Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

Certification of Adequacy of the Massachusetts State Implementation Plan with Clean Air Act Section 110(a)(2)(D)(i)(I) Interstate Air Pollution Transport Requirements for the 2010 Sulfur Dioxide National Ambient Air Quality Standard

February 9, 2018

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

Printed on Recycled Paper

1. Background

This document is the Massachusetts Department of Environmental Protection's (MassDEP) Certification that the Massachusetts State Implementation Plan (SIP) adequately meets the basic (or "infrastructure") requirements of 7401 U.S.C. §2110(a)(1) and (2) of the federal Clean Air Act to address the interstate transport of air pollution with regard to the 2010 Sulfur Dioxide (SO_2) National Ambient Air Quality Standard (NAAQS).

Pursuant to Sections 110(a)(1) and 110(a)(2) of the CAA, each State is required to submit a plan to provide for the implementation, maintenance, and enforcement of a newly promulgated or revised NAAQS within 3 years after its promulgation. Section 110(a)(1) provides the procedural and timing requirements for SIPs. Section 110(a)(2) lists the basic elements that all SIPs must contain including emissions inventories, ambient air quality monitoring and data systems, programs for enforcement of control measures, and adequate resources to implement the plan. This SIP is commonly referred to as an "Infrastructure" SIP because its purpose is to ensure that a state's SIP contains the necessary structural elements needed to implement a new or revised NAAQS. Section 110(a)(2)(D)(i) specifically requires that the Infrastructure SIP prohibit emissions that will significantly contribute to nonattainment, or interfere with maintenance, of a NAAQS in downwind states. This requirement is commonly referred to as the "Good Neighbor" provision.

If a State determines that its existing SIP is adequate, then the State's SIP submittal may be a certification that the existing SIP contains provisions addressing the requirements of the section 110(a)(2) infrastructure elements.

On June 3, 2010, the United States Environmental Protection Agency (EPA) revised the health-based or "primary" NAAQS for SO_2 by establishing a 1-hour standard at a level of 75 parts per billion (ppb). This triggered the requirement for states to submit recommendations for designating areas for meeting or not meeting the new standard within 1 year, and to submit infrastructure SIPs within 3 years. On June 2, 2011, Governor Patrick submitted a recommendation that Massachusetts be designated as "unclassifiable."[1] On January 9, 2018, EPA designated all areas in Massachusetts as unclassifiable/attainment of the 1-hour SO2 standard.[2]

[1] The "unclassifiable" designation was recommended in light of EPA's requirement at the time that states supplement area-wide monitoring data with modeling of SO_2 emissions from large sources (such as power plants) based on further guidance from EPA.

[2] 40 CFR Part 81, Air Quality Designations for the 2010 Sulfur Dioxide (SO2) Primary National Ambient Air Quality Standard—Round 3, Final Rule. (83 FR 1098, January 9, 2018) https://www.gpo.gov/fdsys/pkg/FR-2018-01-09/pdf/2017-28423.pdf

On June 6, 2014, MassDEP submitted an Infrastructure SIP Certification for the 2010 SO_2 NAAQS to EPA that addressed the Section 110(a)(2) infrastructure elements, but deferred addressing the Good Neighbor transport provision.[3] EPA approved this infrastructure SIP effective January 20, 2017 except for the Good Neighbor transport provision under Section 110(a)(2)(D)(i).[4]

On August 10, 2015, EPA issued the "Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS)."[5] That rule specifies modeling and monitoring requirements for characterization of air quality in areas with large sources of SO_2 emissions to determine whether those areas are in attainment of the 2010 NAAQS. The 2015 Data Requirements Rule requires such analyses only for sources that emit at least 2,000 tons per year of SO_2, except in special circumstances.

There are no sources in Massachusetts that emit 2,000 tons per year of SO_2. On January 13, 2016, MassDEP sent a letter to EPA stating that no facilities were subject to the Data Requirements Rule. On March 17, 2017, EPA sent a letter to MassDEP that concurred that the Data Requirements Rule did not apply to any facilities in Massachusetts.

