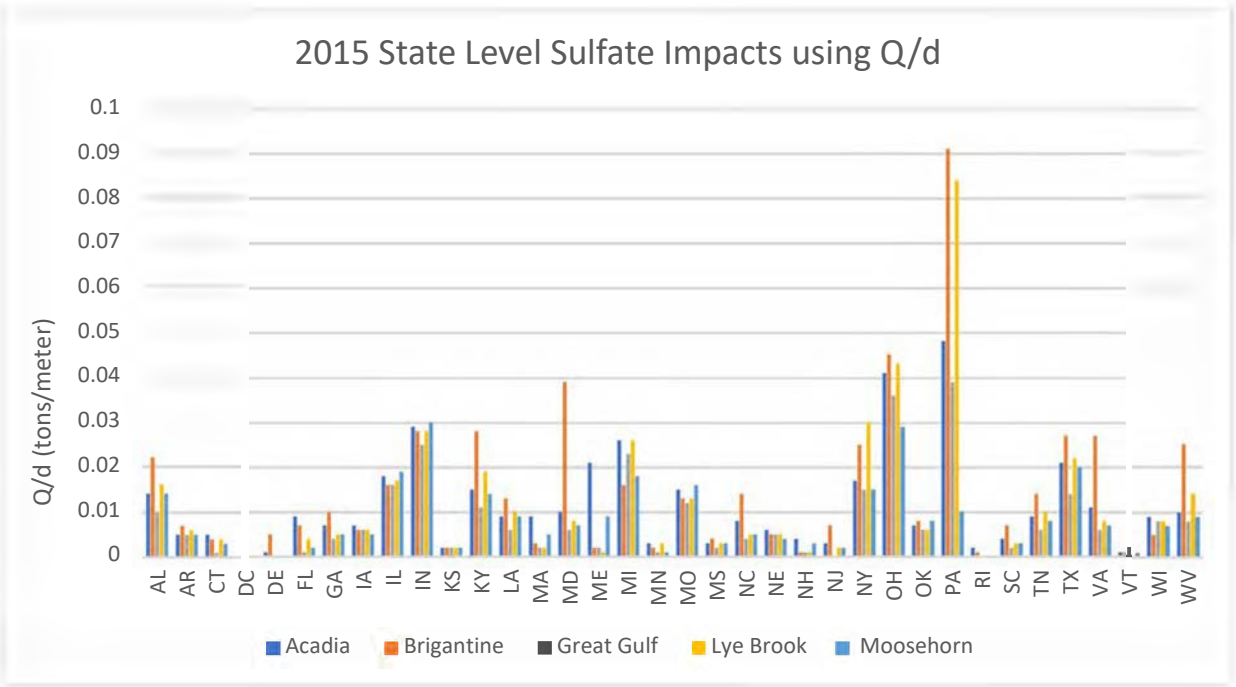


10.2.2. Contributing States and Regions

MANE-VU used various modeling techniques, air quality data analyses, and emissions inventory analyses to identify source categories and states that contribute to visibility impairment in MANE-VU mandatory Class I Federal areas. MANE-VU estimated emissions within MANE-VU in 2015 were responsible for about 30-40 percent of the sulfate and nitrate at MANE-VU and nearby mandatory Class I Federal areas. Emissions from other regions and outside the modeling domain were also important.

One simple technique for deducing the relative impact of emissions from specific point sources on a specific receptor site involves calculating the ratio of annual emissions (Q) to source-receptor distance (d). This ratio is then multiplied by a factor designed to account for the effects of prevailing winds and to convert units. Based on the results of the Q/d technique, Figure 10-2 shows the resulting state level impacts across a set of northern and southern mandatory Class I Federal areas in MANE-VU.

Figure 10-2 - Processed 2015 Statewide Sulfate Emissions Using Q/d



Alternatively, CALPUFF dispersion modeling was used to identify and rank states' contributions to sulfate and nitrate at MANE-VU mandatory Class I Federal areas using 2015 data, shown in the following two figures. The CALPUFF analyses considered 500 EGU and 121 ICI units throughout the eastern U.S. For EGUs, the 95th percentile of daily NO_X and SO_2 emissions for 2011 and 2015 were modeled with three different years of meteorology (2002, 2011, and 2015) and the maximum value from three years of meteorology was used to assess contribution. The 2015 results were used directly in determining relative impact.

Figure 10-3 - Annual Average Contribution of Sulfate to MANE-VU Mandatory Class I Federal Areas

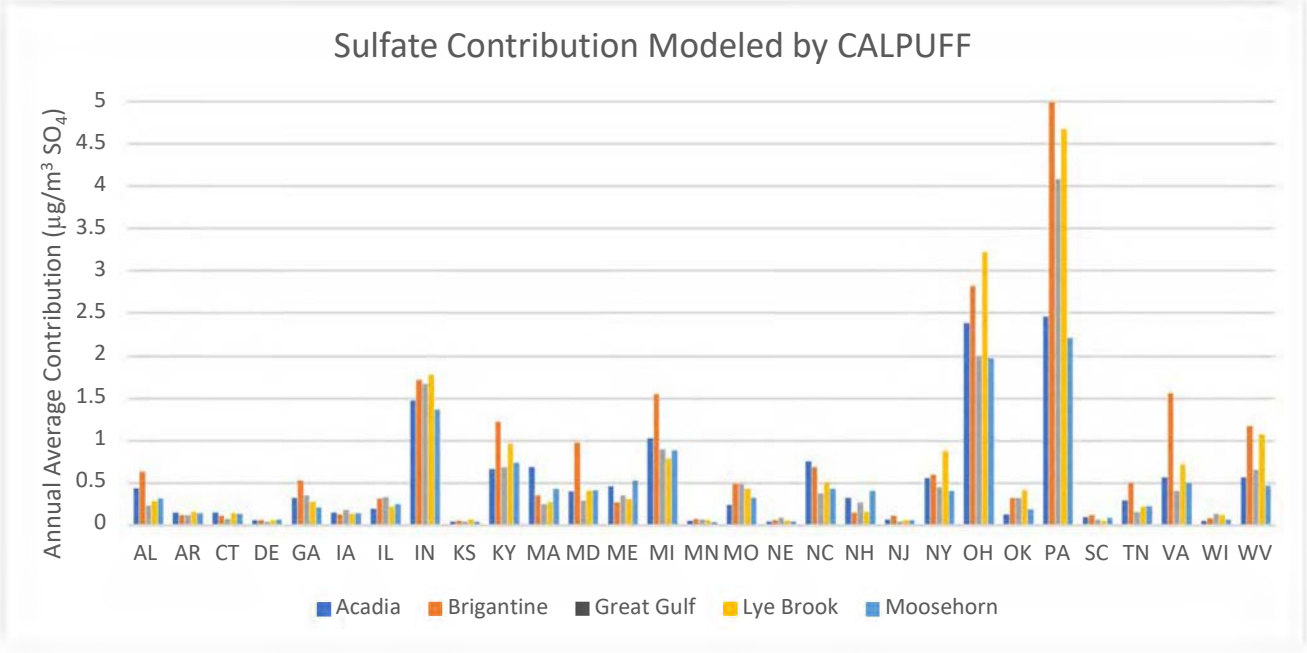


Figure 10-4 - Annual Average Contribution of Nitrate to the MANE-VU Mandatory Class I Federal Areas

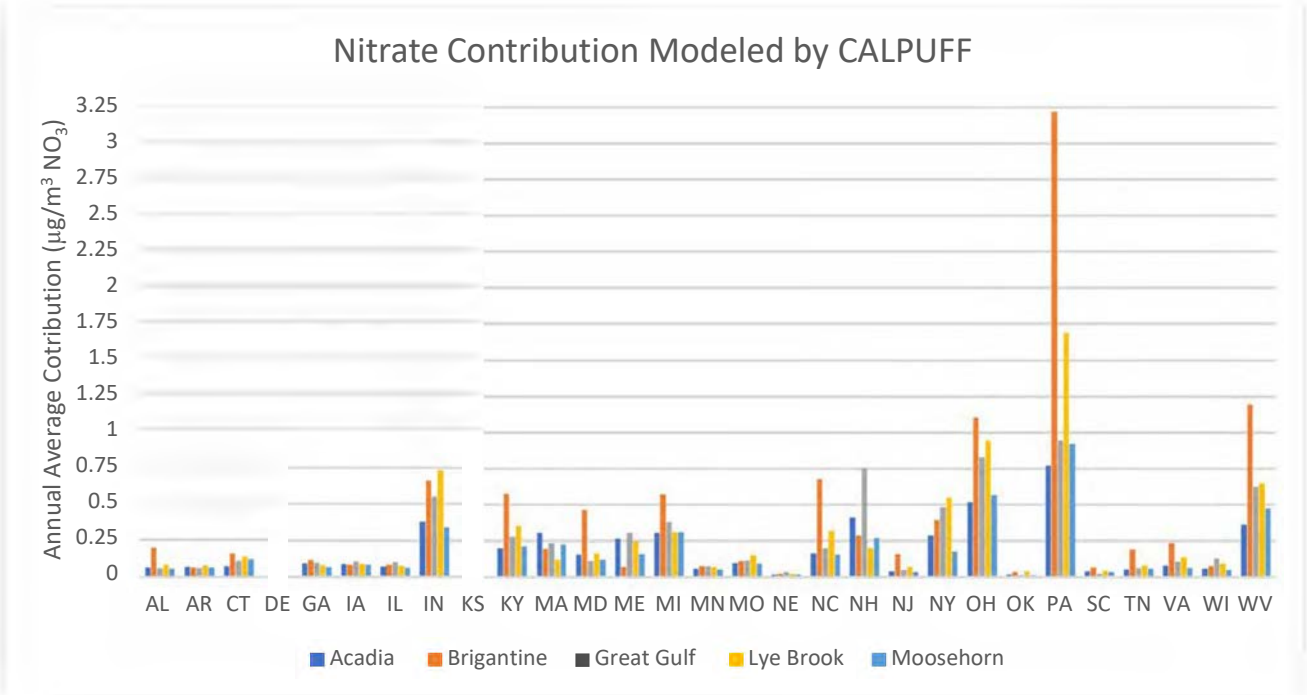


Table 10-1 shows the results of two methods of assessing state-by-state contributions to sulfate and nitrate impacts. This table highlights the importance of emissions from outside the MANE-VU region.

Table 10-1 - Percent Mass-Weighted Sulfate and Nitrate Due to Emissions from Listed States[31]

Contributing States or Areas	Acadia, Maine (%)	Brigantine, New Jersey (%)	Great Gulf and Presidential Range Dry River, New Hampshire (%)	Lye Brook, Vermont (%)	Moosehorn and Roosevelt Campobello, Maine (%)
Connecticut	1.3	1.0	0.7	1.2	1.4
Delaware	0.2	0.6	0.2	0.1	0.2
District of Columbia	0.1	0.2	0.1	0.2	0.1
Maine	8.3	0.9	2.9	1.6	5.6
Maryland	2.7	6.5	2.1	2.3	2.6
Massachusetts	4.4	1.4	1.8	1.2	3.4
New Hampshire	3.4	1.1	3.7	1.1	3.1
New Jersey	1.0	2.2	0.4	0.8	0.9
New York	5.8	6.1	7.6	10.0	5.9
Pennsylvania	12.4	19.9	15.6	20.0	10.5
Rhode Island	0.5	0.3	0.2	0.2	0.1
Vermont	0.6	0.2	2.1	0.3	0.8
MANE-VU	40.7	40.4	37.4	39.0	34.6
Midwest RPO	28.5	22.3	32.3	29.4	30.4
VISTAS	21.6	28.3	19.1	21.2	21.8
Other	**14.7**	**14.4**	**16.8**	**15.7**	**19.1**

The above figures show that New York's contributions, while important, are not the most significant, with the contributions from several states outside the MANE-VU region being significantly larger than New York's. MANE-VU considered modeling results documented in the "Selection of States for MANE-VU Regional Haze Consultation (2018)" to determine which states should be consulted in developing the long-term strategy for improving visibility in MANE-VU mandatory Class I Federal areas.

For purposes of deciding how broadly to consult, the MANE-VU states decided to include states that contributed at least 2 percent of total sulfate observed on the 20 percent worst visibility days in 2011. Connecticut; Washington, DC; Rhode Island; and Vermont were not identified as being among the states contributing at least 2 percent of sulfate to any of the above mandatory Class I Federal areas.

[31] Percentages based on 2015 annual average sulfate and nitrate impact estimated with Q/d and CALPUFF as described in MANE-VU Contribution Assessment.

However, as MANE-VU members, those states have agreed to adopt regional control measures to contribute to visibility improvement on the worst days and to the prevention of visibility degradation on clear days.

Each of the following five figures shows on the left side the IMPROVE monitored $PM_{2.5}$ mass data by species for 2011-2015. The yellow portion of the bar chart is the measured sulfate concentration. The middle bar chart indicates percent contributions of states and regions to the total modeled sulfate and nitrate concentrations. Finally, on the right, is a map indicating which states met the criteria identified above for identifying states with the greatest contribution to sulfates in MANE-VU mandatory Class I Federal areas in 2011. In each of these figures, New York is shown to have contributed at least 2 percent of total sulfate observed on 20 percent worst visibility days in 2011 in each of the mandatory Class I Federal areas shown, including the Shenandoah and Dolly Sods areas. Due to its proximity to New York, the proportion of sulfate and nitrate impacts in the Lye Brook, Vermont area are the highest. Shenandoah and Dolly Sods are mandatory Class I Federal areas in the VISTAS region that are impacted by emissions from MANE-VU states. The other five mandatory Class I Federal areas are in MANE-VU. The IMPROVE monitor at Great Gulf also represents the Presidential Range/Dry River Wilderness. The IMPROVE monitor at Moosehorn also represents Roosevelt Campobello International Park.

