Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
100 Cambridge Street Suite 900 Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

Massachusetts

Regional Haze Progress Report

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Contents

Summary

The Massachusetts Department of Environmental Protection (MassDEP) has prepared this Draft Regional Haze Progress Report to provide an update on implementation of the Massachusetts Regional Haze State Implementation Plan.

The federal Clean Air Act, in sections 169A and 169B, contains requirements for the protection of visibility in 156 national parks, forests and wilderness areas that have been federally designated as Class I areas, which include some of our nation's most treasured public lands. Unfortunately, enjoyment of the scenic vistas in these pristine areas is impaired by regional haze. Regional haze is caused by fine particle pollution that impairs visibility over a large region by scattering or absorbing light.

In 1999, the U.S. Environmental Protection Agency (EPA) issued regulations, known as the Regional Haze Rule (RHR) (40 CFR 51.300-309) that require each state to develop a State Implementation Plan (SIP) to reduce haze-causing pollution to improve visibility in Class I areas and to update these SIPs every 10 years. States also must submit periodic progress reports to provide an update on the implementation of measures within the latest SIP revision. The goal of the regional haze program is to restore natural visibility conditions at Class I areas by 2064.

Although Massachusetts has no Class I areas, emissions from Massachusetts sources contribute to visibility degradation in Class I areas in several other states. These include Lye Brook Wilderness Area (Vermont), Great Gulf Wilderness Area (New Hampshire), Presidential Range-Dry River Wilderness Area (New Hampshire), Acadia National Park (Maine), Moosehorn Wildlife Refuge (Maine), and Roosevelt Campobello International Park (Maine/Canada).

In 2012, MassDEP submitted a Regional Haze SIP to EPA for the first planning period (2008-2018). EPA approved this SIP in 2013. MassDEP submitted a Regional Haze Progress Report to EPA in 2018. MassDEP submitted a Regional Haze SIP revision for the second planning period (2018-2028) on July 22, 2021. EPA approved this SIP revision on July 8, 2024. This Progress Report provides an update on implementation of measures contained in MassDEP's 2021 Regional Haze SIP revision.[1]

EPA created regional planning organizations so that states could share the analytical work required to understand the causes of regional haze and evaluate options for addressing it. Massachusetts participates in this work as a member of the Mid-Atlantic Northeast Visibility Union (MANEVU), which includes 10 other mid-Atlantic and Northeast states and the District of Columbia, as well as tribes, EPA, and Federal Land Managers (FLMs) for Class I areas. To better understand regional haze for the second planning period, MANEVU analyzed visibility

[1] Available at https://www.mass.gov/lists/massachusetts-state-implementation-plans-sips#regional-haze-sip-

data from Class I areas, the makeup of particles causing haze, and the sources of emissions of those particles and their precursors. Based on these analyses, MANEVU developed screening criteria and identified the largest potential contributing sources to visibility impairment and evaluated reasonable control strategies. MANEVU also facilitated consultations with states, tribes, and FLMs on development of reasonable progress goals and long-term strategies for reducing regional haze in the second planning period. For the second planning period progress reports, MANEVU developed data and templates, which MassDEP used to develop this progress report.

The RHR requires states to submit their progress reports to EPA by January 31, 2025. This progress report fulfills the requirements of paragraphs 51.308(g), (h), and (i) of the RHR for a progress report for the second regional haze planning period. It demonstrates that MassDEP is implementing its SIP commitments, that emissions of pollutants causing haze are declining, and that the 2028 visibility goals set by the MANEVU Class I states in the second planning period Regional Haze SIPs will be met. Based on this progress report, MassDEP has determined that no revisions are needed to the Massachusetts Regional Haze SIP at this time.

1. 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 and 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 finalized the Regional Haze Rule (RHR) in 1999. The RHR was amended and revised in 2005 and 2017 and is codified under 40 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.

This document fulfills the requirements of 40 CFR 51.308(g), (h), and (i) for a progress report for the second regional haze planning period (2018 to 2028). Through this progress report MassDEP affirms that its approved Regional Haze SIP for the second planning period[2] is adequate for making reasonable progress towards the RHR goal of achieving natural visibility conditions at Class I areas by 2064.

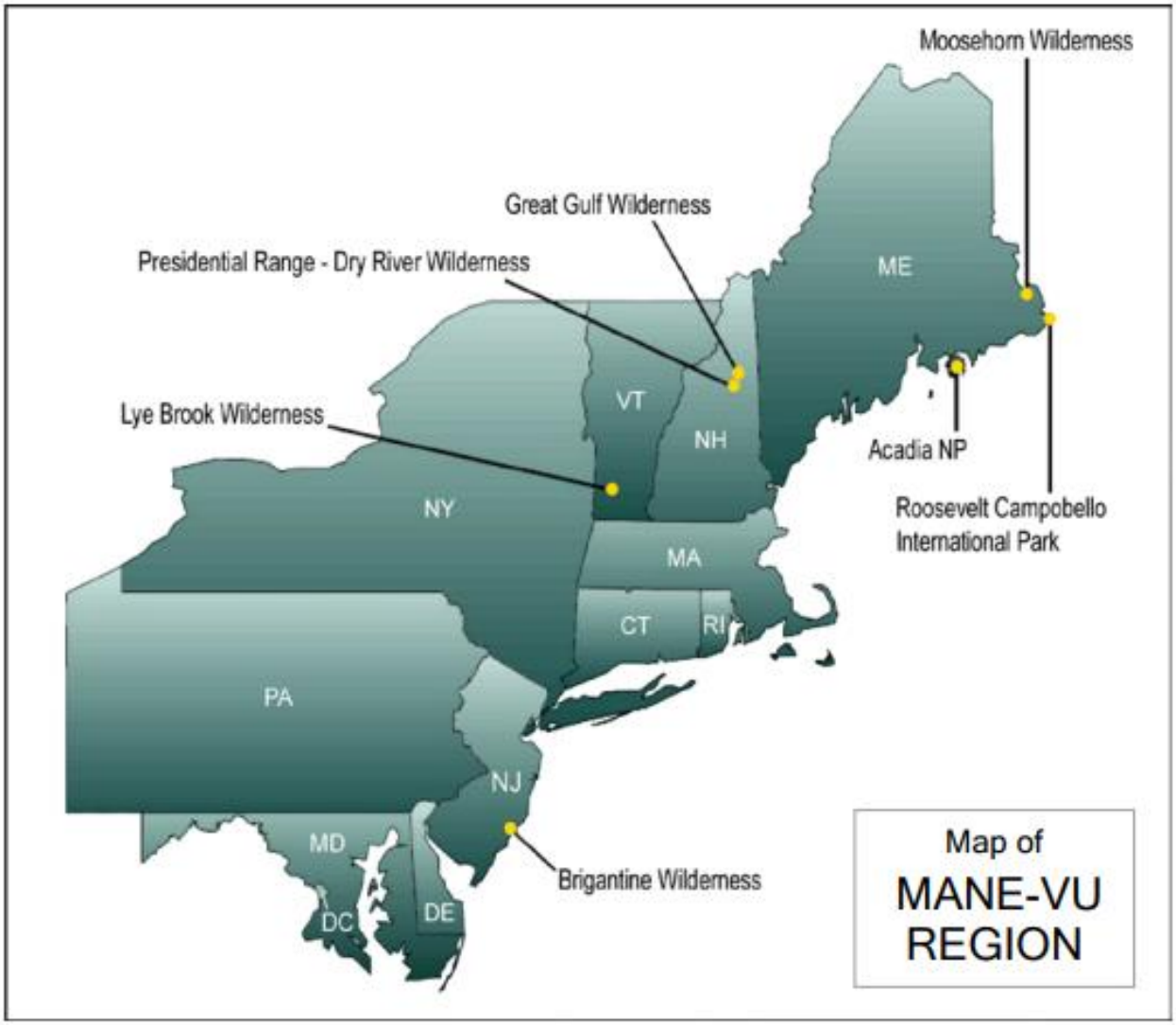
Massachusetts is a member of the Mid-Atlantic/Northeast Visibility Union (MANEVU). MANEVU's voting membership includes 11 states, the District of Columbia, and two tribal nations: Penobscot Indian Nation and the St. Regis Mohawk Tribe. Additional MANEVU members include EPA, the U.S. Fish and Wildlife Service (F&W), the U.S. Forest Service (FS), and the U.S. National Park Service (NPS). There are 7 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 larger federal areas in which the Class I areas are located. A map of the MANEVU region with the Class I areas is provided in Figure 1-1.

- Acadia National Park, ME
- Moosehorn Wilderness Area, ME (Moosehorn National Wildlife Refuge)

[2] Approval and Promulgation of Air Quality Implementation Plans; Massachusetts; Regional Haze State Implementation Plan for the Second Implementation Period. 89 FR 55891 07/08/2024.

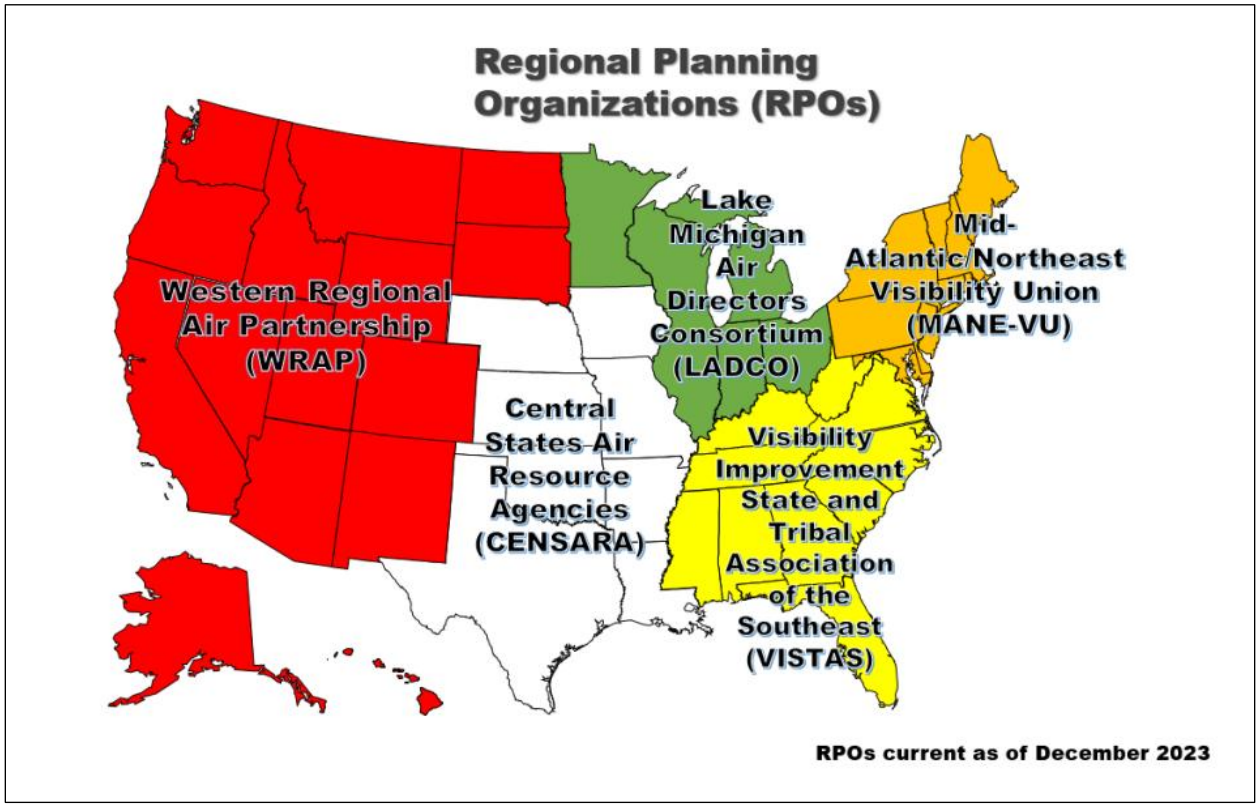
- Roosevelt/Campobello International Park, New Brunswick Canada
- Great Gulf Wilderness Area, NH (White Mountain National Forest)
- Presidential Range - Dry River Wilderness Area, NH (White Mountain National Forest)
- Brigantine Wilderness Area, NJ (E.B. Forsythe National Wildlife Refuge)
- Lye Brook Wilderness, VT (Green Mountain National Forest)

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



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 activities related to regional haze. These RPOs are shown in Figure 1-2.

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 below. In July 2024, EPA published guidance for progress reports: Overview of Elements for the Regional Haze Second Planning Period State Implementation Plan Progress Reports Due in 2025. MassDEP followed this guidance in preparing the progress report.

Table 1-1: Organization of Progress Report

40 CFR 51.308	Report Section	Description
(g)(1)	2	Implementation status of measures for achieving Reasonable Progress Goals (RPGs) at Class I areas within and outside the state
(g)(2)	2	Overview of the emissions reductions achieved with the measures described in Section 2
(g)(3)	3	Summary of visibility conditions changes at Class I areas in the state and the MANEVU region
(g)(4)	4	Change in emissions since the time of the second planning period regional haze SIPs
(g)(5)	5	Evaluation of any significant changes in emissions since the time of the second planning period regional haze SIPs
(g)(6)	6	Assessment that MassDEP's current plan elements and strategies are sufficient for Massachusetts, and states with Class I areas affected by Massachusetts '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
(g)(8)	7	Assessment of the most recent periodic assessment of smoke management program
(h)	8	Affirmation that MassDEP's current plan is adequate to ensure reasonable progress and that no revision to the plan is needed at this time
(i)	9	A description of the consultation with the Federal Land Manager and the public comment process

2. Status of Implemented Measures and Emissions Reductions Achieved

40 CFR 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*. In its Regional Haze SIP for the first and second planning periods, MassDEP included the following measures for making reasonable progress:

- Low sulfur fuel oil standard
- Best Available Retrofit Technology (BART) and Alternative to BART for sulfur dioxide (SO_2) and nitrogen oxides (NO_x) reductions
- Targeted Electrical Generating Unit (EGU) strategy for SO_2 reductions
- Controls on Outdoor Hydronic Heaters
- Year-round operation of NO_x controls
- Fuel sulfur limit for Canal Station 1
- Emission Reduction Strategy for High Electrical Demand Day (HEDD) Peaking Units
- State-Level Energy Demand Reduction and Clean Technology Adoption Initiatives

These measures are described in detail in Section 3 and Section 6 of MassDEP 's Regional Haze SIP for the second planning period.[3] These measures remain fully implemented and there has been no change in implementation status since the time that MassDEP 's Regional Haze SIP and associated rulemaking were formally adopted. The status of these measures is described below.

40 CFR 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.* The emissions reductions associated with the above measures are described below.

[3] Massachusetts Regional Haze SIP Revision for 2018-2028 (7/22/21) : https://www.mass.gov/doc/massachusetts-regional-haze-sip-revision-for-2018-2028-7-22-21/download

2.1 Low sulfur fuel oil standard

In July 2012, MassDEP adopted amendments to 310 CMR 7.05: *Fuels All Districts* to lower the sulfur content of fuel oil as shown below. This rule was fully implemented by July 1, 2018.

Massachusetts Low Sulfur Fuel Limits and Schedule

#2 Distillate Oil	500 ppm by 7/1/2014
	15 ppm by 7/1/2018
#4 / #6 Residual Oil	1% by 7/1/2014 (0.5% for power plants)
	0.5% by 7/1/2018

Table 2-1 compares recent SO_2 emissions associated with the combustion of fuel oils in Massachusetts and the MANEVU region. The emissions data are taken from the 2017 and 2020 National Emissions Inventories (NEI).[4]

The 2017 NEI represents the data that was available at the time the second planning period regional haze SIPs were drafted and some states and jurisdictions had not yet adopted low sulfur fuel oil standards at that time. The 2020 NEI reflects adoption of the low sulfur fuel oil standards by all the MANEVU states and jurisdictions in accordance with the MANEVU Intra-RPO "Ask".[5]

Table 2-1: Fuel Oil SO_2 Emissions in Massachusetts and MANEVU Region 2017 and 2020 (tons)

Sector	Massachusetts			MANEVU Total		
	2017	2020	Difference	2017	2020	Difference
Electric Generation	482	46	-436	9,395	6,804	-2,591
Industrial	212	60	-152	3,769	2,142	-1,627
Commercial/Institutional	357	156	-201	3,995	1,847	-2,148
Residential	1836	0	-1836	9,805	215	-9,590
Total	2887	262	-2625	26,964	11,008	-15,956
Percent reduction			-91%			-59%

Source: National Emissions Inventories (NEI) data queries: 2020 NEI: https://www.epa.gov/air-emissions-inventories/2020-nei-supporting-data-and-summaries
2017 NEI: https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data

[4] National Emissions Inventories (NEI): (https://www.epa.gov/air-emissions-inventories/emissions-inventory-system-eis-gateway)
[5] MANEVU Intra-RPO "Ask": (https://otcair.org/manevu/Upload/Publication/Formal%20Actions/MANE-VU%20Intra-Regional%20Ask%20Final%208-25-2017.pdf)

SO_2 emissions from fuel oil combustion in Massachusetts and in the MANEVU region were substantially lower in 2020 than in 2017, with reductions of 91% and 59% respectively. This is mostly due to the MANEVU-wide adoption of the low sulfur fuel oil standards. Economics, supply availability, and market forces also likely contributed to the reductions.

2.2 BART and Alternative to BART

MWC BART Determination – For each of the two Wheelabrator-Saugus municipal waste combustor units, MassDEP determined that a NO_x emissions rate target of 185 ppm (30-day average), no further SO_2 controls, and a PM emissions limit of 25 milligrams per dry standard cubic meter (mg/dscm) represented BART. MassDEP issued a modified Emission Control Plan for Wheelabrator-Saugus with the BART NO_x, PM, SO_2 emission limits in March 2012, and EPA approved this control plan into the Massachusetts SIP.[6] Wheelabrator-Saugus was operating in accordance with its BART emissions limitations and therefore this control was fully implemented. In addition, on February 11, 2020, MassDEP issued a new Emission Control Plan that established a lower NO_x emission rate limit of 150 ppm (24-hour daily arithmetic average) under 310 CMR 7.08(2)(f)3 by which the facility continues to operate. See Section 2.9 for details on emissions from MWCs.

EGU Alternative to BART – MassDEP adopted an Alternative to BART that covers all BART-eligible electrical generating units (EGUs) plus all additional coal- and oil-fired EGUs subject to MassDEP regulation *310 CMR 7.29, Emissions Standards for Power Plants*. MassDEP's Alternative to BART for EGUs included the measures below.

1. *310 CMR 7.29 Emissions Standards for Power Plants*, which established NO_x and SO_2 emission rates (as well as mercury and carbon dioxide emissions limits) for certain EGUs.

2. The retirement of Somerset Power.

3. Permit restrictions for Brayton Point, Salem Harbor Station and Mt. Tom Station that limit or retire SO_2 and/or NO_x emissions. MassDEP issued Emission Control Plans for Salem Harbor, Brayton Point, and Mt. Tom to implement the Alternative to BART. MassDEP submitted the Emission Control Plans as part of the 2012 Regional Haze SIP, and they remained in effect until each of those facilities was retired.

4. *310 CMR 7.19 Reasonably Available Control Technology (RACT) for Sources of NO_x*, which establishes NO_x emission rates for various sources including EGUs.

[6] 78 FR 57487. September 19, 2013. (https://www.govinfo.gov/app/details/FR-2013-09-19/2013-22692)

5. 310 CMR 7.05: *Fuels All Districts*, which requires EGUs to limit the sulfur content of residual oil to 0.5% by weight beginning July 1, 2014.

Table 2-2 lists the Alternative to BART measures and their status. Table 2-3 shows that in 2017 the EGUs subject to the Alternative to BART had achieved more emissions reductions than the original 2018 reduction targets from the 2012 RH SIP, primarily through retirements. All EGU emissions from 2002 to 2023 are shown in Table 2-5, which includes facilities subject to 310 CMR 7.29 and 7.19.

Table 2-2: **Massachusetts BART and Alternative to BART Facilities with Current Status**

Source Type	Source	Unit	BART- Eligible EGU or MWC	Description of BART Controls Implemented (Implementation Deadline)	Current Operation Status
BART (MWCs)					
MWC	Wheelabrator-Saugus	1, 2	Yes	Emission Control Plan with emission limits for: $NO_x \leq 150$ ppm by volume at 7% O_2 dry basis (24-hour daily arithmetic average) (March 10, 2020) PM – 25 milligrams per dry standard cubic meter (mg/dscm) and $SO_2 \leq 29$ ppm by volume at 7% O_2 dry basis or 75% reduction by weight or volume, whichever is less stringent (24-hour geometric mean) (March 2012)	Operating
Alternative to BART (EGUs)					
EGU	Cleary Flood	8, 9	Yes	Regulation 310 CMR 7.05: *Fuels All Districts*, requiring EGUs that burn residual oil to limit the sulfur content to 0.5% by weight (July 1, 2014)	Unit 8 retired, Unit 9 Operating
EGU	Mystic Station	7	Yes	Regulation 310 CMR 7.05: *Fuels All Districts*, requiring EGUs that burn residual oil to limit the sulfur content to 0.5% by weight (July 1, 2014)	Retired
EGU	Canal Station	1, 2	Yes	Regulation 310 CMR 7.05: *Fuels All Districts*, requiring EGUs that burn residual oil to limit the sulfur content to 0.5% by weight (July 1, 2014)	Operating
EGU	Brayton Point	1, 2, 3, 4	Yes	Regulation 310 CMR 7.29 (existing) Prohibit the use of 310 CMR 7.29 SO_2 Early **Reduction** Credits and federal Acid Rain Allowances for compliance (June 1, 2014) Regulation 310 CMR 7.05: *Fuels All Districts*, requiring EGUs that burn residual oil to limit the sulfur content to 0.5% by weight (July 1, 2014)	Retired

Source Type	Source	Unit	BART- Eligible EGU or MWC	Description of BART Controls Implemented (Implementation Deadline)	Current Operation Status
EGU	Salem Harbor	4	Yes	Retirement (June 1, 2014)	Retired
EGU	Salem Harbor	1	No (Alternative to BART)	Regulation 310 CMR 7.29 (existing) Prohibit use of 310 CMR 7.29 SO_2 Early Reduction Credits and federal Acid Rain Allowances for compliance (June 1, 2014); An annual cap of 276 tons of NO_x	Retired
EGU	Salem Harbor	2	No (Alternative to BART)	Annual cap of 300 tons of SO_2 (June 1, 2014) Annual cap of 50 tons of NO_x	Retired
EGU	Salem Harbor	3	No (Alternative to BART)	Retirement (June 1, 2014)	Retired
EGU	Mount Tom Station	1	No (Alternative to BART)	Prohibit use of 310 CMR 7.29 SO_2 Early Reduction Credits and federal Acid Rain Allowances for compliance (May 15, 2009)	Retired
EGU	Somerset Power	8	No (Alternative to BART)	Retirement (2010)	Retired

2.3 Targeted EGU Strategy

For the first planning period SIPs, MANEVU identified 167 EGU sources whose 2002 emissions contributed significantly to visibility impairment in MANEVU Class I areas. The MANEVU Ask for the first planning period called for a 90% reduction in SO_2 emissions at these sources by 2018. Massachusetts had 10 EGUs on the 167 EGU stacks list. Table 2-4 shows that SO_2 emissions from these EGUs had decreased 99% by 2017 and 99.9% by 2023, exceeding the 90% goal for 2018. All EGUs emissions from 2002 to 2023 are shown in Table 2-5.