On July 25, 2013, EPA designated 29 areas in 16 states as nonattainment for the 2010 SO_2 standard (see Figure 1).[6] One of these areas is in southern New Hampshire (the Central New Hampshire area – parts of Hillsborough, Merrimack, and Rockingham counties – see Figure 1). On January 31, 2017, New Hampshire submitted an attainment plan for the Central New Hampshire area.[7] That plan did not require any reductions from Massachusetts sources and no Massachusetts sources were part of the modeling used to demonstrate attainment. The design value for this area (20 ppb based on 2013-

[3] Certification of Massachusetts Compliance with Clean Air Act Sections 110(a)(1) and (2) State Implementation Plan Requirements for the 2010 Sulfur Dioxide National Ambient Air Quality Standard. MassDEP. June 6, 2014. http://www.mass.gov/eea/docs/dep/air/priorities/isip-jun-2014-ozone-no2-so2-wattachments.zip

[4] 40 CFR Part 52 Air Plan Approval; MA; Infrastructure State Implementation Plan Requirements, Final rule. (81 FR 93627) December 21, 2016. https://www.gpo.gov/fdsys/pkg/FR-2016-12-21/pdf/2016-30466.pdf#page=1

[5] 40 CFR Part 51,Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS); Final Rule (80 FR 51052) August 21, 2015.

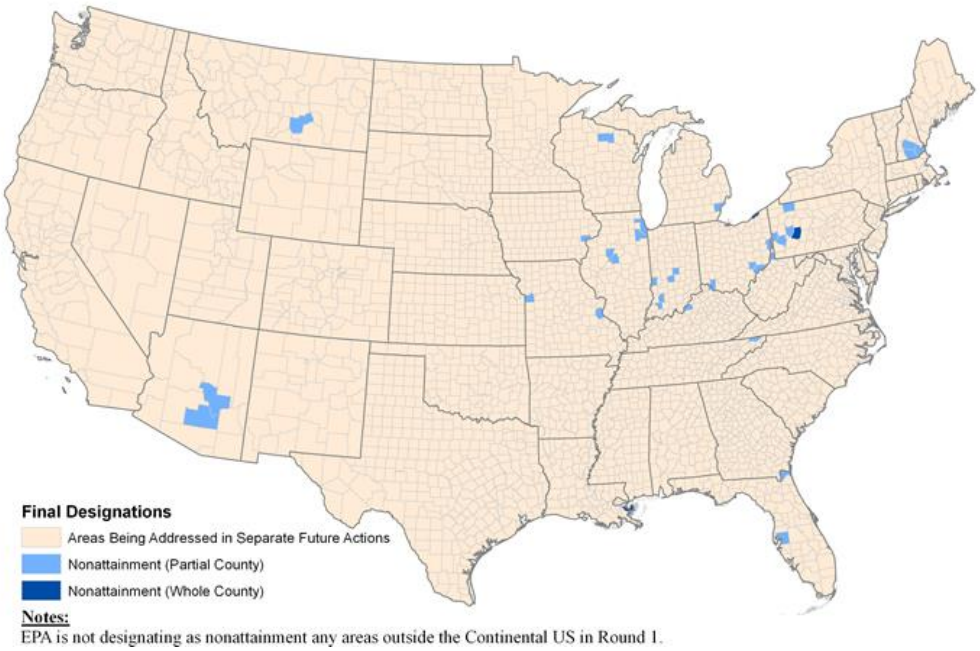
[6] 40 CFR Part 81 Air Quality Designations for the 2010 Sulfur Dioxide (SO2) Primary National Ambient Air Quality Standard (78 FR 47191) August 5, 2013.

[7] Revision to the New Hampshire State Implementation Plan, Central New Hampshire Nonattainment Area Plan for the 2010 Primary 1-Hour Sulfur Dioxide NAAQS. New Hampshire Department of Environmental Services. January 20, 2017

2015 data) now meets the standard and New Hampshire plans to request a redesignation to attainment.[8]

On June 30, 2016, EPA designated 61 areas in 24 states – 4 of these were nonattainment with the remainder unclassifiable/attainment or unclassifiable (Round 2 – see Figure 1).[9] On November 29, 2016, EPA designated 3 additional areas in Texas as non-attainment. The nearest to Massachusetts of the nonattainment or unclassifiable areas in Round 2 are in Michigan and Maryland.