Figure 10-5 - Modeled 2011-2015 Contributions to Sulfate and Nitrate by State at Acadia

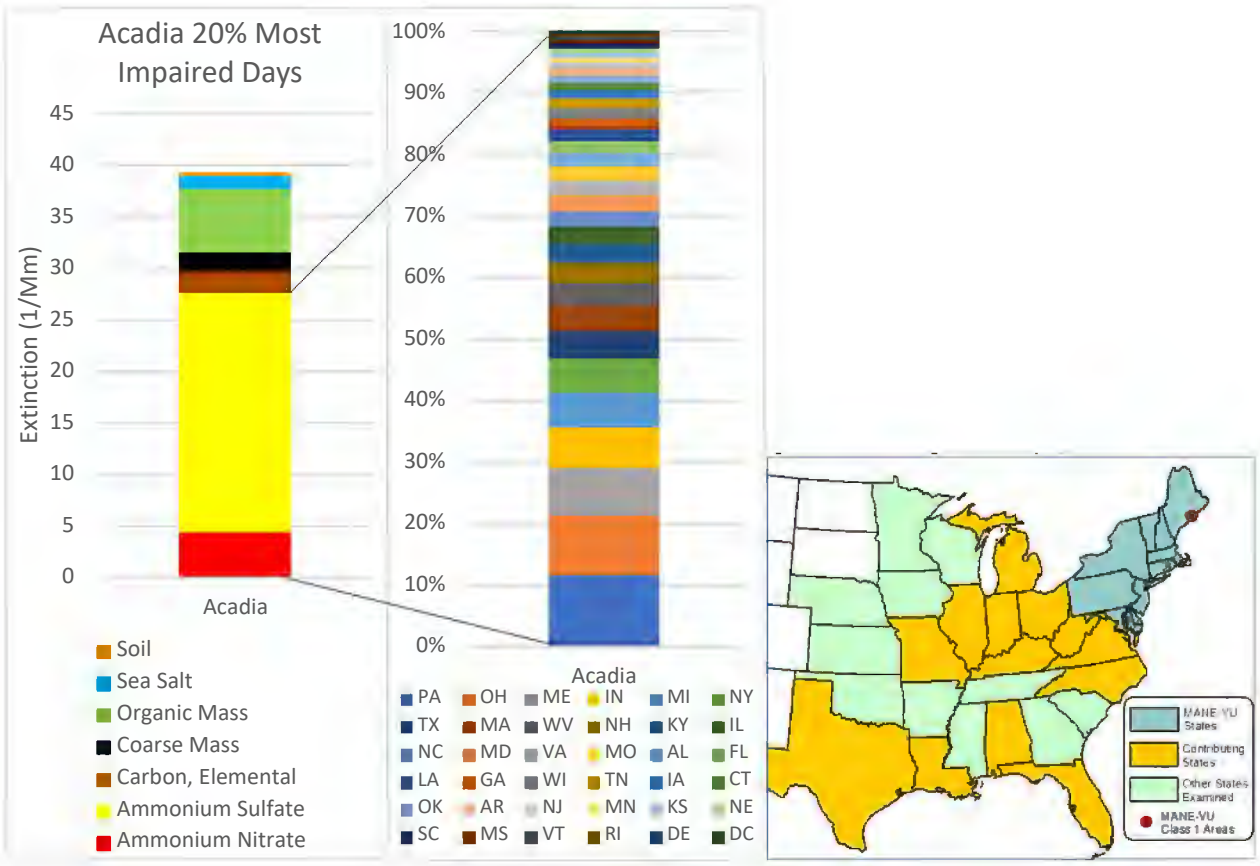


Figure 10-6 – Modeled 2011-2015 Contributions to Sulfate and Nitrate by State at Brigantine

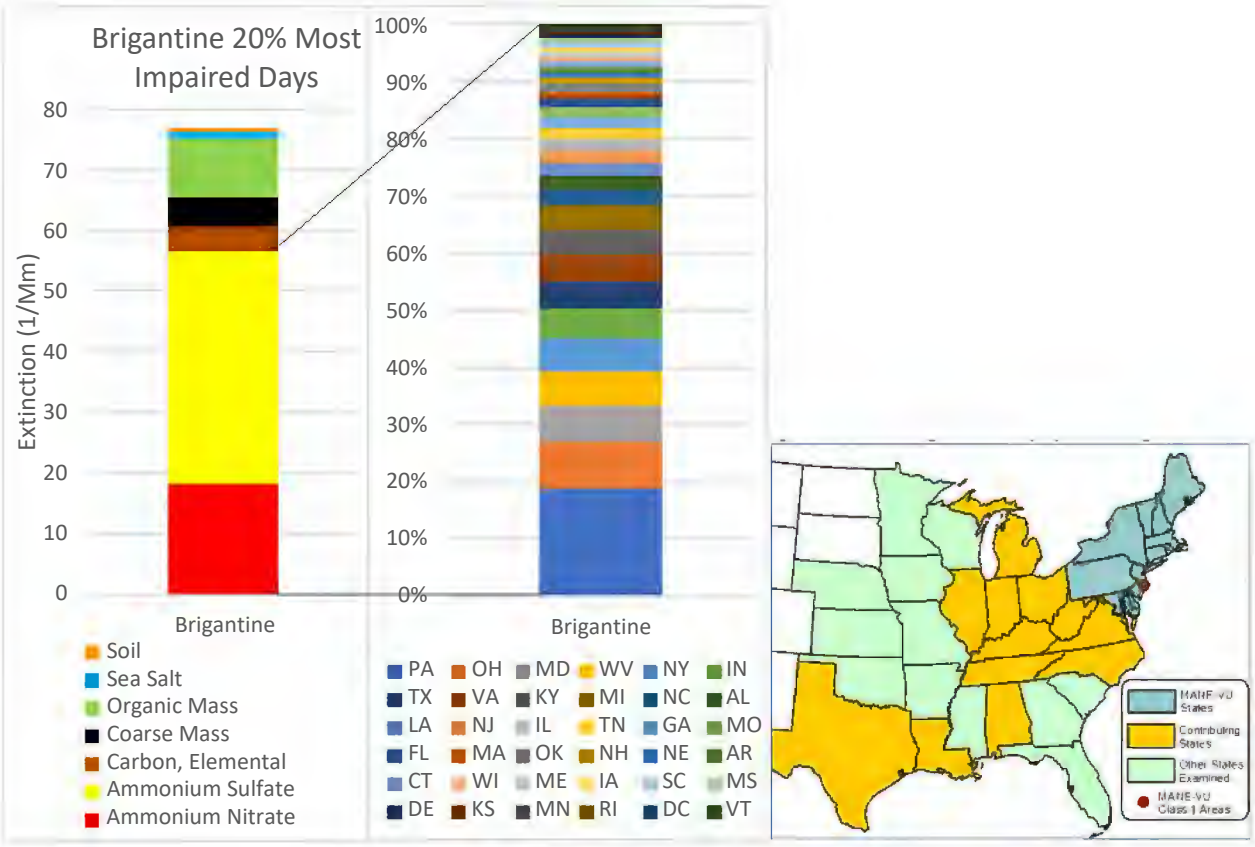


Figure 10-7 – Modeled 2011-2015 Contributions to Sulfate and Nitrate by State at Lye Brook

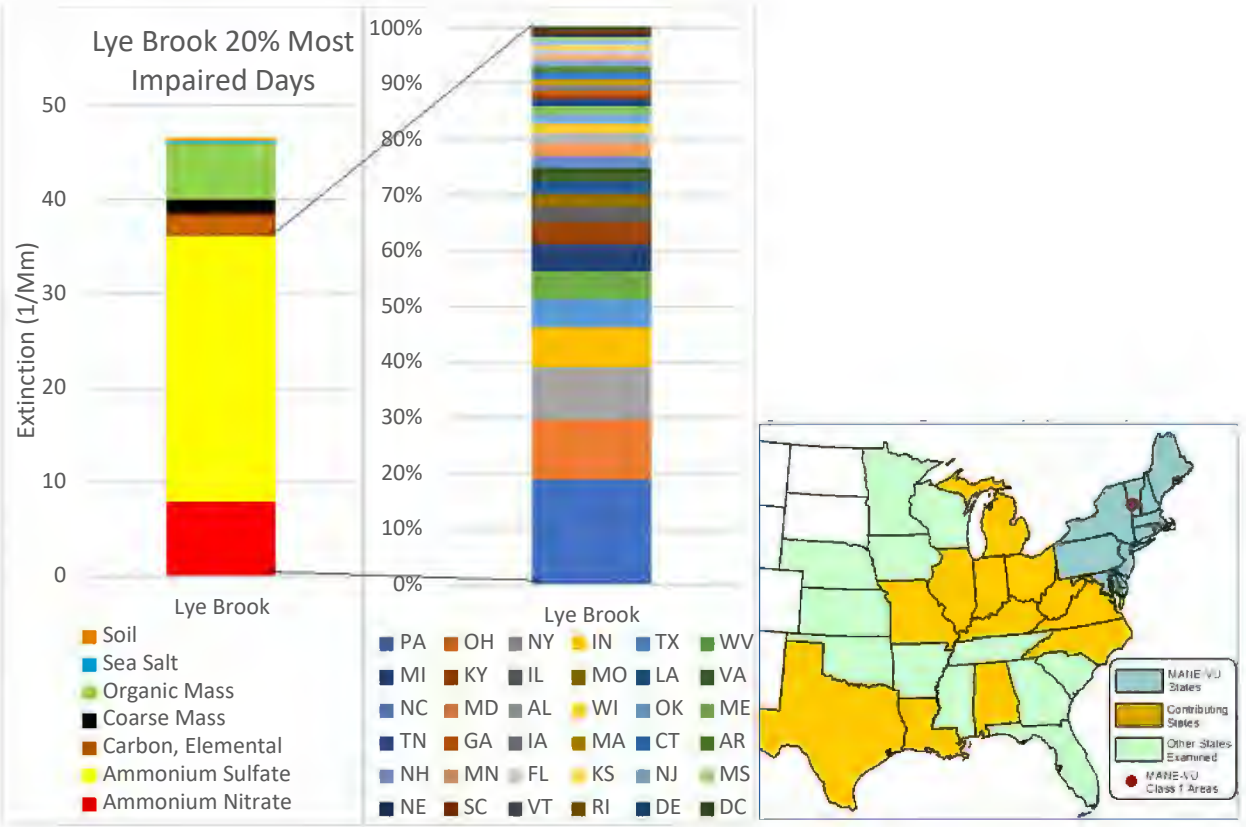


Figure 10-8 - Modeled 2011-2015 Contributions to Sulfate and Nitrate by State at Great Gulf

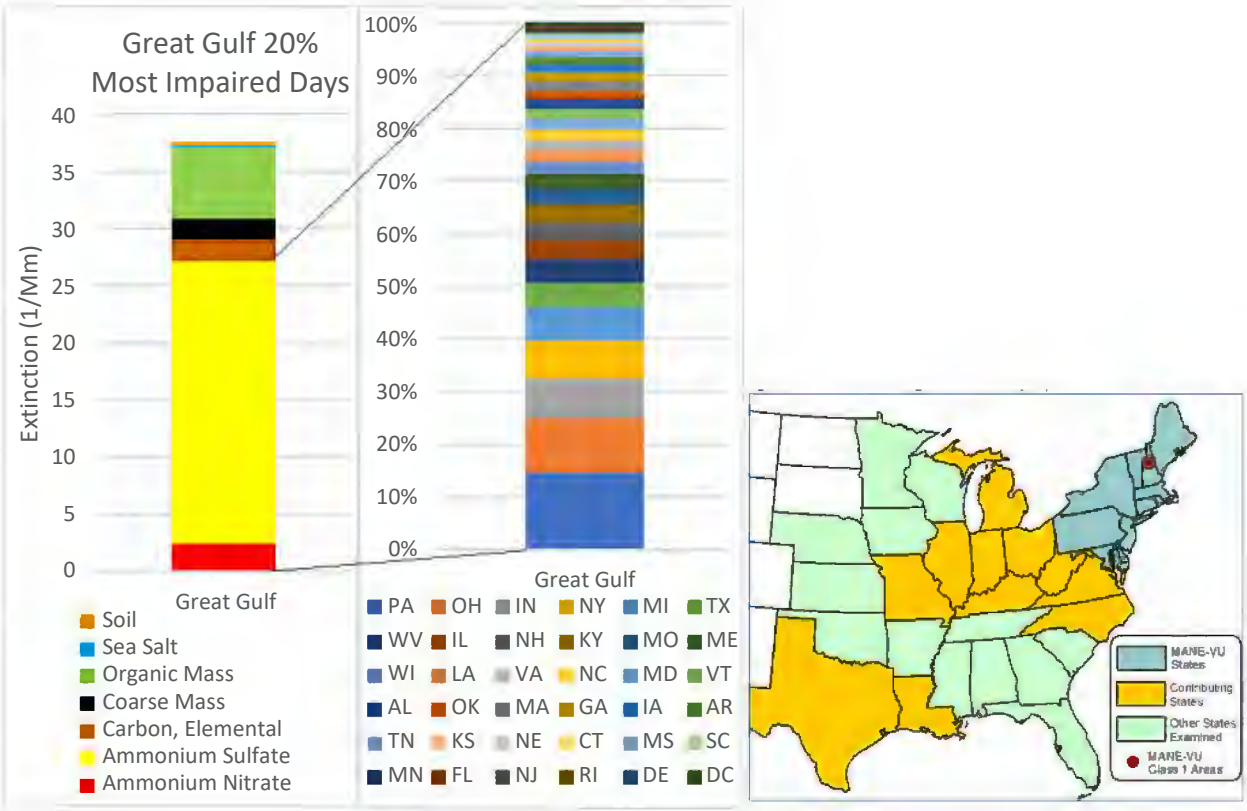
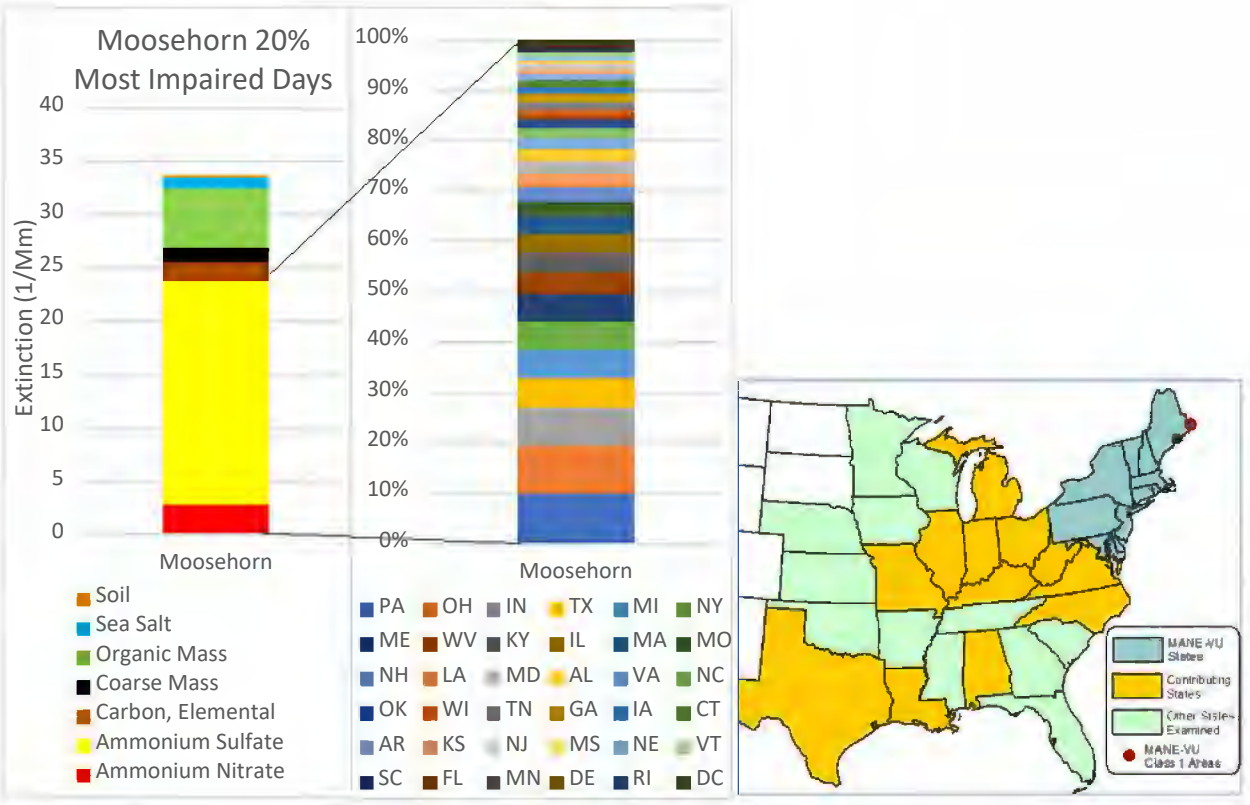


Figure 10-9 - Modeled 2011-2015 Contributions to Sulfate and Nitrate by State at Moosehorn



10.2.3. Base Year Emissions

40 CFR Section 51.308(f)(2)(iii) requires that New York identify the baseline emissions information on which the long-term strategy is based. The Gamma version of the 2011 inventory was used as the base year inventory for both emissions within and outside of MANE-VU.

