DRAFT

Regional Haze Progress Report

for the

Second Planning Period

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Air Quality

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List of Acronyms

BART	Best Available Retrofit Technology
CAA	Clean Air Act
CAMPD	Clean Air Markets Program Data
CFR	Code of Federal Regulations
DNREC	Delaware Department of Natural Resources and Environmental Control
DSI	Dry Sorbent Injection
EGU	Electric Generating Unit
ESP	Electrostatic Precipitator
EPA	U.S. Environmental Protection Agency
FLM	Federal Land Manager
FR	Federal Register
HEDD	High Electric Demand Day
LB	Pound
LTS	Long Term Strategy
MANEVU	Mid-Atlantic/Northeast Visibility Union
MMBTU	Million British Thermal Units
MW	Megawatt
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NH_3	Ammonia
NOx	Nitrogen Oxides
O2	Oxygen
PM	Particulate Matter
PM_{10}	Particulate Matter < 10 microns
$PM_{2.5}$	Particulate Matter < 2.5 microns
PPM	Parts Per Million
RH	Regional Haze
RHR	Regional Haze Rule
RPG	Reasonable Progress Goal
RPO	Regional Planning Organization
SIP	State Implementation Plan
SMP	Smoke Management Program
SO_2	Sulfur Dioxide
TPY	Tons Per Year
VOC	Volatile Organic Compounds
WI	Water Injection

1.0 Introduction

Section 169A of the Clean Air Act (CAA) "declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution." Mandatory class I Federal areas (referenced hereinafter as Class I areas) consist of National Parks greater than 6,000 acres, wilderness areas & national memorial parks greater than 5,000 acres, and international parks, all of which were in existence as of August 7, 1977. Visibility was found to be an important value at 156 of these areas.

The CAA directed the U.S. Environmental Protection Agency (EPA) to promulgate regulations aimed at meeting the goals of Section 169A. To this end, EPA originally finalized the Regional Haze Rule (RHR) in 1999.[1] The RHR was amended and revised in 2005 and 2017 and is codified under 40 Code of Federal Regulations (CFR) 51.300-309. The overarching goal of the RHR is to achieve natural visibility conditions at Class I areas by 2064.

The RHR requires states to submit two types of regional haze planning documents: regional haze state implementation plans (SIPs), each of which covers a 10-year planning period, and progress reports, which are typically submitted at the mid-point of each planning period (although noting that Regional Haze SIPs themselves must include the required information such that they also serve as progress reports; the mid-course progress reports, such as this one, are their own stand-alone documents).

This document is intended to fulfill the requirements of paragraphs 51.308(g), (h), and (i) of the RHR and to serve as a progress report for the second regional haze planning period, which covers the period from 2018 to 2028. Delaware's Regional Haze SIP for the second planning period (2018 RH SIP) was proposed for approval by EPA on August 19, 2024 [89 Federal Register (FR) 67018)[2]].

Delaware has consulted with the Federal Land Manager (FLM) on the contents of this progress report and has made it available for public review prior to this submittal to EPA. However, per revisions made to the RHR in 2017 (82 FR 3078)[3], this progress report is not required to be submitted as a formal SIP revision.

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[1] Regional Haze Regulation. EPA Final Rule. 64 FR 35714. July 1, 1999. https://www.govinfo.gov/content/pkg/FR-1999-07-01/pdf/99-13941.pdf

[2] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Regional Haze State Implementation Plan for the Second Implementation Period. EPA Proposed Rule. 89 FR 67018. August 19, 2024. https://www.govinfo.gov/content/pkg/FR-2024-08-19/pdf/2024-18174.pdf

[3] Protection of Visibility: Amendments to Requirements for State Plans. EPA Final Rule 82 FR 3078. January 10, 2017. https://www.govinfo.gov/content/pkg/FR-2017-01-10/pdf/2017-00268.pdf

Delaware is a member of the Mid-Atlantic/Northeast Visibility Union (MANEVU). MANEVU's voting membership includes 11 states, the District of Columbia, and two tribal nations: Penobscot Indian Nation and the St. Regis Mohawk Tribe. Additional MANEVU members include EPA, the U.S. Fish and Wildlife Service (F&W), the U.S. Forest Service (FS), and the U.S. National Park Service (NPS). There are seven Class I areas within the MANEVU region. The MANEVU Class I areas are listed below along with the state/province in which they are located. The names in parentheses indicate the larger area in which the Class I area is embedded.

- Acadia National Park, Maine
- Moosehorn Wilderness Area, Maine (Moosehorn National Wildlife Refuge)
- Roosevelt/Campobello International Park, New Brunswick Canada
- Great Gulf Wilderness Area, New Hampshire (White Mountain National Forest)
- Presidential Range - Dry River Wilderness Area, New Hampshire (White Mountain National Forest)
- Brigantine Wilderness Area, New Jersey (E.B. Forsythe National Wildlife Refuge)
- Lye Brook Wilderness, Vermont (Green Mountain National Forest)

A map of the MANEVU region, including the Class I areas within, is provided in Figure 1-1. MANEVU provides technical assistance, facilitates discussion, and encourages coordinated action among its member agencies. It also fosters communication with other regional planning organizations (RPOs) that are engaged in planning activities related to regional haze. These RPOs are shown in Figure 1-2.

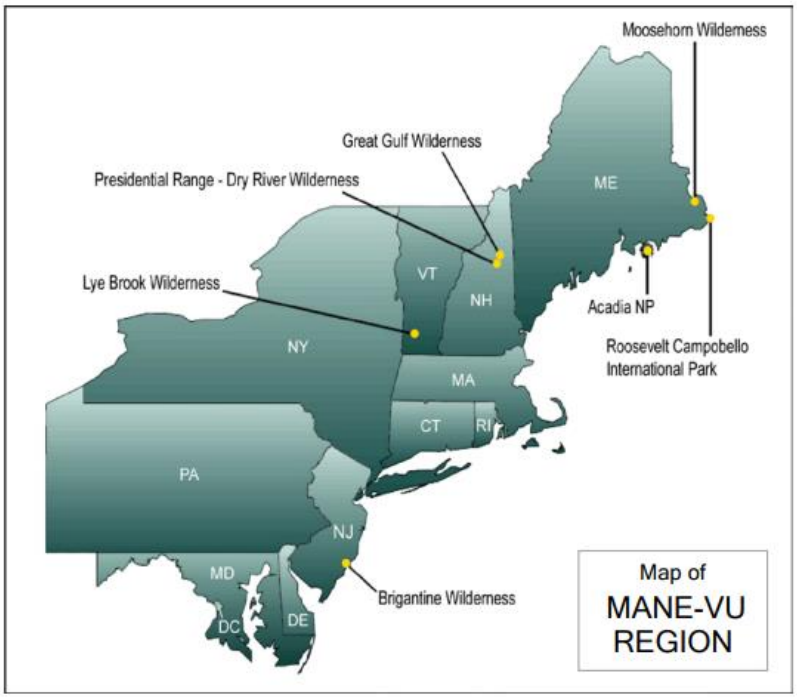


Figure 1-1: MANEVU Region and MANEVU Class I Areas

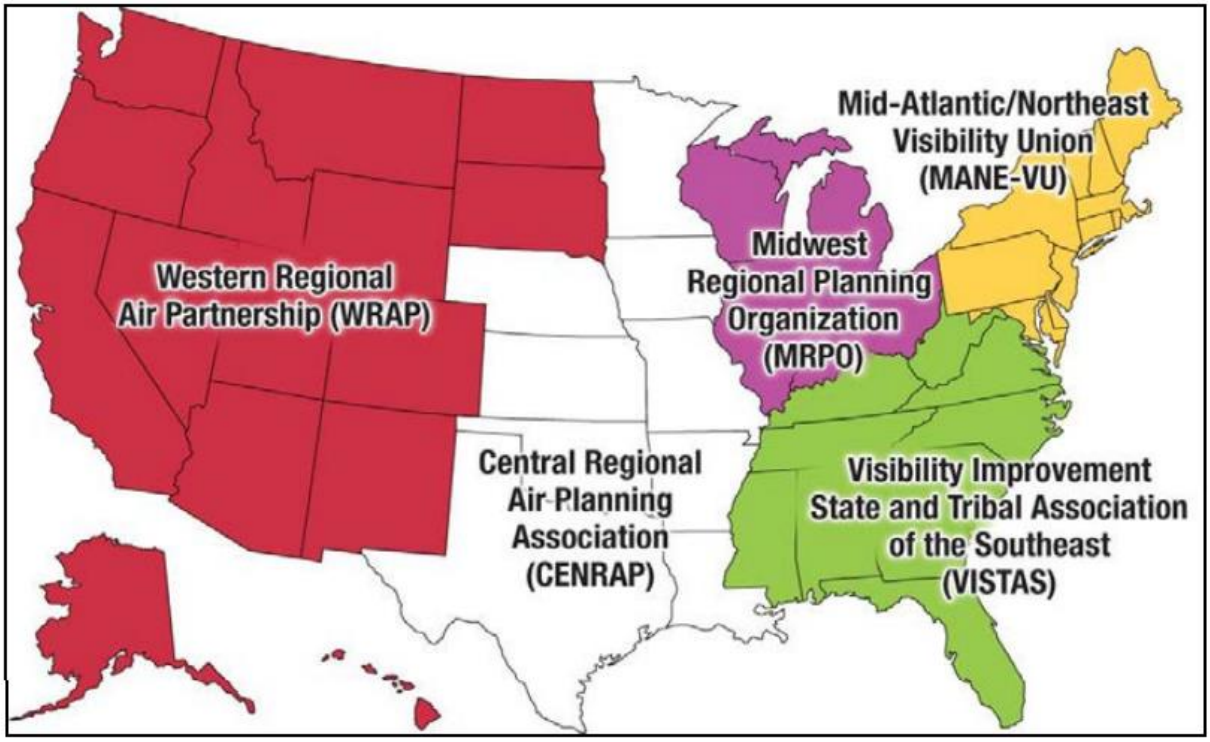


Figure 1-2: U.S. Regional Planning Organizations

The remainder of this document is organized to follow the structure of the progress report requirements of the RHR, as shown in Table 1-1 below.

Table 1-1: Organization of Progress Report

40 CFR 51.308	Report Section	Description
(g)(1)	2.0	Implementation status of measures for achieving Reasonable Progress Goals (RPGs) at Class I areas within and outside the state
(g)(2)	3.0	Overview of the emissions reductions achieved with the measures described in Section 2.0
(g)(3)	4.0	Summary of visibility conditions changes at Class I areas in the state and the MANEVU region
(g)(4)	5.0	Change in emissions since the time of the second planning period Regional Haze SIPs
(g)(5)	6.0	Evaluation of any significant changes in emissions since the time of the second planning period Regional Haze SIPs
(g)(6)	7.0	Assessment that Delaware's current plan elements and strategies are sufficient for Delaware, and states with Class I areas affected by Delaware's emissions, to meet the RPGs that were established in the second planning period Regional Haze SIPs
(g)(7)	Not Applicable	Review of visibility monitoring strategy for the first regional haze planning period (not applicable to the second regional haze planning period)
(g)(8)	8.0	Assessment of the most recent periodic assessment of a State’s smoke management program, if applicable
(h)	9.0	Affirmation that Delaware’s current plan is adequate to ensure reasonable progress and that no revision to the plan is needed at this time
(i)	10.0	A description of the consultation with the Federal Land Manager and the public comment process

2.0 Status of Implemented Measures

RHR 51.308(g)(1) requires "A description of the status of implementation of all measures included in the implementation plan for achieving reasonable progress goals for mandatory Class I Federal areas both within and outside the state."

A core component of the Regional Haze SIP is to develop a long-term strategy (LTS) that includes enforceable emissions limitations, compliance schedules, and other measures necessary to make reasonable progress in affected Class I areas. These measures and their original implementation are described in detail in Sections 8.6 and 10.7.1 of Delaware's 2018 RH SIP.[4] All these enforceable measures remain fully implemented and there has been no change in implementation status since the time that Delaware's 2018 RH SIP was submitted to EPA in August of 2022. The current implementation of these measures is described below.

2.1 Status of Continuing Control Measures from the Second Implementation Period

In its 2018 RH SIP, Delaware determined that the following measures were necessary for making reasonable progress.

2.1.1 Delaware Regulations

Delaware-specific regulations are codified in Delaware's Administrative Code, 7 **DE Admin. Code** – Natural Resources and Environmental Control and will be referred to below by Regulation number, i.e. Regulation 1108. For more information about each of these regulations, see Section 8.6 of Delaware's 2018 RH SIP:

- Regulation 1108, *Sulfur Dioxide Emissions from Fuel Burning Equipment* (Low sulfur fuel oil standard); Sulfur Dioxide (SO_2) emission control
- Regulation 1124, Section 46.0, *Crude Oil Lightering Operations*; Volatile Organic Compounds (VOC) emission control
- Regulation 1124, Section 11.0, *Mobile Equipment Repair and Refinishing*, VOC emission control
- Regulation 1124, Section 33.0, *Solvent Cleaning and Drying*; VOC emissions control
- Regulation 1124, Section 36.0, *Stage II Vapor Recovery*; VOC emission control
- Regulation 1141, Section 3.0, *Portable Fuel Containers*; VOC emission control
- Regulation 1142, Section 2.0, *Control of NOx Emissions from Industrial Boilers and Process Heaters at Petroleum Refineries*; Nitrogen Oxides (NOx) emission control
- Regulation 1144, *Control of Stationary Generator Emissions*; SO_2, Particulate Matter (PM), VOC, and NOx emissions control

[4] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Regional Haze State Implementation Plan for the Second Implementation Period. EPA Proposed Rule. 89 FR 67018. August 19, 2024. https://www.govinfo.gov/content/pkg/FR-2024-08-19/pdf/2024-18174.pdf

- Regulation 1146, *Electric Generating Unit (EGU) Multi-Pollutant Regulation*; SO_2 and NO_x emission control
- Regulation 1148, *Control of Stationary Combustion Turbine Electric Generating Unit Emissions*; NOx emission control

2.1.2 Facility and Unit Shutdowns

RHR 51.308(f)(2)(iv)(C) requires States to consider source retirement and replacement schedules in developing its LTS.