Figure 1: SO_2 Nonattainment Designations
2013 (Round 1) and 2016 (Round 2)

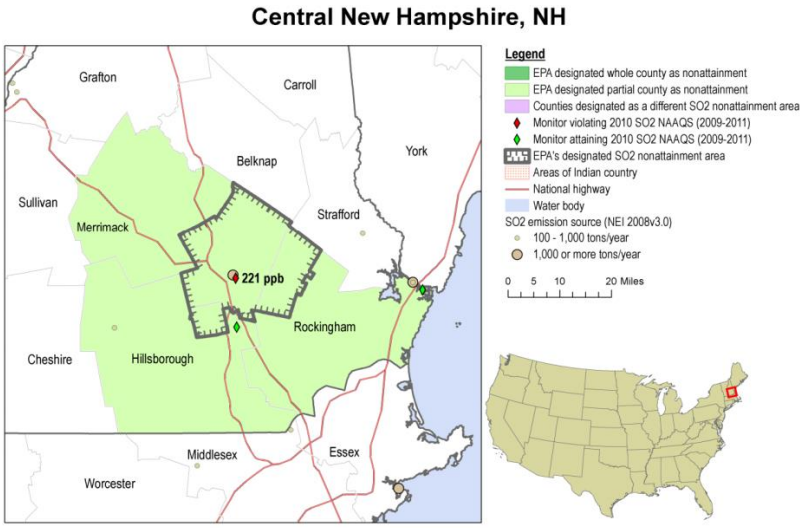


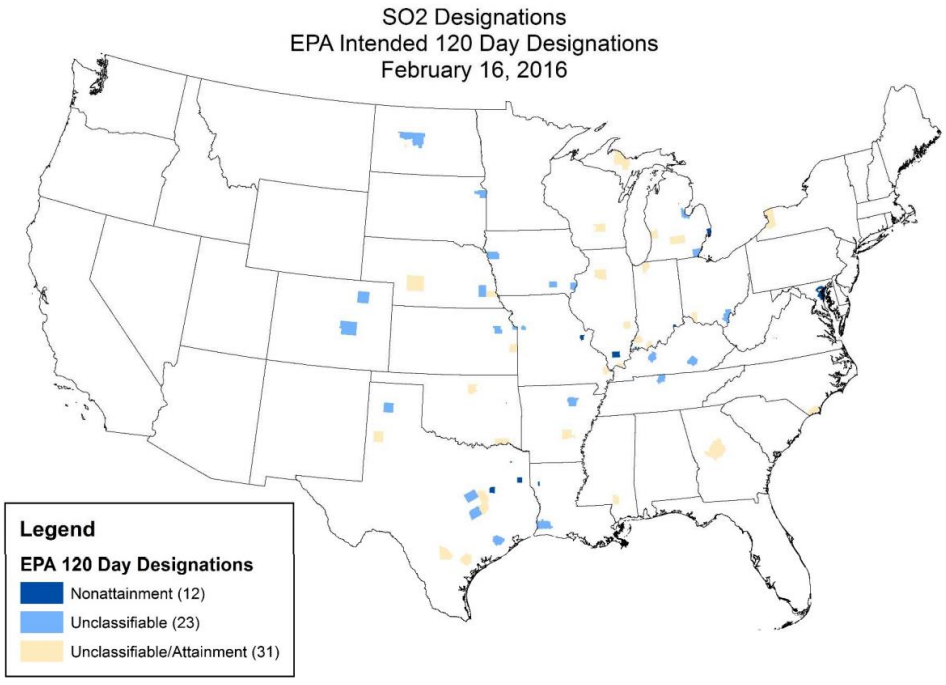
(continued)

[8] Amendment to New Hampshire 2010 Sulfur Dioxide NAAQS Infrastructure SIP to Address the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I). New Hampshire Department of Environmental Services. June 16, 2017.
[9] 40 CFR Part 81 Air Quality Designations for the 2010 Sulfur Dioxide (SO2) Primary National Ambient Air Quality Standard—Round 2, Final Rule. (81 FR 45039) July 12, 2016.

Figure 1: SO_2 Nonattainment Designations 2013 (Round 1) and 2016 (Round 2) *(continued)*

Map of the Central New Hampshire nonattainment area including location of sources with emissions greater than 100 tpy (based on 2008 data from NEI) and ambient monitors.