2.4 Controls on Outdoor Hydronic Heaters

MassDEP included in its 2012 Regional Haze SIP regulations to control emissions on outdoor hydronic heaters [310 CMR 7.26(50) through (54)]. These regulations require manufacturers to meet emissions standards to sell such heaters in Massachusetts and contain operational

requirements for owners of existing and new heaters. MassDEP continues to implement these regulations.

Table 2-3: Alternative to BART Unit Emissions

Facility Name	Facility ID (ORISPL)	Unit ID	2002		2011		2017		2019		2023		Operating Status
			SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	
Brayton Point	1619	1	9,253.5	2,513.2	4,298.3	635.0	212.2	128.2					Retired
Brayton Point	1619	2	8,852.7	2,270.3	3,535.0	827.0	144.5	269.4					Retired
Brayton Point	1619	3	19,450.3	7,334.9	10,768.9	1,134.5	194.7	188.7					Retired
Brayton Point	1619	4	2,036.9	552.0	46.2	40.0	0.006	0.9					Retired
Canal Station	1599	1	13,065.9	3,338.8	99.1	20.2	46.3	11.6	59.5	12	42.5	21.6	Operating
Canal Station	1599	2	8,948.2	2,260.0	28.8	13.5	41.5	30.8	24.3	15.1	34.3	35.4	Operating
Cleary Flood	1682	8	39.2	12.5	21.8	6.7	7.5	3.6	1	0.5			Retired
Cleary Flood	1682	9	67.6	160.8	4.6	46.2	1.1	51.7	0.2	30.8	0.4	45.3	Operating
Mount Tom	1606	1	5,281.7	1,969.3	128.8	70.1							Retired
Mystic	1588	7	3,727.3	804.5	21.7	66.8	381	123.3	72.3	27.5			Retired
Salem Harbor Station	1626	1	3,425.5	920.0	893.3	204.3							Retired
Salem Harbor Station	1626	2	2,821.2	755.2	304.9	68.5							Retired
Salem Harbor Station	1626	3	4,999.0	1,331.2	2,343.8	277.8							Retired
Salem Harbor Station	1626	4	2,886.1	787.4	69.4	21.3							Retired
Somerset	1613	8	4,399.0	1,444.9									Retired
Totals			89,254	26,455	22,565	3,432	1,029	808	157	86	77	102	
Reductions					66,690	23,023	88,225	25,647	89,097	26,369	89,177	26,353	
Reduction Targets by 2018							54,986	13,117					
Percent Reduction					74.7%	87.0%	98.8%	96.9%	99.8%	99.7%	99.9%	99.6%	

Source: EPA CAMPD for EGU 2017, 2019 and 2023 emissions, and Massachusetts Regional Haze SIP (2012 revision), Table 17, and 19 for Reduction Targets by 2018.

Table 2-4: SO_2 Emissions at Massachusetts Targeted EGUs

Facility	Unit	2002	2011	2017	2017 Reductions from 2002 (%)	*2019*	*2023*	2023 Reductions from 2017 (%)	Operating Status
Brayton Point	1	9,254	4,298	212	97.7%	0	0	-	Retired
Brayton Point	2	8,853	3,535	145	98.4%	0	0	-	Retired
Brayton Point	3	19,450	10,769	195	99.0%	0	0	-	Retired
Canal Station	1	13,066	99	46	99.6%	59.5	42.5	28.6%	Operating
Canal Station	2	8,948	29	42	99.5%	24.3	34.3	41.2%	Operating
Mount Tom	1	5,282	129	0	100%	0	0	-	Retired
Salem Harbor	1	3,425	893	0	100%	0	0	-	Retired
Salem Harbor	3	4,999	2,344	0	100%	0	0	-	Retired
Salem Harbor	4	2,886	69	0	100%	0	0	-	Retired
Somerset	8	4,399	0	0	100%	0	0	-	Retired
Total		80,562	22,165	640	-	84	77	-	
Reduction			58,396	79,922	-	80,478	80,485	-	
Percent Reduction from 2002			72%	99%	99%	99.90%	99.90%	99.90%	

Source: EPA CAMPD data for 2017, 2019 and 2023 emissions, and Massachusetts Regional Haze SIP, Section 10, Long-Term Strategies, Table 25, for 2002 and 2011 data.

Table 2-5: Emission reductions from Massachusetts EGUs in CAMPD from 2002 to 2023

Facility Name	Facility ID	Unit ID	2002		2011		2017		2019		2023		Operating Status
			SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	
ANP Bellingham Power Generation LLC	55211	1	0.6	102.4	1.2	14.4	2.0	38.3	2.0	55.4	3.4	36.3	Operating
ANP Bellingham Power Generation LLC	55211	2	0.2	33.4	1.2	14.3	2.1	41.0	1.8	48.9	3.4	38.5	Operating
ANP Blackstone Power Generation LLC	55212	1	2.0	40.5	2.4	29.9	2.2	42.4	1.8	42.3	2.9	33.5	Operating
ANP Blackstone Power Generation LLC	55212	2	2.2	39.2	2.1	25.2	2.1	37.8	1.9	39.8	3.1	36.4	Operating
Bellingham	10307	1		486.9	0.8	124.7	1.0	127.9	1.9	7.7	0.1	9.8	Operating
Bellingham	10307	2		459.1	0.8	129.6	1.0	130.9	1.9	12.9	0.2	26.2	Operating
Berkshire Power	55041	1	3.0	49.0	2.4	40.2	0.9	70.4	0.8	17.0	0.2	5.5	Operating
Blackstone	1594	11		59.2		46.3		18.3		3.5		4.4	Operating
Blackstone	1594	12		61.4		43.2		21.6		10.1		7.6	Operating
Brayton Point	1619	1	9253.5	2513.2	4298.3	635.0	212.2	128.2					Retired
Brayton Point	1619	2	8852.7	2270.3	3535.0	827.0	144.5	269.4					Retired
Brayton Point	1619	3	19450.3	7334.9	10768.9	1134.5	194.7	188.7					Retired
Brayton Point	1619	4	2036.9	552.1	46.3	40.0	0.0	0.9					Retired
Canal Station	1599	1	13065.9	3338.9	99.1	20.2	46.3	11.6	59.0	11.9	42.5	21.6	Operating
Canal Station	1599	2	8948.2	2260.0	28.8	13.5	41.5	30.8	24.3	15.1	34.3	35.4	Operating
Canal Station	1599	3							0.1	4.2	0.0	0.1	Operating
Cleary Flood	1682	8	39.2	12.5	21.8	6.7	7.5	3.6	1.0	0.5			Operating
Cleary Flood	1682	9	67.6	160.8	4.6	46.3	1.1	51.7	0.3	30.8	0.4	45.3	Operating
Dartmouth Power	52026	1		55.7	0.3	13.8	0.2	10.9	0.1	6.1	0.1	3.3	Operating
Dartmouth Power	52026	2				0.6		0.7		0.4		0.7	Operating
Dighton	55026	1	1.4	36.5	2.4	48.6	1.6	35.1	0.7	15.4	0.8	17.2	Operating

Facility Name	Facility ID	Unit ID	2002		2011		2017		2019		2023		Operating Status
			SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	
Doreen	1631	10		2.1		1.5		1.7		0.4			Operating
Exelon L Street Generating Station	1587	NBJ-1		4.7		1.6							Retired
Exelon West Medway II	59882	J4							0.1	1.6	0.2	3.6	Operating
Exelon West Medway II	59882	J5							0.1	1.3	0.3	4.0	Operating
Fore River Energy Center	55317	11			5.0	59.4	4.4	57.3	5.2	54.7	1.9	24.0	Operating
Fore River Energy Center	55317	12			5.2	60.0	5.2	66.1	4.6	51.9	3.1	36.3	Operating
Framingham Station	1586	FJ-1		2.3		1.3		1.2		0.2		0.7	Operating
Framingham Station	1586	FJ-2		3.5		1.1		1.5		0.1		0.8	Operating
Framingham Station	1586	FJ-3		15.1		1.3		1.0		0.3		1.4	Operating
Indeck-Pepperell	10522	CC1	2.3	31.5									Retired
Kendall Green Energy LLC	1595	1	13.5	89.7									Operating
Kendall Green Energy LLC	1595	2	5.0	97.6	0.0	0.5	0.0	6.2	0.0	1.0	0.0	3.0	Operating
Kendall Green Energy LLC	1595	3	37.6	111.1	0.0	5.6	0.1	6.4	0.0	3.2	0.0	4.9	Operating
Kendall Green Energy LLC	1595	4	0.6	415.3	2.8	30.3	4.3	51.0	4.1	44.1	4.3	46.6	Operating
Kendall Green Energy LLC	1595	S6		21.6		2.6		4.4		6.5		5.2	Operating
Kendall Green Energy LLC	1595	S7		9.0									Operating
L'Energia Energy Center(a)	54586	1	0.3	9.5									Operating
L'Energia Energy Center(a)	54586	2			0.3	5.2	0.2	8.9	0.0	2.5			Operating
Lowell Cogeneration Company	10802	1	0.1	6.5	0.0	14.3							Retired
MASSPOWER	10726	1		111.7	1.0	53.5	0.8	44.2	0.4	21.5	0.8	52.3	Operating
MASSPOWER	10726	2		112.2	1.1	56.6	0.8	39.3	0.3	19.5	0.8	42.3	Operating

Facility Name	Facility ID	Unit ID	2002		2011		2017		2019		2023		Operating Status
			SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	
Medway Station	1592	J1T1		3.8		4.0		4.4		1.9		4.5	Operating
Medway Station	1592	J1T2		3.5		5.3		3.7		2.0		3.9	Operating
Medway Station	1592	J2T1		4.1		3.0		3.5		1.0		4.1	Operating
Medway Station	1592	J2T2		3.2		3.5		3.3		0.8		4.0	Operating
Medway Station	1592	J3T1		4.3		3.8		6.3		1.5		7.0	Operating
Medway Station	1592	J3T2		5.7		3.1		4.3		1.0		7.0	Operating
Milford Power, LLC	54805	1		80.1	0.5	25.7	0.6	44.5	0.5	23.2	0.5	15.9	Operating
Millennium Power	55079	1	6.0	111.0	5.1	83.9	2.8	60.5	2.0	42.2	1.4	38.1	Operating
Mount Tom	1606	1	5281.7	1969.3	128.8	70.2							Retired
Mystic	1588	4	570.9	153.0									Retired
Mystic	1588	5	390.6	105.8									Retired
Mystic	1588	6	314.4	78.8									Retired
Mystic	1588	7	3727.3	804.5	21.7	66.8	381.0	123.3	72.3	27.5			Retired
Mystic	1588	81		235.8	5.0	56.1	4.2	47.4	1.4	19.2	0.7	9.2	Operating
Mystic	1588	82		82.7	5.2	57.6	4.3	53.4	1.3	20.7	0.7	9.6	Operating
Mystic	1588	93			5.0	63.2	3.3	42.9	1.1	16.4	0.7	9.0	Operating
Mystic	1588	94			5.1	66.4	3.7	43.0	1.1	15.1	0.7	9.1	Operating
Mystic	1588	MJ-1		6.7		0.2		2.1		0.5			Operating
New Boston	1589	1	1.0	167.9									Retired
New Boston	1589	2	1.4	256.4									Retired
Pittsfield Generating	50002	1		41.7		6.0		6.1		2.2		0.6	Operating
Pittsfield Generating	50002	2		42.9		6.7		6.7		2.6		0.7	Operating
Pittsfield Generating	50002	3		41.8		5.3		5.8		2.5		0.6	Operating
Potter	1660	3		79.5		14.0		8.5		7.0		0.0	Operating
Potter	1660	4			0.1	1.9	0.1	1.2	0.0	0.3	0.1	0.9	Operating

Facility Name	Facility ID	Unit ID	2002		2011		2017		2019		2023		Operating Status
			SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	
Potter	1660	5			0.1	1.4	0.1	1.4	0.0	0.4	0.1	1.4	Operating
Salem Harbor Station	1626	1	3425.5	920.0	893.3	204.3							Retired
Salem Harbor Station	1626	2	2821.2	755.2	304.9	68.5							Retired
Salem Harbor Station	1626	3	4999.0	1331.2	2343.8	277.8							Retired
Salem Harbor Station	1626	4	2886.1	787.4	69.4	21.3							Retired
Salem Harbor Station NGCC	60903	1							0.7	7.9	0.9	11.0	Operating
Salem Harbor Station NGCC	60903	2							0.5	8.1	0.7	8.7	Operating
Somerset	1613	11		6.6									Retired
Somerset	1613	8	4399.0	1444.9		0.0							Retired
Stony Brook Energy Center	6081	1		171.0		32.4		35.7		28.1		6.6	Operating
Stony Brook Energy Center	6081	2		89.4		21.5		2.8		3.2		2.8	Operating
Stony Brook Energy Center	6081	3		165.0		27.5		30.4		13.4		5.1	Operating
Stony Brook Energy Center	6081	4		10.0		12.4		16.1		8.5		26.6	Operating
Stony Brook Energy Center	6081	5		5.0		10.0		11.2		7.0		21.5	Operating
Waters River	1678	1				10.8		11.5		3.2		4.9	Operating
Waters River	1678	2		2.8		10.3		15.5		3.3		6.4	Operating
West Springfield	1642	10	0.0	2.1		5.9		1.5		0.6			Operating
West Springfield	1642	3	119.4	74.6	81.0	23.4	6.2	5.0	0.1	0.2			Operating
West Springfield	1642	CTG 1	0.1	7.1	0.1	3.3	0.0	1.9	0.0	0.2			Operating
West Springfield	1642	CTG 2	0.1	6.5	0.1	3.4	0.0	2.0	0.0	0.2			Operating
Woodland Road	1643	10	0.0	1.2		1.0		3.1		0.6			Operating

Facility Name	Facility ID	Unit ID	2002		2011		2017		2019		2023		Operating Status
			SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	SO_2 (tons)	NO_x (tons)	
Totals			90726.8	30971.4	22701.0	4830.2	1083.0	2157.9	193.5	802.8	109.2	765.7	
Reductions from 2002					68025.8	26141.1	89643.8	28813.5	90533.4	30168.5	90617.7	30205.6	
Percent Reduction					75%	84%	99%	93%	100%	97%	100%	98%	

Source: EPA CAMPD data.

Currently Tanner Street Generation, LLC in CAMPD

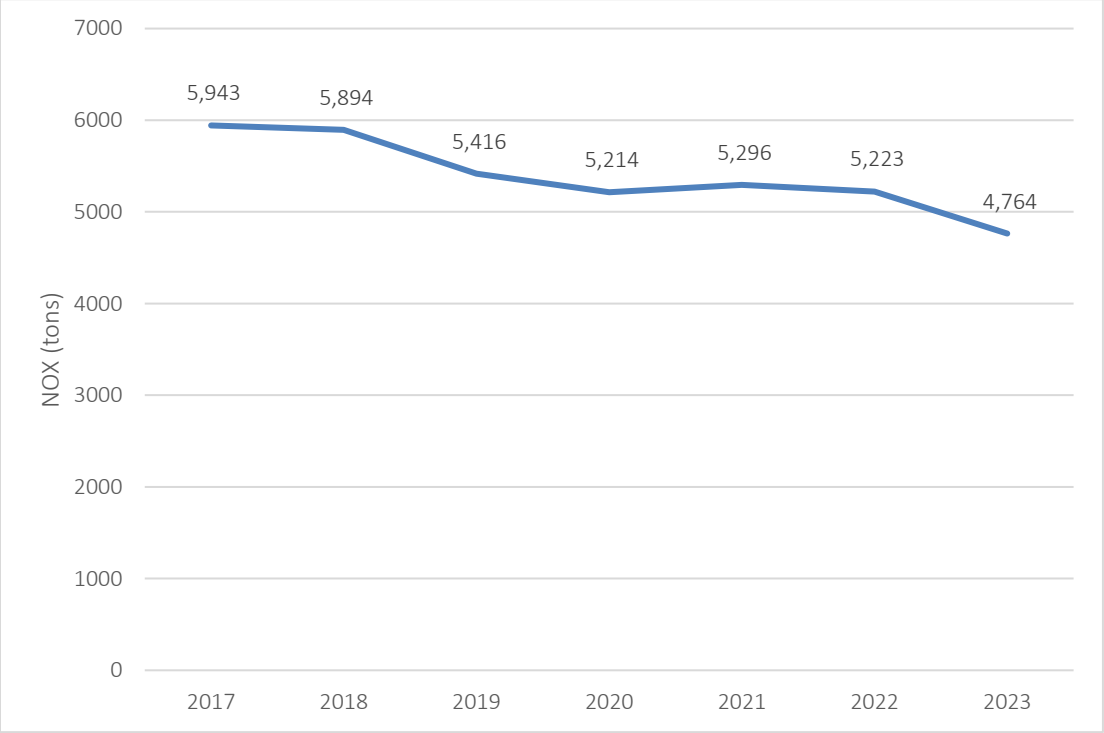
2.5 Year-round operation of NO_x controls for Large EGUs

MassDEP identified 53 EGU units in Massachusetts with a nameplate capacity of 25 MW or larger with installed controls. All these units have NO_x controls. Permits that MassDEP has issued for these units set short-term NO_x emissions limits in lbs/hr or concentration. The permits require the facilities to operate their controls to meet the permit limits at all times except during start-up. The permits also require the performance of the unit and its controls to be verified.

These permits remain in place for those facilities still operating. Therefore, MassDEP continues to implement this strategy for existing units and will do so for new units that begin operation during the second planning period based on the rules now in effect. For further details see Section 3.2 and Appendix 23 of the Regional Haze SIP.[7]

No reductions specifically due to implementation of this strategy were realized because Massachusetts facilities subject to Ask 1 (EGUs ≥ 25MW with controls) already had permits requiring year-round operation of NO_x controls. Nevertheless, a steady decline in NO_x emissions from these facilities between 2017 and 2023 can be seen in Figure 2-1 and Table 2-6.