- Facility and Unit shutdowns information
  - Delaware's Regional Haze SIP for the first planning period (2008 RH SIP)[5] - Appendix 9-8
  - Delaware's 2018 RH SIP - Section 8.8, [6]
    - McKee Run - McKee Run Unit 3 was primarily operated as a residual oil-fired EGU. On June 10, 2021 the City of Dover informed Delaware that the fuel sources at the facility had been disconnected. The permits for McKee Run were cancelled on November 12, 2021.

2.1.3 MANEVU "Asks"

According to the federal RHR (51.308 (f)(2)(ii) through (iv)), all states must consider, in their Regional Haze SIPs, the emission management strategies identified by other States for their sources as being necessary to make reasonable progress in any Class I area. These emission management strategies are referred to as "Asks." In its 2018 RH SIP, Delaware evaluated six individual MANEVU Asks, as described in Section 10.0 of the SIP document. Delaware implemented new control measures as a result of two of the MANEVU Asks, as detailed below in Sections 2.1.3.1 and 2.1.3.2.

[5] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Regional Haze State Implementation Plan. EPA Final Rule. 76 FR 42557. July 19, 2011. https://www.govinfo.gov/content/pkg/FR-2011-07-19/pdf/2011-17867.pdf

[6] It should be noted that Delaware included information in its Regional Haze SIP for the second implementation period regarding the expected future shutdown of Indian River Generating Station (See Section 8.8). At the time of submittal of the second SIP, this facility was still operating. Therefore, the potential shutdown was not relied upon to make reasonable further progress. As of the development of this progress report, Indian River Generating Station is still in operation.

2.1.3.1 MANEVU Ask #3

MANEVU Ask #3 is summarized below:

> *"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 [parts per million] ppm),*
>
> *b. #4 residual oil within a range of 0.25 to 0.5% sulfur by weight, and*
>
> *c. #6 residual oil within a range of 0.3 to 0.5% sulfur by weight."*

In 2013 Delaware adopted a new low-sulfur fuel regulation which went into effect July 1, 2016. The old and new limits for fuel sulfur content in Delaware are shown in Table 2-1:

Table 2-1: 7 DE Admin. Code 1108 (low-sulfur fuel regulation) – Old vs. New Sulfur Limits/Effective Dates

Fuel Type	Pre-Regulation limits	New Regulation Limits (ppm)	Effective Date
No. 2 and Lighter	3,000	15	July, 2016
No. 4	10,000	5,000	July, 2016
No. 5 and No. 6	10,000	5,000	July, 2016

2.1.3.2 MANEVU Ask #5

MANEVU Ask #5 is summarized below:

> *"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) by:*
>
> *a. Striving to meet NOx emissions standard of no greater than 25 ppm at 15% [Oxygen] (O_2) for natural gas and 42 ppm at 15% O_2 for fuel oil but at a minimum meet 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 HEDD.*

HEDD 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. Peaking combustion turbine is defined for the purposes of this "Ask" as a turbine capable of generating 15 [Mega Watt] (MW) 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;"

Delaware identified three Calpine Mid-Atlantic Generation LLC facilities for which additional controls were technologically and economically feasible (See Delaware's 2nd Regional Haze SIP, Section 10.5):

- Christiana Energy Center – Units 11 and 14
- West Energy Center – Unit 10
- Delaware Energy Center – Unit 10

The turbines at these facilities use a Water Injection (WI) system as a NOx control device. In accordance with Regulation 1148, *Control of Stationary Combustion Turbine Electric Generating Unit Emissions,* the current permit limit is 88 ppm, during the ozone season of May-September. In order to meet this limit, the turbines must use the WI system. Through the development of the 2018 RH SIP, it was determined by Delaware that additional WI was feasible during the two months adjacent to the ozone season - April and October. Therefore, the Department revised the permits for these three facilities, to require the use of WI and add an 88 ppm limit for the months of April and October for the turbines. Starting in 2021, Calpine started using WI in April through October. The new permits were submitted to be included in Delaware's SIP on May 28, 2024.

2.2 Status of Continuing Control Measures from the First Implementation Period

This section includes updated information pertaining to the status of Delaware's Best Available Retrofit Technology (BART) sources. In the 2008 RH SIP, Delaware identified four EGUs located in Delaware that satisfied the size, type, and age criteria for BART eligibility. Detailed information about the units is shown in Table 2-2.

Table 2-2: Delaware BART-subject EGUs

Facility	Unit	Nameplate Rating (MW)	Boiler Type	Primary Fuel	Date of Commercial Operation	Heat Input Capacity (MMBTU/hr)
Edge Moor	4	177	Tangentially-fired	Bituminous Coal	4/1/1966	1867
Edge Moor	5	446	Dry bottom wall-fired	Residual Fuel Oil	8/1/1973	4695
Indian River	3	177	Dry bottom wall-fired	Bituminous Coal	6/1/1970	1904
McKee Run	3	114	Dry bottom wall-fired	Residual Fuel Oil	9/1/1975	1180

2.2.1 BART - Sulfur Dioxide and Oxides of Nitrogen

In the 2008 RH SIP, Delaware provided a detailed discussion of its development of 7 **DE Admin. Code** 1146, a non-trading emissions control regulation for EGUs that was established primarily as a measure to aid in the attainment of the ozone and fine particulate matter ambient air quality standards, and to reduce emissions of the neurotoxin mercury (see Section 8.4.1). Delaware demonstrated that Regulation 1146 was superior to a unit-by-unit BART analysis with regards to SO_2 and NOx emissions control for EGUs and included Regulation 1146 in the Regional Haze SIP as an alternative measure to BART (presumptive BART) for SO_2 and NOx under 40 CFR 51.308(e)(2)(i).

Regulation 1146 provides for stringent control of EGU NOx and SO_2 emissions by implementation of unit-specific annual NOx and SO_2 mass emissions caps and short term (rolling 24-hour) NOx and SO_2 emission rate limits pounds per million British Thermal Units (lb/MMBTU). The SO_2 and NOx emissions limitations of Regulation 1146, have served to significantly reduce the SO_2 and NOx emissions from Delaware's subject EGUs. More details on the analysis can be found in Delaware's 2008 RH SIP, Section 8.4.1. Delaware's EGUs that were subject to Regulation 1146 are shown in Table 2-3.

Table 2-3: Delaware's EGUs Subject to 7 DE Admin. Code 1146

Facility	Unit	Nameplate Rating (MW)	Initial Year of Operation	Primary Fuel on September 25, 2008	Heat Input Rating (MMBTU/hr)
Edge Moor	3	75	1954	Bituminous Coal	1117
Edge Moor	4	177	1966	Bituminous Coal	1867
Edge Moor	5	446	1973	Residual Fuel Oil	4695
Indian River	1	82	1957	Bituminous Coal	1090
Indian River	2	82	1959	Bituminous Coal	1186
Indian River	3	177	1970	Bituminous Coal	1904
Indian River	4	442	1980	Bituminous Coal	5091
McKee Run	3	114	1975	Residual Fuel Oil	1180

Subsequent to the promulgation of Regulation 1146, subject sources utilized a variety of methods to achieve significant SO_2 and NOx reductions. These emissions reduction methods included installation of controls, fuel switches, and acceptance of operating restrictions. The following Sections (2.2.1.1 – 2.2.1.8) describe SO_2 and NOx emissions reduction methodologies associated with the sources that were subject to Regulation 1146 and the current status of the facilities.

2.2.1.1 Edge Moor Unit 3

Prior to mid-2010, Edge Moor Unit 3 was primarily a coal-fired EGU. Subsequent to promulgation of Regulation 1146, this unit has taken permit (permit AQM-003/00007) conditions to convert from utilizing coal as the unit's primary fuel with residual fuel-oil as a secondary fuel, to currently having the option to use natural gas as the primary fuel with No. 2, No. 6, Landfill Gas, Digester Gas, and re-refined oil as secondary fuels.

2.2.1.2 Edge Moor Unit 4

Prior to mid-2010, Edge Moor Unit 4 was primarily a coal-fired EGU. Subsequent to promulgation of Regulation 1146, this unit has taken permit (permit AQM-003/00007) conditions to convert from utilizing coal as the primary fuel with residual fuel-oil as a secondary fuel, to currently having the option to use natural gas as the primary fuel with No. 2, No. 6, Landfill Gas, Digester Gas, and re-refined oil as secondary fuels.

2.2.1.3 Edge Moor Unit 5

Prior to mid- 2010, Edge Moor Unit 5, previously used residual fuel oil as primary fuel and natural gas as a secondary fuel; as of mid-2010 the Calpine has the option to use natural gas as the primary fuel with No. 2, No. 6, Landfill Gas, Digester Gas, and re-refined oil as secondary fuels.

2.2.1.4 Indian River Unit 1

Indian River Unit 1, a coal-fired unit, was shutdown in April of 2011.

2.2.1.5 Indian River Unit 2

Indian River Unit 2, a coal-fired unit, was shutdown in April of 2010.

2.2.1.6 Indian River Unit 3

Indian River Unit 3, a coal-fired unit, was shutdown in December 2013.

2.2.1.7 Indian River Unit 4

Indian River Unit 4 is a coal-fired EGU. The unit has installed NOx controls selective catalytic reduction and SO_2 controls flue-gas desulfurization. These controls became operational in December 2011.

2.2.1.8 McKee Run Unit 3

McKee Run Unit 3 was primarily a residual oil-fired EGU. On June 10, 2021 the City of Dover informed Delaware that the fuel sources at the facility had been disconnected. The permits for McKee Run were cancelled on November 12, 2021.

2.2.2 BART - Particulate Matter

As documented in the 2008 RH SIP, Section 8.4.2, the owner/operator of Delaware's three BART eligible EGUs (Edge Moor, Indian River, and McKee Run) were requested to conduct BART determinations using the 5-factor analysis for PM:
(1) Cost of compliance,
(2) The energy and non-air quality environmental impacts of compliance,
(3) Pollution control equipment in use at the source,
(4) The remaining useful life of the source, and
(5) The degree of improvement in visibility which may reasonably be anticipated to result from use of the technology.

For each of those three BART eligible EGUs, the following sections discuss the status of the implementation of PM BART for the respective BART eligible EGUs.

2.2.2.1 Edge Moor Unit 4

Prior to mid- 2010, Edge Moor Unit 4 utilized bituminous coal as its primary fuel, with No. 6 fuel oil and natural gas as secondary fuels, and included a cold side precipitator for particulate emissions control. Edge Moor Unit 4's owner/operator, Conectiv, identified the technologically feasible options for Edge Moor Unit 4 to include the existing electrostatic precipitator (ESP) and the addition of a dry sorbent injection (DSI) system, and an ESP/DSI combination to include a downstream baghouse.

In 2010, the Edge Moor facility was purchased by Calpine Mid-Atlantic Generation (Calpine). Calpine subsequently made the decision to convert Edge Moor Unit 4 from utilizing coal as the primary fuel to utilizing pipeline natural gas as the primary fuel. Calpine currently has the option to use natural gas as the primary fuel with No. 2, No. 6, Landfill Gas, Digester Gas, and re-refined oil as secondary fuels.

Relative to a pulverized coal-fueled steam generator utilizing an ESP, AP-42 emissions factors estimate an approximate 90% reduction in particulate emissions when firing pipeline natural gas. Therefore, Delaware has determined that the conversion of Edge Moor Unit 4 to pipeline natural gas primary fuel meets the requirements for PM BART for Edge Moor Unit 4.

2.2.2.2 Edge Moor Unit 5

Prior to mid-2010, Edge Moor Unit 5 used residual fuel oil as primary fuel and natural gas as a secondary fuel. Conectiv identified no technologically feasible options for Edge Moor Unit 5 except the use of a lower sulfur (0.5% sulfur) residual fuel oil.

Calpine currently has the option to use natural gas as the primary fuel with No. 2, No. 6, Landfill Gas, Digester Gas, and re-refined oil as secondary fuels. The restriction to accept only residual fuel oils with a sulfur content of 0.5% or less has been incorporated into Edge Moor Unit 5's operating permit (permit AQM-003/00007). The Title V permit for Edge Moor was most recently revised on August 2, 2017, establishing a particulate matter less than 10 microns (PM_{10}) emission rate for Unit 5 of 0.2 lb/MMBTU, maximum 2-hour average. Therefore, Edge Moor Unit 5 is in compliance with the particulate matter BART for the unit identified in Delaware's Regional 2008 RH SIP and permit conditions serve to help ensure continued compliance.