40 CFR Section 51.308(f)(2)(iii) also requires that "the emissions information [analyzed] must include, but need not be limited to, information on emissions in a year at least as recent as the most recent year for which the State has submitted emission inventory information to the Administrator in compliance with the triennial reporting requirements of subpart A of this part," which given the extension of deadlines for submission of Regional Haze SIP would be 2014.

The MANE-VU technical analysis used 2011 as the basis for developing long term strategies. This decision was made for several reasons. Primarily, 2014 was not found to be conducive for transport of haze precursor emissions, whereas analysis revealed that both 2011 and 2015 were years in which the meteorology was favorable to the transport of emissions regionally. Use of emissions that occurred during a year that is chosen according to EPA

guidance[32] is important since, when developing long term strategies, sectors and states that are reasonably anticipated to cause visibility impairment may not all warrant further consideration. Secondarily, regional efforts were undertaken to develop SIP-quality emissions inventories based on 2011. Basing strategies on inventories that have not been quality assured to the same level could lead to an inappropriate selection of strategies.

The initial analysis of 2011 inventory examined all potential sectors that could impact visibility and can be found in the technical memorandum *Contribution Assessment Preliminary Inventory Analysis*. The inventory used in this analysis came from the Beta version of the regional modeling platform. This analysis also included projections to 2018 that considered rules that were going into effect between 2011 and 2018 and known unit shutdowns and fuel switches. From this analysis SO_2 emissions from coal-fired EGUs were found to be by far the most important emissions sector that could lead to impairment of visibility. A secondary list of sectors that resulted as having a potential to impair visibility were:

1. Residential combustion area sources (SO_2),
2. Industrial point combustion sources (SO_2),
3. Oil fired power plants (SO_2),
4. Marine engines (SO_2),
5. Coal fired power plants (NO_X),
6. Heavy duty diesel vehicles (NO_X), and
7. Nonroad diesel equipment (NO_X).

SO_2 emissions from marine engines were not considered further because regulations implemented to comply with the North American Emission Control Area[33] were projected to reduce SO_2 emissions from the sector substantially beginning in 2015. There was no expectation that marine SO_2 emissions would change drastically between 2011 and 2014.

NO_X emissions from nonroad diesel equipment was also not considered further because of major emission reductions from the implementation of Tier 4 emission standards that were projected to reduce NO_X emissions from the sector gradually beginning in 2014.[34] There was no expectation that nonroad NO_X emissions would change drastically between 2011 and 2014.

NO_X emissions from on-road heavy-duty vehicles and SO_2 emissions from residential combustion area sources were both moved forward to the regional MANE-VU strategy, though no major changes were expected in emissions between 2011 and 2014 for on-road heavy duty vehicles. For residential

[32] US EPA, “Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze” (US EPA, December 2014).
[33] “Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder” 75 FR 22895. (US EPA, April 30, 2010).
[34] “Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles-Phase 2” 81 FR 73478 (October 25, 2016)

combustion area sources, low sulfur fuel oil rules were the main factor affecting emissions between 2011 and 2014. The strategy focused on adopting the rule where it was not already adopted. Emissions were not expected to change between 2011 and 2014 in areas where the rule was not adopted.

The remaining four categories of point sources were further analyzed. Given the importance of choosing a year with meteorology that is conducive to haze formation, combined with emissions from EGUs, the MANE-VU states selected 2015 rather than 2014. 2015 emissions data was obtained from AMPD and included in *2016 MANE-VU Source Contribution Modeling Report – CALPUFF Modeling of Large Electrical Generating Units and Industrial Sources* (MANE-VU, April 2017) (Appendix 8-5), which in part allowed strategies to focus on point sources that would reasonably be anticipated to impact visibility.

Additionally, reviewing the emissions trends in Section 7 reveals very little difference in NO_X emission totals between 2011 and 2014 for each sector (Figure 7-1) and a small difference in SO_2 emission totals between 2011 and 2014 (Figure 7-12). Since EGUs were the one sector that 2015 CEMS data were specifically updated for, this also shows that no different assumptions, as to which sectors were of importance for inclusion in the long-term strategy, would have had occurred. More specific information about the baseline emissions inventory data used may be found in the inventory section of this SIP, Section 7.0.

10.2.4. Modeling Techniques Used

The following documents describe preliminary and final modeling runs conducted by MANE-VU and used in developing this long-term strategy:

- MANE-VU Updated Q/d*C Contribution Assessment (MANE-VU, April 2016) (Appendix O)
- 2016 MANE-VU Source Contribution Modeling Report – CALPUFF Modeling of Large Electrical Generating Units and Industrial Sources (MANE-VU, April 2017) (Appendix K)
- Regional Haze Metrics Trends and HYSPLIT Trajectory Analyses (MANE-VU, May 2016) (Appendix L)

As documented in the “Selection of States for MANE-VU Regional Haze Consultation (2018),” two models were used to perform air quality simulations for MANE-VU, CALPUFF and Q/d. In addition, results of the trajectory analyses were used to identify transport patterns and were used in conjunction with other MANE-VU contribution analysis tools (CALPUFF modeling and Q/d analyses) to determine states to be included in the consultation process. The three modeling techniques are described in more detail below.

10.2.4.1. Weighted Q/d

The weighted emissions over distance (Q/d) method is a method for estimating sulfate and nitrate contributions to a receptor. The empirical formula that relates emission source strength and estimated impact is expressed through the following equation:

$$I = C_i \left(\frac{Q}{d}\right)$$

In this equation, total emissions, Q, is linearly related to the impact, I, that it will have on a receptor located a distance, d, away. As in the previous analysis, distances were computed using the Haversine function, using an earth radius of 6,371 km^2. The effect of meteorological prevailing winds can be factored into this approach by establishing the constant, C_i, as a function of the "wind direction sectors" relative to the receptor site. Details of the Q/d analyses can be found in Appendix O.

10.2.4.2. CALPUFF

A new method for the second implementation period SIPs was air pollution transport modeling with the CALPUFF dispersion model, carried out by New Hampshire Department of Environmental Services (NHDES) in conjunction with Vermont Department of Environmental Conservation (VTDEC), which was used to simulate sulfate and nitrate formation and transport in MANE-VU and nearby regions. The modeling effort focused on EGUs and large industrial and institutional sources in the eastern and central United States. This modeling effort, performed in 2016, built on the 2002 point source contribution modeling performed by MANE-VU for the first implementation period. CALPUFF simulates atmospheric transport, transformation, and dispersion through the treatment of air pollutant emissions from stacks or area sources as a series of discrete puffs. The 2016 modeling was performed for specific mandatory Class I Federal area receptor locations both in the MANE-VU RPO and nearby (i.e., Dolly Sods, James River Face, Otter Creek, and Shenandoah). Two emissions years were analyzed (2011 and 2015) with three years of meteorological data (2002, 2011, and 2015). Details of the CALPUFF analyses can be found in Appendix K.

10.2.4.3. HYSPLIT Trajectory

Trajectories can identify the frequency and general direction of air masses that are transported to a mandatory Class I Federal area. However, trajectories don't distinguish emissions density nor what area along the 72-hour projection is most likely to contribute emissions that impact the mandatory Class I Federal areas. Two types of maps were created for each mandatory Class I Federal area. The first map showed the frequency (count) of hourly trajectory endpoints in each of the 25x25 mile grid squares on a map to help define transport patterns to a mandatory Class I Federal area during the most impaired visibility days. The

second set of maps showed individual trajectories for each day to show seasonal differences in transport patterns (Appendix L).

10.2.5. Monitoring and Emissions Data Analysis

Appendix N documents the techniques used for analyzing air monitoring data and emissions data used by MANE-VU to assess the contribution of various states, regions, and source categories to visibility impairment at MANE-VU mandatory Class I Federal areas.

10.3. Emission Reductions Due to Ongoing Air Pollution Control Programs

40 CFR Section 51.308(f)(2)(iv)(A) requires New York to consider emission reductions from ongoing pollution control programs in its long-term strategy. Significant emissions control programs will be implemented on a regional basis by 2028. In developing its LTS, New York considered the emission control programs discussed below.

The MANE-VU 2028 Gamma inventory was developed through consultation with ERTAC, MARAMA, and EPA to prepare emission projections reflecting anticipated changes in economic and population growth, energy use, and air pollution control measures expected to go into effect during the implementation period. The inventory sectors provided by EPA as part of their 2028 package were used and compared against the MARAMA Alpha 2 2028 inventory sectors. Any units that were not in MARAMA 2028 Alpha 2 inventory but were in EPA's 2028 haze modeling inventory were removed using a closure packet, except for units confirmed by states to still be operating. For some states, the MARAMA Alpha 2 2028 control case also included controls that were under consideration for regional haze SIPs that have not yet been adopted. More information may be found in the following sections of the modeling technical support document:[35]

- Section 8. Emissions Inventories and Processing for 2017/2018/2020/2023/2028 12 km Future Year Simulation,
- Section 9. Emissions Inventories and Processing for 2028 Visibility Control 12km Future Year Simulation, and
- Section 12. Projected Visibility Impairment in the MANE-VU Region

[35] OTC, "Ozone Transport Commission/MidAtlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018 Update" (October 18, 2018). Retrieved from: https://otcair.org/MANEVU/Upload/Publication/Reports/OTC%20MANE-VU%202011%20Based%20Modeling%20Platform%20Support%20Document%20October%202018%20-%20Final.pdf

10.3.1. EGU Emissions Controls Expected by 2028 Due to Ongoing Air Pollution Control Programs

The 2028 inventory projections for EGUs used the ERTAC EGU Forecast Tool. This method uses base year hourly AMPD data and fuel specific growth rates and other information to estimate future activity and emissions. Future emission rates are developed from base year emission rates adjusted to account for state knowledge of known future year emission controls, fuel switches, retirements, and new units.

Cross-State Air Pollution Rule

EPA finalized the Cross-State Air Pollution Rule (CSAPR) on July 6, 2011, with implementation beginning on January 1, 2015.[36] CSAPR replaced EPA's 2005 Clean Air Interstate Rule (CAIR), following the direction of a 2008 court decision that required EPA to issue a replacement regulation. CSAPR limits the interstate transport of emissions of NO_X and SO_2 that contribute to harmful levels of $PM_{2.5}$ and ozone in downwind states. The states covered by CSAPR are in Table 10-2.

CSAPR required 27 states in the eastern United States to reduce SO_2, annual NO_X and/or ozone season NO_X emissions from fossil fuel-fired power plants that affect the ability of downwind states to attain and maintain compliance with the 1997 and 2006 $PM_{2.5}$ NAAQS and the 1997 ozone NAAQS. CSAPR achieves these reductions through emissions trading programs. Phase 1 began in January 2015 for the annual programs and May 2015 for the ozone season program. Phase 2 began in January 2017 for the annual programs.

On September 7, 2016, the EPA revised the CSAPR ozone season NO_X program by finalizing an update to account for the 2008 ozone NAAQS, known as the CSAPR Update.[37] Beginning in May 2017, this rule aims to reduce summertime (May - September) NO_X emissions from power plants in 22 states in the eastern U.S. The rule reduces air quality impacts of ozone pollution that crosses state lines and intends to help downwind areas meet and maintain the 2008 ozone air quality standard.

[36] US EPA Clean Air Markets Division. "Overview of the Cross-State Air Pollution Rule (CSAPR)." *EPA*, Environmental Protection Agency, 19 Sept. 2017, www.epa.gov/csapr/overview-cross-state-air-pollution-rule-csapr.

[37] US EPA Clean Air Markets Division. "Cross-State Air Pollution Rule (CSAPR) - Regulatory Actions and Litigation." *EPA*, Environmental Protection Agency, 12 July 2017, www.epa.gov/csapr/cross-state-air-pollution-rule-csapr-regulatory-actions-and-litigation#rule-summary.

Table 10-2 - States Subject to CSAPR

State	Applicable CSAPR Program					
	Ozone Season NOx (1997 NAAQS)	Ozone Season NOx (2008 NAAQS)	Annual SO_2 and NO_X (1997 Annual $PM_{2.5}$ NAAQS)	Annual SO_2 and NO_X (2006 24-hr $PM_{2.5}$ NAAQS)	SO_2 Group	NO_X Group
Alabama		X	X	X	2	2
Arkansas		X				2
Georgia	X		X	X	2	1
Illinois		X	X	X	1	2
Indiana		X	X	X	1	2
Iowa		X	X	X	1	2
Kansas		X		X	2	2
Kentucky		X	X	X	1	2
Louisiana		X				2
Maryland		X	X	X	1	2
Michigan		X	X	X	1	2
Minnesota				X	2	
Mississippi		X				2
Missouri		X	X	X	1	2
Nebraska				X	2	
New Jersey		X		X	1	2
New York		X	X	X	1	2
North Carolina			X	X	1	
Ohio		X	X	X	1	2
Oklahoma		X				2
Pennsylvania		X	X	X	1	2
South Carolina			X		2	
Tennessee		X	X	X	1	2
Texas		X	X		2	2
Virginia		X		X	1	2
West Virginia		X	X	X	1	2
Wisconsin		X	X	X	1	2
Number of States	**1**	**22**	**18**	**21**		

10.3.2. Other Point Source Controls Expected by 2028 Due to Ongoing Air Pollution Control Programs

Control factors were applied to the 2028 MANE-VU inventory to represent the following national, regional, or state control measures:[38]

- OTC and MANE-VU Control Measures,
- State NO_X and VOC Rules with post-2011 compliance dates,
- State Fuel Oil Sulfur Rules,
- Facility and Unit Closures,
- Boiler Maximum Achievable Control Technology (MACT) Rules,
- RICE MACT Standards,
- Consent Decrees,
- Regional Haze Plan Controls, and
- Stand Alone Inventories

In addition, states provided specific control measure information about specific sources or regulatory programs in their state. MANE-VU used state-specific data for the 2028 point source inventory to the extent it was available. Control factors that were developed can be found in the MARAMA Alpha 2 inventory technical support document.

New York Reasonably Available Control Technology (RACT) Reductions

CAA Section 172(c)(1) requires SIPs to "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 RACT) and shall provide for attainment of the national primary ambient air quality standards." EPA interprets RACT to mean "the lowest emissions limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility."

Section 212.3 details New York State's RACT program for major sources of NOx and VOCs, both major constituents of particulate matter. Through the RACT regulations, New York State controls emissions from combustion sources, surface coating processes, graphic arts printing, and metal cleaning operations, among others.

[38] McDill, McCusker, & Sabo. "Technical Support Document Emission Inventory Development for 2011, 2018 and 2028 for the Northeastern U.S. ALPHA2 Version". *MARAMA*. November 23, 2015. Retrieved from: http://www.marama.org/images/stories/documents/2011-2018-2028_Technical_Support_Docs/TSD%20ALPHA2%20Northeast%20Emission%20Inventory%20for%202011%202018%202028%20DraftFinal%2020151123.pdf.

Although emission reductions of VOC are not required to be addressed in this SIP, the reduction in their emissions are expected to improve visibility in mandatory Class I Federal areas as well as others. The application of RACT in New York is of importance to the reduction of visibility impairment, therefore, New York's SIP considers VOC emission reductions as appropriate.

A statewide RACT SIP revision was submitted to EPA on December 22, 2014, supplemented by a New York metropolitan area-specific SIP revision on November 10, 2017; both revisions affirmed that RACT is being applied at a sufficient level of control. Several additional RACT regulations are being revised to update the current control requirements, however, due to the ongoing ozone nonattainment in the New York metropolitan area.