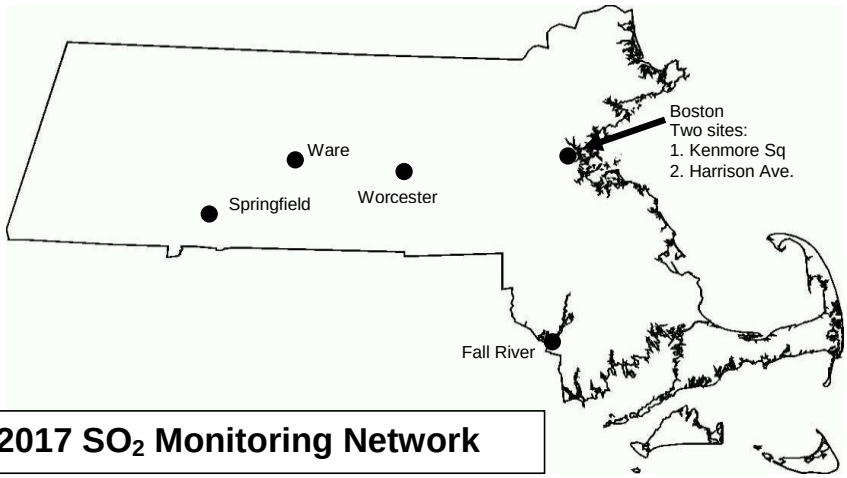


Source: EPA Sulfur Dioxide Designations web page
Round 1: Map of EPA Nonattainment Designations **(**https://www.epa.gov/sulfur-dioxide-designations/so2-designations-map-nonattainment-designations-july-2013
Final Technical Support Document, July 2013, New Hampshire First Round of Nonattainment Area Designations for the 2010 SO2 Primary NAAQS, Prepared by The Region 1
file:///Y:/AIR/SO2/SO2%20Infrastructure%20SIP%20-%20Transport/EPA-HQ-OAR-2012-0233-0320.pdfRound 2: Map of Designated Areas (https://www.epa.gov/sulfur-dioxide-designations/epa-completes-second-round-sulfur-dioxide-designations file: so2d-r2-map.pdf)

2. SO_2 Air Monitoring Trends

MassDEP operates six SO_2 monitors shown in Figure 2. SO_2 levels at all monitors are well below the 75 ppb SO_2 NAAQS.[10] The maximum design value since 2005 was 72 ppb at Fall River based on 2010-2012 data, which likely was in part due to emissions from the nearby Brayton Point Power Station. However, due to the decreased operation of Brayton Point, the design value at the Fall River monitor dropped to 28 ppb based on 2013-2015 data. The Brayton Point Power Station ceased operations on May 31, 2017.

Figure 2: SO_2 Monitors in Massachusetts



Source: Massachusetts 2017 Air Monitoring Network Plan. MassDEP Air Assessment Branch. July 2017 (http://www.mass.gov/eea/agencies/massdep/air/reports/annual-ambient-air-quality-monitoring-network-plan.html)

SO_2 levels in nearby states also are below the NAAQS. Figure 3 shows the maximum SO_2 design value trends in Massachusetts and neighboring states. The maximum design value for 2013-2015 is 29 ppb at the Portsmouth monitor in New Hampshire, which is less than half of the standard. In Rhode Island the most recent design value for 2013-2015 is 10 ppb, less than 20% of the standard.