2.2.2.3 Indian River Unit 3

Indian River Unit 3, a coal-fired unit, was shutdown in December 2013.

2.2.2.4 McKee Run Unit 3

On June 10, 2021 the City of Dover informed Delaware that the fuel sources at the facility had been disconnected. The permits for McKee Run were cancelled on November 12, 2021.

3.0 Emissions Reductions Achieved

RHR paragraph 51.308(g)(2) requires "A summary of the emissions reductions achieved throughout the state through the implementation of the measures described in paragraph (g)(1) of this section." Therefore, this section of the progress report gives a description of some of the emissions reductions associated with the measures described above in Section 2.0.

3.1 Low Sulfur fuel oil standard

Table 3-1 below compares past and recent SO_2 emissions associated with the combustion of fuel oils in Delaware and the MANEVU region. The emissions data are taken from the 2017 and 2020 National Emissions Inventories (NEI).[7]

The 2017 NEI represents the most recent data that was available at the time that the second planning period Regional Haze SIPs were being drafted. Many states and jurisdictions had not adopted low sulfur fuel oil standards at the time that the 2017 NEI was compiled. As detailed in Section 2.1.3.1 above, in 2013 Delaware adopted a new low-sulfur fuel regulation, Regulation 1108, which went into effect July 1, 2016.

The 2020 NEI is reflective of all MANEVU states and jurisdictions having adopted the low sulfur fuel oil standards as was requested of all MANEVU jurisdictions in the MANEVU Intra-RPO "Ask".[8]

Table 3-1: 2017 and 2020 Fuel Oil SO_2 Emissions in Delaware and the MANEVU Region (Tons)

	Delaware			MANEVU Total		
Sector	**2017**	**2020**	**Difference**	**2017**	**2020**	**Difference**
Electric Generation	4	16	12	9,395	6,804	-2,591
Industrial	42	2	-40	3,769	2,142	-1,627
Commercial/Institutional	44	3	-41	3,995	1,847	-2,148
Residential	8	1	-7	9,805	215	-9,590
Total	**98**	**22**	**-76**	**26,964**	**11,008**	**-15,956**

In general, SO_2 emissions from fuel oil combustion in Delaware and in the MANEVU region are lower for 2020 than for 2017. This is likely due in large part to the enforceable MANEVU-wide adoption of the low sulfur fuel standards; but economics, supply availability, and market forces likely also contribute to the differences.

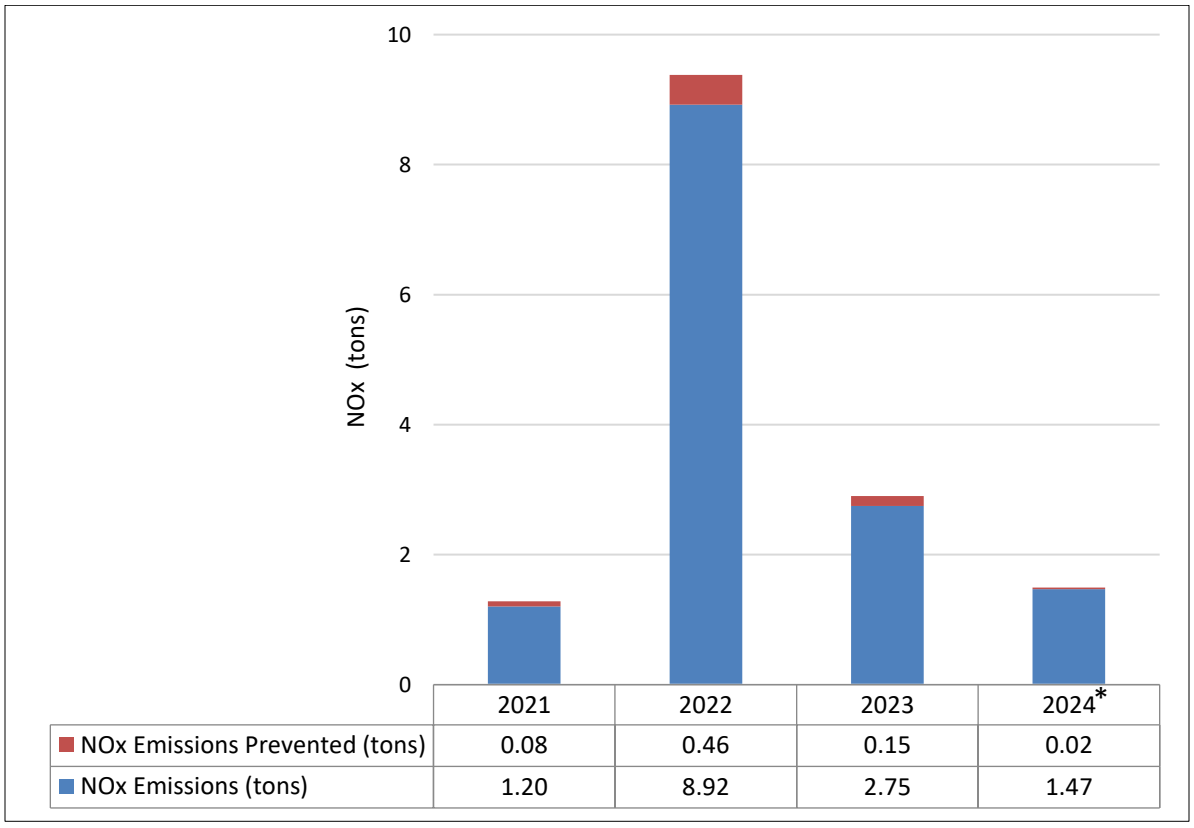
[7] National Emissions Inventories. EPA Website. https://www.epa.gov/air-emissions-inventories/emissions-inventory-system-eis-gateway

[8] Statement of MANEVU States Concerning a Course of Action Within MANEVU Toward Assuring Reasonable Progress for the Second Regional Haze Implementation Period. MANEVU Statement. August 25, 2017. https://otcair.org/manevu/Upload/Publication/Formal%20Actions/MANE-VU%20Intra-Regional%20Ask%20Final%208-25-2017.pdf

3.2 Year-round Operation of NOx controls (Ask #1) and Peaking Combustion Turbines on High Electric Demand Days (HEDD) (Ask #5)

As detailed in Section 2.1.3.2 above, Calpine implemented an additional two months of WI adjacent to the ozone season; at three of its Title V facilities: Christiana (Units 11 and 14), West (Unit 10), and Delaware City (Unit 10) Energy Centers. Extending the use of the WI system to April and October increases the control of NOx emissions for the turbines during those months.

Annual NOx emissions for the four Calpine turbines are shown in Figure 3-1 below beginning with 2021 (when the facility started the new controls); for the two months that WI was added, August and October. Figure 3-1 shows both the total NOx emissions from all four turbines for April and October, and the total NOx emissions prevented by using WI during those months. It should be noted that the emissions data for 2022 – 2024 is preliminary[9] (as of the development of this progress report) as the data has not yet been reviewed and approved by EPA.



	2021	2022	2023	2024*
NOx Emissions Prevented (tons)	0.08	0.46	0.15	0.02
NOx Emissions (tons)	1.20	8.92	2.75	1.47

*As of the date of development of this draft progress report, October 2024 data was not yet available.

Figure 3-1: NOx Emissions Prevented for Calpine Turbines (April and October) – MANEVU Ask #5, 2021 to 2024 (Tons)

[9] Emissions data for 2022-2024 has been reported to Delaware through its State and Local Emissions Inventory system (2022 and 2023) and Semi-Annual Title V reports (April of 2024 data). While it is still preliminary, it is being presented in this report to show the most current estimated emissions reductions from the recent implementation of Water Injection NOx controls at the facilities.

3.3 BART

Table 3-2 and Figure 3-2 show the total annual SO_2 and NOx mass emissions from EGUs subject to 7 **DE Admin. Code** 1146 (Delaware's presumptive BART, as described in Section 2.2). The data was taken from the EPA's Clean Air Market Program Data (CAMPD) and includes the baseline year 2002 through calendar year 2023, the last calendar year with full year data available in the EPA's CAMPD at the time of preparation of this document.

Table 3-2: Delaware CAMPD SO_2 and NOx Emissions 2002-2023

Year	Annual SO_2 (tons)	Annual NOx (tons)
2002	31,183	8,143
2003	36,998	9,492
2004	34,475	9,495
2005	30,482	10,419
2006	28,738	8,675
2007	32,778	9,714
2008	31,785	8,587
2009	16,524	3,803
2010	14,485	3,911
2011	9,278	2,731
2012	2,644	1,248
2013	2,170	976
2014	765	701
2015	769	487
2016	492	541
2017	524	266
2018	625	312
2019	266	138
2020	296	524
2021	663	708
2022	478	745
2023	170	583

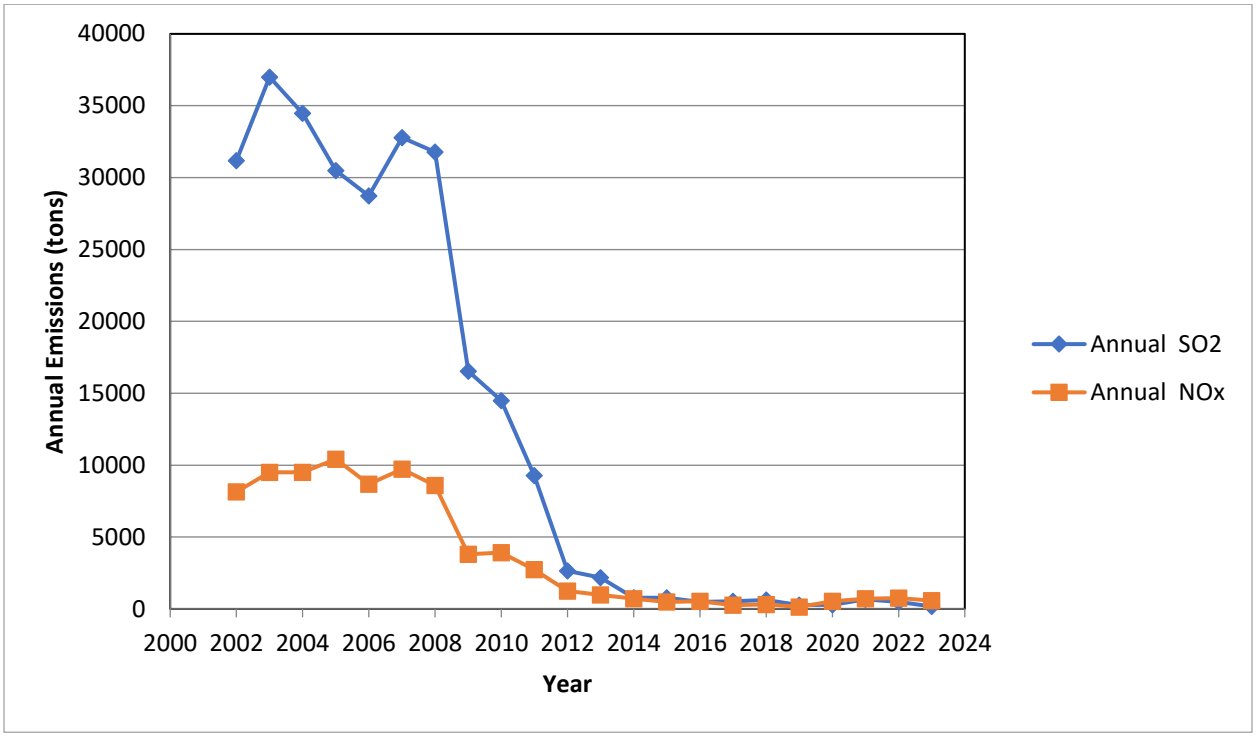


Figure 3-2: Delaware CAMPD SO_2 and NOx Emissions 2002-2023

4.0 Visibility Conditions and Changes

Per RHR paragraph 51.308(g)(3), states with Class I areas must assess the visibility conditions and changes of visibility conditions. Delaware does not have any Class I areas, therefore it will not address these requirements in this report. Information regarding the progress being made toward improving visibility in the MANE-VU Region can be found in the *Mid-Atlantic/Northeast U.S Visibility Data 2004-2022 (2nd RH Metrics)* (August 13, 2024).[10]

[10] Mid-Atlantic Northeast U.S Visibility Data. Second Regional Haze SIP Metrics. Final Report. MANEVU. August 13, 2024.
https://otcair.org/manevuUpload/Publication/Reports/MV_Visibility_2022_Metrics_Report_FINAL.pdf

5.0 Change in Emissions

RHR paragraph 51.308(g)(4) requires an analysis tracking the change in emissions of pollutants contributing to visibility impairment from all sources in the state. The emissions changes should be identified by source type or activity. The emissions analysis should cover the time frame since the previous Regional Haze SIP planning period. Paragraph 51.308(g)(4) has two distinct requirements that revolve around two separate sets of emissions inventory data as described below:

- Emissions from all sources and activities: The primary source of this data is the NEI, which is compiled and released on a triennial basis by the EPA. The NEI is made up of emissions estimates submitted by state, local, and tribal air agencies supplemented with EPA's own estimates. For the 51.308(g)(4) requirement, the analysis must extend at least through the most recent NEI year for which data is available six months prior to the required date of the progress report. The most recent NEI available six months prior to the due date of the second planning period progress reports (i.e., this submittal) is the 2020 NEI.[11] Information about the NEI can be found at https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei.