Additionally, DEC determined that source-specific RACT provisions presently in place also meet RACT requirements for all applicable EPA source categories in operation in New York. Many permits in which these requirements appear contain conditions requiring the reassessment of RACT for the affected sources, resulting in the frequent updating of these requirements. These regulations will serve to reduce PM (and ozone) concentrations throughout the state because VOCs and NOx are precursors to both pollutants.

10.3.3. Area Source Controls Expected by 2028 Due to Ongoing Air Pollution Control Programs

For controls on area sources within MANE-VU, New York relied on MANE-VU's Gamma 2028 inventory. Control factors are inputs to the Control Strategy Tool (CoST) to project emissions for future years. Area source control factors were developed for the following national or regional control measures:

- Portable Fuel Container Rules,
- OTC and MANE-VU Control Measures,
- State Specific NO_X and VOC Rules with post-2011 compliance dates,
- State Fuel Oil Sulfur Rules,
- Boiler MACT Rules, and
- RICE MACT Rules

10.3.4. MANE-VU Consideration of Controls on Nonroad Sources Expected by 2028 due to Ongoing Air Pollution Control Programs

Nonroad source controls incorporated into the modeling include the following:

- Clean Air Nonroad Diesel Final Rule - Tier 4,
- Control of Emissions from Nonroad Large Spark-Ignition Engines, and Recreational Engines (Marine and Land-Based), and
- Small Engine Spark Ignition ("Bond") Rule

10.3.5. On-road Source Controls Expected by 2028 due to Ongoing Air Pollution Control Programs

Mobile source controls incorporated into the MANE-VU modeling came from EPA's 2028 modeling and included the following:

- Light Duty Vehicle GHG Rule for Model-Year 2017-2025,
- Tier 3 Motor Vehicle Emission and Fuel Standards Rule, and
- Local inspection and maintenance (I/M) programs

Heavy Duty Diesel (2007) Engine Standard

EPA set a PM emissions standard for new heavy-duty engines of 0.01 grams per brake-horsepower-hour (g/bhp-hr), to take full effect for diesel engines in the 2007 model year. This rule also includes standards for NOx and non-methane hydrocarbons (NMHC) of 0.20 g/bhp-hr and 0.14 g/bhp-hr, respectively. These NO_X and NMHC standards were phased in together between 2007 and 2010 for diesel engines. Sulfur in diesel fuel must be lowered to enable modern pollution-control technology to be effective on these trucks and buses. EPA required a 97 percent reduction in the sulfur content of highway diesel fuel from its current level of 500 parts per million (low sulfur diesel, or LSD) to 15 parts per million (ultra-low sulfur diesel, or ULSD).

Tier 3 Motor Vehicle Standards

Tier 3 is a fleet averaging, banking, and trading program, modeled after the California Low Emission Vehicle (LEV) III standards.[39] Tier 3 lowers the sulfur content of gasoline and therefore considers the vehicle and the fuel an integrated system. The Tier 3 standards are included in the assumptions used for calculating mobile source emissions inventories used for 2028. As part of the Tier 3 standards, EPA set new tailpipe standards for the sum of non-methane organic gases (NMOG) and NO_X, presented as NMOG+NO_X, and for PM that apply to all light-duty vehicles and some heavy-duty vehicles.[40] Compared to 2014 standards, the NMOG and NO_X tailpipe standards for light-duty vehicles represent approximately an 80% reduction from 2014's fleet average and a 70% reduction in per-vehicle PM standards. Heavy-duty tailpipe standards represent about a 60% reduction in both fleet average NMOG+NO_X and per-vehicle PM standards. The standards for NMOG+NO_X are fleet-average standards, meaning that a manufacturer calculates the weighted average emissions of the vehicles it produces in each model year and compares that average to the applicable standard for that model year. The

[39] https://www.arb.ca.gov/msprog/levprog/leviii/leviii.htm
[40] https://nepis.epa.gov/Exe/ZyPDF.cgi/P100HVZV.PDF?Dockey=P100HVZV.PDF

new PM standards are expressed on a per-vehicle basis, meaning the standards apply to each vehicle separately (i.e., not as a fleet average). Both the NMOG+NO_X and PM standards differ by vehicle class and test cycle.

EPA set more stringent standards designed to eliminate fuel vapor-related evaporative emissions and improve durability. EPA set a new testing requirement referred to as the bleed emission test. The bleed emissions test standard for light-duty and medium-duty passenger vehicles is 0.020 g/test without averaging. The standard for on-road gasoline-powered heavy-duty vehicles is 0.030 g/test without averaging. EPA finalized a new emission standard and test procedure requiring that the cumulative equivalent diameter of any orifices or “leaks” not exceed 0.02 inches anywhere in the fuel/evaporative system for light-duty vehicles, medium-duty passenger vehicles, and some gasoline-powered heavy-duty vehicles. EPA also adopted the California Air Resources Board’s (CARB) current Onboard Diagnostic System regulations, effective for MY 2017, with some minor differences, for all vehicles except those in the heavier fraction of the heavy-duty vehicle class.

Under the final Tier 3 program, federal gasoline was required to meet an annual average standard of 10 ppm of sulfur by January 1, 2017 to lower emissions from vehicles currently on the road. EPA also finalized standards that maintain the current 80 ppm refinery gate and 95 ppm downstream cap. The Tier 3 gasoline sulfur standards are similar to levels already being achieved in California, Europe, Japan, South Korea, and several other countries. EPA is including the ability to carry over credits from Tier 2 to Tier 3 in the ABT program and is also finalizing a three-year delay for small refiners and small volume refineries processing 75,000 barrels of crude oil per day or less, as well as other flexibilities for refiners such as hardship provisions for extenuating circumstances. EPA also updated the federal emissions test fuel to better match today’s in-use gasoline and to be forward-looking with respect to future ethanol and sulfur content. Key changes include moving to a test fuel containing 10 percent ethanol by volume, lowering octane, and lowering the existing sulfur specification to be consistent with Tier 3 requirements. EPA also set test fuel specifications for E85 for the first time.[41]

[41] https://nepis.epa.gov/Exe/ZyPDF.cgi/P100HVZQ.PDF?Dockey=P100HVZQ.PDF

10.3.6. New York State and Federal Requirements for Particulate Matter, Sulfur and Nitrogen Oxides

Existing State Particulate Matter Measures

Part 215: Open Burning

6 NYCRR Part 215 was revised and published in the New York State Register during the previous planning period. The new version became effective October 14, 2009. This revised regulation allows (in any town with a total population less than 20,000) for the burning of downed limbs and branches (including branches with attached leaves or needles) less than six inches in diameter and eight feet in length between May 15th and the following March 15th. The burning of all other household generated wastes is prohibited. DEC has found that the strengthened rule has reduced the impacts of pollutants such as dioxins, PM and CO. Exemptions from this rule include restricted categories such as camp fires, agricultural burning, prescribed burning, and ceremonial fires.

Existing Federal Particulate Matter Measures

Locomotive Engines and Marine Compression-Ignition Engines Final Rule

Locomotives and marine diesel engines are important contributors to the nation's air pollution, as they emit large amounts of direct PM and NOx. In 2007, these engines accounted for approximately 25 percent of mobile source diesel $PM_{2.5}$ emissions and 20 percent of mobile source NOx emissions. To dramatically reduce emissions from these engines, EPA issued its rule, "Control of Emissions of Air Pollution From Locomotive Engines and Marine Compression-Ignition Engines Less than 30 Liters per Cylinder." This final rule was effective on July 7, 2008 and set new exhaust emission standards on all types of locomotive engines, and on all types of marine diesel engines below 30 liters per cylinder displacement.

This program includes a set of near-term emission standards for newly-built engines, which was phased in starting 2009, and for existing locomotives, it took effect as soon as 2008 but no later than 2010 (2013 for Tier 2 locomotives), as soon as certified remanufacture systems were available. Further long-term standards were phased in over time, starting in 2014. Provisions were also included to reduce unnecessary locomotive engine idling. Compared to engines meeting the earlier standards, these stricter requirements will ultimately result in estimated PM reductions of 90 percent and NOx reductions of 80 percent. In addition to PM and NOx reductions, the standards will effectively reduce NMHC, CO, and air toxics.

New or Revised State Particulate Matter Measures

Part 219: Incinerators

The existing Subpart 219-4 was revised to better reflect the current cremation technology and reduce emissions from new crematories constructed in New York. Subparts 219-5 and 219-6 were phased out, by requiring that units subject to these subparts be regulated by more stringent standards. Furthermore, a new Subpart 219-10 was adopted to set a limit on NO_X emissions from municipal waste combustors. These revisions were adopted February 12, 2020.

Part 231: New Source Review for New and Modified Facilities

A revised Part 231 was proposed to conform to changes under the federal New Source Review (NSR) rule and the Supreme Court ruling on *Perez* v. *Mortgage Bankers Association*, 135 S. Ct. 1199 (2015) that overruled the *Paralyzed Veterans of America* v. *D.C. Arena L.P.*, 117 F. 3d 579 (D.C. Cir. 1997) decision. The Part 231 revisions specifically include changes to NSR applicability based on emissions of greenhouse gases and requirements for $PM_{2.5}$.

Part 247: Outdoor Wood Boilers

The existing Part 247 is being updated to conform to the emission standards and certification requirements of the federal NSPS rule effective May 15, 2015.

Existing Federal Sulfur Measures

Clean Air Act Title IV: Acid Rain Program

Due to the ongoing problem of acid deposition, caused principally by the combustion of fossil fuels, Title IV of the CAA contained the goal of reducing annual emissions of SO_2 by 10 million tons from 1980 emissions levels within the continental U.S. EPA proposed to meet these goals through two phases of SO_2 requirements. In CAA Section 403, EPA established an SO_2 allowance allocation and trading system.

The Phase I SO_2 requirements went into effect on January 1, 1995. Under CAA Section 404, EPA allocated allowances to sources in 21 eastern and midwest states, including New York State. A total of 445 units were held to emissions limitations by the Phase I requirements.

On January 1, 2000, the emissions limitations established in CAA Section 404 were superseded by those established in the Phase II SO_2 requirements of CAA section 405. This section served to place more stringent controls on the Phase I units, and imposed restrictions on smaller plants with oil-, coal- and gas-fired units as well. These requirements impacted over 2,000 units.

The SO_2 part of the program set a permanent cap on the total amount of SO_2 that may be emitted by EGUs in the contiguous United States. The program was phased in, with the final 2010 SO_2 cap set at 8.95 million tons, a level of about one-half of the emissions from the power sector in 1980.

Also included in Title IV is a similar goal of reducing annual NOx emissions by 2 million tons from 1980 levels.

New or Revised State Sulfur Measures

Part 225: Fuel Consumption and Use

6 NYCRR Part 225, "Fuel Consumption and Use," contains methods by which to reduce sulfur associated with different types of fuel use.

Subpart 225-1 regulates the sulfur content of solid and liquid fuels fired throughout New York State. Subpart 225-1 was last revised in 2013. The Department is currently working to revise Subpart 225-1 again. The proposed revisions will clarify that all emission sources that fire solid or liquid fuels are required to meet the sulfur-in-fuel standards of this subpart. Also, the rule will propose to lower the sulfur content limit of waste oil.

A revised Subpart 225-2 was adopted on March 3, 2020 and addresses the use of waste fuels for energy recovery. The revisions lower limits on PCBs and lead while adding limits for cadmium, chromium, and arsenic. The revisions also include removing outdated regulatory references, remove outdated work practices, expanding the number of facilities allowed to burn waste oil, and update the rule to complement Title V criteria.

Part 245: CSAPR SO2 Group 1 Trading Program

CSAPR SO_2 allowances are regulated by New York State under 6 NYCRR Part 245, "CSAPR SO_2 Group 1 Trading Program." This regulation uses the same method as New York State's CSAPR NO_X regulations, Part 243 and 244, to distribute federal SO_2 CSAPR allowances to regulated EGUs and the New York State Energy Research and Development Authority

(NYSERDA). Part 245 is designed to reduce $PM_{2.5}$ in New York State and downwind states by limiting emissions of SO_2 year-round from fossil fuel-fired electricity generating units.

Existing State NOx Measures

Part 210: Emissions and Labeling Requirements for Personal Watercraft Engines

6 NYCRR Part 210, "Emissions and Labeling Requirements for Personal Watercraft Engines," establishes an emissions reduction program for personal watercraft engines. Adopted in 2003, this regulation reduces emissions of NOx, PM and hydrocarbons past the levels achieved by federal standards.

This regulation includes lower emission certification levels beginning with model year 2006 and which become increasingly stringent; requires test procedures for new and in-use engines which guarantee compliance with the standards; establishes an environmental label program; and extends emission warranty requirements. Manufacturers must ensure that the emissions of their entire product line meet the corporate average requirement. CARB's average requirement declines through the 2008 model year.

Part 217: Motor Vehicle Emissions

6 NYCRR Part 217, "Motor Vehicle Emissions," effective October 30, 2002, includes provisions that curb NOx, PM, hydrocarbon and CO emissions from motor vehicles in New York State. Part 217 includes motor vehicle inspection and maintenance (I/M) programs as well as additional requirements for heavy-duty motor vehicles.

Subpart 217-3 contains anti-idling provisions for heavy duty vehicles. Heavy-duty vehicles with a gross vehicle weight rating (GVWR) greater than 8,500 lbs. and designed for transporting persons or properties, are not permitted to idle for more than five minutes while the vehicle remains motionless, unless specifically exempted.

Subpart 217-5, effective since June 1, 1999, requires all heavy-duty diesel vehicles (HDDVs) requiring registration in the 9-county New York Metropolitan Area (except for buses, municipally owned vehicles and other vehicles exempted in the subpart) to pass an annual diesel emissions inspection test. Beginning June 1, 2000, buses and municipally owned vehicles were also held to this requirement. This schedule also applies statewide for vehicle subject to roadside or random inspection along public highways and quasi-public locations.

Subpart 217-6 covers statewide enhanced motor vehicle inspection and maintenance program requirements.

- After January 1, 2011, no owner, operator, or lessee shall operate any model year 1996 and newer non-diesel motor vehicle with a GVWR of 8,500 pounds or less with a malfunctioning onboard diagnostic system as defined by the Subpart, unless an emission inspection waiver has been issued by the Department of Motor Vehicles.
- After January 1, 2012, no owner, operator, or lessee shall operate any model year 1997 and newer diesel motor vehicle with a GVWR of 8,500 pounds or less with a malfunctioning onboard diagnostic system as defined by the Subpart, unless an emission inspection waiver has been issued by the Department of Motor Vehicles.

Diesel Emissions Reduction Act of 2006

New York State enacted the Diesel Emissions Reduction Act of 2006 (DERA), which provided emissions reductions beginning in 2008, and additional reductions in 2009 and 2010 and contributes to the attainment of the PM NAAQS. This initiative requires thousands of state-owned or operated heavy duty diesel vehicles (HDDV's) to use ultra-low sulfur diesel (ULSD) fuel and best available retrofit technology (BART). These ULSD and BART requirements also apply to all HDDV's of prime contractors doing work on behalf of state agencies or public authorities. BART includes emission control equipment to reduce the release of air contaminants. The benefit will be seen with existing engines which are not expected to be replaced with new, cleaner engines for some time. DEC later promulgated 6 NYCRR Part 248, "Use of Ultra Low Sulfur Diesel Fuel and Best Available Retrofit Technology for Heavy Duty Vehicles," with an effective date of July 30, 2009 to implement DERA. The current version of 6 NYCRR Part 248 became effective on February 9, 2013. In March 2014, DERA was amended to extend the BART compliance date to December 31, 2015. Furthermore, due to a recent change in the underlying statute (Chapter 58, Laws of 2018), DEC will not enforce the requirement that subject vehicles that have received a useful life waiver pursuant to section 4.1(c) of 6NYCRR Part 248 cease to be used in New York State until after January 1, 2021.