Figure 2-1: Total NO_x Emissions for EGUs ≥ 25 MW with Controls 2017 to 2023 (tons)



[7] MA Regional Haze SIP for 2018-2028, Appendix 23 - Massachusetts Facilities Subject to Ask 1 EGUs 25 MW with Controls (https://www.mass.gov/lists/massachusetts-state-implementation-plans-sips)

Table 2-6: Annual NO_x emissions for EGUs ≥ 25MW with Controls 2017 to 2023 (tons)

Facility Name	Facility ID	Unit ID	2017	2018	2019	2020	2021	2022	2023	Operating Status
ANP Bellingham Power Generation LLC	55211	1	38.3	52.7	55.4	20.9	33.5	39.7	36.3	Operating
ANP Bellingham Power Generation LLC	55211	2	41.0	48.6	48.9	28.6	35.1	39.7	38.5	Operating
ANP Blackstone Power Generation LLC	55212	1	42.4	43.6	42.3	23.7	32.8	38.9	33.5	Operating
ANP Blackstone Power Generation LLC	55212	2	37.8	38.9	39.8	22.4	34.8	38.7	36.4	Operating
Bellingham	10307	1	127.9	22.6	7.7	7.8	19.3	29.9	9.8	Operating
Bellingham	10307	2	130.8	28.5	12.8	13.0	26.4	47.5	26.2	Operating
Berkshire Power	55041	1	70.4	47.2	17.0	26.3	32.1	26.9	5.5	Operating
Canal Station	1599	1	11.6	30.8	11.9	1.8	5.5	69.2	21.6	Operating
Canal Station	1599	2	30.8	57.9	15.1	7.1	19.2	101.7	35.4	Operating
Canal Station	1599	3			4.2	15.1	7.4	14.0	0.1	Operating
Cleary Flood	1682	8	3.6	4.6	0.5					Retired
Cleary Flood	1682	9	51.7	66.6	30.8	46.0	8.8	20.9	45.3	Operating
Dartmouth Power	52026	1	10.9	7.8	6.1	4.8	4.0	5.7	3.3	Operating
Dartmouth Power	52026	2	0.7	0.7	0.4	0.6	0.4	1.0	0.7	Operating
Dighton	55026	1	35.1	21.0	15.4	14.1	16.2	12.8	17.2	Operating
Exelon West Medway II	59882	J4			1.6	4.9	4.1	6.3	3.6	Operating
Exelon West Medway II	59882	J5			1.3	4.9	4.1	4.3	4.0	Operating
Fore River Energy Center	55317	11	57.3	51.3	54.7	39.9	44.3	55.5	24.0	Operating
Fore River Energy Center	55317	12	66.1	43.8	51.9	46.2	53.3	58.2	36.3	Operating
Kendall Green Energy LLC	1595	4	51.0	42.1	44.1	42.1	40.0	41.8	46.6	Operating
MASSPOWER	10726	1	44.2	37.0	21.5	26.7	19.7	19.7	52.3	Operating
MASSPOWER	10726	2	39.3	33.2	19.5	23.9	17.8	16.4	42.3	Operating
Milford Power, LLC	54805	1	44.5	39.9	23.2	24.6	22.0	13.9	15.9	Operating
Millennium Power	55079	1	60.5	56.6	42.2	51.2	38.6	60.9	38.0	Operating
Mystic	1588	81	47.4	31.1	19.2	13.1	7.3	11.9	9.2	Retired
Mystic	1588	82	53.4	31.2	20.7	14.3	10.1	12.9	9.6	Retired
Mystic	1588	93	42.9	34.1	16.4	15.4	11.3	10.5	9.0	Retired
Mystic	1588	94	42.9	30.3	15.1	15.5	10.1	9.9	9.1	Retired
Pittsfield Generating	50002	1	6.1	3.3	2.2	1.0	1.8	1.5	0.6	Operating
Pittsfield Generating	50002	2	6.7	3.4	2.6	1.1	2.0	1.9	0.6	Operating
Pittsfield Generating	50002	3	5.8	3.8	2.5	1.2	1.9	1.7	0.6	Operating
Potter	1660	3	8.5	10.5	7.0	0.2				Operating
Potter	1660	4	1.2	1.1	0.3	0.6	0.7	1.2	0.9	Operating
Potter	1660	5	1.4	1.2	0.4	0.6	0.8	1.7	1.4	Operating
Salem Harbor Station NGCC	60903	1		29.8	7.9	7.9	10.5	9.1	11.0	Operating
Salem Harbor Station NGCC	60903	2		27.8	8.1	10.0	7.8	6.8	8.7	Operating
South Boston Combustion Turbines	10176	B	0.5	0.6	0.2	0.1	0.1	0.3	0.1	Operating
Stony Brook Energy Center	6081	1	35.7	34.9	28.1	32.8	25.8	40.4	6.6	Operating
Stony Brook Energy Center	6081	2	2.8	10.4	3.2	2.8	1.3	13.7	2.8	Operating
Stony Brook Energy Center	6081	3	30.4	39.5	13.4	24.2	13.2	18.0	5.1	Operating
Stony Brook Energy Center	6081	4	16.1	27.4	8.5	8.9	9.0	25.1	26.5	Operating
Stony Brook Energy Center	6081	5	11.2	28.3	7.0	8.5	10.0	24.2	21.5	Operating
Tanner Street Generation, LLC	54586	2	8.9	4.9	2.5	2.5	2.9	2.1		Operating
Waters River	1678	2	15.5	7.0	3.3	4.6	5.8	7.8	6.4	Operating
West Springfield	1642	CTG1	1.9	1.4	0.2	0.3	1.0	0.4		Retired
West Springfield	1642	CTG2	2.0	1.4	0.2	0.5	1.1	0.9		Retired
Covanta Haverhill	50661		1019.7	996.4	988.7	1049.6	1034.5	772.1	710.4	Operating
SEMASS Partnership	50290		1351.3	1511.2	1434.4	1389.8	1422.7	1456.8	1616.8	Operating
Wheelabrator Millbury Facility	50878		855.2	864.7	863.2	839.0	863.1	843.4	663.7	Operating
Wheelabrator North Andover	50877		777.0	743.1	814.9	674.1	735.2	558.1	490.2	Operating
Wheelabrator Saugus	50880		602.9	639.7	578.2	598.7	586.5	627.1	580.3	Operating
Totals			5943.1	5893.9	5416.3	5213.9	5295.8	5223.1	4763.9	
Reductions from 2017				49.2	526.8	729.2	647.4	720.1	1179.3	
Percent Reduction				1%	9%	12%	11%	12%	20%	

Source: EPA CAMPD data; MassDEP Source Registration.

2.6 Fuel sulfur limit for Canal Station Unit 1

At MassDEP's request, Canal Station Unit1 conducted a four-factor analyses that concluded that reducing the sulfur content of the No. 6 fuel oil from 0.5% to 0.3% was feasible. Canal Station's owner submitted an application to modify its Plan Approval to require use of 0.3% sulfur fuel oil. MassDEP approved the plan application on May 26, 2022, and MassDEP submitted the Plan Approval to EPA for approval into the SIP on June 15, 2022. The plan approval is attached as Appendix 1. Canal Unit 1 operated at a capacity factor of 1.2 % from 2020 to 2023. If Canal Unit 1 should operate above 10% capacity factor in the future, existing NO_x RACT regulations (310 CMR 7.19) will further limit the NO_x emissions. Annual emissions reductions from 0.3% sulfur fuel oil at Canal 1 are shown in Table 2-7.

Table 2-7: Canal Station Unit 1 SO_2 Emissions Reduction from 0.3% Sulfur Fuel Oil

Year	Annual SO_2 Emissions (tons)	SO_2 Emission Rate (lbs/MMBtu)	Estimated SO_2 Emissions if using 0.5% Sulfur Fuel (tons)	Reduction in Emissions from using 0.3% Sulfur Fuel (tons)	Percentage Reduction in SO_2 Emissions from using 3% Sulfur Fuel
2010	241.6	0.4			
2011	99.1	0.4			
2012	63.7	0.4			
2019	59.0	0.4	64.3	5.3	9%
2020	7.7	0.4	8.3	0.6	8%
2021	39.9	0.4	43.1	3.2	8%
2022	320.0	0.4	357.1	37.1	12%
2023	42.5	0.3	54.6	12.2	29%

Source: MassDEP Source Registration data

2.7 Emission Reduction Strategy for HEDD Peaking Turbines

MassDEP identified 25 combustion turbines rated at 15 MW or higher that have the potential to operate on high electric demand days and evaluated these turbines relative to emissions limits identified by MANEVU. These 25 turbines are listed in Table 2-9 along with their current emission limits.

Table 2-9 shows that 14 of these turbines met the MANEVU limits in 2018 through either the 1995 (Reasonably Available Control Technology) RACT limits for combined cycle turbines or through (Best Available Control Technology) BACT permit limits – these continue to remain in effect. The limits for 11 of the units did not meet the MANEVU limits. Of these 11, 3 units have retired since 2018.

All remaining units operate with 3-year capacity factors below 1% because they run very infrequently as shown in Table 2-9. This low-capacity factor exempts them from more stringent RACT limits for NO_x that apply to units with 3-year capacity factors equal to or greater than 10%. If in the future they meet or exceed the 10% capacity factor limit then they will be subject to the RACT limits of 310 CMR 7.19 and will therefore meet the MANEVU limits.

The Regional Haze SIP included an analysis demonstrating that the retirement of Brayton Point units 1-3 and repowering of Solutia Boiler unit 11 each provide equivalent alternative SO_2 and NO_x emission reductions on HEDDs that are far larger than any NO_x reductions possible from the turbines that do not already meet the MANEVU limits. Solutia Boiler 11 emissions of NO_x and SO_2 have remained below the 2018 levels used in that analysis. That, combined with the reductions due to the five retired turbines and the continued low-capacity factors for the remaining turbines, demonstrate that the analysis of equivalent alternative emission reductions in the Regional Haze SIP remains valid.

Table 2-8: Solutia Boiler 11 Emissions 2011-2023 and Annual Emissions Reductions (MassDEP EU4/EU157)

Year	SO_2 (tons)	NO_2 (tons)	Heat Input (mmbtu)
2005	623	309	1,279,516
2006	727	276	1,499,596
2007	701	365	1,499,428
2008	747	374	1,582,952
2009	450	223	952,588
2010	667	359	1,420,020
2011	630	329	1,384,796
2012	658	303	1,428,084
2013	699	314	1,528,072
2014	668	284	1,443,820
2015	523	284	1,248,098
2016	0.3	62	911,854
2017	0.4	88	1,297,638
2018	0.4	94	1,377,328
2019	0.4	89.1	1,311,054
2020	0.3	67.5	993,540
2021	0.3	77.5	1,140,014
2022	0.3	69.9	1,027,870
2023	0.2	43.5	640,420
Average 2011-2015	636	303	1,406,574
Average 2017-2018	0.39	91	1,337,483
Average 2020-2023	0.28	64.6	950,461
Reduction from 2011-2015	636	238	
Reduction %	100%	79%	
Reduction from 2017-2018	0.1	26.4	
Reduction %	29%	29%	

Sources: Source Registration reporting by facility to MassDEP.
AQID: 0420086 EU4 /EU157 (POWER HOUSE - BOILER #11)

Table 2-9: Turbines Subject to Peaking Turbine Strategy and their Emission Limits and Capacity Factors

CAMPD Facility Name	Facility ID (ORISPL)	AMPD Unit ID	MassDEP AQID	MassDEP Unit ID	Town	Installed Date	Capacity (mmbtu/hr)	Nameplate Capacity (MW)	Average of Operating Time 2014-2016*	Capacity Factor 2017-2019 (%)	Average of Operating Time 2021-2023	Capacity Factor 2021-2023(%)	Unit Type	Fuel Type (Primary)	Fuel Type (Secondary)	Current NO_x Emission Limit - OIL (ppm at 15% O_2)	Current NO_x Emission Limit - GAS (ppm at 15% O_2)	Meets MANEVU STRIVING (25 ppm gas and 42 ppm oil)	Meets MANEVU MIN (42 ppm gas and 96 ppm oil)	Reference for Current Limits
Waters River	1678	1	1190015	1	PEABODY	15-Dec-70	321.9	21.3	379.8	1.05	87.9	0.62	Combustion turbine	Pipeline Natural Gas	Diesel Oil	100	65	NO	NO	RACT(averaging with EU2+ERC)
Waters River	1678	2	1190015	2	PEABODY	5-Nov-90	485.9	43.6	94.6	1.41	110.8	0.92	Combustion turbine	Pipeline Natural Gas	Diesel Oil	42	25	YES	YES	BACT
Medway Station	1592	J3T1	1200133	5	MEDWAY	1-Jan-70	392	45	47.8	0.53	48.4	0.55	Combustion turbine	Diesel Oil	Pipeline Natural Gas	100	65	NO	NO	RACT(averaging + ERC)
Medway Station	1592	J1T1	1200133	1	MEDWAY	1-Jan-70	392	45	54.1	0.44	32.2	0.37	Combustion turbine	Diesel Oil	Pipeline Natural Gas	100	65	NO	NO	RACT(averaging + ERC)
Medway Station	1592	J1T2	1200133	2	MEDWAY	1-Jan-70	392	45	45.3	0.37	26.8	0.31	Combustion turbine	Diesel Oil	Pipeline Natural Gas	100	65	NO	NO	RACT(averaging + ERC)
Medway Station	1592	J2T2	1200133	4	MEDWAY	1-Jan-70	392	45	45.1	0.25	27.7	0.32	Combustion turbine	Diesel Oil	Pipeline Natural Gas	100	65	NO	NO	RACT(averaging + ERC)
Medway Station	1592	J3T2	1200133	6	MEDWAY	1-Jan-70	392	45	44	0.42	28.7	0.33	Combustion turbine	Diesel Oil	Pipeline Natural Gas	100	65	NO	NO	RACT(averaging + ERC)
Medway Station	1592	J2T1	1200133	3	MEDWAY	1-Jan-70	392	45	57.6	0.28	45.2	0.52	Combustion turbine	Diesel Oil	Pipeline Natural Gas	100	65	NO	NO	RACT(averaging + ERC)
South Boston Combustion Turbines	10176	A	1191667	1	BOSTON	1-May-79	396	69	41.1	0.34	14.0	0.16	Combustion turbine	Other Oil		55		NO	YES	BACT
South Boston Combustion Turbines	10176	B	1191667	2	BOSTON	1-Feb-95	396		37.9	0.18	6.1	0.07	Combustion turbine	Other Oil		55		NO	YES	BACT
Woodland Road	1643	10	1170166	1	LEE	1-Jan-69	230	20.4	12.3	0.14	-	-	Combustion turbine	Diesel Oil		Retired	Retired	Retired	Retired	Retired
Doreen	1631	10	1170167	1	PITTSFIELD	1-Jan-69	230	21.1	9.3	0.11	-	-	Combustion turbine	Diesel Oil		Retired	Retired	Retired	Retired	Retired
Potter	1660	3	1190491	3	BRAINTREE	1-Apr-77	975.5	76	78.5	0.78	-	-	Combined cycle	Pipeline Natural Gas	Diesel Oil	65	42	NO	YES	RACT(ERC)[1] Retired
West Springfield	1642	CTG2	420117	2	WEST SPRINGFIELD	1-Jun-02	462.6	60	427.1	1.69	-	-	Combustion turbine	Pipeline Natural Gas	Diesel Oil	Retired	Retired	Retired	Retired	Retired
West Springfield	1642	CTG1	420117	1	WEST SPRINGFIELD	1-Jun-02	462.6	60	431	1.6	-	-	Combustion turbine	Pipeline Natural Gas	Diesel Oil	Retired	Retired	Retired	Retired	Retired
West Springfield	1642	10	420117	4	WEST SPRINGFIELD	27-Nov-68	244	17	13.2	0.09	-	-	Combustion turbine	Diesel Oil		Retired	Retired	Retired	Retired	Retired
Pittsfield Generating	50002	3	1170006	3	PITTSFIELD	26-Jul-90	430	40.7	1488.4	6.87	394.0	3.86	Combined cycle	Pipeline Natural Gas	Diesel Oil	14	10	YES	YES	BACT[2]
Pittsfield Generating	50002	1	1170006	1	PITTSFIELD	23-Jul-90	430	40.7	1416.8	6.41	371.9	3.64	Combined cycle	Pipeline Natural Gas	Diesel Oil	14	10	YES	YES	BACT[2]
Pittsfield Generating	50002	2	1170006	2	PITTSFIELD	18-Jul-90	430	40.7	1529.6	7.14	403.2	4.01	Combined cycle	Pipeline Natural Gas	Diesel Oil	14	10	YES	YES	BACT[2]
Stony Brook	6081	5	420001	5	LUDLOW	1-Nov-82	952	85	44.1	0.28	64.0	0.37	Combustion turbine	Diesel Oil		75		NO	YES	BACT
Stony Brook	6081	4	420001	4	LUDLOW	1-Nov-82	952	85	41.8	0.31	59.3	0.40	Combustion turbine	Diesel Oil		75		NO	YES	BACT
Stony Brook	6081	3	420001	3	LUDLOW	1-Nov-81	952	85	851.4	3.78	224.1	2.07	Combined cycle	Diesel Oil	Pipeline Natural Gas	65	42	NO	YES	RACT
Stony Brook	6081	2	420001	2	LUDLOW	1-Nov-81	952	85	68.5	0.64	101.2	1.03	Combined cycle	Diesel Oil	Pipeline Natural Gas	65	42	NO	YES	RACT
Stony Brook	6081	1	420001	1	LUDLOW	1-Nov-81	952	85	1033.7	3.83	335.8	3.22	Combined cycle	Diesel Oil	Pipeline Natural Gas	65	42	NO	YES	RACT
Kendall Green Energy LLC	1595	S6	1190093	6	CAMBRIDGE	1-Sep-70	308	20	28.3	0.42	21.6	0.25	Combustion turbine	Diesel Oil		100		NO	NO	RACT

Notes:
Blue shading indicates current unit emissions limits meet Ask 5 requirements.
RACT for these units means the 1995 RACT that does not meet Ask 5 for simple cycle turbines.
* For Woodland, Doreen, West Springfield, Kendall the average of operating hours and capacity factor in this table underestimates true operating hours and capacity factors for these units because they only report 5-6 months to EPA's CAMPD. Their annual emissions as reported in MassDEP Source Registration for 2017-2018 range from 0.16% to 0.39%. Therefore, they will not exceed the Ask 5 limit of 1720 hours or the 2018 RACT 10% capacity exemption.
[1]Potter 3: Emissions over-controlled to generate emission reduction credits (ERCs) for emission unit 2 (now decommissioned) which had no emission controls.
[2]Pittsfield Generating 1-2-3: Permit limits in lbs/hour, converted based on max heat input, F factor.
Kendall and West Springfield are less than 25 MW and therefore not Acid Rain Units. However, since they are collocated with other Acid Rain Units and their facilities are not capped below major source so they are subject to RACT.
2018 Ask 5 - STRIVING (25 ppm gas and 42 ppm oil); MINIMUM (42 ppm gas and 96 ppm oil)
Sources: MassDEP permit files, MassDEP Source Registration, EPA CAMPD.

Table 2-10: Turbines Subject to Peaking Turbine Strategy and their NO_x Emissions 2017-2023

Facility Name	Facility ID (ORISPL)	Unit ID	NO_x Emissions (tons)						
			2017	2018	2019	2020	2021	2022	2023
Doreen*	1631	10	1.7	2.2	0.4	0.7	0.4	*	*
Kendall Green Energy LLC	1595	S6	4.4	7.7	6.5	5.6	4.0	2.3	5.2
Medway Station	1592	J1T1	4.4	5.9	1.8	1.4	2.3	3.1	4.5
Medway Station	1592	J1T2	3.7	5.1	2.0	1.5	1.9	2.8	3.9
Medway Station	1592	J2T1	3.5	2.7	1.0	1.9	1.6	2.3	4.1
Medway Station	1592	J2T2	3.3	2.7	0.8	1.9	1.6	2.6	4.0
Medway Station	1592	J3T1	6.3	6.6	1.5	0.9	2.7	4.3	7.0
Medway Station	1592	J3T2	4.3	5.1	0.9	0.9	2.0	4.4	7.0
Pittsfield Generating	50002	1	6.1	3.3	2.2	1.0	1.8	1.5	0.6
Pittsfield Generating	50002	2	6.7	3.4	2.6	1.1	2.0	1.9	0.6
Pittsfield Generating	50002	3	5.8	3.8	2.5	1.2	1.9	1.7	0.6
Potter*	1660	3	8.5	10.5	7.0	0.2	*	*	*
South Boston Combustion Turbines	10176	A	1.6	0.5	0.3	0.3	0.3	0.5	0.4
South Boston Combustion Turbines	10176	B	0.5	0.6	0.2	0.1	0.1	0.3	0.1
Stony Brook Energy Center	6081	1	35.7	34.9	28.1	32.8	25.8	40.4	6.6
Stony Brook Energy Center	6081	2	2.8	10.4	3.2	2.8	1.3	13.7	2.8
Stony Brook Energy Center	6081	3	30.4	39.5	13.4	24.2	13.2	18.0	5.1
Stony Brook Energy Center	6081	4	16.1	27.4	8.5	8.9	9.0	25.1	26.5
Stony Brook Energy Center	6081	5	11.2	28.3	7.0	8.5	10.0	24.2	21.5
Waters River	1678	1	11.4	6.1	3.2	2.6	2.8	2.3	4.9
Waters River	1678	2	15.5	7.0	3.3	4.6	5.8	7.8	6.4
West Springfield*	1642	10	1.5	1.6	0.6	1.7	1.7	*	*
West Springfield*	1642	CTG1	1.9	1.4	0.2	0.3	1.0	0.4	*
West Springfield*	1642	CTG2	2.0	1.4	0.2	0.5	1.1	0.9	*
Woodland Road*	1643	10	3.1	1.8	0.6	0.9	0.8	*	*
Total Emissions for Operating Turbines that do not meet Ask 5			41.4	41.9	17.8	16.8	19.0	24.2	40.7
Total Emissions			192.6	219.9	97.9	106.4	95.1	160.6	111.9
Emissions change from 2017				27.4	-94.6	-86.2	-97.4	-32.0	-80.7
Emissions change from 2020							-11.2	54.2	5.6

Sources: MassDEP Source Registration, EPA CAMPD.

Blue shading indicates current unit emissions limits meet MANEVU limits.

* Retired

2.8 State-Level Energy Demand Reduction and Clean Technology Adoption Initiatives

In the 2021 Regional Haze SIP revision MassDEP identified a number of measures and programs that will decrease energy demand and increase new clean generation sources such as solar and wind. Most of these measures are focused on reducing greenhouse gas emissions and although not part of the SIP, these measures will achieve substantial NO_x and SO_2 emissions reductions that will contribute to visibility improvements in Class I areas through 2028 and beyond. These programs include energy efficiency investment plans implemented by the state's investor-owned electric and gas utilities; the Renewable Energy Portfolio Standard and Clean Energy Standard that require retail electricity sellers to annually demonstrate increasing percentages of the state's electricity sales come from renewable and clean energy; the Regional Greenhouse Gas Initiative that establishes a CO_2 budget and trading program; the Clean Peak Energy Standard designed to shift clean energy to peak load periods to decrease emissions; and procurements of offshore wind power and hydroelectric power to increase clean electricity for Massachusetts customers. To report on the status of these and many other clean energy initiatives Massachusetts maintains a Climate Report Card at https://www.mass.gov/report/massachusetts-climate-report-card and a Clean Energy and Climate dashboard at https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-metrics.

2.9 Reductions from municipal waste combustors (MWCs)

In response to comments from the Federal Land Managers (FLMs), MassDEP committed in the Regional Haze SIP to report on progress in controlling emissions from the municipal waste combustor facilities (MWCs) in the state. The tables below are updates to the tables in the Regional Haze SIP for the MWC units about which the FLMs expressed concern.

Emissions Control Plans (ECPs): In 2020 MassDEP issued updated Emission Control Plans (ECPs) to the MWCs with lower NO_x emission limits down from 205 ppm to a range of 146 to 150 ppm on a 24-hour basis. These ECPs were appealed and the appeals were then settled. Table 2-11 summarizes the controls and limits on the MWC facilities.