- Emissions from sources that report to a centralized EPA database: There are many individual emissions sources that are required to report their emissions directly to EPA because of their participation in an air quality program such as Cross-State Air Pollution Rule, the Acid Rain Program, and the Regional Greenhouse Gas Initiative, to name a few. Most of the sources that report in this manner are large stationary sources such as electric generating units (EGUs) and large industrial facilities. These data are readily obtainable through EPA's CAMPD at https://campd.epa.gov/. For purposes of 51.308(g)(4), the analysis must extend through the most recent year available six months prior to the required date of the progress report. Facilities are required to report emissions data to CAMPD on a quarterly bases, making 2023 the most recent year available.

The subsections below detail the change in emissions since the time of the second planning period Regional Haze SIPs for all emissions sources and CAMPD emissions sources respectively. The following visibility impairing pollutants are covered in the summaries:

- Ammonia (NH_3)
- NOx
- Particulate Matter < 10 microns (PM_{10})
- Particulate Matter < 2.5 microns ($PM_{2.5}$)
- SO_2
- VOC

[11] 2020 National Emissions Inventory (NEI) Data. EPA website. Accessed September 17, 2024. https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data

5.1 NEI Data

As described above, in Section 5.0, the source of this data is EPA's NEI. The most recent NEI available six months prior to the due date of the second planning period progress reports (i.e., this submittal) is the 2020 NEI.[12] The figures below compare emissions estimates from the 2020 NEI with those from the 2017 NEI, which was the most recently available NEI at the time of the 2018 RH SIP.[13] To provide a broader trend, emissions estimates from prior NEIs are also shown. Emissions estimates are provided for Delaware as well as the other MANEVU states. The state-specific charts (see Sections 5.1.1 – 5.1.6) are broken down into the following emissions source categories:

- Point sources represent large sources of emissions located at a discrete geographic point. Examples include power plants, factories, industries, and large institutional facilities. Point sources typically hold a federal/state/tribal/local air permit and report their emissions to the state/tribal/local air agency and/or EPA directly. For NOx and SO_2, the state-specific charts further divide point sources into those that report to CAMPD and those that do not.
- Nonpoint sources (also called area sources) are those that are too widespread or numerous to be accounted for individually. There are many nonpoint subcategories, but a handful of examples include residential fuel combustion, consumer solvent use, commercial cooking, animal husbandry, and agricultural tilling.
- Nonroad sources are equipment and vehicles that do not primarily travel on roadways. Examples include construction equipment, recreational vehicles, and lawn & garden equipment.
- Onroad sources are vehicles that primarily travel on roadways such as cars, trucks, buses, and motorcycles.

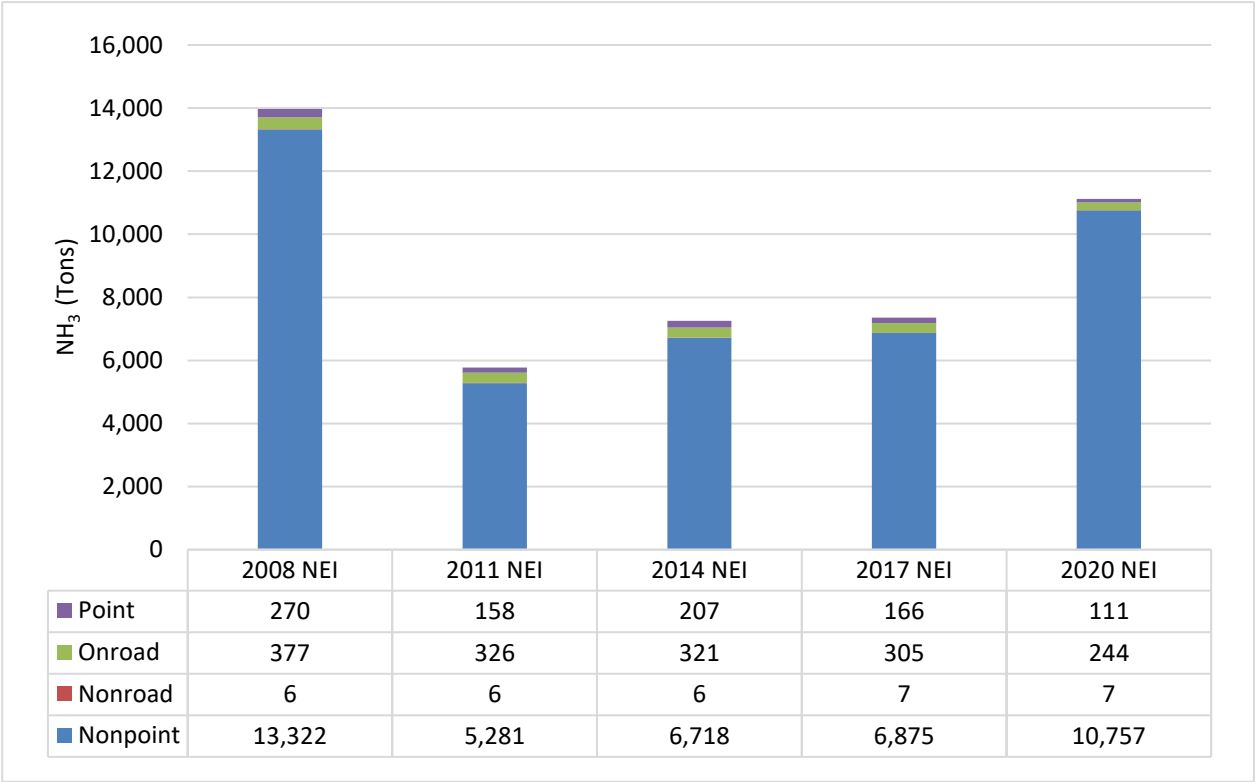
5.1.1 Ammonia

Ammonia emissions for Delaware and the MANEVU region are shown in Figures 5-1 and 5-2 below. Figure 5-1 shows NH_3 emissions for all data categories in Delaware. It should be noted that the decrease in Delaware's nonpoint NH_3 between the 2008 and 2011 inventories is due to changes in inventory estimation methodologies.

[12] As of the date of development of this draft progress report, the 2023 NEI is still under development. The 2023 NEI is expected to be finalized by EPA in March of 2026.

[13] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Regional Haze State Implementation Plan for the Second Implementation Period. EPA Proposed Rule. 89 FR 67018. August 19, 2024. https://www.govinfo.gov/content/pkg/FR-2024-08-19/pdf/2024-18174.pdf

While NH_3 emissions were stable between the 2014 and 2017 inventories, there was a slight increase in NH_3 emissions from 2011 to 2014. This increase is due to a change in methodology, the addition of NH_3 emissions from domestic and wild animals in 2014.[14] The increase in nonpoint NH_3 emissions from 2017 to 2020 is due to a change in methodology for animal husbandry. In 2020 Delaware switched from using its own animal husbandry emissions calculation methodology to using EPA's updated methodology.[15] Similar to Delaware, Figure 5-2 shows that NH_3 emissions in other MANEVU states have generally trended downward, with some of the same year-to-year variability.

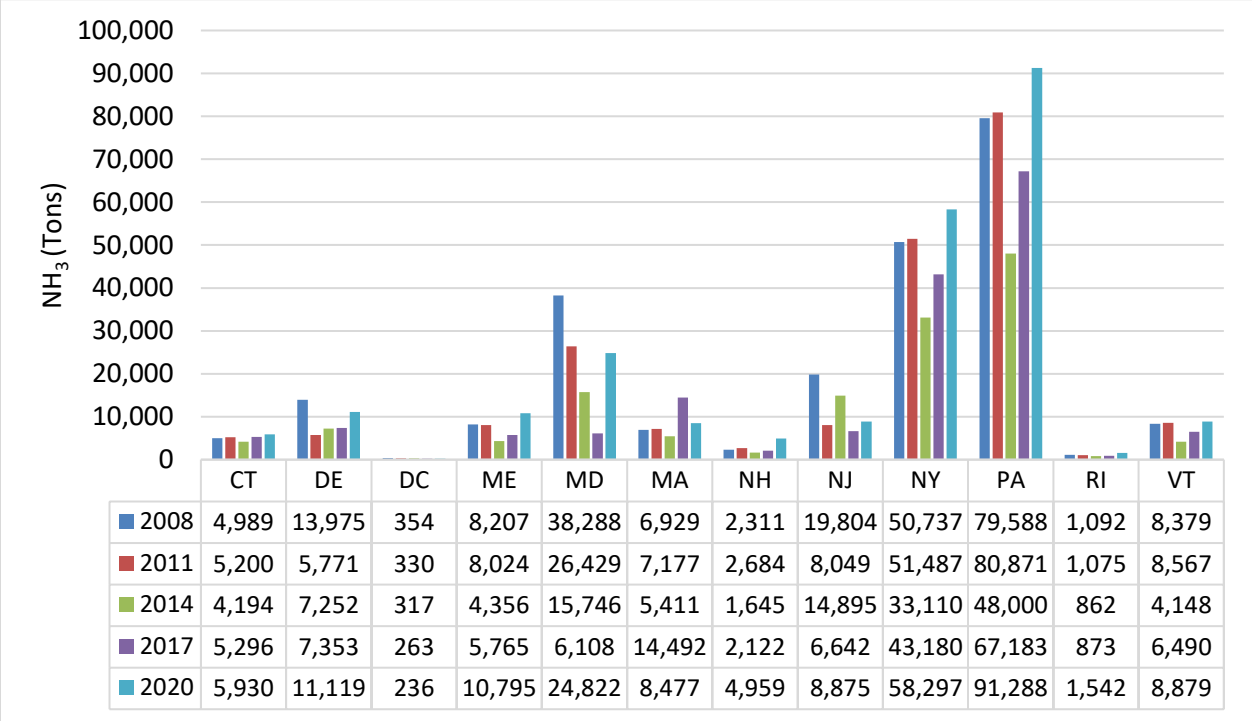


	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
Point	270	158	207	166	111
Onroad	377	326	321	305	244
Nonroad	6	6	6	7	7
Nonpoint	13,322	5,281	6,718	6,875	10,757

Figure 5-1: 2008 to 2020 NH_3 Emissions for Delaware (Tons)

[14] EPA 2014 National Emissions Inventory, version 2, Technical Support Document. July 2018. https://www.epa.gov/sites/default/files/2018-07/documents/nei2014v2_tsd_05jul2018.pdf

[15] 2020 National Emissions Inventory (NEI) Technical Support Document (TSD). EPA Final Document. Section 10. March 2023. https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-technical-support-document-tsd



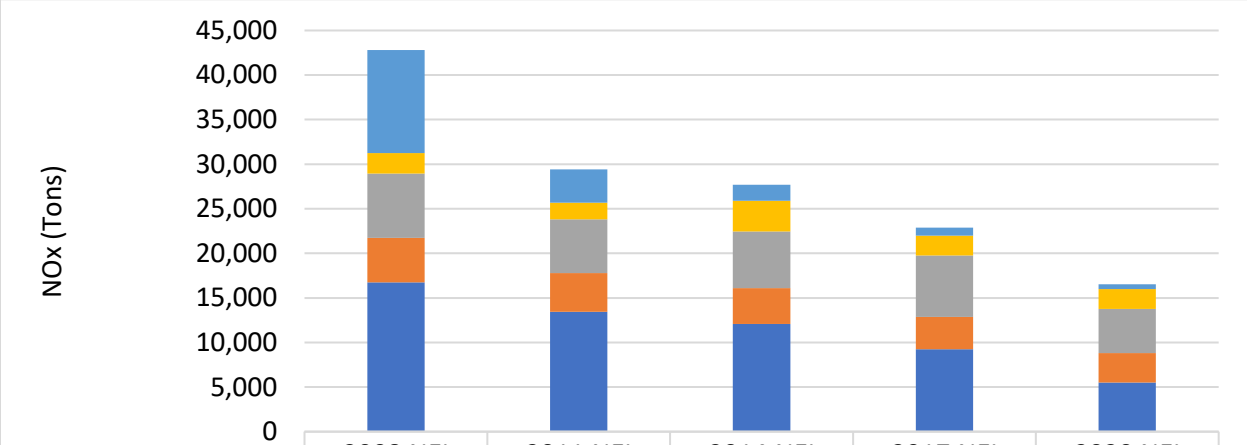
	CT	DE	DC	ME	MD	MA	NH	NJ	NY	PA	RI	VT
2008	4,989	13,975	354	8,207	38,288	6,929	2,311	19,804	50,737	79,588	1,092	8,379
2011	5,200	5,771	330	8,024	26,429	7,177	2,684	8,049	51,487	80,871	1,075	8,567
2014	4,194	7,252	317	4,356	15,746	5,411	1,645	14,895	33,110	48,000	862	4,148
2017	5,296	7,353	263	5,765	6,108	14,492	2,122	6,642	43,180	67,183	873	6,490
2020	5,930	11,119	236	10,795	24,822	8,477	4,959	8,875	58,297	91,288	1,542	8,879