Subpart 220-1: Portland Cement Plants

DEC targeted the reduction of NOx emissions with 6 NYCRR Part 220, "Portland Cement Plants." NOx is created during fuel combustion for the energy-intensive formation of cement. The state investigated RACT controls to identify a feasible way to meet these reductions.

There are currently two Portland Cement plants in New York State (both have a dry kiln). Upon the introduction of NOx RACT in 1995, DEC promulgated revisions to Part 220 that required owners of these facilities to submit a plan that identified RACT and included a schedule for installation of RACT. An all-inclusive regulation could not be established, as the variation in technology demanded a distinct analysis and application of NOx controls that were reasonably available at the time.

DEC retains the same approach, where each plant owner will be required to perform a RACT analysis that will identify the level of control technology and include a schedule for installation.

Subpart 220-2: Glass Manufacturing

DEC implemented this regulation to limit the emissions of NO_X formed by the high temperatures required in glass melting furnaces. New York State currently does not contain specific emission limitation requirements, the facilities determine what the appropriate emission limit should be and New York State approves it or denies it.

There are several alternate control technology options to reduce NO_X from glass furnaces. These include 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, selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR)). Oxy-firing has proved to be the most effective control measure by reducing NO_X emissions up to 85 percent, as well as reducing energy consumption, increasing production rates and improving glass quality.

<u>New or Revised New York State NOx Measures</u>

Part 212: Process Operations

DEC revised Part 212: General Process Emission Sources in June 2015 to reorganize it into four subparts: General Provisions (212-1), Allowable Emissions from Process Operations (212-2), Reasonably Available Control Technology for Major Facilities (212-3), and Control of Nitrogen Oxides for Hot Mix Asphalt Production Plants (212-4).

Part 212-3, which applies to both NOx and VOC emissions, requires major stationary sources to apply RACT to all emission points of NOx and VOC emissions. The definition of a major stationary source depends on the location of the source within the State. Sources located in the New York

Metropolitan Area and Orange County have a lower major source emission threshold (25 tons per year for both contaminants) than major sources located outside these areas (100 tons per year for NO_X and 50 tons per year for VOCs). The 2015 rulemaking clarified the term “Lower Orange County” with a list of regulated Orange County towns.

Part 212-4, which applies to NOx emissions, requires all hot-mix asphalt plants after 2012 to install low NOx burners upon burner replacement or apply for a NOx variance. All existing hot mix asphalt plant have until 2020 to upgrade to low NOx burners or apply for a variance.

Part 218: Emission Standards for Motor Vehicles and Motor Vehicle Engines

Section 177 of the CAA permits states to adopt new motor vehicle emissions standards that are identical to California's for a given weight class. New York has exercised this option in 6 NYCRR Part 218, "Emission Standards for Motor Vehicles and Motor Vehicle Engines," which incorporates California's emissions standards for light-duty vehicles. These regulations apply to 1993, 1994, 1996 and newer model year passenger cars and light duty trucks; 2004 and newer model year medium-duty vehicles; 2005 and newer heavy-duty Otto-cycle engines; and 2005-2007 heavy-duty diesel engines and vehicles.

The LEV regulations provide flexibility to auto manufacturers by allowing them to certify their vehicle models to one of several different emissions standards. However, manufacturers must demonstrate that the overall fleet for each model year meets the specified NMOG and NO_X standard for that year. These requirements are progressively lower with each model year.

Section 218-5.1(a) was revised to include that all manufacturers of new vehicles subject to this Part, certified for sale in California and produced and delivered for sale in New York, shall conduct inspection testing in accordance with California Code of Regulations. This revision also includes that remedial action plans will apply to vehicles certified to the California standards intended for sale in New York based on a full calendar or partial calendar quarter of testing, unless the vehicle has already been sold to its ultimate owner.

Subpart 218-7: Aftermarket Parts, specifically 218-7.2(c) limits the installation, sale, offer for sale, or advertisement of any new aftermarket catalytic converter intended for use on a gasoline powered passenger car, light-duty truck, or medium-duty vehicle originally certified with a catalytic converter in New York State unless it has been exempted pursuant to the

requirements of California Code of Regulations, title 13, section 2222. This subpart was revised to clarify or amend aftermarket catalytic converter prohibitions that currently apply to 1993, 1994, 1996 and subsequent model-year light and medium duty vehicles. This revision was adopted on February 12, 2020.

Part 222: Distributed Generation Sources

A distributed generation (DG) source is a stationary reciprocating or rotary internal combustion engine that feeds into the distribution grid or produces electricity for use at the host facility or both. This measure will apply to owners and operators of DG sources where the potential NOx emissions are below the major source threshold set forth in paragraph 201-2.1(b)(21) of Part 201.

DEC adopted 6 NYCRR Part 222, “Distributed Generation Sources”, along with attendant revisions to 6 NYCRR Part 200, “General Provisions”, on November 1, 2016. The new rule took effect on December 1, 2016. On March 1, 2017, an Article 78 petition was filed challenging various aspects of Part 222. On July 26, 2017, a Stipulation and Order was issued whereby the Department agreed to propose a new rule to replace the adopted rule pursuant to the State Administrative Procedure Act (SAPA).

Consistent with this Order, on February 24, 2020, DEC adopted new Part 222. New Part 222 applies to economic dispatch sources with output ratings of 200 horsepower (hp) or greater in the NYMA. Economic dispatch includes DG sources enrolled in demand response programs sponsored by the NYISO or distribution utilities that receive capacity or energy payments or both. In addition, price-responsive generation sources, defined in Part 222 as DG sources used to provide electricity when the cost of electricity supplied by the distribution utility is high, are also covered under the definition of economic dispatch sources. Subject economic dispatch sources will be required to meet emission control requirements beginning May 1, 2021.

Part 227: Stationary Combustion Installations

Subpart 227-1 regulates PM emissions from stationary combustion sources. Currently, this Subpart is being revised. The proposed revisions will include updated permit references and rule citations; revised particulate matter emission limits; updated monitoring, recordkeeping, and reporting requirements, and updated definitions.

Subpart 227-2 regulates NOx emissions from stationary combustion installations. This subpart was revised in 2010.

On December 11, 2019, the state adopted Subpart 227-3 to include lower emission limits for simple cycle combustion turbines, compliance option updates, administrative updates, and updated monitoring, recordkeeping, and reporting requirements.

Part 243: CSAPR NO_X Ozone Season Group 2 Trading Program and Part 244: CSAPR NO_X Annual Trading Program

In New York State there are two CSAPR NO_X regulations, Part 243 "CSAPR NO_x Ozone Season Group 2 Trading Program," and Part 244, "CSAPR NO_x Annual Trading Program," that make explicit the allocation method New York uses to distribute federal CSAPR NO_X allowances to regulated EGUs and NYSERDA.

After setting aside 5% of New York's CSAPR budget for new sources, Parts 243 and 244 allocate NO_x allowances based on recent emissions (the average of the last three years for which data are available) and provide 10% of the CSAPR budget plus any remaining allowances to NYSERDA, who uses the proceeds of the sale of those excess allowances to promote energy efficiency and renewable energy technologies.

The CSAPR Part 244 program is designed to reduce ozone and $PM_{2.5}$ in New York State and downwind states by limiting emissions of NO_X year-round from fossil fuel-fired electricity generating units.

Existing Federal NOx Measures

Small Spark-Ignition Engines

The first phase of regulations to control emissions from new nonroad spark-ignition engines at or below 19 kW (25 hp) was published in July 1995.[42] Covered under this rule are a wide variety of new engines manufactured during or after 1997 used in, among other things, lawn and garden equipment and small construction equipment. This first phase of standards was to reduce hydrocarbon emissions by 32 percent and CO emissions by seven percent in 2020, when complete fleet turnover would be achieved.

[42] "Control of Air Pollution; Emission Standards for New Nonroad Spark-ignition Engines At or Below 19 Kilowatts" 60 FR 34582 (US EPA, July 3, 1995).

A second phase of control requirements was published in March 1999,[43] specifically for Class I and Class II non-handheld spark-ignition engines at or below 19 kW such as lawnmowers and garden tractors. These Phase 2 requirements, which were phased in from 2001 to August 2007, were expected to result in an estimated 51 percent reduction in combined hydrocarbon and NOx emissions by 2010, and a 59 percent reduction of these emissions by 2020. Additional Phase 2 requirements were published by EPA in April 2000.[44] These standards affected handheld spark-ignition engines at or below 19 kW, principally those used in lawn and garden equipment such as trimmers, leaf blowers and chainsaws. An estimated 70 percent reduction of combined hydrocarbon and NOx emissions were expected by 2010. The standards apply to Class III, IV, and V engines, and were phased in between 2002 and 2007.

In October 2008, EPA published the Phase 3 Engine Standards Affecting Retailers and Importers of Lawn and Garden Equipment[45] to reduce emissions of hydrocarbons and NOx from nonroad small spark-ignition engines below 19kW and marine spark-ignition engines. This rule includes exhaust and evaporative emission standards for these engines as well as related gasoline fuel tanks and fuel lines. This final rule also includes a wide range of amendments to other highway and nonroad programs.

Maximum Achievable Control Technology

Under Section 112 of the 1990 CAA Amendments, hazardous air pollutants (HAPs) are required to be controlled by technology determined to be MACT. Otherwise known as NESHAP standards, DEC has been adopting these control requirements as they have been developed by EPA and has therefore been realizing the reductions resulting from the MACT program. Many of these standards affect emissions of PM or its precursors. Notable sources of NO_X reductions include the MACT standards relating to combustion, such as the standards for Stationary Combustion Turbines, Combustion Sources at Kraft, Soda, and Sulfite Pulp & Paper Mills, and Reciprocating Internal Combustion Engines.

[43] "Phase 2 Emission Standards for New Nonroad Spark-Ignition Nonhandheld Engines At or Below 19 Kilowatts" 64 FR 15208(US EPA, March 30, 1999). Retrieved from: https://www.govinfo.gov/content/pkg/FR-1999-03-30/pdf/99-6175.pdf

[44] "Phase 2 Emission Standards for New Nonroad Spark-Ignition Handheld Engines At or Below 19 Kilowatts and Minor Amendments to Emission Requirements Applicable to Small Spark-Ignition Engines and Marine Spark-Ignition Engines" 65 FR 24268 (US EPA, April 25, 2000).

[45] "Control of Emissions From Nonroad Spark-Ignition Engines and Equipment" 73 FR 59034 (US EPA, October 8, 2008).

10.3.7. Additional Measures

Several other programs are in place for which emission reductions for $PM_{2.5}$ and its precursors will be realized. They are not to be included as enforceable SIP measures but are offered to highlight ongoing efforts in New York that will result in additional emission reductions over time.

NYSERDA Programs

NYSERDA was established in 1975 and is primarily funded by the System Benefits Charge (SBC) on utility bills and proceeds from auctions through the Regional Greenhouse Gas Initiative. The funds are allocated to the Clean Energy Fund and Renewable Portfolio Standard for energy-efficiency programs, research and development initiatives, and other clean energy activities for the industrial, commercial, municipal, and residential sectors.

NYSERDA provides funding and technical assistance in many programs which result in reductions of emissions of PM and its precursors. For example, the C&I Carbon Challenge gives large, non-residential energy users flexibility in using Clean Energy Fund resources to implement cost-effective carbon and energy reduction opportunities through a competitive proposal process. A wide range of businesses, schools, universities, state and local governments, and other institutions are eligible for these incentives. NYSERDA's Clean Transportation Program aims to encourage innovative ideas to provide more secure, sustainable, and cleaner transportation options for the state's communities. NYSERDA specifically targets public transit systems, smart mobility, transportation demand strategies, and electric vehicles and other alternate fuel vehicles with this program. Many public transportation systems in New York could be much safer, cleaner, more efficient, and easier to use with some planning and implementation of new technologies. Smart mobility is using technology such as smartphones to reduce congestion and idling by allowing drivers to be informed of road conditions and alternate routes. Transportation demand management aims to reduce single-occupancy vehicle trips by encouraging carpools, bike friendly paths, safe walking areas, or even alternative work schedules to avoid traffic congestion. The ChargeNY program has been increasing electrification of all vehicle types in New York, but the Clean Transportation program also provides information and more fueling stations for vehicles that run on natural gas, propane, biofuels, and hydrogen.

Climate Leadership and Community Protection Act (CLCPA)

The CLCPA includes the most ambitious and comprehensive climate and clean energy legislation in the country.[46] The CLCPA requires New York to achieve a carbon free electricity system by 2040 and reduce greenhouse gas emissions 85% below 1990 levels by 2050, to expedite the transition to a clean energy economy. This law will drive investment in clean energy solutions such as wind, solar, energy efficiency and energy storage. The CLCPA targets investments to benefit disadvantaged communities, create tens of thousands of new jobs, improve public health and quality of life and provide all New Yorkers with more robust clean energy choices. With a focus on environmental justice, state agencies will invest at least 35% of clean energy program resources to benefit disadvantaged communities but will aim for a 40% investment.

DEC will, through the future adoption of regulations, drive an 85% reduction in greenhouse gas emissions by 2050, with an interim benchmark of 40% reduction in emissions by 2030 (both relative to 1990 levels). The Climate Action Council will develop a plan to offset remaining emissions through carbon capture or other technologies to create a carbon-neutral economy. Additionally, a just transition working group will work to ensure that individuals working in conventional energy industries are provided with training and opportunities in the growing clean energy economy.

The CLCPA codifies Governor Cuomo's nation-leading goals under his Green New Deal, mandating that at least 70% of New York's electricity come from renewable energy sources such as wind and solar by 2030, and that the state's power system is 100% carbon neutral by 2040. Governor Cuomo committed to install 9,000 megawatts of offshore wind by 2035; 6,000 megawatts of distributed solar by 2025; and 3,000 megawatts of energy storage by 2030 as part of this legislation.

10.3.8. Source Retirement and Replacement Schedules

40 CFR Section 51.308(f)(2)(iv)(C), requires states to consider source retirement and replacement schedules in developing the LTS. Source retirement and replacement were considered in developing the 2028 emission projections. Retirement and replacement will be managed in accordance with existing SIP requirements pertaining to PSD and NSR. New York State has negotiated consent decrees with certain electric utility companies that require retirement of specific air pollution sources. Table 10-3 identifies the expected unit shutdowns in MANE-VU included in the modeling.

[46] Governor's Press Office. "Governor Cuomo Executes the Nation's Largest Offshore Wind Agreement and Signs Historic Climate Leadership and Community Protection Act". July 18, 2019. Retrieved from: https://www.governor.ny.gov/news/governor-cuomo-executes-nations-largest-offshore-wind-agreement-and-signs-historic-climate

Table 10-3 Expected Shutdowns

State	Owner/Operator	Unit	Proposed Deactivation Date
New York	Entergy Nuclear Power Marketing, LLC	Indian Point 2	April 30, 2020
		Indian Point 3	April 30, 2021
New York	Hawkeye Energy Greenport LLC	Greenport GT 1	June 6, 2018
New York	Selkirk Cogen Partners, LP	Selkirk 1	May 17, 2018
		Selkirk 2	May 17, 2018
New Jersey	B L England	2	2020
		3	2020
New Jersey	Sewaren Generating Station	1	January 1, 2018
		2	January 1, 2018
		3	January 1, 2018
		4	January 1, 2018
Massachusetts	Brayton Point	4	January 1, 2017

10.4. National Park Service Source Evaluation Request

In a letter dated April 12, 2018, NPS requested that MANE-VU states consider specific individual sources in their long-term strategies. NPS used an analysis of emissions divided by distance (Q/d) to estimate the impact of MANE-VU facilities on NPS mandatory Class I Federal areas – Acadia and Shenandoah National Parks. To select the facilities, first, NPS summed 2014 NEI NO_X, PM_{10}, SO_2, and SO_4 and divided by the distance to a specified NPS mandatory Class I Federal area across all MANE-VU states relative to the mandatory Class I Federal areas. Next, NPS ranked the Q/d value relative to each area and then created a running total. Finally, NPS identified those facilities contributing 80% of the total impact at each NPS mandatory Class I Federal area, but not more than 25 top-ranked facilities. The NPS identified 39 facilities in New York in this letter.