Emissions: Table 2-12 shows actual annual emissions for the MWCs updated to 2023, the most recent year available. From 2019 to 2023 emissions of NO_x decreased from 4,679 to 4,061 tons and emissions of SO_2 decreased from 744 to 739 tons. Table 2-13 and Table 2-14 show updated emission rates per ton for the MWC units and facilities.

Table 2-11: SO_2 and NO_x Controls on MWCs Identified by FLMs

Facility Name	Current Controls	310 CMR 7.08(2) MWC Rule	ECP SO_2 limits	ECP NOx limits
SEMASS PARTNERSHIP	All units: SNCR, SDA Acid Gas Control	SO_2 – 29 ppm or 75% reduction 146 ppm (RDF)	Less stringent of 29 ppm or 75% reduction (EU1&2), 29 ppm or 80% reduction (EU3)	146 ppm (24-hr daily average) for RDF
WHEELABRATOR MILLBURY INC	All units: SNCR, SDA Acid Gas Control	SO_2 – 29 ppm or 75% reduction NO_x – 150 ppm (MB)	Less stringent of 30 ppm or 80% reduction	150 ppm (24-hr daily average) and 145 ppm (30-day rolling average)
WHEELABRATOR NORTH ANDOVER INCORPORATED	Both units: SNCR, SDA Acid Gas Control	SO_2 – 29 ppm or 75% reduction NO_x – 150 ppm (MB)	Less stringent of 30 ppm or 80% reduction	150 ppm (24-hr daily average) and 145 ppm (30-day rolling average)
WHEELABRATOR SAUGUS INC	Both units: SNCR, SDA Acid Gas Control	SO_2 – 29 ppm or 75% reduction NO_x – 150 ppm (MB)	Less stringent of 30 ppm or 80% reduction	150 ppm (24-hr daily average utilizing ERCs) and 175 ppm 30-day rolling average (no ERCs)
COVANTA HAVERHILL	Both units: SNCR, SDA Acid Gas Control	SO_2 – 29 ppm or 75% reduction NO_x – 150 ppm (MB)	Less stringent of 29 ppm or 75% reduction	150 ppm (24-hr daily average)

* NO_x control effectiveness is minimum effectiveness needed to reduce estimated uncontrolled emissions to meet the emissions limit. The basis for control effectiveness is uncontrolled values of 265 ppm (RDF - SEMASS) and 231 ppm (mass burn – Wheelabrator units) derived from AP-42 Ch 2 Sec 1. Note that the facilities over-control to maintain a margin of compliance so that actual control effectiveness is likely greater than shown.

** Wheelabrator Saugus is allowed to use Emission Reduction Credits to meet 150 ppm emissions limit.

MD = mass burn applies to all ECP limits unless otherwise noted

RDF = refuse derived fuel

Table 2-12: MWC SO_2 and NO_x Emissions 2008 - 2023 (tons/yr)

Facility Name	AQID	Pollutant	2008	2011	2015	2018	2019	2023
SEMASS PARTNERSHIP – SE	1200001	SO_2	523	451	192	362	378	512
WHEELABRATOR MILLBURY INC – CE	1180419	SO_2	139	225	224	166	147	115
WHEELABRATOR NORTH ANDOVER INCORPORATED – NE	1210261	SO_2	58	38	51	72	82	36
WHEELABRATOR SAUGUS INC – NE	1197654	SO_2	55	31	54	16	33	24
COVANTA HAVERHILL -- NE	1210007	SO_2	71	74	12	96	104	52
SEMASS PARTNERSHIP	1200001	NO_X	1384	1259	1249	1511	1434	1617
WHEELABRATOR MILLBURY INC	1180419	NO_X	814	865	873	865	863	664
WHEELABRATOR NORTH ANDOVER INCORPORATED	1210261	NO_X	781	768	738	743	815	490
WHEELABRATOR SAUGUS INC	1197654	NO_X	722	705	667	640	578	580
COVANTA HAVERHILL -- NE	1210007	NO_X	897	1021	986	996	989	710

Source: MassDEP Source Registration data

Table 2-13: MWC Unit SO_2 and NO_x Emission Rates for 2018 and 2023 (lbs/ton)

Facility Name	AQID	Design Capacity	Pollutant	2018 Actual Emissions All Units, TPY	2018 Unit Specific Actual Emissions, TPY	2018 Unit Specific MSW Burned, TPY	2018 Unit Specific Emission Rate, lb/Ton MSW Burned	2023 Actual Emissions All Units, TPY	2023 Unit Specific Actual Emissions, TPY	2023 Unit Specific MSW Burned, TPY	2023 Unit Specific Emission Rate, lb/Ton MSW Burned
SEMASS PARTNERSHIP – SE	1200001	3 units, 375 MMBtu/hr each	SO_2	362	U1 – 149.9 U2 – 133.0 U3 – 79.4	U1 – 338,213 U2 – 362,002 U3 – 375,297	U1 – 0.8820 U2 – 0.7280 U3 – 0.4220	512	U1 – 169.1 U2 – 180.0 U3 – 162.9	U1 – 356,831 U2 – 349,572 U3 – 355,441	U1-0.9478 U2-1.0298 U3-0.9166
WHEELABRATOR MILLBURY INC – CE	1180419	2 units, 323 MMBtu/hr each	SO_2	166	U1 – 82.4 U2 – 83.2	U1 – 236,036 U2 - 245,428	U1 - 0.6985 U2 - 0.6781	115	U1-59.7 U2-55.6	U1-248,117 U2-252,218	U1-0.4812 U2-0.4409
WHEELABRATOR NORTH ANDOVER INCORPORATED – NE	1210261	2 units, 288.4 MMBtu/hr each	SO_2	72	U1 – 28.8 U2 – 43.0	U1 - 229,001 U2 - 227,852	U1 - 0.2516 U2 - 0.3772	36	U1-21.0 U2-14.7	U1-216,147 U2-217,712	U1-0.1943 U2-0.1350
WHEELABRATOR SAUGUS INC – NE	1197654	2 units, 325 MMBtu/hr each	SO_2	16	U1 – 9.1 U2 – 7.0	U1 - 211,926 U2 - 219,763	U1 - 0.0861 U2 - 0.0636	24	U1-15.6 U2-8.6	U1-216,572 U2-213,846	U1-0.1441 U2-0.0804
COVANTA HAVERHILL -- NE	1210007	2 units, 381.56 MMBtu/hr each	SO_2	96	U1 - 49.5 U2 - 46.6	U1 - 295,011 U2 - 299,073	U1 - 0.3356 U2 - 0.3116	52	U1 – 29.4 U2 -22.4	U1 – 312,101 U2 – 305,182	U1 - 0.1858 U2 – 0.1442
SEMASS PARTNERSHIP	1200001	3 units, 375 MMBtu/hr each	NO_x	1511	U1 – 569.4 U2 – 550.2 U3 – 389.3	U1 – 338,213 U2 – 362,002 U3 – 375,297	U1 – 3.3890 U2 – 3.0360 U3 – 2.0700	1617	U1 – 463.3 U2 – 566.1 U3 – 587.3	U1 – 356,831 U2 – 349,572 U3 – 355,441	U1-2.5967 U2-3.2388 U3-3.3046
WHEELABRATOR MILLBURY INC	1180419	2 units, 323 MMBtu/hr each	NO_x	865	U1 – 431.9 U2 – 430.9	U1 - 236,036 U2 - 245,428	U1 – 3.6592 U2 – 3.5113	664	U1-336.3 U2-327.3	U1-248,117 U2-252,218	U1-2.7108 U2-2.5954
WHEELABRATOR NORTH ANDOVER INCORPORATED	1210261	2 units, 288.4 MMBtu/hr each	NO_x	743	U1 – 363.6 U2 – 379.0	U1 - 229,001 U2 - 227,852	U1 – 3.1758 U2 – 3.3271	490	U1-241.8 U2-248.3	U1-216,147 U2-217,712	U1-2.2374 U2-2.2810
WHEELABRATOR SAUGUS INC	1197654	2 units, 325 MMBtu/hr each	NO_x	640	U1 – 304.1 U2 – 323.7	U1 - 211,926 U2 - 219,763	U1 – 2.8697 U2 – 2.9459	580	U1-309.7 U2-270.6	U1-216,572 U2-213,846	U1-2.8600 U2-2.5308
COVANTA HAVERHILL -- NE	1210007	2 units, 381.56 MMBtu/hr each	NO_x	996	U1 – 499.2 U2 – 494.4	U1 - 295,011 U2 - 299,073	U1 – 3.3843 U2 – 3.3062	710	U1 – 367.1 U2 – 343.2	U1 – 312,101 U2 – 305,182	U1 – 2.3524 U2 – 2.2491

Source: MassDEP Source Registration data

Table 2-14: MWC Facility Emission Rates for 2018 and 2023 (lbs/MMBtu)

Facility Name	AQID	Design Capacity	Pollutant	2018 Actual Emissions All Units, TPY	2018 MSW Burned All Units, TPY	2018 MSW Heat Input, MMBtu	2018 Actual Emission Rate, lb/MMBtu	2023 Actual Emissions All Units, TPY	2023 MSW Burned All Units, TPY	2023 MSW Heat Input, MMBtu	2023 Actual Emission Rate, lb/MMBtu
SEMASS PARTNERSHIP – SE	1200001	3 units, 375 MMBtu/hr each	SO_2	362	1,075,512	9,679,608	0.0748	512	1,061,844	9,556,596	0.1072
WHEELABRATOR MILLBURY INC – CE	1180419	2 units, 323 MMBtu/hr each	SO_2	166	481,464	4,333,176	0.0766	115	500,335	4,333,176	0.0531
WHEELABRATOR NORTH ANDOVER INCORPORATED – NE	1210261	2 units, 288.4 MMBtu/hr each	SO_2	72	456,853	4,111,677	0.0350	36	433,859	3,904,731	0.0184
WHEELABRATOR SAUGUS INC – NE	1197654	2 units, 325 MMBtu/hr each	SO_2	16	431,689	3,885,201	0.0082	24	430,418	3,873,762	0.0124
COVANTA HAVERHILL -- NE	1210007	2 units, 381.56 MMBtu/hr each	SO_2	96	594,084	5,346,756	0.0359	52	617,283	5,555,547	0.0187
SEMASS PARTNERSHIP	1200001	3 units, 375 MMBtu/hr each	NO_x	1511	1,075,512	9,679,608	0.3122	1617	1,061,844	9,556,596	0.3384
WHEELABRATOR MILLBURY INC	1180419	2 units, 323 MMBtu/hr each	NO_x	865	481,464	4,333,176	0.3992	664	500,335	4,333,176	0.3065
WHEELABRATOR NORTH ANDOVER INCORPORATED	1210261	2 units, 288.4 MMBtu/hr each	NO_x	743	456,853	4,111,677	0.3614	490	433,859	3,904,731	0.2510
WHEELABRATOR SAUGUS INC	1197654	2 units, 325 MMBtu/hr each	NO_x	640	431,689	3,885,201	0.3295	580	430,418	3,873,762	0.2995
COVANTA HAVERHILL -- NE	1210007	2 units, 381.56 MMBtu/hr each	NO_x	996	594,084	5,346,756	0.3726	710	617,283	5,555,547	0.2556

Assumes 4,500 Btu/lb MSW from AP-42
Source: MassDEP Source Registration data

3. Visibility Conditions and Changes

40 CFR 51.308(g)(3) requires that states with Class I areas assess the visibility conditions and changes described in items 1-3 below, expressed in terms of 5-year averages of the annual haze index values, in deciviews, for the 20% most impaired and clearest days.

1. Current visibility conditions.
2. The difference between current conditions and baseline conditions.
3. The change in visibility impairment since the most recent SIP revision.

Although Massachusetts does not have a Class I area, visibility conditions are presented here for all the MANEVU Class I areas for reference.

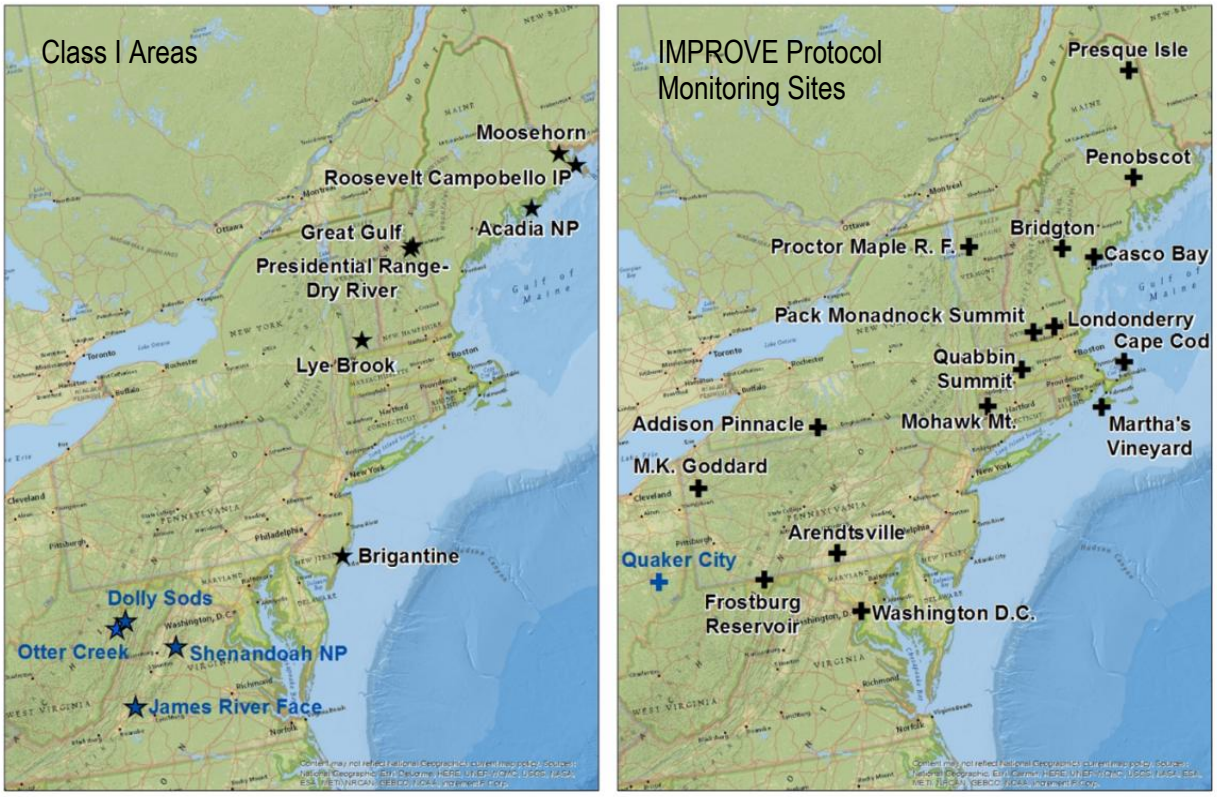
3.1 Visibility Monitoring

The Interagency Monitoring of Protected Visual Environments (IMPROVE) program[8] was established in 1985 to provide the data needed to assess current visibility, track changes in visibility, and help determine the causes of visibility impairment in Class I areas. IMPROVE is a collaborative of state, tribal, and federal agencies, and international partners. IMPROVE monitors in and near the MANEVU region are shown in Figure 3-1.

In Massachusetts, three IMPROVE monitors have provided data to the IMPROVE program: Cape Cod (CACO), Martha's Vineyard (MAVI), and Quabbin Summit (QURE). The CACO IMPROVE monitor is located at Cape Cod National Seashore in Truro and is operated by the National Park Service. The MAVI IMPROVE monitor is located on Martha's Vineyard and is operated by the Wampanoag Tribe of Gay Head (Aquinnah). The QURE IMPROVE monitor was located at the Quabbin Reservoir in Ware and was operated by MassDEP. EPA eliminated funding for MassDEP's IMPROVE monitor at Quabbin Reservoir, and as a result, MassDEP discontinued IMPROVE monitoring at the end of 2015.[9]

[8] IMPROVE program website: http://vista.cira.colostate.edu/improve/.
[9] Massachusetts 2016 Air Monitoring Network Plan. MassDEP Air Assessment Branch. November 2016. (https://www.mass.gov/lists/massdep-air-monitoring-plans-reports-studies)

Figure 3-1: Class I Areas and IMPROVE Monitoring Sites In and Adjacent to the MANEVU Region



Source: Figure 1-1. *Visibility Trends 2004-2022 Report (2nd RH SIP Metrics). MANEVU. Aug. 13, 2024*. (Appendix 2)

3.2 Visibility Trends

Visibility impairment is expressed in deciviews (dv), where the higher the value, the greater the visibility impairment (i.e., higher dv values mean worse visibility). Generally, a one deciview change in the haze index is likely to be perceptible to the human eye. The IMPROVE program calculates deciviews from several different measurements collected by its monitors. MANEVU used IMPROVE data to assess visibility conditions for Class I areas impacted by MANEVU states. MANEVU has presented these data in the report Mid-Atlantic/Northeast U.S. Visibility Data (2nd RH SIP Metrics).[10]

The tables in this section show data from the MANEVU visibility report for Class I areas in and near MANEVU (i.e., potentially affected by emissions from MANEVU states). The figures

[10] Mid-Atlantic/Northeast U.S. Visibility Data (2nd RH SIP Metrics), MANE-VU. August 13, 2024 (https://otcair.org/manevu/materials/reports) (Appendix 2)

(also taken from the MANEVU report) illustrate visibility trends for MANEVU Class I areas potentially impacted by emissions from Massachusetts.

The goal for the RHR is natural background visibility – the conditions that would exist without anthropogenic pollution. MANEVU calculated natural background for each Class I area for both the 20% clearest days and the 20% of days with the most impaired visibility. The RHR requires states to compare natural background visibility to a baseline visibility for the 5-year period from 2000-2004 for both the 20% clearest days and 20% most impaired days. The straight-line between the baseline (in 2000) and natural conditions (in 2064) for the 20% most impaired days defines the uniform rate of progress (URP) line or "glide path" for each Class I area (shown in Figures 3-2 to 3-6).

The actual visibility for each year after the baseline period was calculated as a rolling 5-year average for both the 20% most impaired days and the 20% clearest days for each year (also shown in Figures 3-2 to 3-6). The values for the current 5-year period (2018-2022) are in the tables and in the figures.

The RHR requires states with Class I areas to determine reasonable progress goals (RPGs) for each area to be achieved by the end of the current planning period (i.e., 2028 for the second planning period). The RPGs are designed to: (1) at a minimum ensure no degradation in visibility from the baseline period for the 20% clearest days and (2) achieve reasonable progress toward natural conditions for the 20% most impaired days. MANEVU Class I states determined the 2028 RPGs based on inventory projections and modeling based on expected reductions from state long-term strategies, including responses to the MANEVU Ask. [11] The 2028 RPGs are shown in Figures 3-2 to 3-6 with a straight-line from the baseline period so they may be compared to current progress and the URP.

The RHR specifies that the period to assess for current conditions is the most recent 5-year period preceding the required date of the progress report for which data are available 6 months preceding the required date of the progress report. Based on this criterion, the most recent 5-year period for this progress report is 2018-2022.

To satisfy requirements 1 and 2 above, current conditions, baseline conditions, and the difference between the two are shown in Tables 3-1 and 3-2 for the 20% most impaired and the 20% clearest days respectively. For item 3, Tables 3-3 and 3-4 repeat the current conditions and present the conditions that were most recent at the time that the second planning period regional haze SIPs were drafted (these are labeled as "Most Recent Plan").

All haze indexes presented below are based on data that was measured and analyzed as part of the Interagency Monitoring of Protected Visual Environments (IMPROVE) program

[11] MANEVU Intra-RPO "Ask": (https://otcair.org/manevu/Upload/Publication/Formal%20Actions/MANE-VU%20Intra-Regional%20Ask%20Final%208-25-2017.pdf)

(http://vista.cira.colostate.edu/IMPROVE/Default.htm). The data were accessed via the Federal Land Manager Environmental Database (FED, http://views.cira.colostate.edu/fed/).

Table 3-1: Baseline and Current Conditions for MANEVU Class I Areas, 20% Most Impaired Days (in deciviews)

Class I Area	State/Province	Baseline 2000-2004	Current 2018-2022	Difference
Acadia National Park	ME	22.01	13.84	-8.17
Moosehorn Wilderness Area	ME	20.65	12.86	-7.79
Roosevelt Campobello Int'l Park	NB			
Great Gulf Wilderness Area	NH	21.88	11.82	-10.06
Presidential Range - Dry River Wild. Area	NH			
Brigantine Wilderness Area	NJ	27.43	16.91	-10.52
Lye Brook Wilderness Area	VT	23.57	13.34	-10.23

Difference = Current minus Baseline; therefore, negative differences indicate an improvement in visibility since the time of baseline

Table 3-2: Baseline and Current Conditions for MANEVU Class I Areas, 20% Clearest Days (in deciviews)

Class I Area	State/Province	Baseline 2000-2004	Current 2018-2022	Difference
Acadia National Park	ME	8.78	6.20	-2.58
Moosehorn Wilderness Area	ME	9.16	6.10	-3.06
Roosevelt Campobello Int'l Park	NB			
Great Gulf Wilderness Area	NH	7.65	4.53	-3.12
Presidential Range - Dry River Wild. Area	NH			
Brigantine Wilderness Area	NJ	14.33	9.97	-4.36
Lye Brook Wilderness Area	VT	6.37	4.41	-1.96

Difference = Current minus Baseline; therefore, negative differences indicate an improvement in visibility since the time of baseline

Table 3-3: Most Recent Plan and Current Conditions for MANEVU Class I Areas, 20% Most Impaired Days (in deciviews)

Class I Area	State/Province	Most Recent Plan 2015-2019	Current 2018-2022	Difference
Acadia National Park	ME	14.24	13.84	-0.4
Moosehorn Wilderness Area	ME	12.99	12.86	-0.13
Roosevelt Campobello Int'l Park	NB			
Great Gulf Wilderness Area	NH	12.33	11.82	-0.51
Presidential Range - Dry River Wild. Area	NH			
Brigantine Wilderness Area	NJ	18.53	16.91	-1.62

Lye Brook Wilderness Area	VT	14.06	13.34	-0.72

Difference = Current minus Most Recent Plan; therefore, negative differences indicate an improvement in visibility since the time of the second planning period regional haze SIPs.