Figure 5-2: 2008 to 2020 NH_3 Emissions for MANEVU (Tons)

5.1.2 Nitrogen Oxides

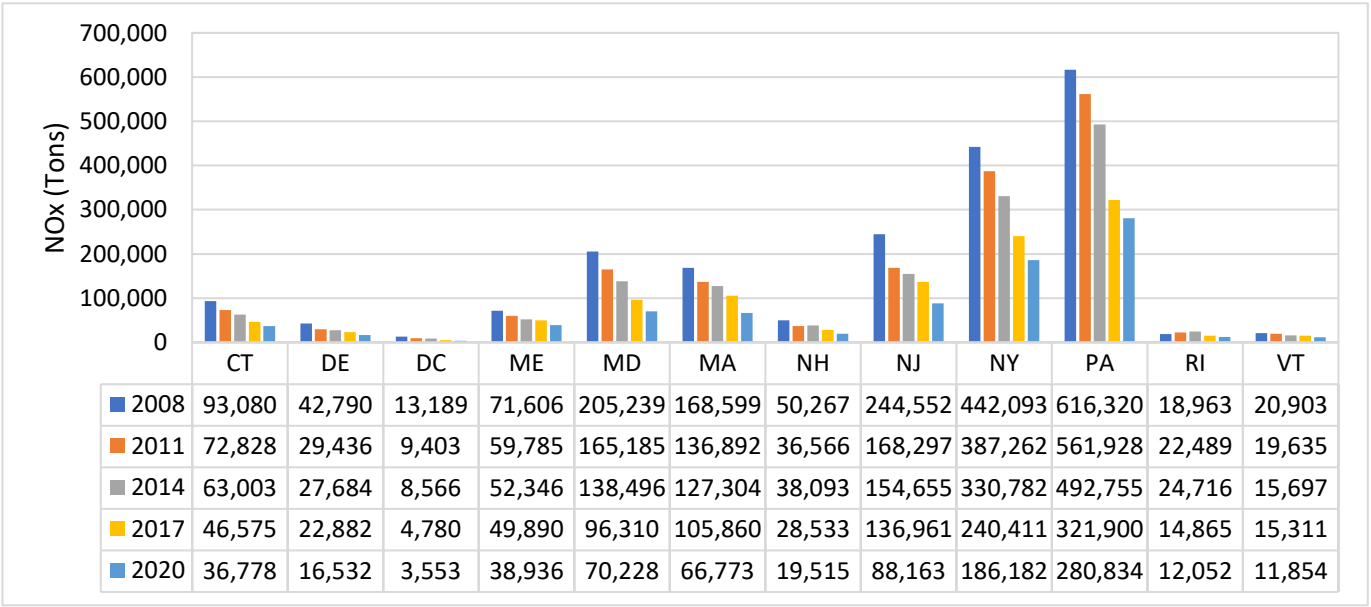
Figures 5-3 and 5-4 below show NOx emissions in Delaware and the MANEVU region respectively. Note that Figure 5-3 breaks point sources further down into CAMPD and non-CAMPD sources.

NOx emissions in Delaware are primarily dominated by the onroad mobile category, followed by the nonpoint category. There has been a steep decline in onroad mobile NOx emissions due to Federal and State control programs for diesel and gasoline vehicles. Onroad emissions decline as older, more polluting vehicles are retired and newer, cleaner vehicles are phased into the fleet. Some of the year-to-year variability in the NOx emission trends are due to updated models and methodologies for estimating nonpoint and onroad emissions. Point source NOx emissions have also declined due to the permanent and enforceable measures described earlier in Sections 2.0 and 3.0 as well as other state and federal programs aimed at maintaining the ozone National Ambient Air Quality Standards (NAAQS). Figure 5-4 shows that NOx emissions have declined sharply in other MANEVU states as well.



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
CAMPD Point	11,545	3,748	1,791	889	524
Non-CAMPD Point	2,304	1,876	3,424	2,246	2,242
Nonpoint	7,204	6,024	6,383	6,881	4,968
Nonroad	4,972	4,347	4,020	3,623	3,293
Onroad	16,765	13,441	12,066	9,243	5,505

Figure 5-3: 2008 to 2020 NOx Emissions for Delaware (Tons)

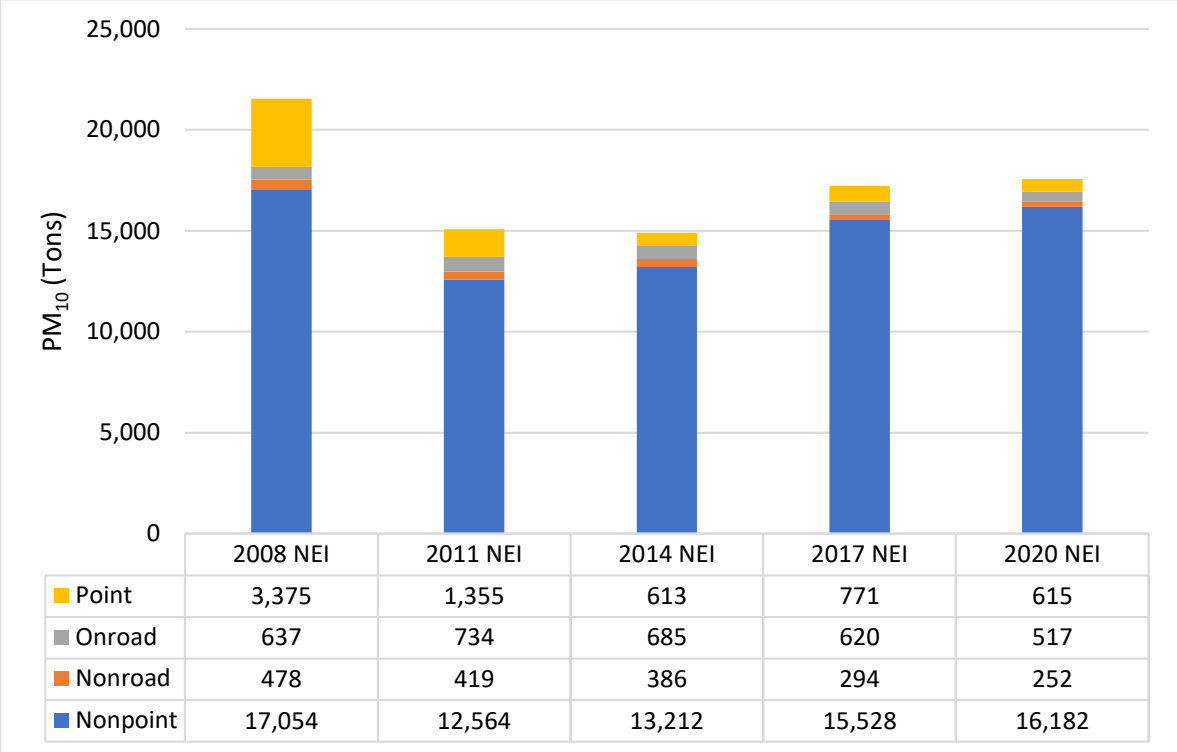


	CT	DE	DC	ME	MD	MA	NH	NJ	NY	PA	RI	VT
2008	93,080	42,790	13,189	71,606	205,239	168,599	50,267	244,552	442,093	616,320	18,963	20,903
2011	72,828	29,436	9,403	59,785	165,185	136,892	36,566	168,297	387,262	561,928	22,489	19,635
2014	63,003	27,684	8,566	52,346	138,496	127,304	38,093	154,655	330,782	492,755	24,716	15,697
2017	46,575	22,882	4,780	49,890	96,310	105,860	28,533	136,961	240,411	321,900	14,865	15,311
2020	36,778	16,532	3,553	38,936	70,228	66,773	19,515	88,163	186,182	280,834	12,052	11,854

Figure 5-4: 2008 to 2020 NOx Emissions for MANEVU (Tons)

5.1.3 Particulate Matter <10 Microns

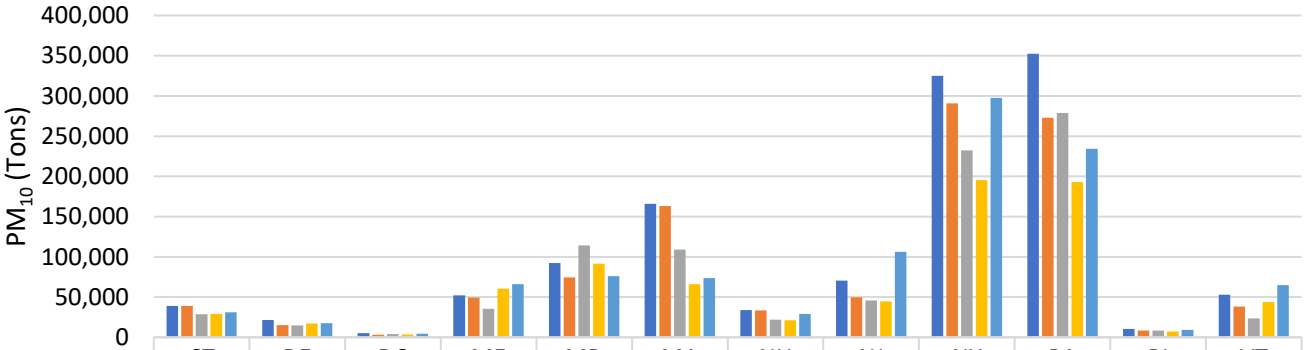
PM_{10} emissions for Delaware and for the MANEVU region are shown in Figures 5-5 and 4-6 respectively. PM_{10} emissions in Delaware are largely dominated by the nonpoint category. Primarily, construction dust and paved road dust. Figure 5-6 shows that PM_{10} emissions have remained relatively stable over the past several years in Delaware, with a slight increase in nonpoint emissions from 2014 – 2017. This increase was primarily due to an increase in road construction and commercial cooking emissions (EPA introduced a new commercial cooking emission methodology in 2017 and a new survey of sources in 2020).[16]



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
Point	3,375	1,355	613	771	615
Onroad	637	734	685	620	517
Nonroad	478	419	386	294	252
Nonpoint	17,054	12,564	13,212	15,528	16,182

Figure 5-5: 2008 to 2020 PM_{10} Emissions for Delaware (Tons)

[16] National Emissions Inventory (NEI) Data. EPA website. Accessed September 17, 2024. https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei

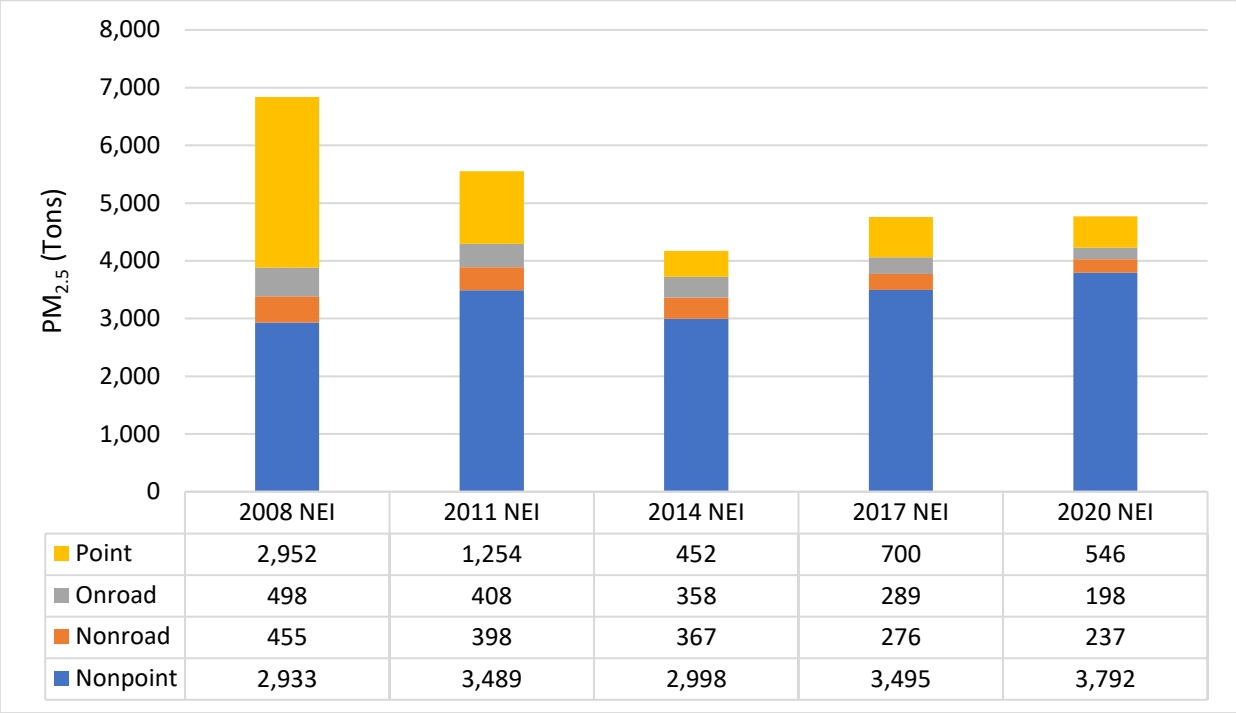


	CT	DE	DC	ME	MD	MA	NH	NJ	NY	PA	RI	VT
2008	39,048	21,544	5,211	52,311	92,156	165,801	33,814	70,431	325,041	352,392	10,267	53,130
2011	39,097	15,071	3,410	49,526	74,522	162,952	33,379	49,742	290,566	273,067	8,387	38,373
2014	28,842	14,896	3,865	35,606	114,097	109,218	21,985	45,946	232,441	278,725	8,400	23,422
2017	29,058	17,213	3,771	60,347	91,366	65,922	21,142	44,487	195,140	193,114	7,148	43,618
2020	31,279	17,567	4,525	65,977	75,977	73,575	29,167	106,187	297,593	234,247	9,141	65,031