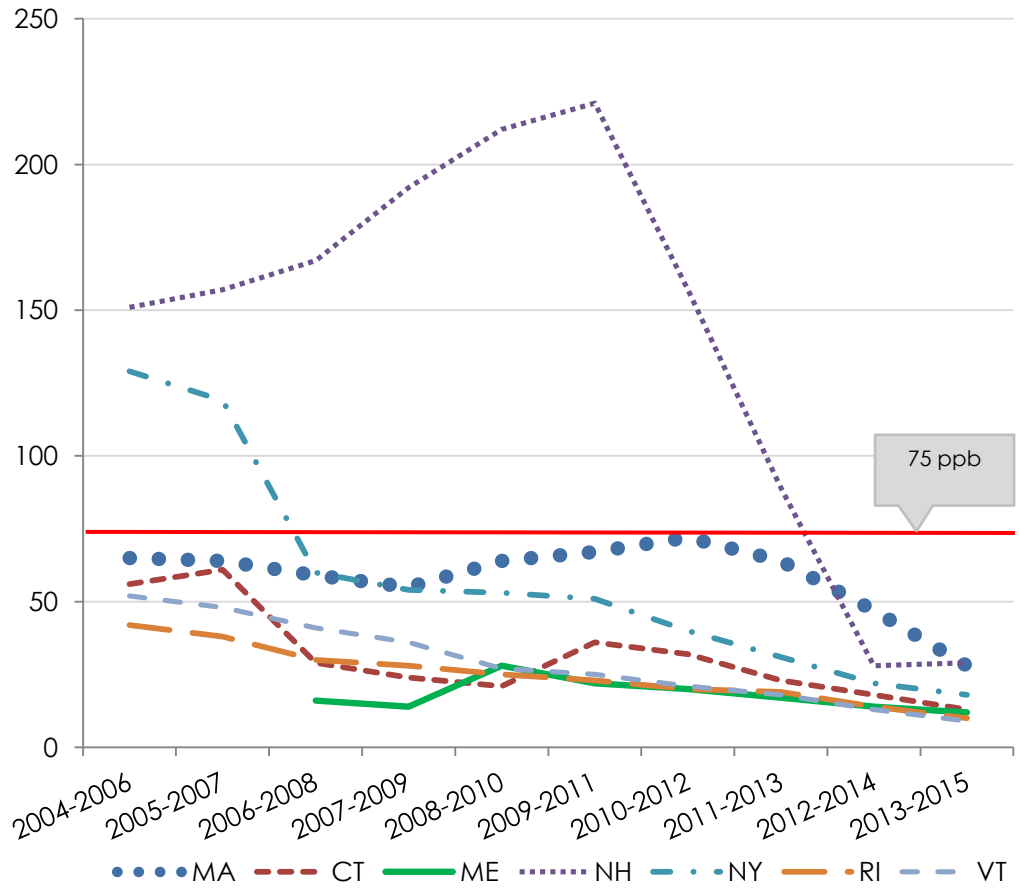
Monitored SO_2 levels in neighboring states have been generally below the NAAQS for the past 10 years except for the Pembroke monitor in New Hampshire. The maximum design value for the Pembroke monitor was 221 ppb based on 2009-2011 data. However, the design value at this monitor dropped to 20 ppb based on 2013-2015 data, which is

[10] EPA Design Values: http://www.epa.gov/airtrends/values.html Table 6c. Monitoring Site Design Value History Site level for Sulfur Dioxide 1 Hr NAAQS for 2005 through 2014, AQS Data Query: 7/6/2015.

below the NAAQS, due to the installation of a flue gas desulfurization system at the nearby coal-fired Merrimack Station power plant.[11] [12]

Figure 3: Maximum SO_2 Design Value Trends

Massachusetts and Neighboring States
Maximum Design Values from 2005-2014 (ppb)



Source: EPA Design Value website: https://www.epa.gov/air-trends/air-quality-design-values. File: so2_designvalues_20132015_final_07_29_16.xlsx. The data was taken from sheets: "Table6c - Site Trends 1hr" for emissions, and "Table5a - Site Level Ann" for site information.

[11] THE NEW HAMPSHIRE AMBIENT AIR MONITORING PROGRAM 2015/2016 ANNUAL NETWORK REVIEW, PLAN and 5 YEAR ASSESSMENT, July 2015. New Hampshire Department of Environmental Services, http://des.nh.gov/organization/divisions/air/tsb/ams/aqmdp/

[12] Amendment to New Hampshire 2010 Sulfur Dioxide NAAQS Infrastructure SIP to Address the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I). New Hampshire Department of Environmental Services. June 16, 2017