Table 3-4: Most Recent Plan and Current Conditions for MANEVU Class I Areas, 20% Clearest Days (in deciviews)

Class I Area	State/Province	Most Recent Plan 2015-2019	Current 2018-2022	Difference
Acadia National Park	ME	6.36	6.20	-0.16
Moosehorn Wilderness Area	ME	6.48	6.10	-0.38
Roosevelt Campobello Int'l Park	NB			
Great Gulf Wilderness Area	NH	4.69	4.53	-0.16
Presidential Range - Dry River Wild. Area	NH			
Brigantine Wilderness Area	NJ	10.81	9.97	-0.84
Lye Brook Wilderness Area	VT	4.88	4.41	-0.47

Difference = Current minus Most Recent Plan; therefore, negative differences indicate an improvement in visibility since the time of the second planning period regional haze SIPs.

Tables 3-5 and 3-6 compare current conditions to the modeled 2028 reasonable progress goals. Table 3-5 presents those for the 20% Most Impaired days and Table 4-6 addresses the 20% Clearest days.

Table 3-5: Modeled 2028 RPGs and Current Conditions for MANEVU Class I Areas, 20% Most Impaired Days (in deciviews)

Class I Area	State/Province	RPG 2028	Current 2018-2022	Difference
Acadia National Park	ME	13.35	13.84	0.49
Moosehorn Wilderness Area	ME	13.12	12.86	-0.26
Roosevelt Campobello Int'l Park	NB			
Great Gulf Wilderness Area	NH	12.00	11.82	-0.18
Presidential Range - Dry River Wild. Area	NH			
Brigantine Wilderness Area	NJ	17.97	16.91	-1.06
Lye Brook Wilderness Area	VT	13.68	13.34	-0.34

Difference = Current minus RPG; therefore, negative differences indicate that current conditions are lower (i.e., better) than the 2028 RPGs.

Table 3-6: Modeled 2028 RPGs and Current Conditions for MANEVU Class I Areas, 20% Clearest Days (in deciviews)

Class I Area	State/Province	RPG 2028	Current 2018-2022	Difference
Acadia National Park	ME	6.33	6.20	-0.13
Moosehorn Wilderness Area	ME	6.45	6.10	-0.35
Roosevelt Campobello Int'l Park	NB			
Great Gulf Wilderness Area	NH	5.06	4.53	-0.53
Presidential Range - Dry River Wild. Area	NH			
Brigantine Wilderness Area	NJ	10.47	9.97	-0.5
Lye Brook Wilderness Area	VT	3.86	4.41	0.55

Difference = Current minus RPG; therefore, negative differences indicate that current conditions are lower (i.e., better) than the 2028 RPGs.

Findings from these data are summarized below.

- Tables 3-1 and 3-2 show that current 5-year haze indexes for all MANEVU Class I areas are lower than those from the time of baseline, meaning that visibility has improved since the time of baseline for both the 20% Most Impaired and the 20% Clearest days.

- Tables 3-3 and 3-4 show that current 5-year haze indexes at all MANEVU Class I areas are lower than those that were current at the time of the second planning period regional haze SIPs, meaning that there have been similar improvements in visibility since the time of the second planning period regional haze SIPs.

- Tables 3-5 and 3-6 show that current 5-year haze indexes are below the modeled 2028 RPGs at all MANEVU Class I areas except for Acadia where the visibility for the 20% most impaired days is 0.19 deciviews (4%) higher and for Lye Brook where the visibility for the 20% clearest days is 0.55 deciviews (14%) higher than the RPGs.

In addition to the visibility improvements at MANEVU Class I areas, visibility has improved at the following Class I areas that are considered nearby to MANEVU.

- Dolly Sods and Otter Creek in WV

- James River Face and Shenandoah National Park in VA

Visibility metrics for these Class I areas, the MANEVU Class I areas, and the MANEVU and Nearby IMPROVE Protocol sites are shown in the MANEVU Technical Support Committee's 2022 Visibility Data Report which is provided as Appendix 2.

Figures 3-2 to 3-6 illustrate visibility trends in the MANEVU Class I areas. They present annual and 5-year average haze indexes on the 20% clearest days and 20% most impaired days at MANEVU and adjacent Class I areas between 2000 and 2022 in the context of long-term visibility goals. URPs and RPGs shown in the figures are the long-term visibility goals for each

Class I area. The MANEVU visibility report concluded: *these figures show that haze levels on the 20 percent clearest and 20 percent most impaired days from 2000 through 2022 have dropped across the entire region (although in very recent years, a leveling off, or even increase, is evident at some sites).*

3.3 Conclusions

MANEVU drew the following conclusions in the visibility report.

- *The visibility data examined using the 20 percent most impaired and 20 percent clearest days metrics in this report demonstrate that broad, regional efforts to reduce emissions of visibility-impairing pollutants have had a beneficial effect at the region's Class I areas.*
- *IMPROVE data trends indicate that states continue to be on track keeping visibility levels significantly below the uniform rate of progress levels and some Class I areas have already achieved levels below the respective RPGs.*
- *However, further progress is needed at some Class I areas to achieve 2028 reasonable progress goals that have been established for the second regional haze implementation planning period.*
- *Further work is also needed to ensure that downward trends continue towards the RHR goal of natural visibility conditions by 2064.*

Figure 3-2: Visibility Metrics Levels at Acadia National Park

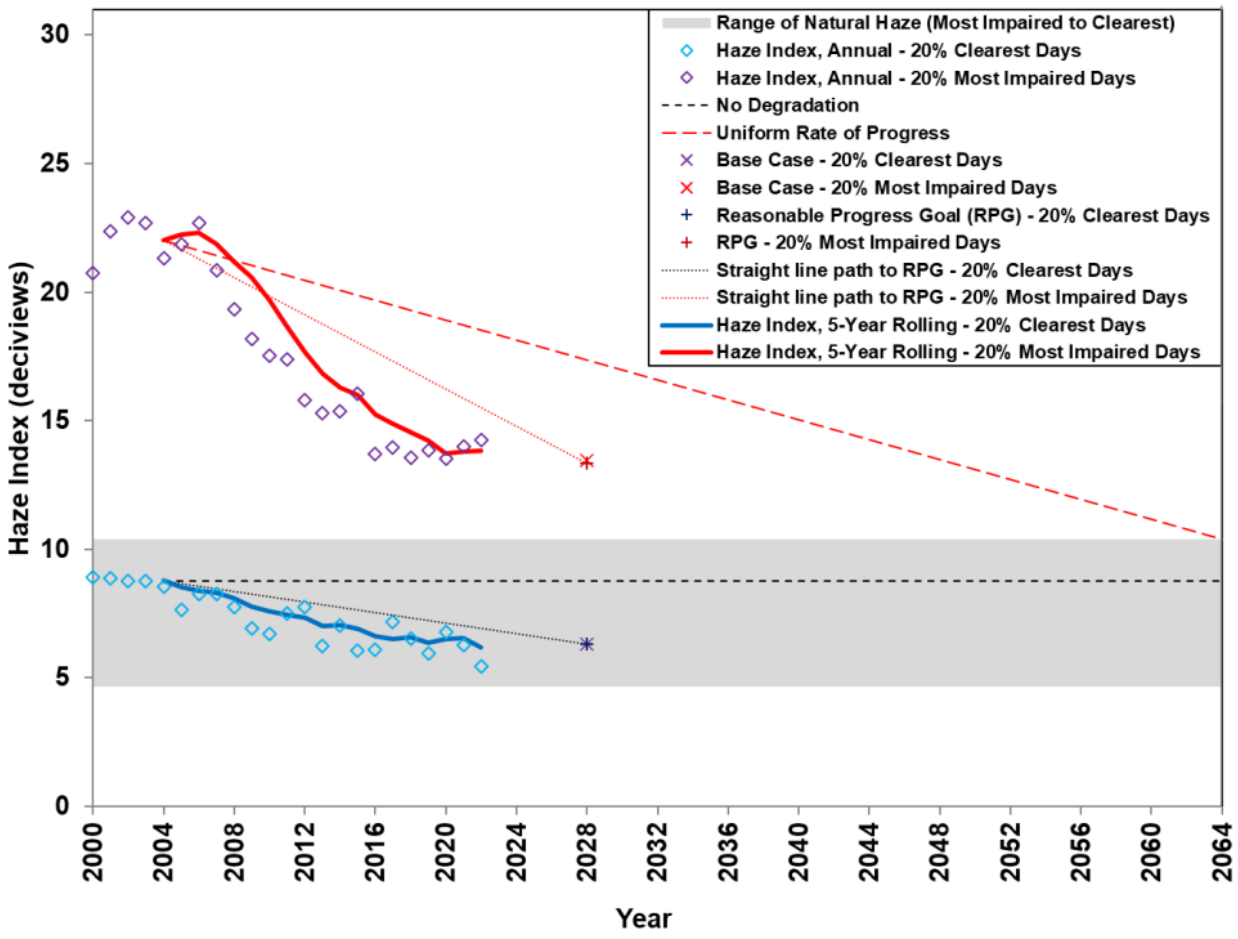


Figure 3-3: Visibility Metrics Levels at Moosehorn Wilderness Area

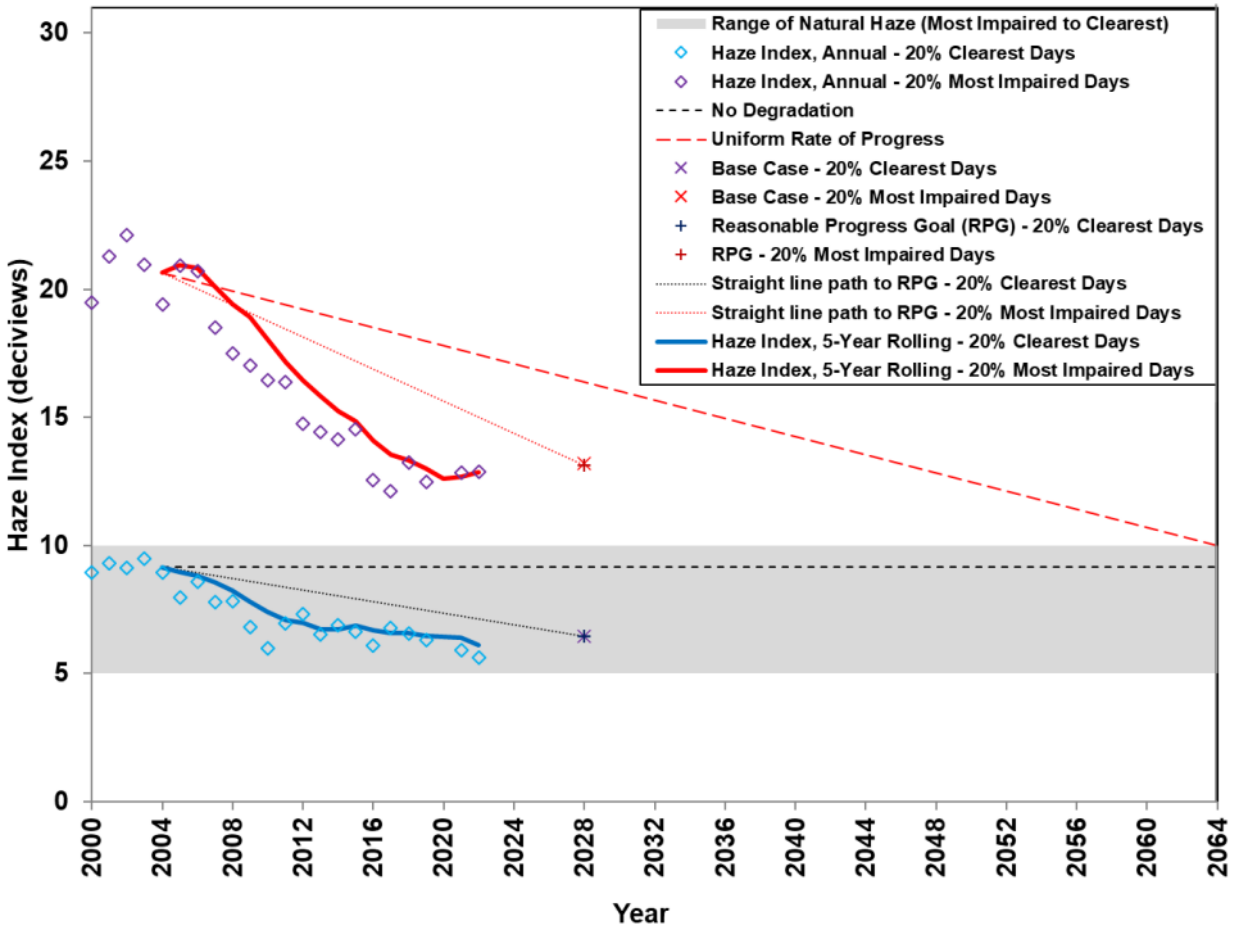


Figure 3-4: Visibility Metrics Levels at Great Gulf Wilderness Area

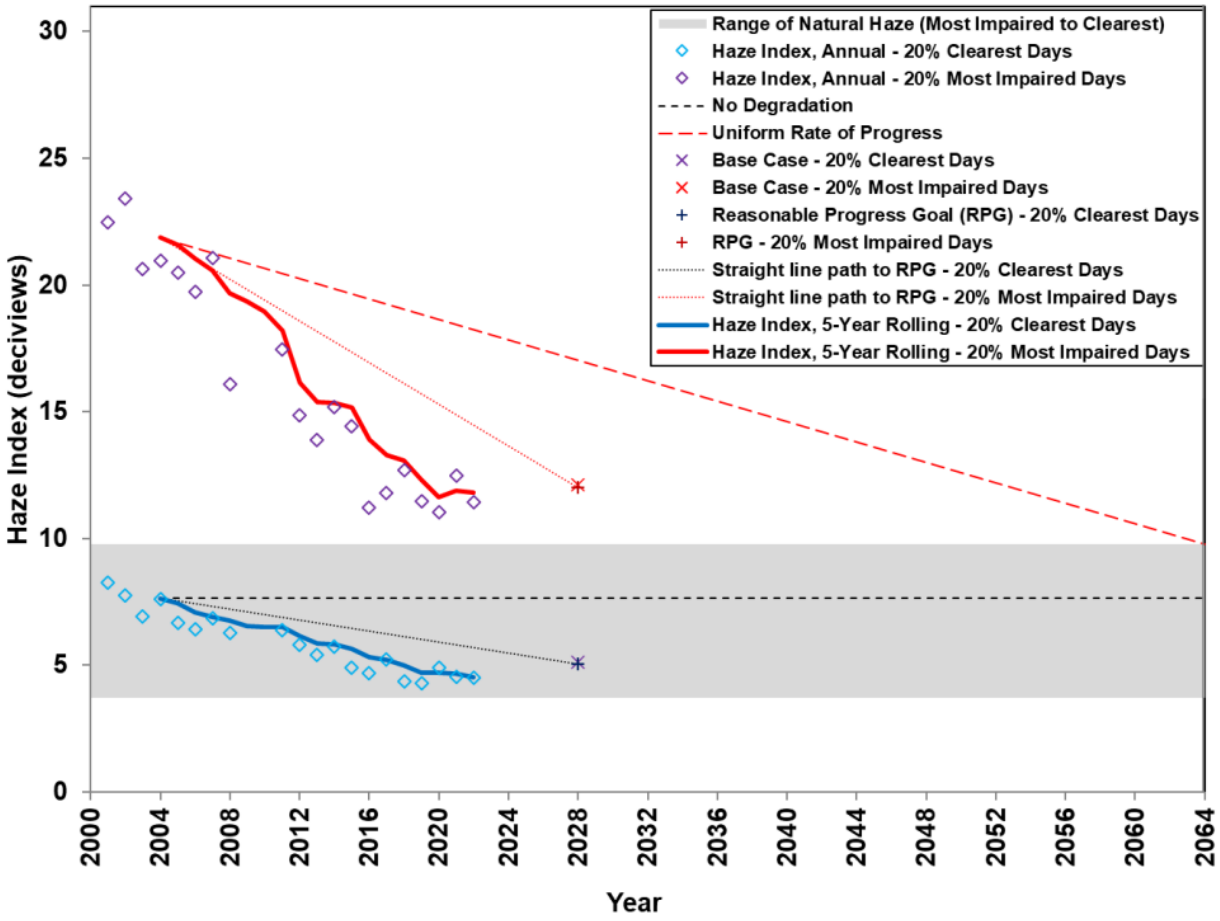


Figure 3-5: Visibility Metrics Levels at Lye Brook Wilderness Area

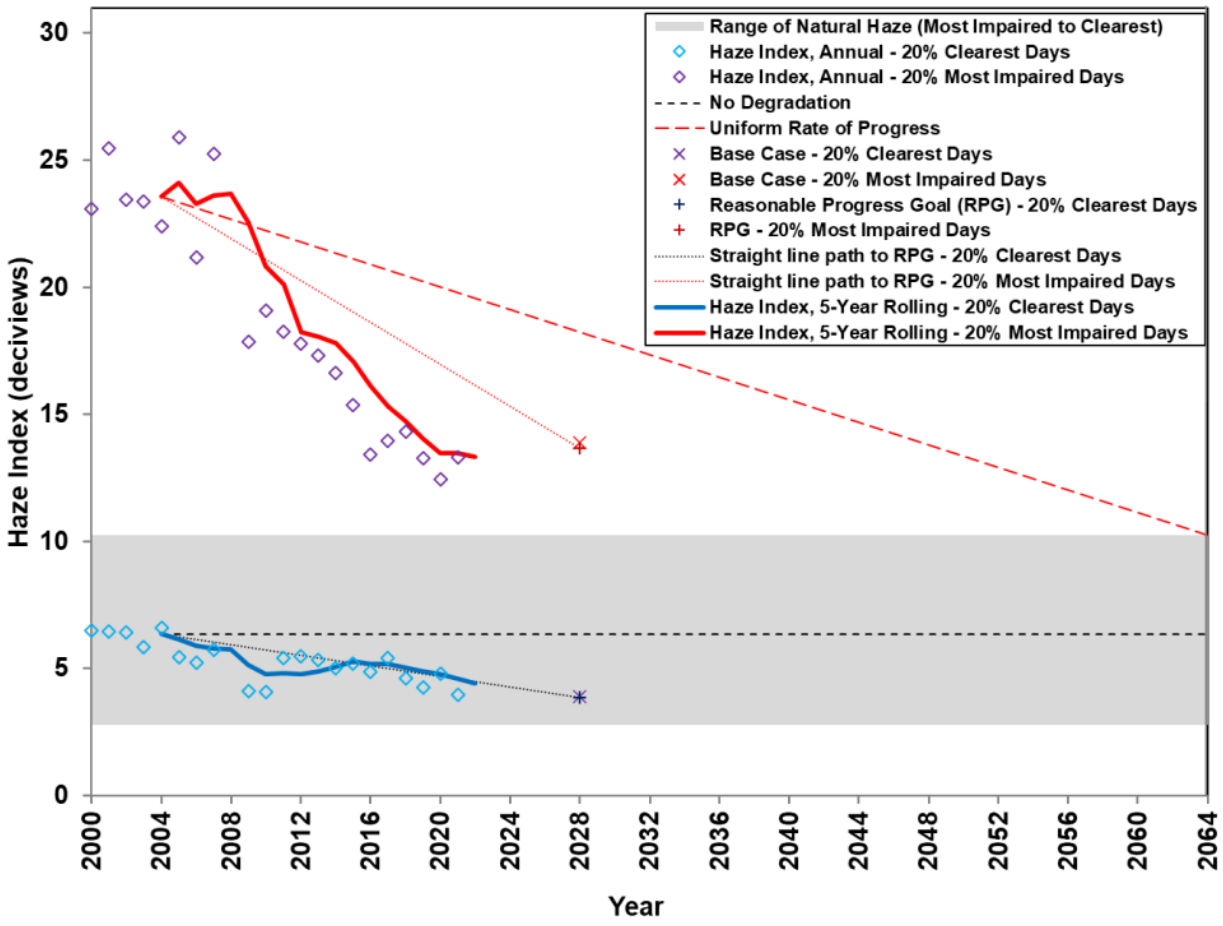
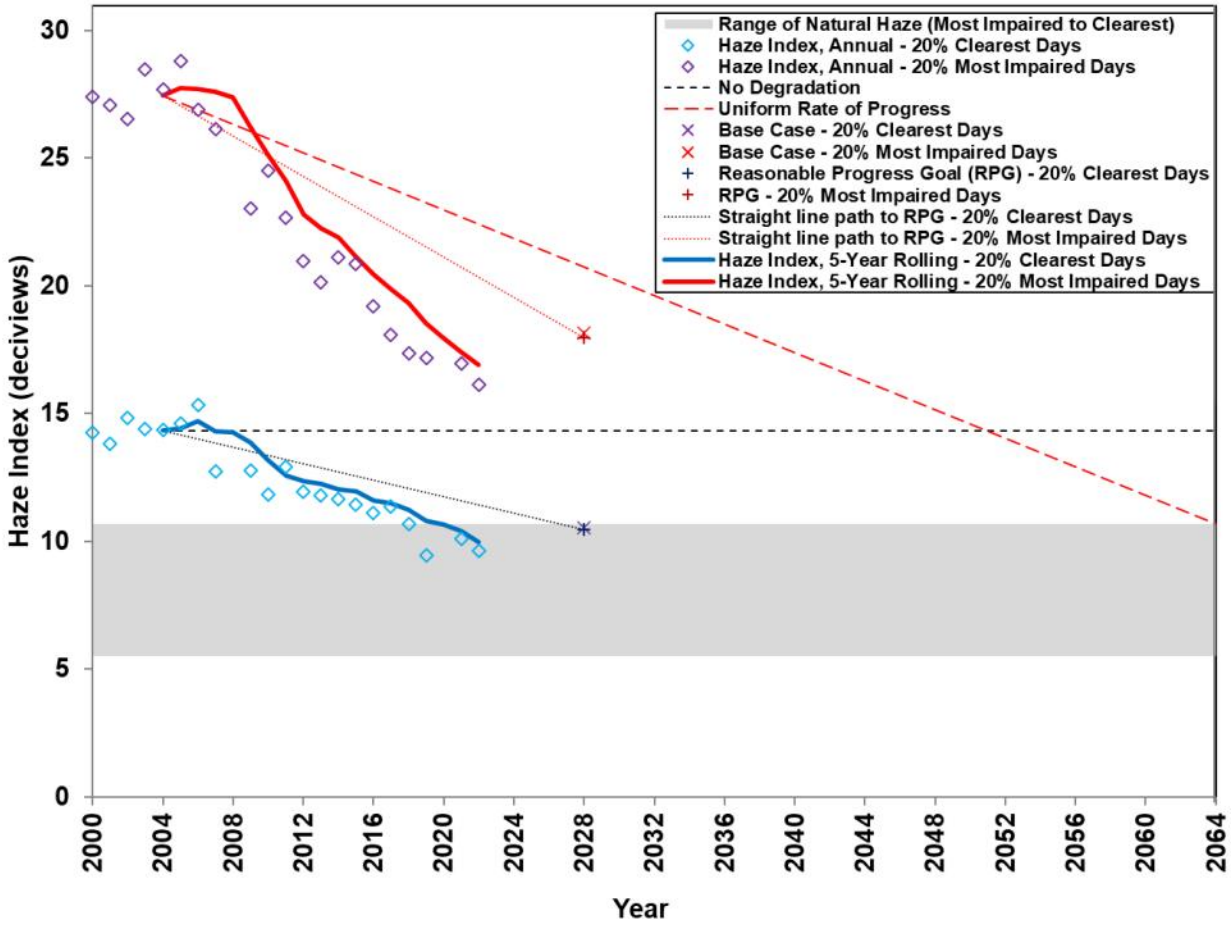


Figure 3-6: Visibility Metrics Levels at Brigantine Wilderness Area



Source for Figures 2-2 – 2-6: Mid-Atlantic/Northeast U.S. Visibility Data (2nd RH SIP Metrics), MANEVU. August 13, 2024 (https://otcair.org/manevu/materials/reports) (Appendix 2)

4. Change in Emissions

40 CFR 51.308(g)(4) requires: *An analysis tracking the change over the period since the period addressed in the most recent plan . . . 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 . . . as of a date 6 months preceding the required date of the progress report. 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.*

40 CFR 51.308(g)(4) has two distinct requirements for two separate sets of emissions inventory data.

1. **Emissions from all sources and activities**. The primary source of this data is the National Emissions Inventory (NEI), which is compiled and published every 3 years by 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 6 months prior to the required date of the progress report. Information and data for the NEI can be found at https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei.