Figure 5-6: 2008 to 2020 PM_{10} Emissions for MANEVU (Tons)

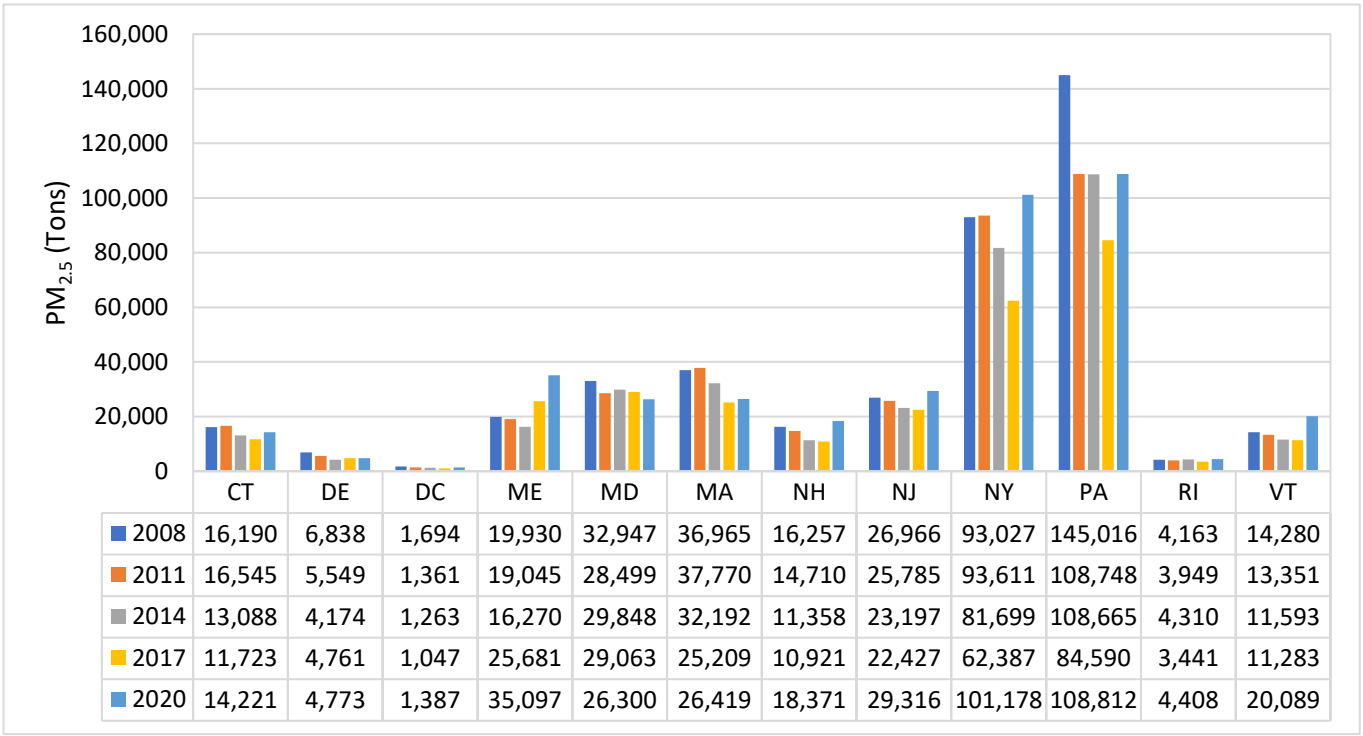
5.1.4 Particulate Matter <2.5 Microns

Figures 5-7 and 5-8 show $PM_{2.5}$ emissions for Delaware and for MANE-VU respectively. The emissions patterns and trends for $PM_{2.5}$ are largely similar to those described above for PM_{10}. As with PM_{10}, $PM_{2.5}$ emissions are dominated by the nonpoint category. In general, total $PM_{2.5}$ emissions have been relatively stable for Delaware, with a slight increase in nonpoint emissions from 2014 – 2017. As detailed in Section 5.1.3 above, this increase was primarily due to an increase in road construction and commercial cooking emissions.



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
Point	2,952	1,254	452	700	546
Onroad	498	408	358	289	198
Nonroad	455	398	367	276	237
Nonpoint	2,933	3,489	2,998	3,495	3,792

Figure 5-7: 2008 to 2020 $PM_{2.5}$ Emissions for Delaware (Tons)



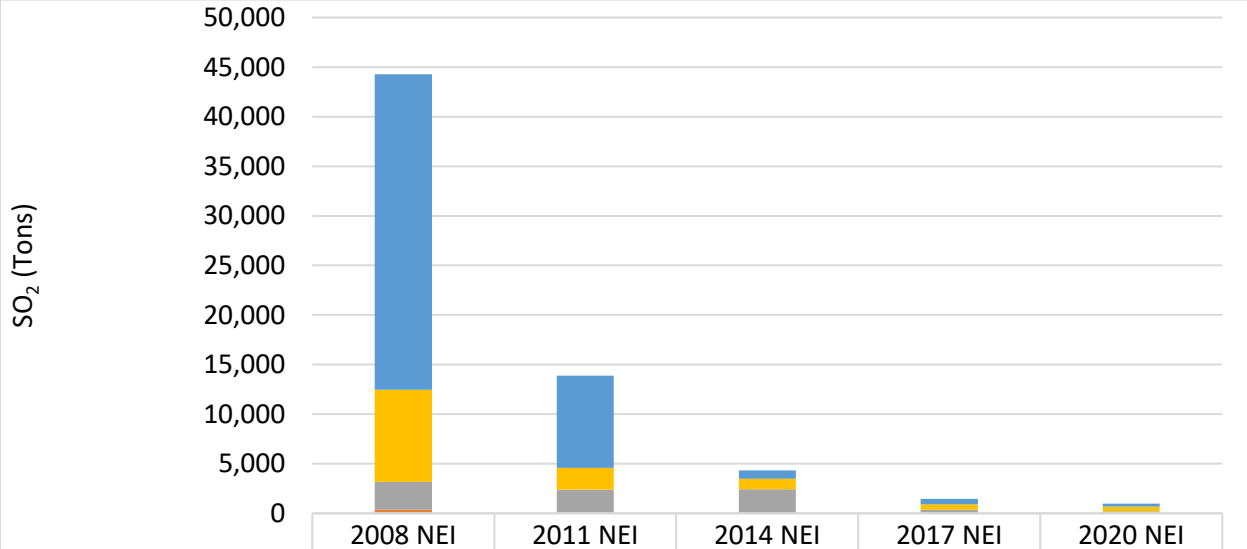
	CT	DE	DC	ME	MD	MA	NH	NJ	NY	PA	RI	VT
2008	16,190	6,838	1,694	19,930	32,947	36,965	16,257	26,966	93,027	145,016	4,163	14,280
2011	16,545	5,549	1,361	19,045	28,499	37,770	14,710	25,785	93,611	108,748	3,949	13,351
2014	13,088	4,174	1,263	16,270	29,848	32,192	11,358	23,197	81,699	108,665	4,310	11,593
2017	11,723	4,761	1,047	25,681	29,063	25,209	10,921	22,427	62,387	84,590	3,441	11,283
2020	14,221	4,773	1,387	35,097	26,300	26,419	18,371	29,316	101,178	108,812	4,408	20,089

Figure 5-8: 2008 $PM_{2.5}$ Emissions for MANEVU (Tons)

5.1.5 Sulfur Dioxide

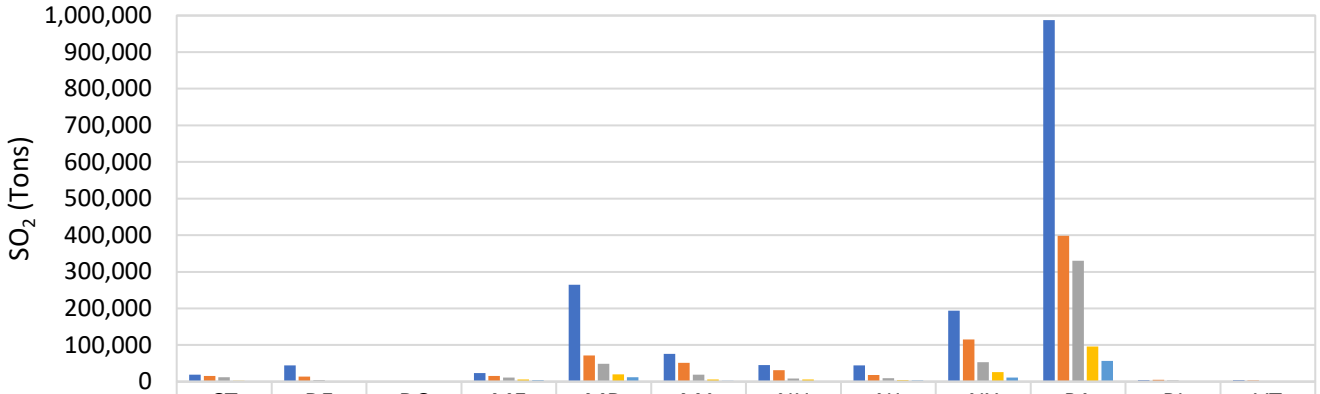
SO_2 emissions for Delaware and for MANEVU are shown in Figures 5-9 and 5-10. Similar to NOx, point source SO_2 emissions are further broken down in Figure 5-9 into the CAMPD and non-CAMPD categories. As shown in Figure 5-9, SO_2 emissions in Delaware have been historically dominated by the point source category, the CAMPD sources in particular. The nonpoint category also makes a fairly significant contribution. In general, nonroad and onroad sources are not major contributors to SO_2 emissions.

The dramatic decrease in point source SO_2 emissions in Delaware is due to the extensive control programs that have been implemented to control SO_2 from coal fired power plants (See Section 2.1.1).



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
CAMPD Point	31,808	9,306	829	545	296
Non-CAMPD Point	9,300	2,182	1,070	537	473
Nonpoint	2,814	2,298	2,328	259	173
Nonroad	266	12	9	8	4
Onroad	92	85	93	98	27

Figure 5-9: 2008 to 2020 SO_2 Emissions for Delaware (Tons)

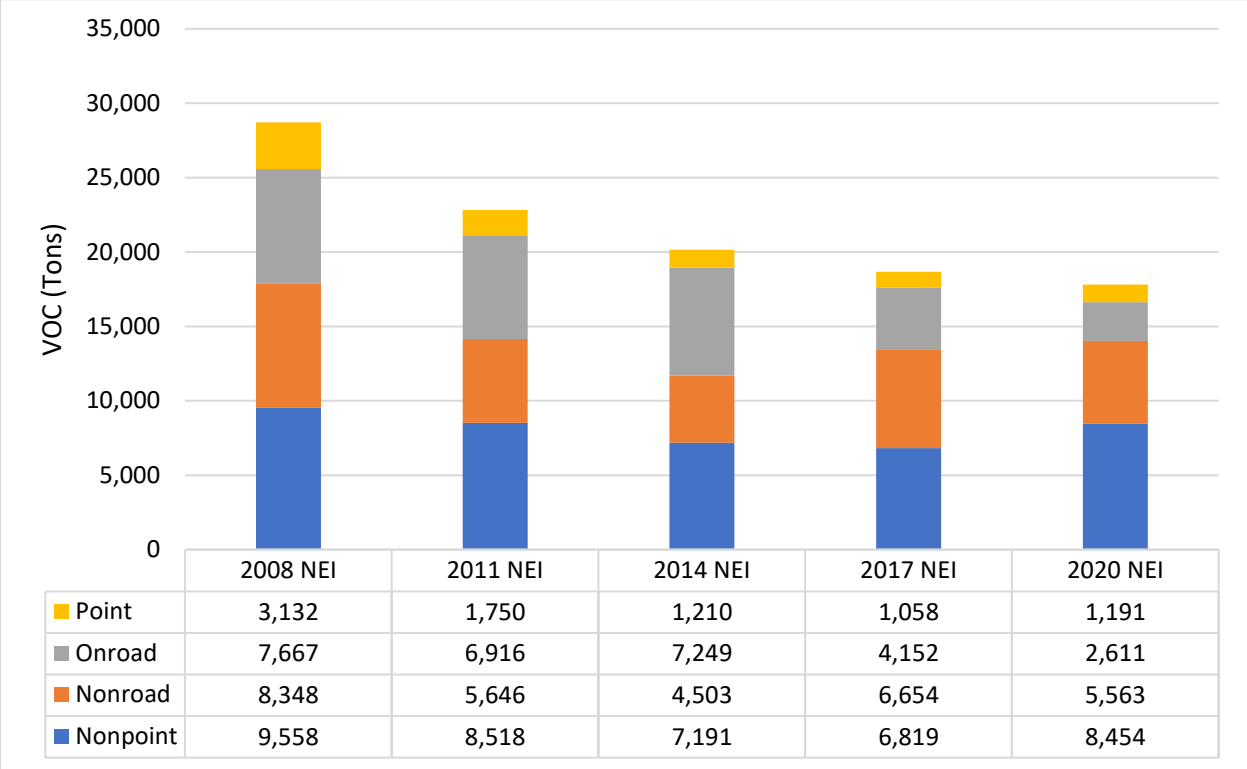


	CT	DE	DC	ME	MD	MA	NH	NJ	NY	PA	RI	VT
2008	19,443	44,282	1,273	23,362	264,487	76,256	45,666	44,370	193,703	987,671	4,345	4,044
2011	15,334	13,883	1,829	15,528	71,751	51,338	31,257	17,907	114,940	398,497	4,689	3,445
2014	12,445	4,330	252	11,242	48,490	18,890	8,554	9,781	52,857	329,804	3,406	1,503
2017	2,692	1,448	90	5,762	20,130	6,256	5,972	4,483	25,988	96,263	816	743
2020	923	973	39	4,175	12,290	2,095	1,398	2,965	11,436	56,330	396	655