In a letter dated October 22, 2018, NPS identified 26 facilities for which more control information was desired. The following sections detail emission controls

and updates to the 26 facilities that have occurred since the 2014 NEI to address the NPS's request for more information.

Table 10-4 - Facilities Identified by the National Park Service

Inventory	Facility Name	Q/d	NPS Mandatory Class I Federal Area
2014 NEI	Lafarge Building Materials Inc	15.26	Acadia
2014 NEI	Alcoa Massena Operations (West Plant)	5.72	Acadia
2014 NEI	International Paper Ticonderoga Mill	5.52	Acadia
2014 NEI	Finch Paper LLC	5.04	Acadia
2019 Repower	RED-Rochester LLC at Eastman Business Park	4.70	Shenandoah
2014 NEI	Morton Salt Division	3.80	Shenandoah
2014 NEI	Anchor Glass Container Corp	3.45	Shenandoah
2014 NEI	Bowline Point Generating Station	2.99	Shenandoah
2014 NEI	Guardian Geneva Float Glass Facility	2.75	Shenandoah
2014 NEI	Lehigh Northeast Cement Company	2.26	Acadia
2014 NEI	Wheelabrator Westchester LP	2.03	Acadia
2014 NEI	Hempstead Resource Recovery Facility	1.86	Acadia
2017 CAMD	Northport	1.63	Acadia
2017 CAMD	Somerset Operating Company (Kintigh)	1.50	Acadia
2017 CAMD	East River	1.34	Acadia
2017 CAMD	Ravenswood Generating Station	1.33	Acadia
2014 NEI	Covanta Niagara LP	1.30	Acadia
2017 CAMD	Cayuga Operating Company, LLC	1.23	Acadia
2014 NEI	Globe Metallurgical Inc	1.16	Acadia
2014 NEI	Black River Generation LLC	1.03	Acadia
2017 CAMD	Roseton Generating LLC	1.01	Acadia
2014 NEI	TGP Compressor Station 245	0.99	Acadia
2017 CAMD	E. F. Barrett	0.98	Acadia
2014 NEI	Northeast Solite Corporation	0.92	Acadia
2014 NEI	General Chemical LLC	0.87	Acadia
2014 NEI	Onondaga County Resource Recovery Facility	0.83	Acadia

10.4.1. Lafarge Building Materials

Lafarge Building Materials built a new state-of-the-art plant on the property of the old plant that began operating in 2017. More detail on the new plant can be found in Section 10.6.3.

10.4.2. Alcoa Massena Operations (West Plant)

St. Lawrence County has not been designated for the 1-hour SO_2 primary standard yet because Alcoa Massena Operations is working to reduce their SO_2

emissions and requested that the area be designated by December 31, 2020 based on actual monitoring data. A commitment to specific new controls to be installed cannot be made at this time, because this is a developing situation, but actions will be decided on during this implementation period. There are new monitors downwind of Alcoa to monitor the effects of their operations, and the residence time in the scrubbers has been increased to address emissions.

10.4.3. International Paper Ticonderoga Mill

International Paper submitted an updated RACT analysis in September 2016 which set an emission limit of 0.23 lb NO_X/mmBtu on the power boiler that burns natural gas.

10.4.4. Finch Paper

Finch Paper updated some operations since the 2014 NEI that was used by the NPS in their Q/d analysis. More details on these updates can be found in Section 10.6.3.

10.4.5. RED-Rochester LLC at Eastman Business Park

RED-Rochester is located in the old Kodak Park and has converted coal-fired boiler #44 to natural gas with #2 fuel oil backup. Boiler #44 is rated at 694 mmbtu/hr. on natural gas and 670 mmbtu/hr on No. 2 oil. The final conversion scenario decommissioned three boilers: the previously shut down 640 MBTU/hr coal fired Boiler 41, the 670 MBTU/hr coal fired Boiler 42 in March 2018, and the 640 MBTU/hr coal-fired Boiler 43 in March 2018. Four operating 98 MBTU/hr #6 fuel oil fired package boilers have been retained as limited use boilers. The new natural gas boilers will significantly reduce both NO_X and SO_2 emissions compared to historical and NPS estimated emissions from the coal boilers.

10.4.6. Morton Salt Division

Morton Salt has converted from coal to natural gas.

10.4.7. Anchor Glass Container Corporation

The Anchor Glass Container Corporation facility in Elmira is subject to the consent decree from a settlement with EPA. Both furnaces will be rebuilt and will burn oxyfuel or install a selective catalytic reduction (SCR) unit to minimize NO_X emissions. Elmira 1 must be controlled by July 31, 2019 and Elmira 2 by December 31, 2029 at the latest. A scrubber system will be operating on Elmira 1 by December 31, 2021 and the 30-day rolling average emission limit will be 0.70 pounds of SO_2 per ton of glass produced. Batch optimization will be performed

on Elmira 2 to limit SO_2 emissions to 2.10 pounds of SO_2 per ton of colored glass produced and 1.80 pounds of SO_2 per ton of blue or flint glass produced. To control PM, Elmira 1 must have an ESP operating by December 31, 2021 and Elmira 2 must undergo batch optimization.

10.4.8. Bowline Point Generating Station

Bowline Point Generating Station switched to natural gas but can burn oil as a backup.

10.4.9. Guardian Geneva Float Glass Facility

Guardian Geneva Float Glass underwent a rebuild in 2017.

10.4.10. Lehigh Northeast Cement

Lehigh Northeast Cement operates with a dry process, which has fewer emissions than wet processes and is well controlled. An SNCR began operation July 2012.

10.4.11. Municipal Waste Combustors

The National Park Service requested additional information on several municipal waste combustors: Wheelabrator Westchester LP, Hempstead Resource Recovery Facility, Covanta Niagara LP, and Onondaga County Resource Recovery Facility. New York is currently revising the regulation that sets NO_X RACT limits for municipal waste combustors that should be proposed in 2019.

10.4.12. Northport Power Station

Northport has not had any recent changes to controls or their process, but emissions have decreased in the past few years. Northport burned much less #6 high sulfur fuel oil in 2016 and 2017, which leads to lower SO_2 emissions. Also, the sulfur content of #6 fuel oil has decreased in the past couple of years due to Section 225-1.2, Sulfur-in-fuel limitations.

10.4.13. Somerset (Kintigh) Operating Company

The state has adopted revisions to Part 251 and Somerset ceased operations after submitting their deactivation plan to NYISO.

10.4.14. Con Ed-East River Generating Station

Water injection, dry low NO_X burners, and SCR are used to control NO_X emissions and an oxidation catalyst is used to control CO and VOC emissions at this facility. Distillate oil will only be fired in an emergency and for test firing up to 16 hours per year.

10.4.15. Ravenswood Generating Station

Dry low NO_X burners and SCR are used to control NO_X emissions from U-CC001. Emissions of VOC and CO are controlled using an oxidation catalyst. Distillate oil can only be burned for 720 hours per year.

10.4.16. Cayuga Generating Station

The revisions to Part 251 have been adopted and the facility is no longer operating, but still retains their SAPA extended permit.

10.4.17. Globe Metallurgical, Inc.

Globe Metallurgical modified its permit in 2018 to allow it to overhaul its electric arc furnace No. 11 and install a multi-clone cooler for the draft fan baghouse system on that furnace. The multi-clone cooler is part of the air pollution control system designed to allow for “heavies” to drop out in the gas stream, and to reduce off-gas temperatures. The multi-clone improves the operational life of the induced draft fans, reverse air fans, dust collection filter media, and associated hardware. This plant shutdown indefinitely due to market conditions in December 2018.

10.4.18. Black River Generation, LLC

Black River Generation has a biomass boiler that uses clean wood, unadulterated wood from construction and demolition debris, glued wood creosote treated wood, tire derived fuel and non-recyclable fibrous material (waste paper) as fuel.

10.4.19. Roseton Generating Station

Roseton Generating Station burns exclusively natural gas during the ozone season and burns natural gas and No. 6 fuel oil during the remainder of the year. PM from Units 1 & 2 is controlled with a mechanical dust collector. NO_X emissions are controlled with "Burners Out Of Service" (BOOS) controls, oil steam atomization, and windbox flue gas recirculation.

10.4.20. TGP Compressor Station 245

TGP Compressor Station 245 burns natural gas and is subject to NO_X RACT. Additional reductions may be achieved as a result of the state's efforts to regulate the Oil and Gas sector.

10.4.21. E.F. Barrett Power Station

E.F. Barret has not undergone any updates since the data were collected for NPS's analysis.

10.4.22. Northeast Solite Corporation

Northeast Solite has three kilns that can burn coal, #2 fuel oil, or natural gas as of 2017. There are scrubbers on each of the kiln exhausts to reduce particulate and sulfur dioxide emissions. Based on technical and economic evaluations of using different emission control strategies and fuel types, RACT is determined to be tangential firing of the kilns when using coal. According to their RACT analysis, there is no technically or economically feasible emission control equipment to reduce NO_X emissions from the kilns.

10.4.23. Chemtrade Solutions Syracuse

Formerly known as General Chemical LLC and under new ownership. When the facility transferred ownership in 2014, the new owners installed an SCR.

10.5. Forest Service Source Evaluation Request

In the official comment letter dated April 22, 2019, the U.S. Forest Service requested that New York consider specific individual sources in its LTS. The Forest Service identified 3 facilities in New York in this letter. The following sections detail emission controls and updates to the facilities that have occurred since 2011 to address the Forest Service's request for more information.

10.5.1. Cargill Salt Co.-Watkins Glen Plant

Cargill Salt Co.'s Watkins Glen Plant shutdown four boilers in 2013, two coal-fired and two natural gas-fired, totaling 228 MMBtu/hr heat input capacity. The four boilers that were shutdown were replaced by one 181 MMBtu/hr natural gas-fired boiler with a low-NOx burner. The replacement boiler is subject to a 0.1 lbs NOx/MMBtu heat input limit that is monitored using a Continuous Emissions Monitoring System (CEMS). As a result of these changes, the plant is no longer a major facility and switched from a Title V permit to an Air State Facility permit.

10.5.2. Norlite Corporation

Norlite LLC has not undergone any changes in fuel or implemented any new controls since 2011, but the permit limits emissions of NO_X to 22.4 lb/hr and SO_2 to 28 lb/hr from 61 lb/hr of NO_X and 30 lb/hr of SO_2 in 2011. NO_X emissions in 2016 and 2017 at Norlite LLC were 82.3 and 78.8 tons respectively, compared to 80.7 tons in 2011. SO_2 emissions in 2016 and 2017 at Norlite LLC were 128.5 and 60.4 tons respectively, compared to 124.9 tons in 2011.

10.5.3. Oswego Harbor Power

Oswego Harbor Power Emission Unit U00006 consists of one steam generator, Unit 6, that provides steam to a turbine capable of producing 850 MW net of electricity. This unit can produce up to 245 MW by firing natural gas. Natural gas or distillate oil may be used to ignite the boiler during startup. The oil must have a sulfur content no greater than 0.5% by weight to be used in this unit. Unit 6 is subject to 40 CFR Part 60, subpart D. Particulate emissions are controlled by an electrostatic precipitator (S006C). NO_X emissions are controlled by over-fire air and flue gas recirculation. SO_2 emissions in 2017 were 100.9 tons, compared to 373.4 tons in 2011. NO_X emissions from Oswego Harbor Power were 59.7 tons, a decrease from 101.6 tons in 2011.

10.6. Additional Reasonable Strategies

Aside from the state and federal control measures discussed previously, MANE-VU investigated additional control measures to determine what would prove feasible through a four-factor analysis. 40 CFR Section 51.308(f)(2)(i) requires states to consider the following four factors to determine which additional emission control measures are needed to make reasonable progress in improving visibility: 1) costs of compliance, 2) time necessary for compliance, 3) energy and non-air quality environmental impacts of compliance, and 4) remaining useful life of any existing source subject to such requirements. The state's plan must include reasonable measures and identify the visibility improvement that will result from those measures.

10.6.1. Analysis of the Four Statutory Factors

New York agreed to the additional reasonable strategies in the Ask (Appendix H) after consideration of an analysis of the four factors that the CAA requires to be considered in determining whether controls are reasonable.

New York relied on analysis developed for MANE-VU in applying the four factors to a series of emission control measures.[47] This analysis summarizes MANE-VU's assessment of pollutants and associated source categories affecting visibility in mandatory Class I Federal areas in and near MANE-VU, lists possible control measures for those pollutants and source categories, and develops the requisite four factor analysis. Table 10-5 presents a summary of the four-factor analysis for the source categories analyzed to determine reasonable progress.

MANE-VU's Four Factor Workgroup determined how reasonable additional measures in these source categories are in their "High Electric Demand Days and Visibility Impairment in MANE-VU"[48] and "Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions"[49] reports. Guided by this analysis, MANE-VU arrived at a suite of suggested control measures that the MANE-VU states agreed to pursue as a region. The corollary was that the MANE-VU states that have mandatory Class I Federal areas (Maine, New Hampshire, Vermont, and New Jersey) also asked states outside of MANE-VU that also contribute to visibility impairment to pursue similar strategies for reducing sulfate emissions from source sectors, or to make equivalent sulfate reductions from alternate source sectors.