2. **Emissions from sources that report to a centralized EPA database**. There are large individual emissions sources that are required to report their emissions directly to EPA because they are subject to an air quality program such as the Cross-State Air Pollution Rule, the Acid Rain Program, or the Regional Greenhouse Gas Initiative. 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 available from EPA's Clean Air Markets Program Data(base) (CAMPD) at https://ampd.epa.gov/ampd/. For purposes of 51.308(g)(4), the analysis must extend through the most recent year available 6 months prior to the required date of the progress report.

The sections below detail the changes in emissions since the time of the second planning period regional haze SIPs for all emissions sources and CAMPD emissions sources respectively. The summaries cover the visibility impairing pollutants below.

- Ammonia (NH_3)

- Nitrogen Oxides (NO_x)
- Particulate Matter < 10 microns (PM_{10})
- Particulate Matter < 2.5 microns ($PM_{2.5}$)
- Sulfur Dioxide (SO_2)
- Volatile Organic Compounds (VOC)

4.1 All Emissions Sources and Activities

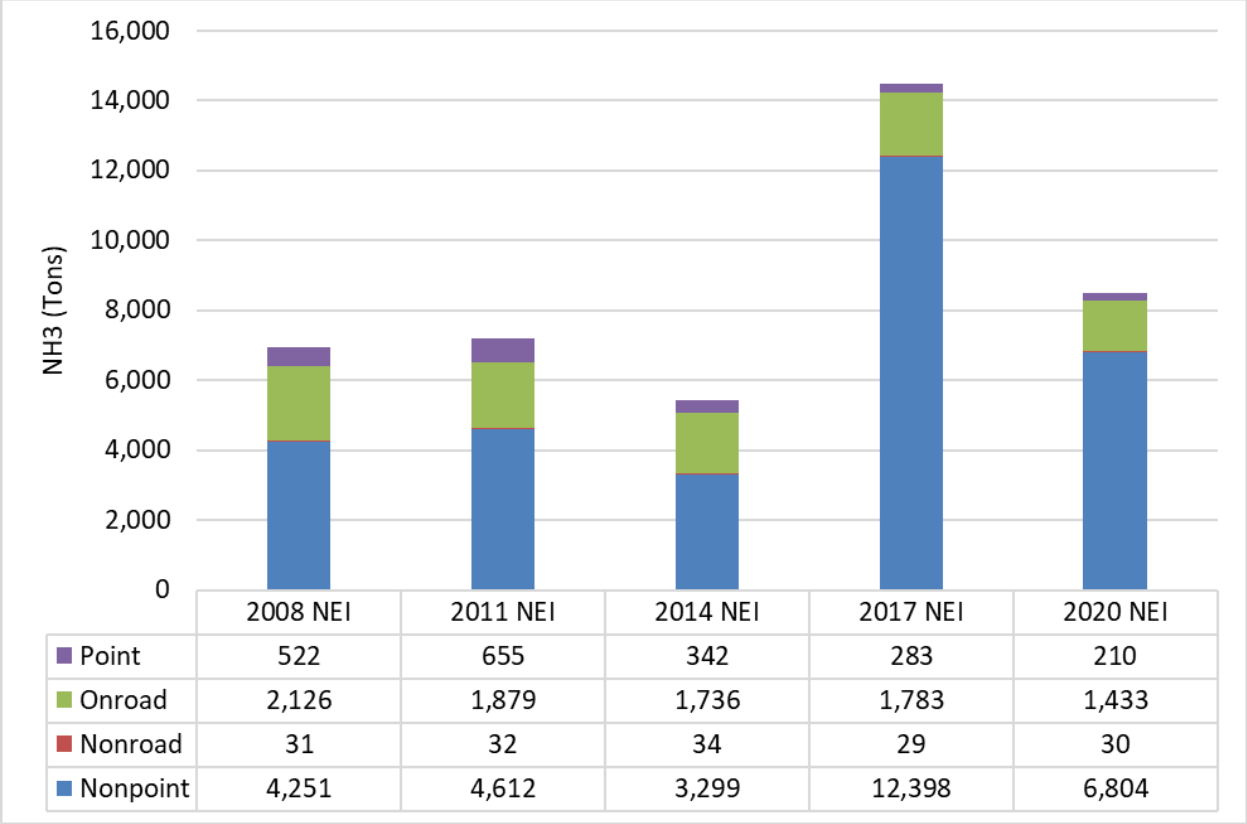
The source of this data is EPA's NEI. The most recent NEI available 6 months prior to the due date of the second planning period progress reports (i.e., this report) is the 2020 NEI. The figures below compare emissions estimates from the 2020 NEI with those from the 2017 NEI, which was the most recently available NEI at the time of the second planning period regional haze SIPs. To provide a broader trend, emissions estimates from prior NEIs are also shown. Emissions estimates are provided for Massachusetts as well as the other MANEVU states. The state-specific charts are broken down into these emissions source categories.

- **Point** sources are large sources of emissions located at a discrete geographic point. Examples include power plants, factories, airports, large rail yards, and large institutions. 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 NO_x 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 categories; examples include residential fuel combustion, consumer solvent use, commercial cooking, 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.

4.2 Ammonia (NH_3)

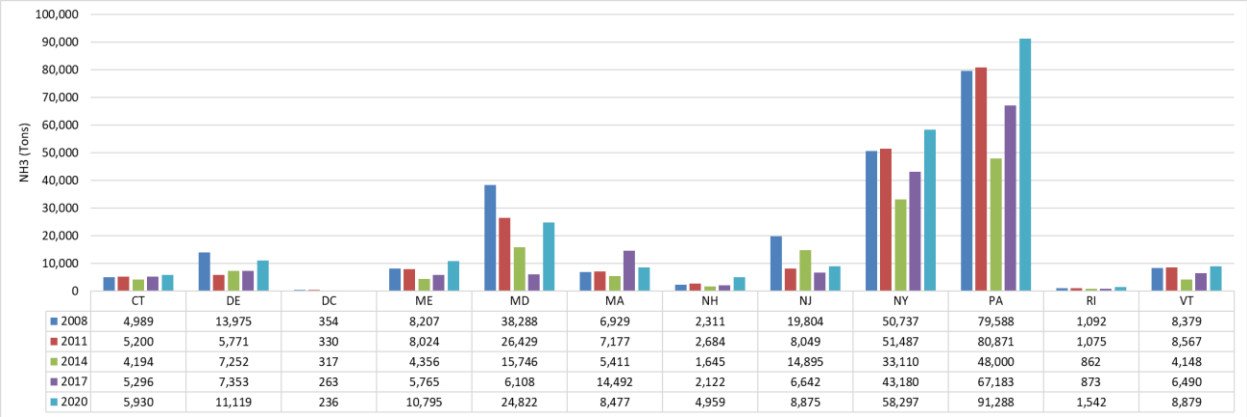
Figures 4-1 and 4-2 below show ammonia emissions for Massachusetts and the MANEVU region. Ammonia emissions in Massachusetts are dominated by the nonpoint source category. Ammonia emissions do not exhibit a strong trend, and there is year-to-year variability. Some of this variability is due to changes in emissions estimation methodologies for categories such as agricultural and animal feeding operations. Similar to Massachusetts, Figure 4-2 shows that ammonia emissions in other MANEVU states have generally no strong discernable trend and have some of the same year-to-year variability.

Figure 4-1: Ammonia Emissions in Massachusetts from All Source Types 2008-2020 (tons)



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
Point	522	655	342	283	210
Onroad	2,126	1,879	1,736	1,783	1,433
Nonroad	31	32	34	29	30
Nonpoint	4,251	4,612	3,299	12,398	6,804

Figure 4-2: Ammonia Emissions in MANEVU States from All Source Types 2008-2020 (tons)



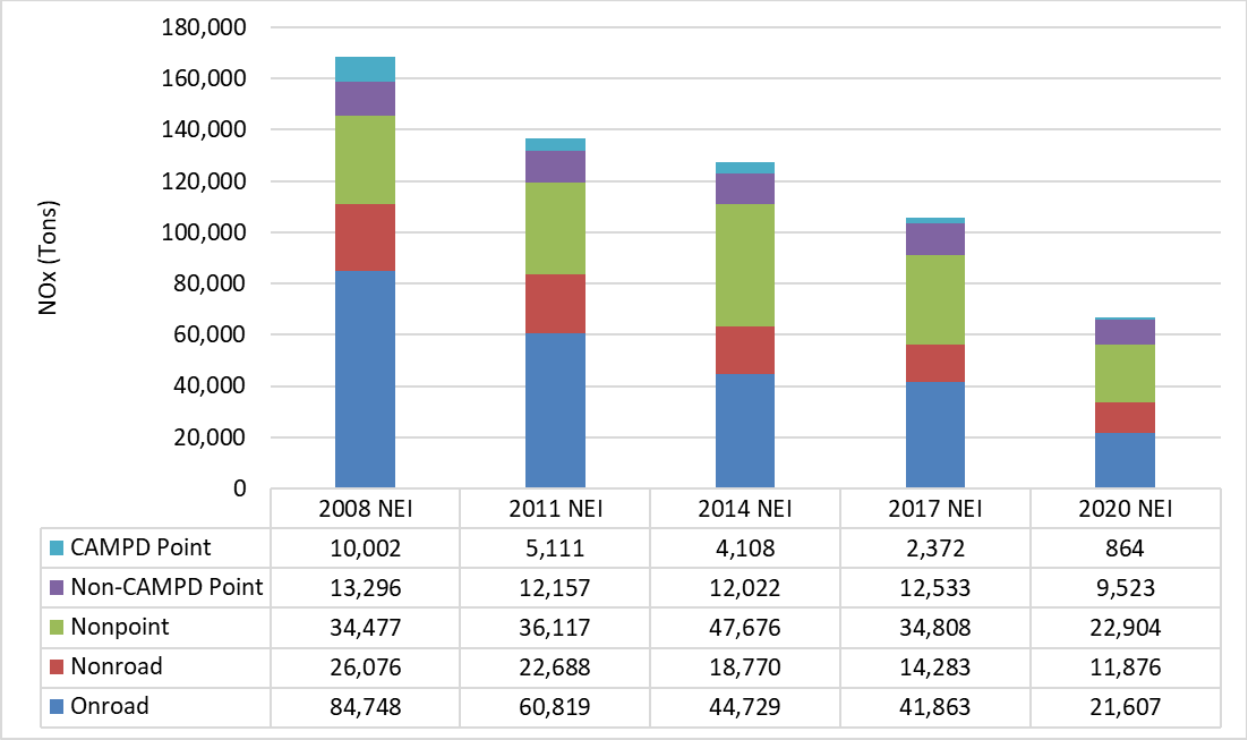
	CT	DE	DC	ME	MD	MA	NH	NJ	NY	PA	RI	VT
2008	4,989	13,975	354	8,207	38,288	6,929	2,311	19,804	50,737	79,588	1,092	8,379
2011	5,200	5,771	330	8,024	26,429	7,177	2,684	8,049	51,487	80,871	1,075	8,567
2014	4,194	7,252	317	4,356	15,746	5,411	1,645	14,895	33,110	48,000	862	4,148
2017	5,296	7,353	263	5,765	6,108	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

4.3 Nitrogen Oxides (NO_x)

Figures 4-3 and 4-4 show NO_x emissions in Massachusetts and the MANEVU region respectively from all source types (point, nonpoint, nonroad, and onroad) from 2008 to 2020. Figure 4-3 breaks point sources into CAMPD and non-CAMPD sources.

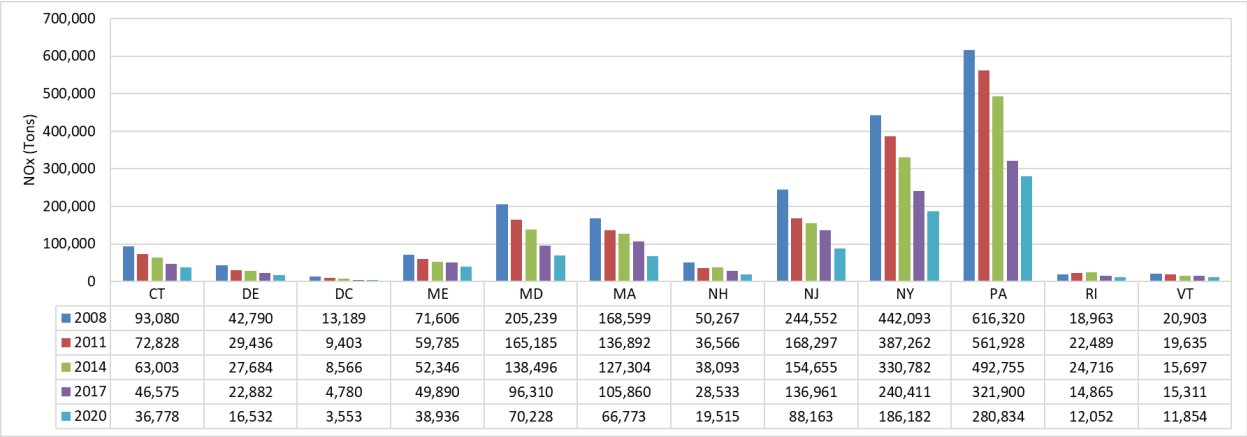
NO_x emissions in Massachusetts are dominated by the onroad mobile category, followed by the nonpoint category. There has been a steep decline in onroad mobile NO_x emissions due to federal and state control programs for diesel and gasoline vehicles. Onroad emissions decline as older, more polluting vehicles are retired and newer, cleaner vehicles are phased into the fleet. Some of the year-to-year variability in the NO_x emission trends is due to updated models and methodologies for estimating nonpoint and onroad emissions. Point source NO_x emissions have also declined due to the measures described earlier in Section 2 as well as other state and federal programs aimed at maintaining the ozone National Ambient Air Quality Standards (NAAQS). Figure 4-4 shows that NO_x emissions have declined sharply in other MANEVU states as well.

Figure 4-3: NO_x Emissions in Massachusetts by Source Type 2008-2020 (tons)



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
CAMPD Point	10,002	5,111	4,108	2,372	864
Non-CAMPD Point	13,296	12,157	12,022	12,533	9,523
Nonpoint	34,477	36,117	47,676	34,808	22,904
Nonroad	26,076	22,688	18,770	14,283	11,876
Onroad	84,748	60,819	44,729	41,863	21,607

Figure 4-4: NO_x Emissions in MANEVU States from All Source Types 2008-2020 (tons)

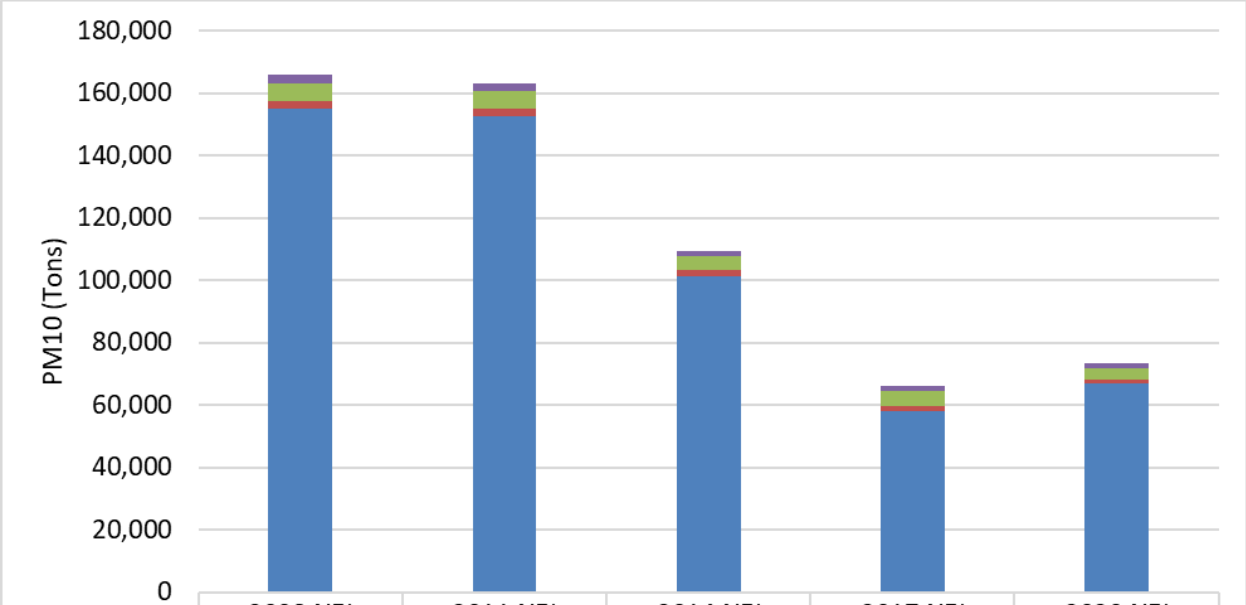


	CT	DE	DC	ME	MD	MA	NH	NJ	NY	PA	RI	VT
2008	93,080	42,790	13,189	71,606	205,239	168,599	50,267	244,552	442,093	616,320	18,963	20,903
2011	72,828	29,436	9,403	59,785	165,185	136,892	36,566	168,297	387,262	561,928	22,489	19,635
2014	63,003	27,684	8,566	52,346	138,496	127,304	38,093	154,655	330,782	492,755	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

4.4 Particulate Matter Less Than 10 Microns (PM_{10})

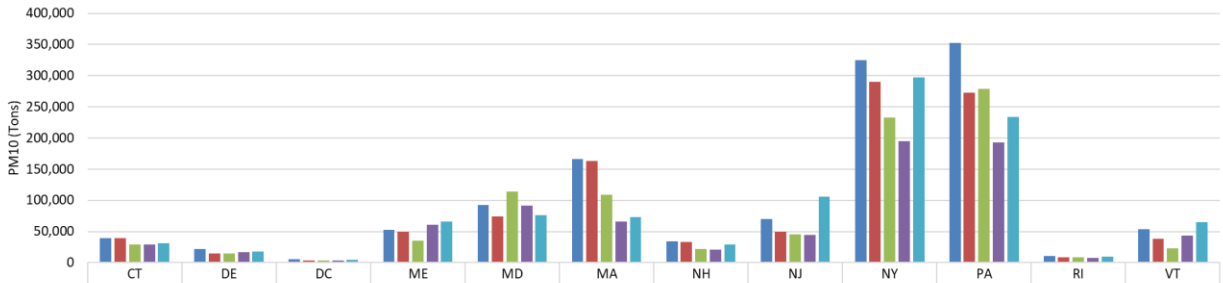
Figures 4-5 and 4-6 show PM_{10} emissions from Massachusetts and MANEVU states, respectively, for all source types (point, nonpoint, nonroad, and onroad) from 2008-2020. PM_{10} emissions in Massachusetts are dominated by the nonpoint category. Nonpoint contributors to PM_{10} emissions include residential fuel combustion (especially wood); paved and unpaved road dust; agricultural tilling; and construction dust. Figure 4-6 shows that PM_{10} emissions have trended sharply downward in Massachusetts, but not in many other MANEVU states. The decline is mostly from the nonpoint category due to fuel switching from oil to natural gas. Some of this improvement also is due to the particulate matter co-benefits of the low sulfur fuel rules described in Section 2.