Figure 5-10: 2008 to 2020 SO_2 Emissions for MANEVU (Tons)

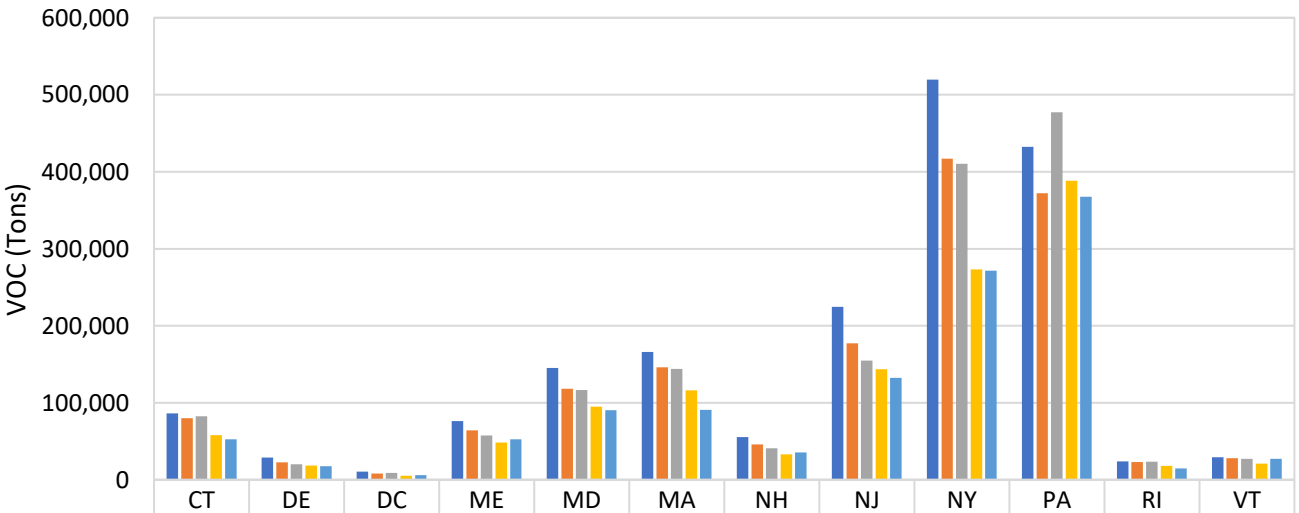
5.1.6 Volatile Organic Compounds

Figures 5-11 and 5-12 show VOC emissions for Delaware and MANEVU respectively. VOC emissions in Delaware are generally dominated by the nonpoint, nonroad, and onroad categories. Overall, point sources are generally not a major contributor to VOC emissions. Figure 5-11 shows that there has been a modest decline in Delaware VOC emissions between 2008 and 2020.



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
Point	3,132	1,750	1,210	1,058	1,191
Onroad	7,667	6,916	7,249	4,152	2,611
Nonroad	8,348	5,646	4,503	6,654	5,563
Nonpoint	9,558	8,518	7,191	6,819	8,454

Figure 5-11: 2008 to 2020 VOC Emissions for Delaware (Tons)

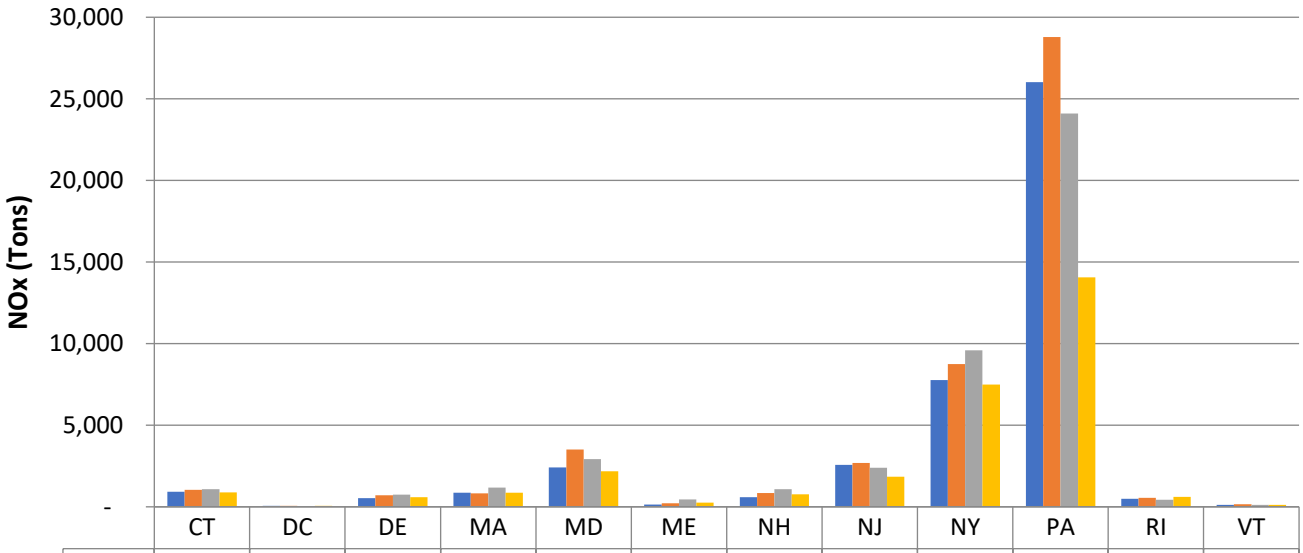


	CT	DE	DC	ME	MD	MA	NH	NJ	NY	PA	RI	VT
2008	86,024	28,705	10,467	76,423	145,138	166,086	55,344	224,688	519,566	432,590	23,770	29,131
2011	79,809	22,830	7,950	64,086	118,309	146,068	45,884	177,043	416,915	372,135	23,186	27,869
2014	82,350	20,153	8,939	57,527	116,512	144,016	40,767	154,589	410,573	477,338	23,499	27,366
2017	58,059	18,682	5,165	48,454	95,087	116,269	33,088	143,384	273,152	388,427	17,965	20,922
2020	52,578	17,820	5,845	52,408	90,435	90,781	35,572	132,243	271,757	367,378	14,927	27,389

Figure 5-12: 2008 to 2020 VOC Emissions for MANEVU (Tons)

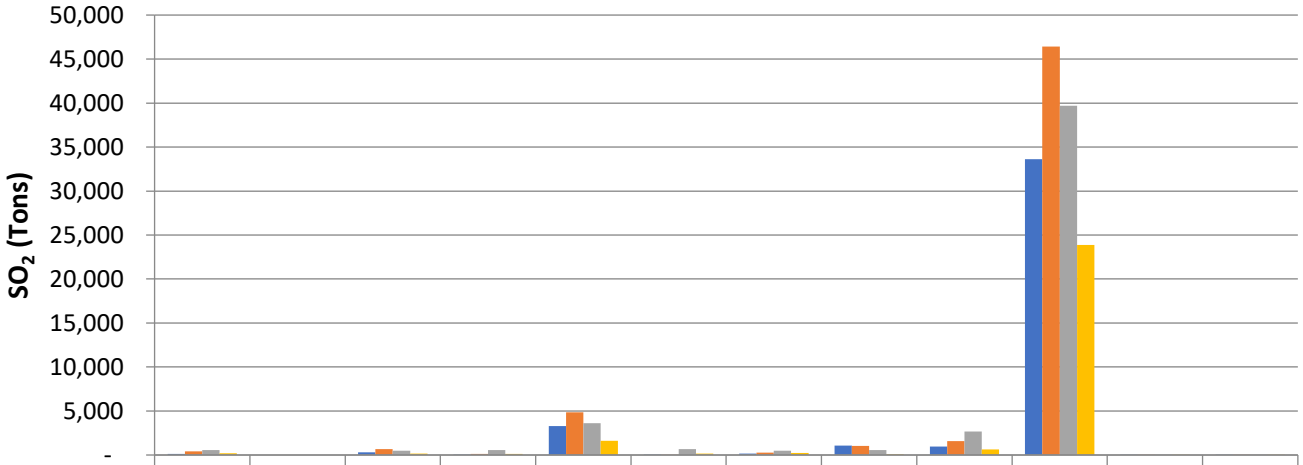
Figures 5-13 and 5-14 show NOx and SO_2 emissions, respectively, in Delaware and the other MANEVU states for those sources that report to EPA's CAMPD. As described earlier, sources that report to CAMPD are those facilities that participate in an EPA air program and generally include EGUs and very large industrial facilities.

Figures 5-13 and 5-14 show significant declines in NOx and SO_2 emissions for Delaware. These are due in large part to the enforceable measures described in Sections 2.0 and 3.0, as well as measures aimed at maintaining the ozone and SO_2 NAAQS. Some of the declines are also due to market forces and the shift from coal to low-cost natural gas. Declines in NOx and SO_2 emissions are also evident for most other MANEVU states, with some year-to-year variability. Like Delaware, most of the declines in MANEVU are due to the enforceable measures that MANEVU states have adopted as part of their long-term strategies for making reasonable progress as well as the measures that states have adopted to maintain the ozone and SO_2 NAAQS.



	CT	DC	DE	MA	MD	ME	NH	NJ	NY	PA	RI	VT
2020	923	66	524	864	2,408	144	590	2,575	7,763	26,019	484	124
2021	1,043	62	708	826	3,513	208	845	2,687	8,748	28,786	543	149
2022	1,073	50	745	1,181	2,917	446	1,088	2,401	9,584	24,092	440	124
2023	887	54	583	857	2,171	255	763	1,853	7,488	14,067	618	109

Figure 5-13: NOx Emissions for CAMPD Sources in Delaware and MANEVU (Tons)



	CT	DC	DE	MA	MD	ME	NH	NJ	NY	PA	RI	VT
2020	131	-	296	62	3,279	53	152	1,082	975	33,602	18	1
2021	409	-	663	141	4,847	34	279	1,031	1,573	46,407	19	1
2022	565	-	478	577	3,632	658	493	571	2,662	39,709	17	1
2023	194	-	170	109	1,621	146	224	77	645	23,887	23	1

Figure 5-14: SO2 Emissions for CAMPD Sources in Delaware and MANEVU (Tons)

6.0 Assessment of Significant Changes in Emissions

RHR Paragraph 51.308(g)(5) requires an assessment of any significant changes in anthropogenic emissions within or outside the state since the period addressed in the most recent plan (in this case, Delaware's 2018 RH SIP),[17] including whether those changes were anticipated in the most recent plan and whether they have limited or impeded in reducing pollutant emissions and improving visibility.

An examination of Figures 5-1 through 5-14 in the section above show that emissions for visibility impairing pollutants have declined for almost every pollutant and for almost every state in MANEVU. Examination of the figures also shows that, although there is some year-to-year variability, there are no emissions increases in Delaware or in MANEVU that are unexpected or large enough that they would limit or impede visibility improvement.

Tables 6-1 through 6-6 below reprint some of the information that was presented above in Section 5.0 with a specific focus on 2017, which was the NEI year that was current at the time of the 2018 RH SIP, and 2020, which is the most recently available complete NEI. For each visibility impairing pollutant, the tables show total emissions for Delaware and the other MANEVU states and the difference and percent difference between 2017 and 2020 emissions.

Tables 6-1 to 6-6 show a decrease in emissions from 2017 to 2020 for almost every pollutant and every state in MANEVU. SO_2 had the most dramatic decreases, with a reduction of 66% for the total MANEVU region. There are two exceptions, however, to these declining trends.

Some variability in emissions estimates for NH_3, PM, and other pollutants may be due to changes in estimation models and methodologies.[18] In particular, in recent years, EPA has been improving and refining its methodologies and input data for several NH_3-related categories such as agricultural and animal feeding operations.

First, NH_3 emissions increased between 2017 and 2020 for many of the MANEVU states, and the total MANEVU region showed an increase of 35%. As explained in Section 5.1.1 above, the increase in nonpoint NH_3 emissions for Delaware from 2017 to 2020 is due to a change in methodology for animal husbandry. In 2020 Delaware switched from using its own animal husbandry emissions calculation methodology to using EPA's updated methodology.