[47] MANE-VU TSC. *Technical Memorandum: Four-Factor Data Collection*. March 30, 2017. Retrieved from: https://otcair.org/MANEVU/Upload/Publication/Reports/Four-Factor%20Data%20Collection%20Memo%20-%20170314.pdf

[48] MANE-VU TSC. *High Electric Demand Days and Visibility Impairment in MANE-VU*. December 20, 2017. Retrieved from: https://otcair.org/MANEVU/Upload/Publication/Reports/High%20Electric%20Demand%20Days%20and%20Visibility%20Impairment%20in%20MANE%20-%20Final.pdf

[49] MANE-VU Technical Support Committee. *Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions.* November 20, 2017. Retrieved from: https://otcair.org/MANEVU/Upload/Publication/Reports/Winter%20NOX%20Control%20Report%20171120.pdf

Table 10-5 - Summary of Results from the Four Factor Analysis

Source Category	Primary Regional Haze Pollutant	Control Measure(s)	Average Cost (per ton of pollutant reduction)	Compliance Timeframe	Energy and Non-Air Quality Environmental Impacts	Remaining Useful Life
Electric Generating Units	SO_2	Switch to a low sulfur coal (generally <1% sulfur), switch to natural gas (virtually 0% sulfur), coal cleaning, Flue Gas Desulfurization (FGD)-Wet, -Spray Dry, or -Dry.	$800-$2,300 based on EPA Base Case v5.13 (in 2011$)	2-3 years following SIP submittal	Fuel supply issues, potential permitting issues, reduction in electricity production capacity, wastewater issues	50 years or more
Industrial, Commercial, Institutional Boilers	SO_2	Switch to a low sulfur coal (generally <1% sulfur), switch to natural gas (virtually 0% sulfur), switch to a lower sulfur oil, coal cleaning, combustion control, Flue Gas Desulfurization (FGD)- Wet, -Spray Dry, or -Dry.	$600-$7,700 (in 2014$) based on available literature; dependent on size.	2-5 years following SIP submittal	Fuel supply issues, potential permitting issues, control device energy requirements, wastewater issues	10-30 years
Cement and Lime Kilns	SO_2	Fuel switching, Dry Flue Gas Desulfurization-Spray Dryer Absorption (FGD), Wet Flue Gas Desulfurization (FGD), Advanced Flue Gas Desulfurization (FGD).	$1,900-$73,000 (in 2006$) based on available literature. Depends on size.	2-3 years following SIP submittal	Control device energy requirements, wastewater issues	10-30 years
Heating Oil	SO_2	Lower the sulfur content in the fuel. Depends on the state.	$550-$750 (in 2006$) based on available literature; high degree of uncertainty with this cost estimate.	Currently feasible. Capacity issues may influence timeframe for implementation of new fuel standards	Increases in furnace/boiler efficiency, Decreased furnace/boiler maintenance requirements	18-25 years
Residential Wood Combustion	PM	State implementation of NSPS, ban on resale of uncertified devices, installer training certification or inspection program, pellet stoves, EPA Phase II certified RWC devices, retrofit requirement, accelerated changeover requirement, accelerated changeover inducement.	$30-$246,000 (in 2014$) based on available literature	Several years - dependent on mechanism for emission reduction	Reduce greenhouse gas emissions, increase efficiency of combustion device	10-15 years
Outdoor Wood Boilers	PM	Regulatory approaches to reducing wood smoke, voluntary programs to replace old, inefficient wood stoves and fireplaces, and education and outreach tools to promote cleaner burning	$170-$3070 (in 2014$) according to CSRA	2-22 years, depending on mechanism for emission reductions	Increased logging to satisfy the demand for firewood may cause water quality issues, soil erosion and compaction, and loss of habitat for sensitive species.	20 years

10.6.2. Operating Previously Installed NO_X and SO_2 Controls

EGUs often only run NO_X emission controls to comply with ozone season trading programs; consequently, NO_X sources may be uncontrolled during the winter and non-peak summer days. Controlling emissions year-round at EGUs using existing controls is generally more cost-effective compared to other sectors that would have to install and bear the capital costs of control equipment solely for improving visibility. Uncontrolled NO_X emissions from EGUs outside the ozone season is not an issue in New York, because the Part 227-2 NO_X RACT program includes year-round emission limits. New York requires that controls be run year-round for both NO_X and SO_2 by setting emission limits in permits that reflect the emission levels when the controls are run.

10.6.3. Significant Visibility Impact Emission Sources

Emission sources that were modeled by MANE-VU to have the potential for 3.0 Mm^{-1} or greater visibility impacts at any MANE-VU mandatory Class I Federal area were identified in the Ask, and a four-factor analysis must be performed for reasonable installation or upgrade of emission controls. As previously stated, the four factors are: the cost of compliance, the time necessary to comply, energy and non-air environmental impacts, and remaining useful life.

Finch Paper and Lafarge Building Materials are the two sources in New York State that were identified in the Ask. Both facilities have undergone updates since the 2011 emissions data was collected and have adequate controls installed that limit their potential max extinction to below the 3.0 Mm^{-1} threshold, that satisfies the Ask.

Finch Paper revised their NO_X RACT Plan in May 2015 and chose to implement a phased-in switch from No. 6 fuel oil to natural gas in their boilers, which was completed by the end of 2015.[50] Finch has also reduced their emissions by performing boiler and combustion tune-ups consistent with the 40 CFR Part 63 Subpart DDDDD Boiler MACT Rule, especially for Boilers 4 and 5. Boiler tuning focuses on achieving the optimal air to fuel ratio in a boiler, which results in lower excess oxygen, reduced stack temperature, and correspondingly lower CO emissions from improved efficiency. It also lowers NO_X emissions from the reduced excess oxygen and temperature conditions. Both Boiler No. 4 and No. 5 underwent extensive combustion tuning activities in calendar year 2014 to improve combustion efficiency and to reduce NO_X emissions. Finch also tuned/optimized the performance of Boilers No. 2, No. 3, and No. 9 even though Boilers No. 2 and 3 have relatively low NOx emissions, even at maximum load. All the Finch boilers have controllable primary combustion air dampers and were adjusted and fine-tuned during the tuning of Boiler No. 4 and No. 5.

[50] Finch Paper. “NOx RACT Plan for the Power Boilers.” Finch Paper, LLC, April 2016.

1. Cost of compliance: EPA has estimated that the initial set-up for a boiler tune-up ranges from $3,000 to $7,000 per boiler, and thereafter, an annual tune-up costs $1,000 per boiler per year (Appendix M). The tune-up should achieve at least a 1% improvement in efficiency which will result in fuel savings costs that will offset the tune-up costs.
2. Time necessary to comply: Finch Paper has already implemented these controls, therefore no additional time is needed.
3. Energy and non-air environmental impacts: It is estimated that basic boiler tune-ups can add up savings of up to 5% or more of energy use (Appendix M). The switch to natural gas reduced the amount of PM emitted, which reduces the rate of fouling of heating units. With less sulfur in the fuel, there is less buildup of deposits, which results in longer service intervals between cleaning (Appendix M).
4. Remaining useful life: Boilers 2, 3, 4, and 5 have been in operation since the mid-1960s and Boiler 9 was installed in 1978. There are no current plans to retire these units, but all of the boilers are beyond the 30-year lifespan estimated for most ICI boilers by MARAMA (Appendix M).

Lafarge Building Materials underwent a major renovation since the data were collected for the analysis, replacing its two wet process kilns with a dry process kiln. To control SO_2 and mercury, a wet scrubber was installed. To control NO_X from the kiln system, a SNCR was installed. With the controls started on May 16, 2017 for SO_2, mercury, and NO_X, Lafarge now meets the NSPS limits in 40 CFR Part 60 Subpart F.

1. Cost of compliance: Lafarge's plant modernization cost over $300 million, including labor, engineering and permitting, and equipment.
2. Time necessary to comply: Lafarge Building Materials has already installed and begun operations of the new dry process kiln, wet scrubber, and SNCR.
3. Energy and non-air environmental impacts: The dry process kiln is more energy efficient and therefore uses significantly less fuel. The new kiln also uses less limestone than the wet process. There is no change in industrial water usage from the previous plant setup. Another non-air environmental impact is the dry process kiln creates more dust that may have to be landfilled if it does not meet standards to be recycled in the process as kiln feed and dry process creates smaller dust particles than the wet process. The wet scrubber will potenitally increase water and energy usage at the plant, as well as increase fouling.
4. Remaining useful life: over 30 years

10.6.4. Low-Sulfur Oil Strategy

New York has already fully implemented a low-sulfur fuel oil standard and does not need to take further action by 2028.

10.6.5. Fuel Switching Commitment

Due to economics, many large point emission sources, including EGUs, have been switching from fuels with a potential for higher emissions to fuels with a lower potential to emit, such as natural gas. MANE-VU wants these units to commit to use these less-polluting fuels in case the price of the higher polluting fuels becomes more appealing for facilities again. New York updates permits for large point emission sources every five years for Title V facilities, every ten years for Air State Facilities, and when both Title V and Air State facilities make a major update. New York will require the use of lower emitting fuel in the permits when they are updated. Also, New York has adopted NYCRR Part 251 "to require all power plants in New York to meet new emissions limits for carbon dioxide (CO_2), a potent greenhouse gas that contributes to climate change. The regulations, a first-in-the-nation approach to regulating carbon emissions, will achieve the Governor's goal to end the use of coal in New York State power plants by the end of 2020."[51]

10.6.6. Peaking Combustion Turbines

New York adopted a rule on December 11, 2019 that would limit emissions from peaking combustion turbines that operate on high electric demand days. The proposal would limit NO_X emission rates to 25ppm at 15% O_2 for natural gas and 42ppm at 15% O_2 for fuel oil. This rule helps get emission reductions to help prevent high ozone days in addition to improving visibility in mandatory Class I Federal areas in response to the Ask.

10.6.7. Energy Efficiency and Demand Reduction

New York State is a leader in adopting energy efficiency and renewable energy programs and is always investigating additional programs that will decrease use of fossil fuels in energy generation. Descriptions of current energy programs in New York can be found on NYSERDA's website, www.nyserda.ny.gov, as well as on the Department of Public Service's website, www.dps.ny.gov.

[51] Governor's Press Office. "Governor Cuomo Announces Adoption Of Final Regulations To Make New York Power Plants Coal-Free By End Of 2020." May 9, 2019. Retrieved from: https://www.governor.ny.gov/news/governor-cuomo-announces-adoption-final-regulations-make-new-york-power-plants-coal-free-end

10.7. Additional Measures Considered

10.7.1. Measures to Mitigate the Impacts of Construction

The Regional Haze Rule required states to consider measures to mitigate the impacts of construction activities on Regional Haze in the first planning period in 40 CFR 51.308(d)(3)(v)(B). In the first planning period, New York considered additional measures that would mitigate the impacts of construction but decided not to implement them at the time.

40 CFR 51.308(f)(2)(iv)(B) similarly requires states to consider measures to mitigate the impacts of construction activities on regional haze in the second implementation period. MANE-VU found that, from a regional haze perspective, crustal material generally does not significantly contribute to visibility impairment at MANE-VU mandatory Class I Federal areas. However, the crustal fraction at any given location can be heavily influenced by the proximity of construction activities, and construction activities occurring in the immediate vicinity of MANE-VU mandatory Class I Federal areas could have a noticeable effect on visibility.

New York State Department of Transportation has a standard in place that specifically targets minimizing the impacts of construction on air quality, including visibility impairment in the mandatory Class I Federal areas. Section 107-11: Air Quality Protection of NYSDOT's *Standard Specifications*[52] requires contractors to apply proactive measures to prevent dust from being released from construction sites. Areas not subject to traffic can have approved products and materials applied to the exposed soil surfaces, including vegetative covers, mulch, and spray adhesives. If there will be construction or public traffic in the area, the contractor can use water, polymer additives, barriers, windbreaks, and wheel washing to prevent the spread of dust from the site.

10.7.2. Agricultural and Forestry Smoke Management

40 CFR Section 51.308(f)(2)(iv)(D) requires states to address updates to smoke management techniques for the purposes of agricultural and forestry management in developing RPGs. A description of MANE-VU's analysis of smoke management in the context of regional haze SIPs can be found in the MANE-VU Smoke Management TSD entitled, *Technical Support Document on Agricultural and Forestry Smoke Management in the MANE-VU Region* in Appendix J. New York's regulations on prescribed fire have not been updated since the previous Regional Haze Progress Report, which was submitted in 2015.

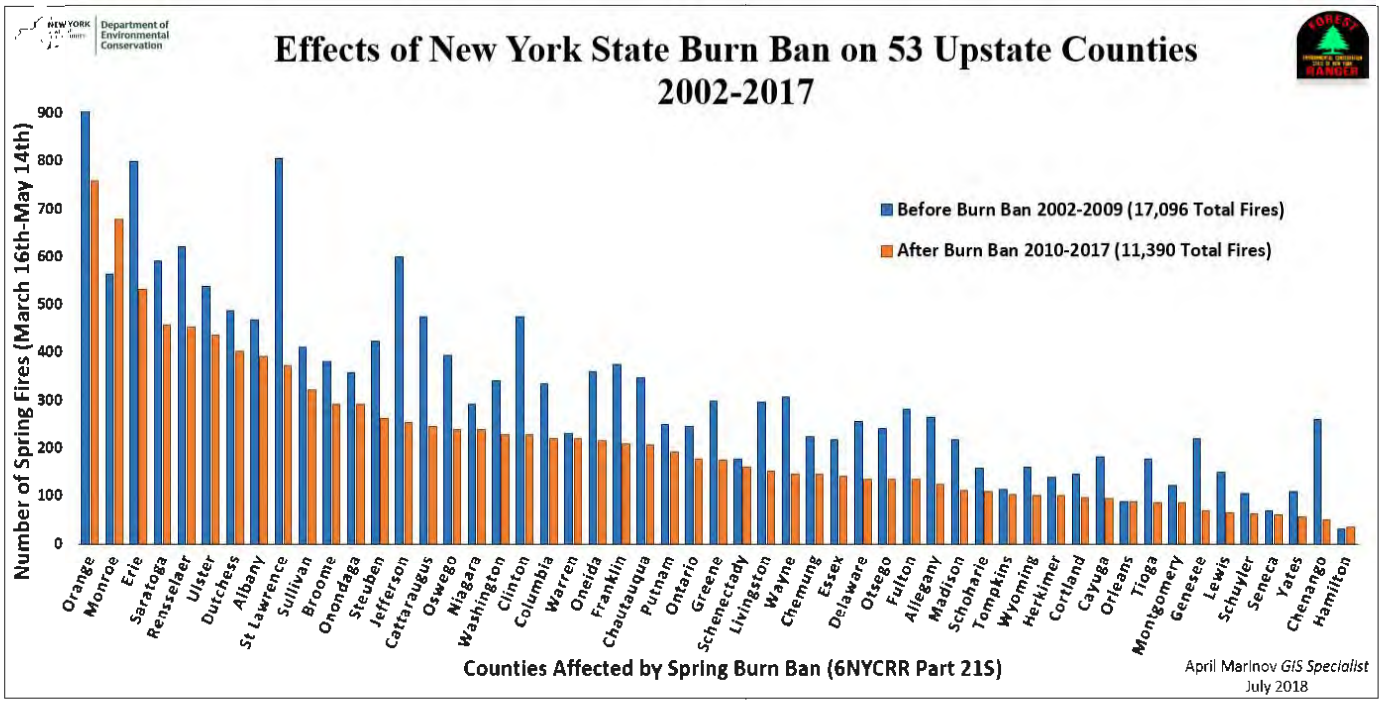
[52] NYS Department of Transportation (2008, May 1). *Standard Specifications (US Customary Units)*. Retrieved from: https://www.dot.ny.gov/main/business-center/engineering/specifications/english-spec-repository/espec-english-cd.pdf

In New York, prescribed fires have not been shown to significantly contribute to visibility impairment in mandatory Class I Federal areas. New York has a regulation for prescribed burns that considers the possible impacts in mandatory Class I Federal areas in 6 NYCRR Part 194, Forest Practices.

New York State has a process for authorizing or granting approval to allow certain fires. The Division of Forest Protection and Fire Management at DEC manages prescribed fires. A total of 13 prescribed fires treating 352 acres were conducted in New York State by DEC on public land in 2016. There were also 185 wildfires in 2016 that burned 4,191 acres. In 2015, there were 11 prescribed fires which treated 268 acres of public lands, and there were 175 wildfires that burned 3,924 acres. The prescribed fires are conducted for wildlife and habitat management, and rare and endangered species management purposes. Prescribed burns in the Long Island Pine Barrens area also minimizes wildfire risk by reducing brush that could cause fires to reach a hazardous level. Campfires caused the most wildfires in both 2016 and 2015 at 63 and 36 wildfires, respectively.

Also, to reduce smoke New York State has encouraged wildland owners/managers to consider alternatives to burning, which include mowing techniques, and herbicide use for cost-effective removal. A strengthened ban on open burning has helped reduce forest fires, as shown in Figure 10-10.