Figure 4-5: **PM_{10} Emissions in Massachusetts by Source Type 2008-2020 (tons)**



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
Point	2,691	2,123	1,656	1,527	1,894
Onroad	5,558	5,861	4,282	4,629	3,387
Nonroad	2,392	2,245	1,952	1,565	1,331
Nonpoint	155,160	152,722	101,328	58,200	66,963

Figure 4-6: PM_{10} Emissions in MANEVU States from all Source Types 2002-2017 (tons)



	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

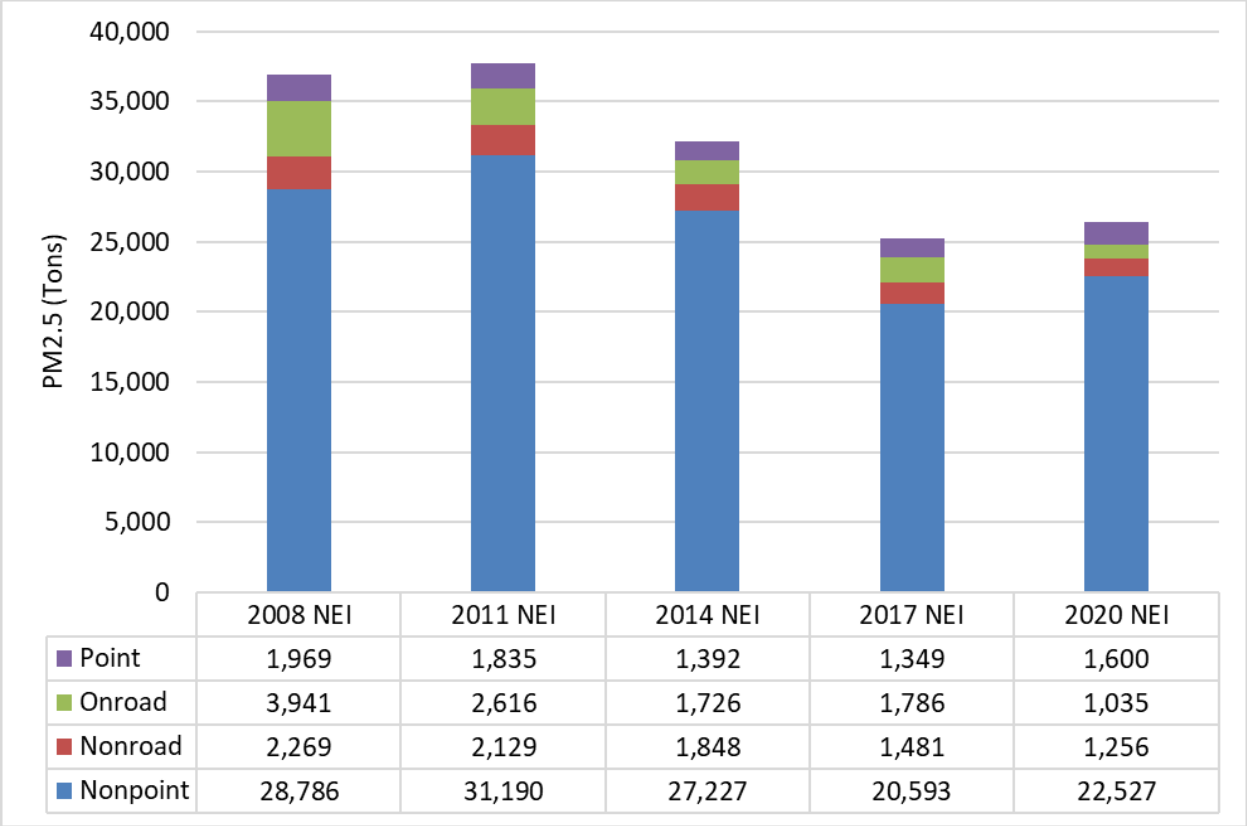
4.5 Particulate Matter Less Than 2.5 Microns ($PM_{2.5}$)

Figures 4-7 and 4-8 show $PM_{2.5}$ emissions in Massachusetts and for MANEVU, respectively, from all source types from 2008-2020.

The emissions patterns and trends for $PM_{2.5}$ are largely similar to those described for PM_{10}. As with PM_{10}, $PM_{2.5}$ emissions are dominated by the nonpoint category. $PM_{2.5}$ emissions have decreased for Massachusetts and a few other states in MANEVU. Similar to PM_{10}, the majority of reductions in Massachusetts came from the nonpoint category due to fuel combustion switching from oil to natural gas. As with other pollutants, some of the variability is also due to changes in emissions estimation tools and methodologies.

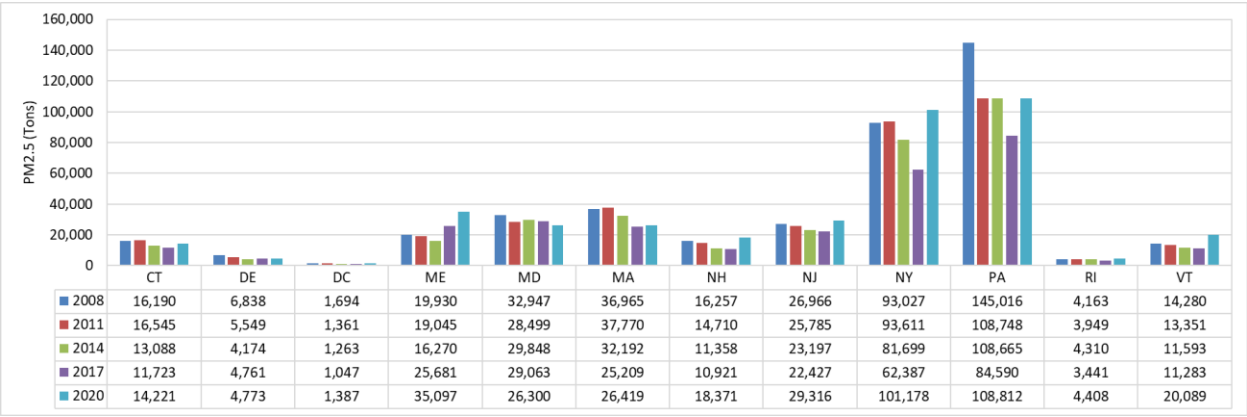
On February 7, 2024, EPA strengthened the National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM), setting the level of the primary (health-based) annual $PM_{2.5}$ standard at 9.0 micrograms per cubic meter. Current ambient air monitoring data for Massachusetts indicate that the state meets the strengthened $PM_{2.5}$ NAAQS.

Figure 4-7: $PM_{2.5}$ Emissions in Massachusetts by Source Type 2008-2020 (tons)



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
Point	1,969	1,835	1,392	1,349	1,600
Onroad	3,941	2,616	1,726	1,786	1,035
Nonroad	2,269	2,129	1,848	1,481	1,256
Nonpoint	28,786	31,190	27,227	20,593	22,527

Figure 4-8: $PM_{2.5}$ Emissions in MANEVU States from all Source Types 2008-2020 (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

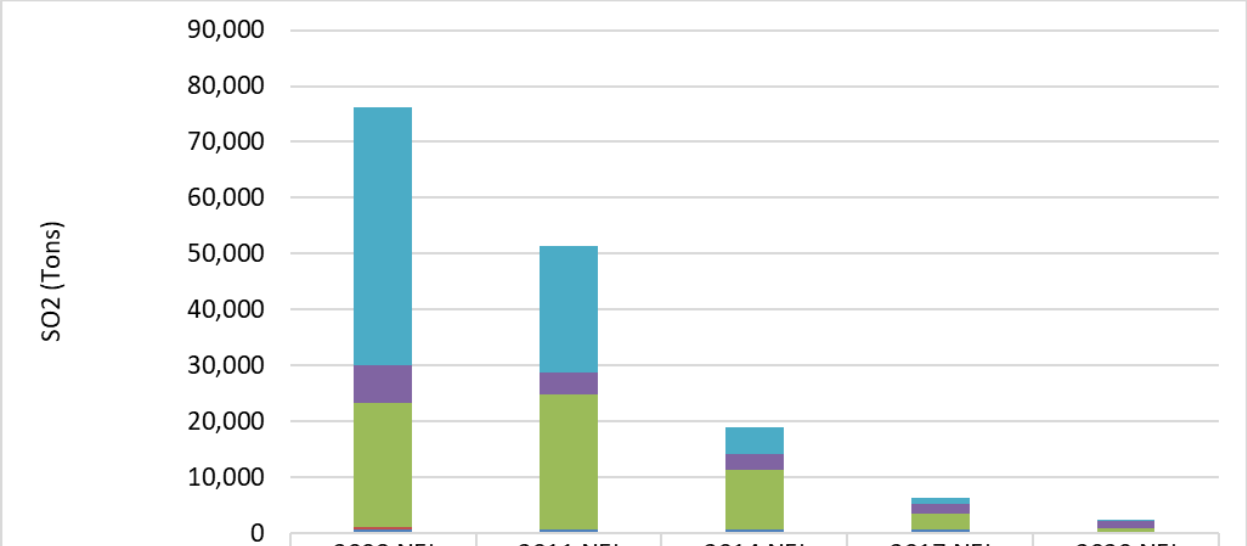
4.6 Sulfur Dioxide (SO_2)

Figures 4-9 and 4-10 show SO_2 emissions for Massachusetts and MANEVU respectively. Point source SO_2 emissions are further broken down in Figure 4-9 into the CAMPD and non-CAMPD categories.

As shown in Figure 4-9, SO_2 emissions in Massachusetts have been historically dominated by the point source category, CAMPD sources in particular. The nonpoint category also makes a 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 Massachusetts is due to the extensive control programs that have been implemented for SO_2 from coal fired power plants, the Massachusetts low sulfur fuel rule, fuel switching to natural gas, and the eventual retirement of all coal fired power plants in the state. As shown in Figure 4-10, all the MANEVU states have seen similar steep declines in SO_2 emissions for similar reasons.

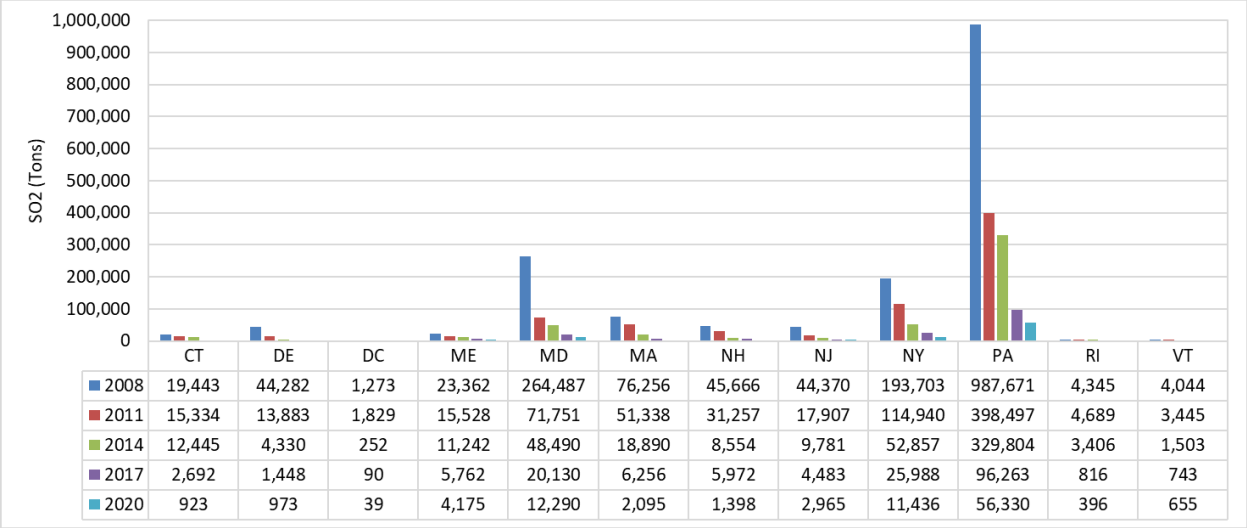
On December 10, 2024, EPA promulgated a revised secondary sulfur dioxide (SO_2) NAAQS as an annual standard of 10 parts per billion (ppb) averaged over three years. Current ambient air monitoring data for Massachusetts indicate that the state meets the revised secondary SO_2 NAAQS.

Figure 4-9: **SO_2 Emissions in Massachusetts by Source Type 2008-2020 (tons)**



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
CAMPD Point	46,347	22,701	4,670	1,083	62
Non-CAMPD Point	6,589	3,757	2,877	1,712	1,231
Nonpoint	22,276	24,289	10,738	2,804	621
Nonroad	419	65	49	34	15
Onroad	625	524	555	623	167

Figure 4-10: SO_2 Emissions in MANEVU States for All Source Types 2008-2020 (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

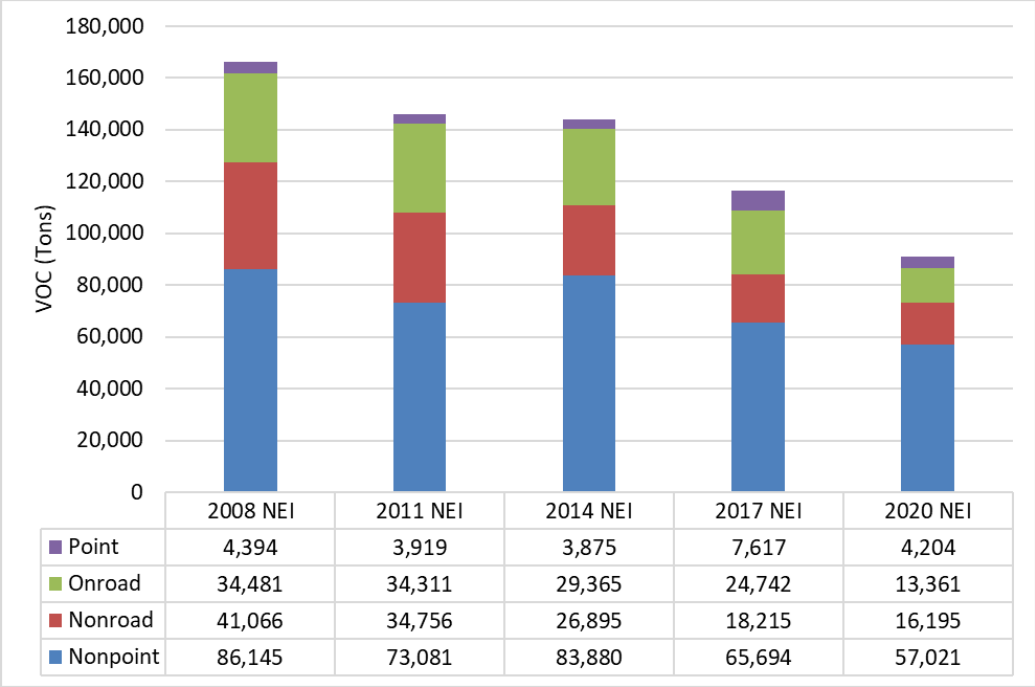
4.7 Volatile Organic Compounds (VOC)

Figures 4-11 and 4-12 show VOC emissions from all source types in Massachusetts and MANEVU, respectively, from 2008-2020. VOC emissions in Massachusetts are dominated by the nonpoint, nonroad, and onroad categories. Point sources are not a major contributor to VOC emissions. Figure 4-11 shows that there has been a steady decline in Massachusetts VOC emissions between 2008 and 2020. Figure 4-12 shows that VOC emissions have declined in most MANEVU states over the 2008 to 2020 period, with some year-to-year variability.

These reductions are due primarily to large decreases in onroad and nonroad emissions. Evaporative VOC emissions from onroad mobile sources have decreased due to state motor vehicle inspection and maintenance programs and the increasing prevalence of on-board refueling vapor recovery (ORVR) equipped vehicles in the fleet. VOC emissions from nonroad and onroad mobile sources are expected to continue decreasing as older, more polluting vehicles are replaced by newer, cleaner ones.

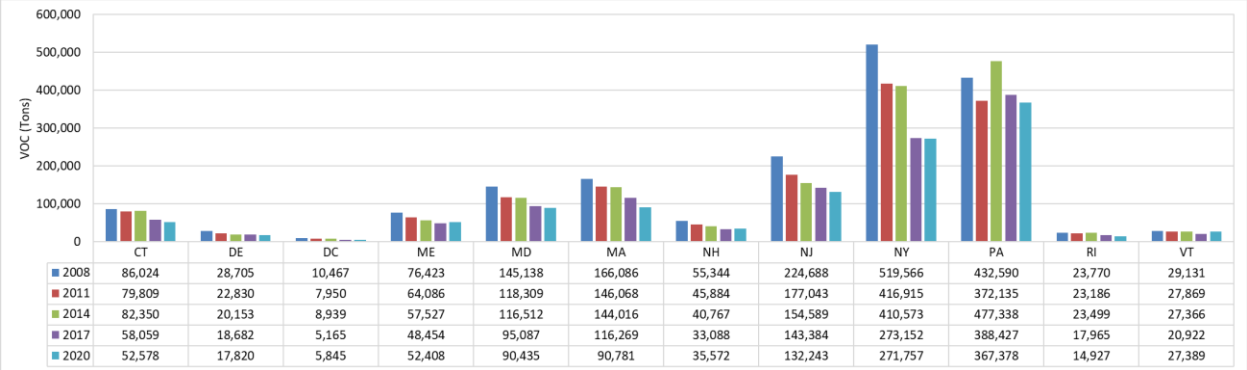
Much of the decrease in nonpoint VOC is due to federal and state rules for evaporative sources such as portable fuel containers; architectural, industrial, and maintenance coatings; consumer products; and solvent degreasing. Note that the decrease in nonpoint emissions may be overstated for many MANEVU states because of improvements in estimation methodologies resulted in lower emissions starting in 2017 for nonpoint categories such as residential wood combustion.

Figure 4-11: **VOC Emissions in Massachusetts from all Source Types 2008-2020 (tons)**



	2008 NEI	2011 NEI	2014 NEI	2017 NEI	2020 NEI
Point	4,394	3,919	3,875	7,617	4,204
Onroad	34,481	34,311	29,365	24,742	13,361
Nonroad	41,066	34,756	26,895	18,215	16,195
Nonpoint	86,145	73,081	83,880	65,694	57,021

Figure 4-12: **VOC Emissions in MANEVU from all Source Types 2008-2020 (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

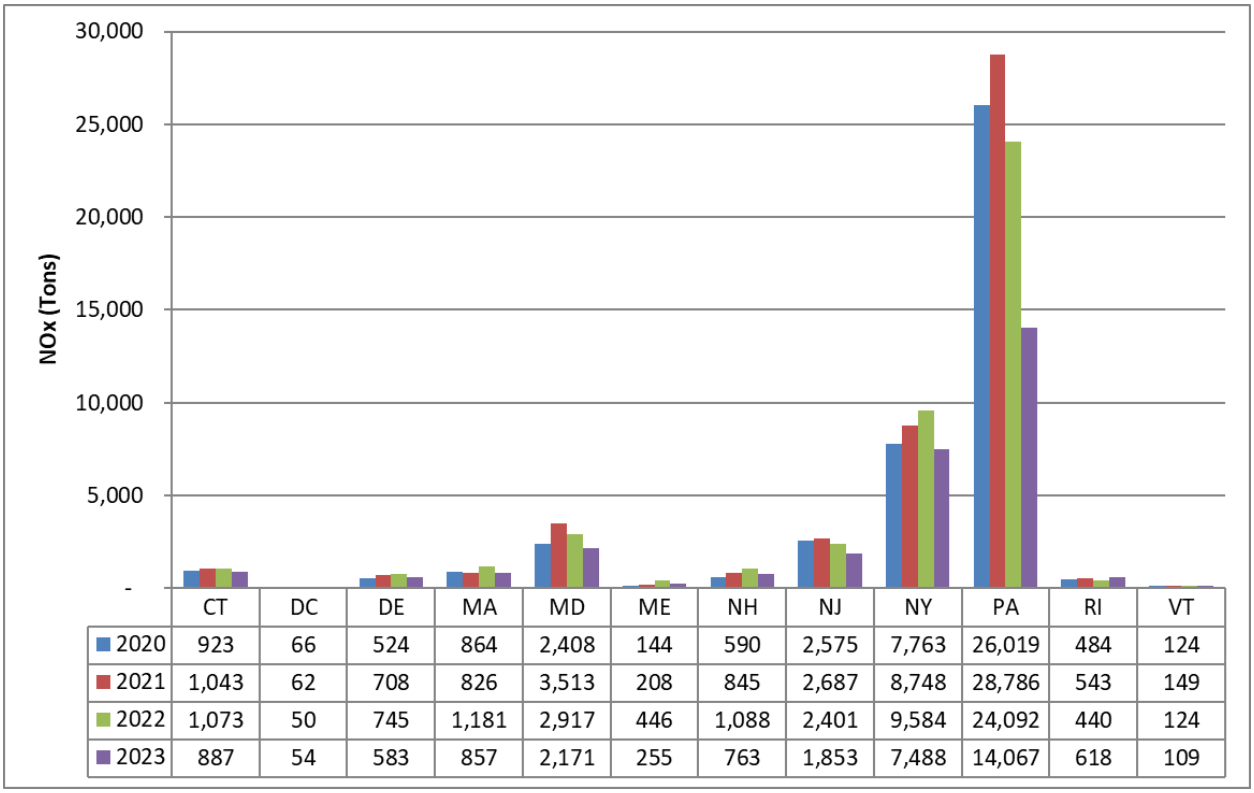
4.8 Emissions from Sources that Report to a Centralized EPA Database

Figures 4-13 and 4-14 show NO_x and SO_2 emissions, respectively, in Massachusetts and the other MANEVU states for sources that report to EPA's CAMPD. Sources that report to CAMPD are facilities that participate in an EPA air program which are generally large EGUs and very large industrial facilities.