Second, PM_{10} and $PM_{2.5}$ emissions increased for a handful of states. However, despite these individual state increases, total MANEVU PM_{10} and $PM_{2.5}$ emissions decreased by 31% and 33% respectively.

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[17] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Regional Haze State Implementation Plan for the Second Implementation Period. EPA Proposed Rule. 89 FR 67018. August 19, 2024. https://www.govinfo.gov/content/pkg/FR-2024-08-19/pdf/2024-18174.pdf

[18] National Emissions Inventory (NEI). EPA website. Accessed on September 17, 2024. https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei

Table 6-1: 2017 and 2020 Total NH_3 Emissions for Delaware and MANEVU (Tons)

State	2017	2020	Difference (2017 – 2020)	Percent Difference (2017 – 2020)
CT	5,296	5,930	634	12%
DE	7,353	11,119	3,766	51%
DC	263	236	-27	-10%
ME	5,765	10,795	5,030	87%
MD	6,108	24,822	18,714	306%
MA	14,492	8,477	-6,015	-42%
NH	2,122	4,959	2,837	134%
NJ	14,976	8,875	-6,101	-41%
NY	43,180	58,297	15,117	35%
PA	67,183	91,288	24,105	36%
RI	873	1,542	669	77%
VT	6,490	8,879	2,389	37%
Total	**174,101**	**235,218**	**61,117**	**35%**

Table 6-2: 2017 and 2020 Total NOx Emissions for Delaware and MANEVU (Tons)

State	2017	2020	Difference (2017 – 2020)	Percent Difference (2017 –2020)
CT	46,575	36,778	-9,797	-21%
DE	22,882	16,532	-6,351	-28%
DC	4,780	3,553	-1,227	-26%
ME	49,890	38,936	-10,955	-22%
MD	96,310	70,228	-26,083	-27%
MA	105,860	66,773	-39,087	-37%
NH	28,533	19,515	-9,018	-32%
NJ	136,961	88,163	-48,798	-36%
NY	240,411	186,182	-54,229	-23%
PA	321,900	280,834	-41,066	-13%
RI	14,865	12,052	-2,812	-19%
VT	15,311	11,854	-3,458	-23%
Total	**1,084,279**	**831,399**	**-252,880**	**-23%**

Table 6-3: 2017 and 2020 Total PM_{10} Emissions for Delaware and MANEVU (Tons)

State	2017	2020	Difference (2017 – 2020)	Percent Difference (2017 – 2020)
CT	29,058	31,279	-2,221	-8%
DE	17,213	17,567	-354	-2%
DC	3,771	4,525	-754	-20%
ME	60,347	65,977	-5,630	-9%
MD	91,366	75,977	15,390	17%
MA	65,922	73,575	-7,654	-12%
NH	21,142	29,167	-8,024	-38%
NJ	44,487	106,187	-61,700	-139%
NY	195,140	297,593	-102,453	-53%
PA	193,114	234,247	-41,133	-21%
RI	7,148	9,141	-1,993	-28%
VT	43,618	65,031	-21,413	-49%
Total	**772,327**	**1,010,267**	**-237,940**	**-31%**

Table 6-4: 2017 and 2020 Total $PM_{2.5}$ Emissions for Delaware and MANEVU (Tons)

State	2017	2020	Difference (2017 – 2020)	Percent Difference (2017 – 2020)
CT	11,723	14,221	2,499	21%
DE	4,761	4,773	12	0%
DC	1,047	1,387	340	32%
ME	25,681	35,097	9,416	37%
MD	29,063	26,300	-2,763	-10%
MA	25,209	26,419	1,210	5%
NH	10,921	18,371	7,449	68%
NJ	22,427	29,316	6,889	31%
NY	62,387	101,178	38,791	62%
PA	84,590	108,812	24,222	29%
RI	3,441	4,408	967	28%
VT	11,283	20,089	8,806	78%
Total	**292,531**	**390,371**	**97,839**	**33%**

Table 6-5: 2017 and 2020 Total SO_2 Emissions for Delaware and MANEVU (Tons)

State	2017	2020	Difference (2017 – 2020)	Percent Difference (2017 – 2020)
CT	2,692	923	-1,769	-66%
DE	1,448	973	-475	-33%
DC	90	39	-51	-56%
ME	5,762	4,175	-1,587	-28%
MD	20,130	12,290	-7,840	-39%
MA	6,256	2,095	-4,161	-67%
NH	5,972	1,398	-4,574	-77%
NJ	4,483	2,965	-1,519	-34%
NY	25,988	11,436	-14,553	-56%
PA	96,263	56,330	-39,934	-41%
RI	816	396	-421	-52%
VT	743	655	-88	-12%
Total	**170,645**	**93,674**	**-76,970**	**-45%**

Table 6-6: 2017 and 2020 Total VOC Emissions for Delaware and MANEVU (Tons)

State	2017	2020	Difference (2017 – 2020)	Percent Difference (2017 – 2020)
CT	58,059	52,578	-5,482	-9%
DE	18,682	17,820	-862	-5%
DC	5,165	5,845	680	13%
ME	48,454	52,408	3,954	8%
MD	95,087	90,435	-4,652	-5%
MA	116,269	90,781	-25,488	-22%
NH	33,088	35,572	2,484	8%
NJ	143,384	132,243	-11,141	-8%
NY	273,152	271,757	-1,395	-1%
PA	388,427	367,378	-21,049	-5%
RI	17,965	14,927	-3,038	-17%
VT	20,922	27,389	6,467	31%
Total	**1,218,654**	**1,159,134**	**-59,521**	**-5%**

In summary, with the exceptions for NH_3 and PM noted in Tables 6-1, 6-3 and 6-4 above, emissions for Delaware and MANEVU have decreased between 2017 and 2020. When looking at 2020 emissions versus those from earlier years (please see Section 5.0), the decreases are even more dramatic for most pollutants. The NH_3 and PM increases are not unexpected, given the likely influence of changes in estimation methodologies, and these increases are not expected to limit or impede visibility improvement in Delaware, MANEVU, or any other region that may be influenced by Delaware's emissions.

7.0 Assessment of Current Implementation Plan Elements and Strategies

RHR paragraph 51.308(g)(6) requires an assessment of whether current plan elements and strategies are sufficient to enable the state, or states with Class I areas affected by emissions from the state, to meet all established RPGs for the period covered by the most recent plan. Delaware affirms that the elements and strategies in its 2018 RH SIP[19] are sufficient to meet the criteria of 51.308(g)(6). Delaware makes this affirmation based on the following assessment of the information and data presented in this progress report:

- Implemented Control Measures (Section 2.0) - There has been no change in the implementation of the measures deemed necessary in Delaware's 2018 RH SIP for making reasonable progress at Class I areas that may be affected by Delaware's emissions. In addition, there have been verifiable emissions reductions from these measures since the time of the 2018 RH SIP; please see Section 3.0.
- Changed in Emissions (Section 5.0) - Except for PM and NH_3 in a handful of states, emissions for visibility impairing pollutants have trended downward for Delaware and for other states in MANEVU. Further, with the exceptions noted above, currently available emissions of visibility impairing emissions are lower than those at the time of the 2018 RH SIP; please see Section 6.0.

[19] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Regional Haze State Implementation Plan for the Second Implementation Period. EPA Proposed Rule. 89 FR 67018. August 19, 2024. https://www.govinfo.gov/content/pkg/FR-2024-08-19/pdf/2024-18174.pdf

8.0 Agricultural and Forestry Smoke Management Program

40 CFR Section 51.308(f)(2)(iv)(D) requires States to consider basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management purposes and smoke management programs (SMP) in developing its LTS. Delaware believes that a SMP is not necessary to make reasonable progress, for the reasons stated below.

Delaware's 2017 emissions inventory shows that overall $PM_{2.5}$ emissions from prescribed agricultural and forest burning were a small percent (7%) of the 2020 NEI total $PM_{2.5}$ emissions in the inventory, as shown in Table 8-1 below.

Table 8-1: Prescribed Agricultural and Forest Burning Emissions

	2020 NEI $PM_{2.5}$ (tons)
Prescribed Burning	260
Agricultural Burning	67
Total Burning Emissions in Delaware	**327**
Total 2020 NEI $PM_{2.5}$ Emissions in Delaware	**4,773**
Percent of TOTAL 2020 NEI $PM_{2.5}$ Emissions in Delaware	**7%**

The Department notes that Delaware's regulation 7 **DE Admin. Code** 1113 (Open Burning), prohibits prescribed and agricultural burning from May through September. Although the Department does not consider the Open Burning regulation a SMP, this regulation still benefits Class I areas.

Regulation 1113 requires the following approvals from the Department for burning activities covered by the regulation:

- Fire companies must obtain written approvals prior to initiating any fire training exercise that involves the demolition of a structure via firefighting instruction,
- Landowners and forest management officials must obtain written approval prior to initiating a prescribed burn event, and;
- Farmers must obtain written approval before initiating an agricultural burn.

A SMP is a required element of a SIP only if it is necessary to make reasonable progress. Since the 2020 NEI data show that agricultural and forestry management woodsmoke emissions are low, 7%, Delaware continues to believe that a SMP is not necessary to make reasonable progress.

9.0 Determination of Adequacy of the Existing Plan

RHR Paragraph 51.308(h) requires the state to take one of the following actions:

1. The state may declare that no further revision of the existing plan is needed at this time. This is commonly referred to as a "negative declaration".
2. If the plan is or may be inadequate to ensure reasonable progress due to emissions from another state, or states, which participated in a regional planning process, the state must notify EPA and the applicable state(s). The state must collaborate with the state(s) through the regional planning process to develop additional strategies for addressing the plan's deficiencies.
3. If the plan is or may be inadequate to ensure reasonable progress due to emissions from another country, the state must notify the EPA and provide any available relevant information.
4. If the plan is or may be inadequate to ensure reasonable progress due to emissions from within the state, then that state must revise its plan within one year to address the deficiencies.

Based on the options above and the evidence presented herein, Delaware is proposing “option one”, a “negative declaration” to the EPA Administrator; specifying that no additional controls are necessary during this, the first five-year progress report period. Therefore, no further revision of the existing Delaware implementation plan is needed.

10.0 FLM Coordination and Public Comment Period

Per RHR paragraph 51.308(i), opportunity for FLM consultation on a progress report must be provided no less than 60 days prior to the public hearing or public comment opportunity on the progress report. The consultation must include the opportunity for the FLM to discuss their:

- Assessment of visibility impairment in the Class I area
- Recommendations on the development and implementation of strategies to address visibility impairment

Delaware did not receive any comments from the FLMs during the 60 day comment period. Although this progress report is not being submitted as a formal SIP revision, Delaware published a notice on November 24,2024 inviting public review and comment. This notice is provided as Appendix A. Table 10-1 below provides a summary of the specific consultation activities that were held.

Table 10-1: Summary of Delaware's Consultation with the FLM and Public Comment Period

Date	Summary of Activity
09/18/24	Date draft report sent to FLMs for review
11/24/24	Delaware publishes notice inviting public comment on progress report.
12/24/24	Public comment period closed

11.0 Summary and Conclusions

As described above in Section 9.0, Delaware declares that no further revision of its 2018 RH SIP[20] is required at this time. The status of implemented measures, as described in Section 3.0, are such that Class I areas affected by Delaware's emissions will continue to make reasonable progress towards the ultimate RHR goal of natural visibility conditions by 2064. This is evidenced by the improvements in visibility referenced in Section 4.0 and further evidenced by the emissions reductions outlined in Sections 5.0 and 6.0.

Delaware made a robust assessment of its current plan elements and strategies (Section 2.0), consulted extensively with the affected FLM (Section 10.0), and made this progress report available for public review and comment (Section 10.0 and Appendix A). Based on this information, and the data provided throughout this document and its attachment, Delaware affirms that this progress report satisfies the requirements of RHR paragraphs (g), (h), and (i).

[20] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Regional Haze State Implementation Plan for the Second Implementation Period. EPA Proposed Rule. 89 FR 67018. August 19, 2024. https://www.govinfo.gov/content/pkg/FR-2024-08-19/pdf/2024-18174.pdf

Appendix A

DNREC- DIVISION OF AIR QUALITY

LEGAL NOTICE

Notice of Public Comment Period

The Department of Natural Resources and Environmental Control (DNREC), Division of Air Quality (AQ) is providing the public an opportunity to inspect and comment on Delaware's Regional Haze Progress Report for the Second Planning Period, prior to submission of the final report to the United States Environmental Protection Agency (EPA).

The Regional Haze Progress Report is a mid-point report to fulfill the requirements of paragraphs 40 Code of Federal Regulations 51.308(g), (h), and (i) of the Regional Haze Rule and serves as a progress report for the second regional haze planning period (2018 - 2028).

The draft report may be inspected online starting November 24, 2024 at de.gov/dnrecnotices, by contacting our New Castle office by phone at 302-323-4542 or by email at Kelsey.Pangman@delaware.gov.

The Department will accept public comment through Tuesday, December 24, 2024. Comments will be accepted in written form via email to Kelsey.Pangman@delaware.gov or by U.S. mail to the following address:

Attn: Kelsey Pangman
DNREC – Air Quality
715 Grantham Lane, New Castle, DE 19720

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