Figure 10-10 – Outcome of Part 215: Open Burning



New York State documents the steps taken prior to the burn and actions taken during and after the burn to reduce air pollutant emissions. Steps are taken to ensure that air quality impacts are minimized during burning, and the prescribed burn plans for an area of 10 acres or more must go through a State Environmental Quality Review and Department review process (USDA Forest Service lands and Department of Defense lands are exempt from the review process for all prescribed burns).

The smoke management components of burn plans are as follows:

- Actions to minimize fire emissions which include measures that will be taken to reduce residual smoke, such as rapid and complete mop-ups and mop-ups of certain fuels;
- Evaluate smoke dispersion conditions prior to authorizing fires. Burn plans should evaluate potential smoke impacts at sensitive receptors and time fires to minimize exposure of sensitive populations and avoid visibility impacts in mandatory Class I Federal areas. The plan should identify the distance and direction from the burn site to local sensitive receptor areas and to regional/interstate areas where appropriate. Fire prescriptions submitted prior to the day of the fire must specify minimum requirements for the atmospheric capacity for smoke dispersal such as minimum surface and upper level wind speeds, desired wind direction, minimum mixing height, and dispersion index;
- The plan should identify actions that will be taken to notify populations and authorities (e.g., local air quality managers) at sensitive receptors, including those in adjacent jurisdictions, prior to the fire. New York State has a public notification process and exposure reduction process in place to reduce the impacts of burning. The plan should also identify contingency actions that will be taken during a fire to reduce the exposure of people at sensitive receptors if smoke intrusions occur. Appropriate short-term (less than 24-hour) contingency actions may include, among other things:
    - Notifying the affected public (especially sensitive populations) of elevated pollutant concentrations,
    - Suggesting actions to be taken by sensitive persons to minimize their exposure (e.g., remain indoors, avoid vigorous activity, avoid exposure to tobacco smoke and other respiratory irritants),
    - Providing clean-air facilities for sensitive persons,
    - Halting ignitions of any new open burning that could impact the same area,
    - Analyzing the fire situation and identifying alternative management responses upon becoming aware that a fire is out of air quality prescription with regard to the air quality criteria,
    - Consulting State air quality managers regarding appropriate short-term fire management response to abate verified impacts,
    - Implementing management responses that will mitigate the adverse

impacts to public health,
- Reporting the steps taken to mitigate adverse impacts to the public and appropriate state agencies after they have been completed.

In addition, New York State has a process to evaluate potential smoke impacts at sensitive receptors and schedule fires to minimize exposure of sensitive populations and avoid visibility impacts in mandatory Class I Federal areas. There are several ways to reduce emissions from a single fire. The approaches fall into four categories and their applicability varies by fuel type:

- Minimize the area burned,
- Reduce the fuel loading in the area to be burned,
- Reduce the amount of fuel to be consumed by the fire, and
- Minimize emissions per ton of fuel consumed.

New York State has a monitoring process in place to determine how fires affect visibility in mandatory Class I Federal areas. New York's monitoring process identifies how the effects of the fire on air quality at sensitive receptors, and visibility in mandatory Class I Federal areas will be monitored. The extent of the monitoring should match the size of the fire. For small fires, visual monitoring of the direction of the smoke plume and monitoring nuisance complaints by the public may be sufficient. Other monitoring techniques include posting personnel on vulnerable roadways to look for visibility impairment and initiate safety measures for motorists, posting personnel at other sensitive receptors to look for smoke intrusions, using aircraft to track the progress of smoke plumes, and continued tracking of meteorological conditions during the fire. For large fires expected to last more than one day, locating real-time PM monitors at sensitive receptors may be warranted to facilitate timely response to smoke impacts.

New York State has established a policy to issue health advisories when necessary. Air Quality Health Advisories help provide increased notice for at-risk individuals to reduce exposure to ozone and $PM_{2.5}$ by taking the recommended preventative measures. DEC and the New York State Department of Health will issue Air Quality Health Advisories when Department meteorologists predict levels of ozone or $PM_{2.5}$ pollution are expected to exceed an Air Quality Index (AQI) value of 100. The AQI was created by the EPA as an easy way to correlate levels of different pollutants to one scale, with a higher AQI value leading to a greater health concern. Air Quality Health Advisories are issued with an effective date and time for locations in one of more of eight air quality regions.

Pursuant to the EPA's interim guidance,[53] New York State has adopted a program that they believe will prevent NAAQS violations and addresses visibility impairment due to fires. This program established basic parameters: wind speed, direction, location, and distance to sensitive receptors.

[53] US EPA, Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze (US EPA, December 2014).

Public education and awareness programs have been implemented to explain the use and importance of fire for ecosystem management, the implications to public health and safety, and the goals of controlling smoke from prescribed fire. Wildland and air quality managers should work with the press to announce pre-fire health advisories, and post-fire results including such things as the management objectives met, smoke intrusions observed, and/or successful minimization of air quality impacts.

New York State has a program in which owners/managers must get prior authorization and a permit prior to implementing fire plans. There must also be an approved burn plan in place, approved by the Natural Resource Supervisor in the DEC region affected.

10.8. Estimated Impacts of New York's Long-Term Strategy on Visibility

40 CFR Section 51.308(f)(2)(iv)(E) requires states to address the net effect on visibility resulting from changes projected in point, area and mobile source emissions by 2028.

From the emission inventory for the MANE-VU region, including New York State, discussed in Section 7, are projected changes to point, area and mobile source inventories by the end of the second implementation period resulting from population growth; industrial, energy and natural resources development; land management; and air pollution control. The net effect of these emission reductions on visibility in mandatory Class I Federal areas was discussed in the weight-of-evidence demonstration provided in the RPG discussion in Section 9.0. These reductions will allow the visibility in mandatory Class I Federal areas to meet the RPGs through 2028, to stay on pace for the 2064 natural visibility benchmark.

The starting point for indicating progress achieved by measures included in this SIP and other MANE-VU-member SIPs is the 2000-2004 baseline visibility at affected mandatory Class I Federal areas, as assessed by NESCAUM in the first planning period. To calculate the baseline visibility for affected mandatory Class I Federal areas, using 2000-2004 IMPROVE monitoring data, the deciview value for the 20 percent best days in each year were averaged together, producing a single average deciview value for the best days. Similarly, the deciview values for the 20 percent most impaired days in each year were averaged together, producing a single average deciview value for the most impaired days. Calculation of best and most impaired days included both biogenic and anthropogenic emissions, as detailed in NESCAUM's *Baseline and Natural Background Visibility Conditions.*[54]

[54] NESCAUM (December 2006). *Baseline and Natural Background Visibility Conditions: Considerations*

Initial modeling to assess the impact of potential control measures is documented in *MANE-VU Modeling for Reasonable Progress Goals: Model Performance Evaluation, Pollution Apportionment, and Control Measure Benefits* (NESCAUM, February 2008). An assessment of potential control measures identified several promising strategies that would yield significant visibility benefits beyond the URP and, in fact, significantly beyond the projected visibility conditions that would result from expected air quality protection programs.

For the second implementation period, analyses of visibility trends are documented in *Mid-Atlantic/Northeast U.S. Visibility Data 2004-2016 (2nd RH SIP Metrics)* (MANE-VU, October 2018).[55] Staff from the Maine Department of Environmental Protection (MEDEP) analyzed visibility data collected at IMPROVE monitoring sites, starting in the baseline period of 2000-2004 through 2012-2016, the most recent five-year period with available data.

Figures 9-2 through 9-8 illustrate the predicted visibility improvement by 2028 resulting from the implementation of the MANE-VU regional long-term strategy by New York State and others. The results for each area indicate that visibility improvement will occur over the period of the second SIP (i.e., through 2028). This improvement is compared to the URP for affected mandatory Class I Federal areas. All MANE-VU and nearby sites are projected to meet or exceed the URP goal for 2028. In addition, no site anticipates increases in best day visibility relative to the baseline.

10.9. Enforceability of Emission Limitations and Control Measures

40 CFR Section 51.308(f)(2) requires states, including New York, to ensure that emission limitations and control measures in the LTS are enforceable. New York's operating permit program requires major source Title V permits to include all applicable requirements. CAA Section 110(a)(2)(C) requires implementation plans submitted by a state to include a program providing for enforcement of all SIP measures and the regulation of construction of new or modified stationary sources to meet PSD and nonattainment new source review (NNSR) requirements. New York's SIP currently includes NNSR requirements. New York took back the administration of the PSD program for attainment pollutants, which had been under EPA's purview since 2004.

Environmental Conservation Law (ECL) Section 19-0305 and Article 71 Sections 71-2103 and 71-2105 authorize the commissioner of DEC to enforce the codes, rules and regulations of DEC established in 6 NYCRR Part 200.1 et seq. The SIP

and Proposed Approach to the Calculation of Baseline and Natural Background Visibility Conditions at MANE-VU Class I Areas. Retrieved from https://www.nescaum.org/topics/regional-haze/regional-haze-documents

[55] https://otcair.org/manevu/Document.asp?fview=Reports

includes a compilation of rules and regulations that have been duly promulgated by DEC in accordance with its statutory authority and consistent with the State Administrative Procedures Act. Therefore, DEC has the authority to enforce all SIP measures.

10.10. Consultation on the Long-Term Strategy

40 CFR Section 51.308(f)(2)(ii) requires New York, as a state that contributes to visibility impairment in a downwind mandatory Class I Federal area, to consult with the affected mandatory Class I Federal area states to develop coordinated emission strategies. New York has consulted with other states and the FLMs by participation in the MANE-VU and inter-RPO processes that developed technical information necessary for development of coordinated strategies. New York also coordinated with MANE-VU and other RPOs to develop a weight-of-evidence analysis that was used to develop New York's LTS for the impacts of New York's emissions on mandatory Class I Federal areas outside the state.

On May 5, 2017, MANE-VU adopted an updated consultation plan, *MANE-VU Regional Haze Consultation Plan*, which detailed MANE-VU's plans for consultation. A list of the consultation events, including telephone conferences and meetings, appears in *MANE-VU Regional Haze Consultation Report,* Appendix E of this document.

MANE-VU consultation meetings and conference calls for this planning period are summarized in Appendix E. New York State's coordination with FLMs on long-term strategy development is described in Section 4 of this SIP.

11. Comprehensive Periodic Implementation Plan Revisions

40 CFR Section 51.308(f) requires states to revise their regional haze SIP and submit to EPA by July 31, 2021, July 31, 2028, and every ten years thereafter. In accordance with the requirements listed in Section 51.308(f) of the Regional Haze Rule, New York commits to revising and submitting this regional haze implementation plan by July 31, 2028 and every ten years thereafter as required.

In addition, 40 CFR Section 51.308(g) requires periodic reports on progress being made toward the RPG established for each mandatory Class I Federal area. These reports will be based on reasonable progress evaluations from states with mandatory Class I Federal areas to which New York sources are contributing to make sure New York and other states' adopted measures are adequate to make reasonable progress. New York further commits to submitting this report to the EPA halfway through each implementation period.

All requirements listed in 40 CFR Section 51.308(g) that apply to states that do not contain a mandatory Class I Federal area shall be addressed in the SIP revision for reasonable progress. The requirements listed in Section 51.308(g) include the following:

- Description of the implementation status;
- Summary of emission reductions achieved thus far;
- Assessments of changes in visibility conditions by states with mandatory Class I Federal areas at each mandatory Class I Federal area affected by sources in New York (current vs. baseline) based on five-year averages of annual values for 20 percent most impaired and 20 percent clearest days;
- Analysis of emission changes over the five-year period;
- Analysis of any significant anthropogenic emissions changes that have impeded progress within New York State;
- Assessment of the sufficiency of this implementation plan to meet RPGs;
- Assessment of New York's smoke management program including conclusions of how the program is meeting its goals.

New York commits to continue consulting with the FLMs on the implementation of Section 51.308 and this SIP, including development and review of SIP revisions and progress reports. Finally, New York commits to meet the required periodic updates of the emission inventory as required under 51.308(f)(6)(v).

12. Determination of the Adequacy of the Existing Plan

States are required to develop a progress report approximately five years after a regional haze SIP is due. The findings of the five-year progress report, which will be based on consultation with states that have mandatory Class I Federal areas to which New York sources contribute, as well as the FLMs and the EPA, will determine which action from 40 CFR Section 51.308(h) is appropriate and necessary.

List of Possible Actions for States that Do Not Have Mandatory Class I Federal Areas – 40 CFR Section 51.308(h)

1. If, after consultation with affected states with mandatory Class I Federal areas, FLMs and EPA, New York determines that its existing SIP requires no further substantive revision in order to achieve its share of the emission reductions needed to reach the established goals for visibility improvement and emissions reductions, the Administrator will be provided a negative declaration from New York that further revision of the existing SIP is not needed.

2. If a state with a mandatory Class I Federal area determines that the existing SIP is or may be inadequate to ensure reasonable progress due to emissions from sources in New York, New York will collaborate with the other state(s) through the regional planning process to develop additional strategies to address New York's SIP deficiencies as required.

Appendices

Due to size constraints, all appendices cannot be posted on the website. The appendices listed below are available online at the respective links or by request by contacting BAQP at dar.sips@dec.ny.gov.

Appendix A	Summary of Federal Land Manager Comments and Responses
Appendix B	Technical Guidance on Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program https://www.epa.gov/visibility/visibility-guidance-documents
Appendix C	Selection of States for MANE-VU Regional Consultation (2018) https://otcair.org/manevu/document.asp?fview=Reports
Appendix D	Technical Support Document for 2011 for the Northeastern U.S. Gamma Inventory https://marama.org/library/ (2011 Gamma Technical Support Documentation)
Appendix E	MANE-VU Regional Haze Consultation Report https://otcair.org/manevu/consultations.asp?fview=21 (MANE-VU RH Consultation Documentation)
Appendix F	PM2.5 and Regional Haze Air Quality Problems in the MANE-VU Region: A Conceptual Description https://www.nescaum.org/topics/regional-haze/regional-haze-documents
Appendix G	Technical Memorandum: Contribution Assessment Preliminary Inventory Analysis https://otcair.org/manevu/document.asp?fview=Reports (Memorandum: Four-Factor Data Collection)
Appendix H	Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Course of Action Within MANE-VU Toward Assuring Reasonable Progress for the Second Implementation Period (2018-2028) https://otcair.org/manevu/document.asp?fview=Formal%20Actions
Appendix I	Statement of the MANE-VU States Concerning a Course of Action in Contributing States Located Upwind of MANE-VU toward Assuring Reasonable Progress for the Second Regional Haze Implementation Period (2018-2028) https://otcair.org/manevu/document.asp?fview=Formal%20Actions
Appendix J	Technical Support Document on Agricultural and Forestry Smoke Management in the MANE-VU Region https://marama.org/library/

Appendix K	2016 MANE-VU Source Contribution Modeling Report-CALPUFF Modeling of Large Electrical Generating Units and Industrial Sources https://otcair.org/manevu/document.asp?fview=Reports
Appendix L	Regional Haze Metrics Trends and HYSPLIT Trajectory Analyses https://otcair.org/manevu/document.asp?fview=Reports
Appendix M	2016 Updates to the Assessment of Reasonable Progress for Regional Haze in MANE-VU Class I Areas https://marama.org/library/ (2016 Updates to 4-Factor Reasonable Progress Report)
Appendix N	Mid-Atlantic/Northeast U.S. Visibility Data 2004-2017 (2nd RH SIP Metrics) https://otcair.org/manevu/document.asp?fview=Reports (MANE-VU Visibility Trends 2004-2017 Report and Plots (2nd RH SIP Metrics))
Appendix O	MANE-VU Updated Q/d*C Contribution Assessment https://otcair.org/manevu/document.asp?fview=Reports (MANE-VU TSC – Updated QC over d Contribution Assessment)