Figures 4-13 and 4-14 show no particular trend in NO_x and SO_2 emissions for Massachusetts CAMPD facilities from 2020-2024. However, previous Figures 4-3 and 4-9 show large decreases over the longer 2008-2020 time period. These declines are due in large part to the measures described in Section 2, and significant retirements from the older coal and oil burning EGU fleet. Some of the decline is also due to the shift from coal to low-cost natural gas.

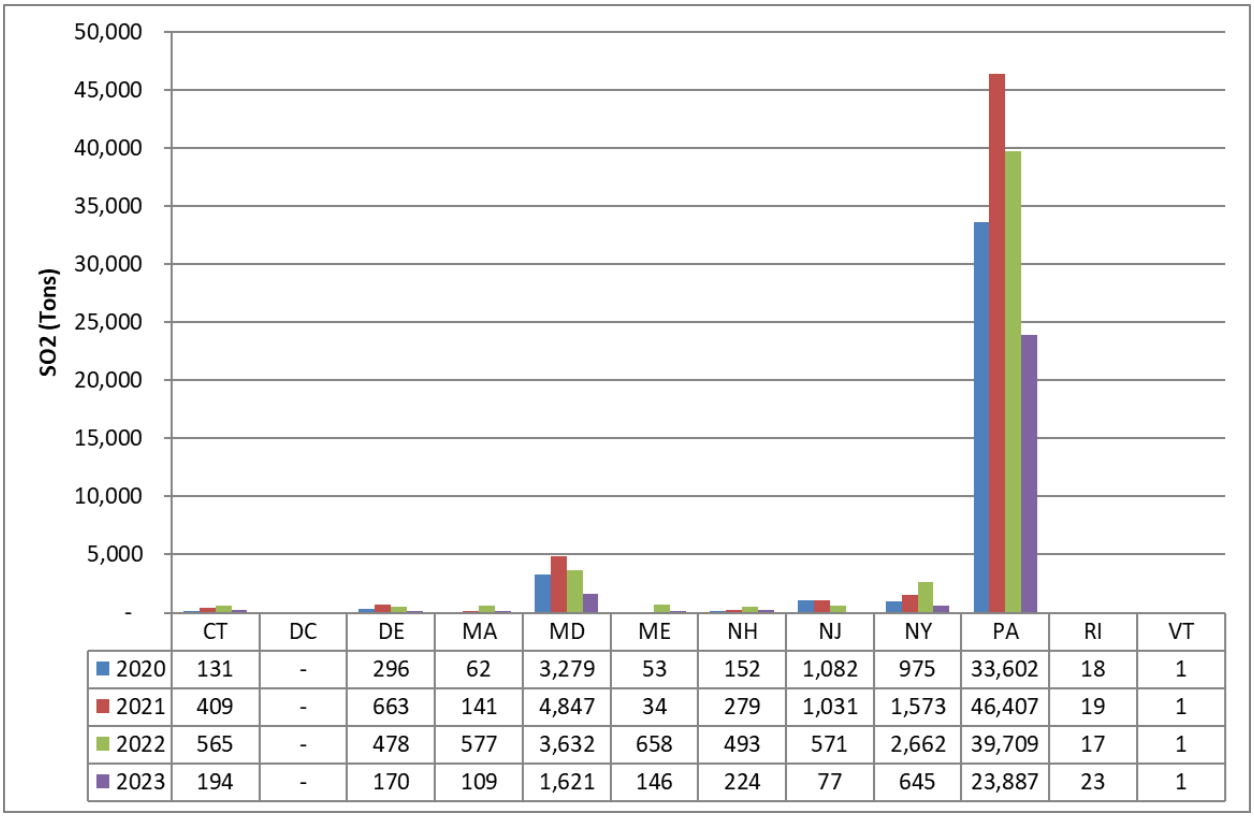
Declines in NO_x and SO_2 emissions are also evident for some other MANEVU states from 2020-2023 (particularly New York, Pennsylvania, Maryland, and New Jersey), with some year-to-year variability. Like Massachusetts, most of the decline in MANEVU is due to the measures that MANEVU states have adopted 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. Because the states with reductions for 2020-2023 are large, the emissions of SO_2 and NO_x from MANEVU states overall has dropped substantially.

Figure 4-13: **NO_x Emissions for CAMPD Sources in Massachusetts and MANEVU (tons)**



	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 4-14: SO_2 Emissions for CAMPD Sources in Massachusetts 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

5. Assessment of Significant Changes in Emissions

40 CFR 51.308(g)(5) requires: *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 … 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*.

An examination of Figures 4-1 through 4-14 in Section 4 shows that emissions of visibility impairing pollutants in Massachusetts have declined for almost every pollutant from 2008-2020, and the same is true 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 Massachusetts or in MANEVU that are unexpected or large enough that they would limit or impede visibility improvement.

Tables 5-1 through 5-6 repeat some of the information that was presented above in Section 4 with a specific focus on 2017, which was the NEI year that was current at the time of the second planning period regional haze SIPs, and 2020, which is the most recently available complete NEI. For each visibility impairing pollutant, the tables show total emissions for Massachusetts and the other MANEVU states and the difference and percent difference between 2017 and 2020 emissions.

Tables 5-1 to 5-6 show a decrease in emissions from 2017 to 2020 for NO_x, SO_2, and VOC for Massachusetts and almost every state in MANEVU. SO_2 had the most dramatic decreases, with a reduction of 66% for the total MANEVU region.

There are exceptions, however, to these declining trends. Ammonia emissions increased between 2017 and 2020 for many of the MANEVU states (although not Massachusetts), and the total MANEVU region showed an increase of 24%. Figures 4-1 and Table 5-1 show that for almost all the MANEVU states 2020 NEI emissions are higher than those for the 2017 NEI (and many of the other NEI years as well). This is further shown in Figure 4-2 for the MANEVU region in total. According to documentation for the 2020 NEI[12], changes and improvements were made to the estimation methodology for agricultural fertilizers. This resulted in an approximately 60% increase in nationwide ammonia emissions from this category between the 2017 and 2020. Similarly, agricultural livestock waste emissions went up approximately 5% because of methodology changes and improvements. Therefore, it is likely that the ammonia emissions

[12] 2020 National Emissions Inventory Technical Support Document (TSD): Agriculture – Fertilizer Application (Section 9). EPA March 2023 (https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-technical-support-document-tsd)

increase in 2020 is an artifact of these methodology changes and not an actual increase in emissions.

PM_{10} and $PM_{2.5}$ emissions increased for almost all states from 2017-2020, including Massachusetts. PM_{10} and $PM_{2.5}$ in Massachusetts had declined in prior years between the 2008 and 2017. For the 2020 NEI, a 2020 meteorological adjustment factor caused an increase in unpaved road dust estimates. In addition, the Energy Information Administration State Energy Data System changed its wood consumption estimation methodology, which resulted in higher wood consumption estimates for northern states. Therefore, the increase in 2020 nonpoint PM_{10}/$PM_{2.5}$ emissions is likely an artifact of these methodology changes rather than an actual increase in emissions.

In summary, emissions for Massachusetts and MANEVU have decreased significantly between 2017 and 2020, with the exceptions for ammonia and PM noted above. When looking at 2020 emissions versus those from earlier years (see Section 4), the decreases are even more dramatic. The ammonia and PM increases are likely the result of changes in estimation methodologies. These increases, even if they were actual increases, are not large enough to limit or impede visibility improvement in Massachusetts, MANEVU, or any other region that may be influenced by Massachusetts emissions.

Table 5-1: **2017 and 2020 Total Ammonia Emissions for Massachusetts and MANEVU (tons)**

State	2017	2020	Reduction (2017 – 2020)	Percent Reduction (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	18,715	306%
MA	14,492	8,477	-6,016	-42%
NH	2,122	4,959	2,837	134%
NJ	6,642	8,875	2,233	34%
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	2,388	37%
Total	**165,768**	**235,218**	**69,451**	**42%**

Table 5-2: 2017 and 2020 Total NO_x Emissions for Massachusetts and MANEVU (tons)

State	2017	2020	Reduction (2017 – 2020)	Percent Reduction (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 5-3: **2017 and 2020 Total PM_{10} Emissions for Massachusetts and MANEVU (tons)**

State	2017	2020	Reduction (2017 – 2020)	Percent Reduction (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	41,133t	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 5-4: 2017 and 2020 Total $PM_{2.5}$ Emissions for Massachusetts and MANEVU (tons)

State	2017	2020	Reduction (2017 – 2020)	Percent Reduction (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 5-5: 2017 and 2020 Total SO_2 Emissions for Massachusetts and MANEVU (tons)

State	2017	2020	Reduction (2017 – 2020)	Percent Reduction (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 5-6: 2017 and 2020 Total VOC Emissions for Massachusetts and MANEVU (tons)

State	2017	2020	Reduction (2017 – 2020)	Percent Reduction (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%**

6. Assessment of Current Implementation Plan Elements and Strategies

40 CFR 51.308(g)(6) requires: *An assessment of whether the current implementation plan elements and strategies are sufficient to enable the State, or other States with mandatory Class I Federal areas affected by emissions from the State, to meet all established reasonable progress goals for the period covered by the most recent plan*.

MassDEP affirms that the elements and strategies in its Regional Haze SIP for the second planning period are sufficient to meet the criteria of 51.308(g)(6). MassDEP makes this affirmation based on the following assessment of the information and data presented in this progress report:

- MassDEP continues to implement all the measures deemed necessary in the second planning period Regional Haze SIP for making reasonable progress at Class I areas that may be affected by Massachusetts emissions (see Section 2). In addition, there have been significant emissions reductions from these measures since the time of the second planning period Regional Haze SIP (see Section 2).

- Except for PM and ammonia, emissions of visibility impairing pollutants have trended downward for Massachusetts and for other states in MANEVU (see Section 5). With the exceptions noted above, visibility impairing emissions are lower than those at the time of the second planning Regional Haze SIPs (see Section 5). As described in the SIPs for the first and second planning periods, NO_x and SO_2 are the largest contributors to visibility impairment in MANEVU Class I areas. In Massachusetts, emissions have substantially decreased since the last SIP, with NO_x down 37% and SO_2 down 67% from all sources since 2017. For larger Massachusetts sources reporting to CAMPD the reduction has been greater with NO_x down 64% and SO_2 down 94% since 2017.

- Current haze indexes for all the MANEVU Class I areas are lower than those for the time of the second planning period regional haze SIPs, and significantly lower than baseline, for the 20% Most Impaired and 20% Clearest days (see Section 3). These trends are indicative that all MANEVU Class I areas are on track to meeting the reasonable progress goals established in the second planning period regional haze SIPs.

7. Assessment of Smoke Management Plan

Massachusetts does not currently have a smoke management program. However, MassDEP's air regulation at 310 CMR 7.07 prohibits open burning entirely in 22 urban municipalities and prohibits the use of open burning to clear commercial or institutional land for non-agricultural purposes. The regulations do allow burning for "activities associated with the normal pursuit of agriculture" and the open burning of brush and debris outside of the 22 urban municipalities from January 15 to May 1, "except during periods of adverse meteorological conditions." Prescribed burning also is allowed under 310 CMR 7.07(3)(f) upon specific permission from MassDEP. MassDEP considers these efforts to be sufficient to protect visibility in the Class I areas affected by emissions from Massachusetts sources, including agricultural and forestry smoke.

8. Determination of Adequacy of the Existing Plan

40 CFR 51.308(h) requires the state to take one of the following actions:

- 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."
- 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.
- 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.
- 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 information and data presented in this progress report, MassDEP declares that no further revision of the existing plan is needed at this time.

9. FLM Consultation and Public Comment

FLM Consultation. 40 CFR 51.308(i) requires that: *The opportunity for consultation on an implementation plan (or plan revision) or on a progress report must be provided no less than 60 days prior to said public hearing or public comment opportunity. This consultation must include the opportunity for the affected Federal Land Managers to discuss their: (i) Assessment of visibility impairment in any mandatory Class I area, and (ii) Recommendations on the development and implementation of strategies to address visibility impairment. (3) In developing any implementation plan (or plan revision) or progress report, the State must include a description of how it addressed any comments provided by the Federal Land Managers.*

Below are the relevant FLMs and their contacts for this progress report.

- **National Park Service (NPS)**
  Holly Salazar holly_salazer@nps.gov
  Don Shepherd don_shepherd@nps.gov
  Andrea Stacy andrea_stacy@nps.gov
  Kirsten King Kirsten_king@nps.gov
  Ksienya Taylor ksienya_taylor@nps.gov
  Melanie Peters melanie_peters@nps.gov
  Heather Dumais heather_dumais@nps.gov

- **U.S. Forest Service (USFS)**
  Alexia Prosperi alexia.prosperi@usda.gov
  Ralph Perron ralph.perron@usda.gov

- **U.S. Fish and Wildlife Service (FWS)**
  Tim Allen tim_allen@fws.gov

MassDEP and other MANEVU states provided the FLMs with opportunity for consultation in part through participation throughout the MANEVU planning process, including regular meetings/calls of the MANEVU Technical Support Committee (which provides oversight and guidance to that process).

On November 5, 2024, MassDEP sent a draft of this progress report to the FLM contacts. This included an invitation to hold video conferences with each FLM on the contents and conclusions of this report. USFS provided comments in an email on December 9, 2024. No other FLMs provided comments. The email with comments from the USFS is in Appendix 3.

USFS Comment Summary: There was an inconsistency between the text and the tables comparing current visibility and that modeled for the 2028 RPGs in Section 3, and an incorrect reference in Section 5.

MassDEP Response: The corrections noted by the USFS have been made in this progress report.

Public Comment. 40 CFR 51.308(g) requires that, although this progress report is not a SIP revision, *progress reports must be made available for public inspection and comment for at least 30 days prior to submission to EPA and all comments received from the public must be submitted to EPA along with the subsequent progress report, along with an explanation of any changes to the progress report made in response to these comments.*

On March 4, 2025, MassDEP published a draft Progress Report and notice of public comment and accepted comments until April 9, 2025. No comments were submitted to MassDEP during the public comment period.

10. Appendices

Some appendices listed below are available separately on MassDEP's website or MANEVU's website at the links indicated.

1. Canal Station Plan Approval Notice issued by MassDEP. May 26, 2022. (https://www.mass.gov/doc/appendix-1-canal-station-plan-approval-may-26-2022)
2. *Visibility Trends 2004-2022 Report (2nd RH SIP Metrics)*. MANEVU. Aug. 13, 2024. (https://otcair.org/manevu/materials/reports)
3. FLM Comments
4. Acronyms and Abbreviations

Appendix 3: FLM Comments

Email from National Park Service to MassDEP December 9, 2024.

Wert, Mark (DEP)

From: Perron, Ralph - FS, NH <ralph.perron@usda.gov>
Sent: Monday, December 9, 2024 9:39 AM
To: Wert, Mark (DEP)
Cc: Keith, Glenn (DEP); Morin, Joanne O (DEP); rackauskas.eric@epa.gov; Martinelli, Ayla; Liu, Xingmei (DEP); Prosperi, Alexia - FS, WI; Holly; Dumais, Heather M; melanie_peters@nps.gov
Subject: Re: [External Email]MassDEP Regional Haze Progress Report for 2018-2028 - DRAFT to FLMs

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hi Mark,

Thanks for the opportunity to review the draft of the MassDEP regional haze progress report for the 2nd planning period (2018-2028).

We have a couple of minor comments:

1. On page 37, the third bullet down, consider editing the text in the sentence "*Tables 3-5 and 3-6 show that current 5-year haze indexes are below the modeled 2028 RPGs at all MANEVU Class I areas*."

   Acadia NP (20% most impaired days) (Table 3-5), and Lye Brook Wilderness Area (20% Clearest Days) (Table 3-6) do not agree with the text.

2. On page 62, middle bullet, there is a reference to "Section 6", which should probably be changed to "Section 5".

Thanks for continuing cooperative efforts to ensure that, together, we will continue to make progress toward the Clean Air Act's goal of natural visibility conditions at our Class I areas.

Ralph Perron (he/him)
Air Quality Specialist
Forest Service
Eastern Region
cell: 802-222-1444
ralph.perron@usda.gov

Caring for the land and serving people

From: Wert, Mark (DEP) <mark.wert@mass.gov>
Sent: Tuesday, November 5, 2024 12:26 PM
To: Perron, Ralph - FS, NH <ralph.perron@usda.gov>
Cc: Keith, Glenn (DEP) <glenn.keith@mass.gov>; Morin, Joanne O (DEP) <Joanne.O.Morin@mass.gov>; rackauskas.eric@epa.gov <rackauskas.eric@epa.gov>; Martinelli, Ayla <Martinelli.Ayla@epa.gov>; Liu, Xingmei (DEP) <Xingmei.Liu@mass.gov>
Subject: [External Email]MassDEP Regional Haze Progress Report for 2018-2028 - DRAFT to FLMs

You don't often get email from mark.wert@mass.gov. Learn why this is important

[External Email]
If this message comes from an **unexpected sender** or references a **vague/unexpected topic;**
Use caution before clicking links or opening attachments.
Please send any concerns or suspicious messages to: Spam.Abuse@usda.gov

TO: Federal Land Managers [**resend of earlier email due to email address error**]

Attached is a draft of the MassDEP regional haze progress report for the 2nd planning period (2018-2028) for your review and comment to fulfill the 60-day consultation requirements of 40 CFR Section 51.308(i)(2). Also included is Appendix 1, the Canal Station Plan Approval. Appendix 2 is available at the MANEVU website via the embedded link.

Please provide us with your comments by January 3, 2025.

Please let us know if you wish to schedule an "in person" video meeting to discuss the draft progress report or other issues regarding the haze SIP.

Mark . . .

Mark Wert
Branch Chief, Air Planning
Massachusetts Dept. of Environmental Protection -- BAW
One Winter Street, 6th floor, Boston, MA 02108
617-292-5598 (o) / 857.891.7532 (c)

Distribution List

NPS	Holly Salazer	Holly_Salazer@nps.gov
NPS	Kirsten King	kirsten_king@nps.gov
FWS	Tim Allen	tim_allen@fws.gov
NPS	Don Shepherd	Don_Shepherd@nps.gov
NPS	Andrea Stacy	andrea_stacy@nps.gov
NPS	Melanie Peters	melanie_peters@nps.gov
NPS	Ksienya Taylor	ksienya_taylor@nps.gov
USFS	Ralph Perron	ralph.perron@usda.gov
USFS	Scott Copeland	Copeland@cira.colostate.edu
USDA	Alexia Prosperi	alexia.prosperi@usda.gov

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Email from MassDEP to FLM contacts November 5, 2024

Wert, Mark (DEP)

From:	Wert, Mark (DEP)
Sent:	Tuesday, November 5, 2024 11:54 AM
To:	'Salazer, Holly'; 'King, Kirsten L'; 'Peters, Melanie'; 'tim_allen@fws.gov'; 'rperron@fs.fed.us'; 'Copeland@cira.colostate.edu'; 'baanderson02@fs.fed.us'; 'lgeiser@fs.fed.us'; 'jash@fs.fed.us'
Cc:	Keith, Glenn (DEP); Morin, Joanne O (DEP); 'Shepherd, Don'; 'andrea_stacy@nps.gov'; rackauskas.eric@epa.gov; Martinelli, Ayla; Liu, Xingmei (DEP); ksienya_taylor@nps.gov; alexia.prosperi@usda.gov
Subject:	MassDEP Regional Haze Progress Report for 2018-2028 - DRAFT to FLMs
Attachments:	MA_RH 2025 Progress Report_Draft Ver 1 Nov 05 2023 to FLM.pdf; 1. Canal Station Plan Approval SO2 NMCPA.ec.052622.pdf

TO: Federal Land Managers

Attached is a draft of the MassDEP regional haze progress report for the 2nd planning period (2018-2028) for your review and comment to fulfill the 60-day consultation requirements of 40 CFR Section 51.308(i)(2). Also included is Appendix 1, the Canal Station Plan Approval. Appendix 2 is available at the MANEVU website via the embedded link.

Please provide us with your comments by January 3, 2025.

Please let us know if you wish to schedule an "in person" video meeting to discuss the draft progress report or other issues regarding the haze SIP.

Mark . . .

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Appendix 5: Acronyms and Abbreviations

AERR	Air Emissions Reporting Requirements rule
AMPD	Air Markets Program Data
BART	Best Available Retrofit Technology
BTU	British Thermal Unit
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CAMPD	EPA Clean Air Markets Program Data
CFR	Code of Federal Regulations
dv	Deciview
EGU	Electric Generating Unit
EPA	U.S. Environmental Protection Agency
FLM	Federal Land Manager of a Class I area
IMPROVE	Interagency Monitoring of Protected Visual Environments
LTS	Long Term Strategy
MassDEP	Massachusetts Department of Environmental Protection
MANEVU	Mid-Atlantic/Northeast Visibility Union
MMBtu	Million British Thermal Units
MW	Megawatt
MWh	Megawatt Hour
MWC	Municipal Waste Combustor
n/a	Not Applicable
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory

NH_3	Ammonia
NO_x	Oxides of Nitrogen
NO_2	Nitrogen dioxide
NPS	National Park Service
OC	Organic Carbon
OTC	Ozone Transport Commission
PM2.5	Fine Particulate Matter; particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM10	Particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers
RACT	Reasonably Available Control Technology
RH	Regional Haze
RPG	Reasonable Progress Goal
RPO	Regional Planning Organization
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
tpy	Tons per year
TSC	Technical Support Committee (of MANEVU)
TSD	Technical Support Document
VOC	Volatile Organic Compound