3. SO_2 Emissions Trends

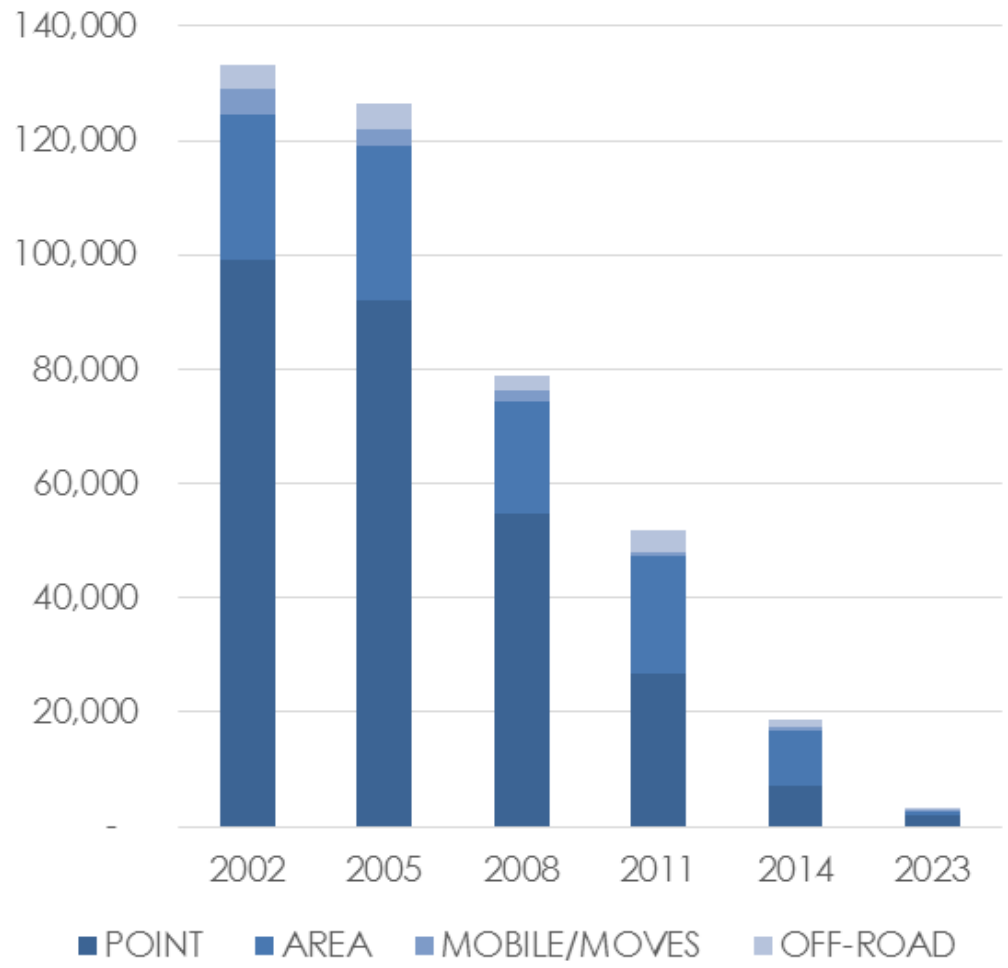
SO_2 emissions in Massachusetts have declined significantly in the past 15 years. Figure 4 shows emissions trends from 2002 to 2014 with projections to 2023.[13] Large point sources once dominated the inventory, but now contribute an amount similar to area sources (area sources are primarily residential oil combustion and small commercial and industrial oil combustion). Point source emissions will continue to decline due to power plant retirements and repowering. Area source emissions also will continue to decline due to lower sulfur fuel requirements starting in 2018.

EPA projects that SO_2 emissions in all nearby states will significantly decline by 2025. Figure 5 shows 2011 emissions with 2017-2025 projections from EPA.[14] The reduction in SO_2 emissions across the region indicates that Massachusetts and its neighboring states will continue to maintain the 2010 SO_2 NAAQS.[15]

[13] Historic emissions: MassDEP 2014 Periodic Emissions Inventory (unpublished) Table 1.5.
2023 projections: MARAMA SharePoint file - MARAMA 11-23 6/5/2017 -Emissions Summaries - MARAMA Gamma 2011-2023 Inventory Summaries 2017-06-05 -Susan McCusker.
[14] EPA website: ftp://ftp.epa.gov/EmisInventory/2011v6/v2platform/reports. Files: 2025eh_cb6v2_v6_11g_state_sector_totals.xlsx; 2017eh_cb6v2_v6_11g_state_sector_totals.xlsx; and 2011eh_cb6v2_v6_11g_state_sector_totals.xlsx.
[15] Although the values projected by the EPA and MARAMA inventories are different, the trend is similar.

Figure 4: SO_2 Emissions Trends in Massachusetts

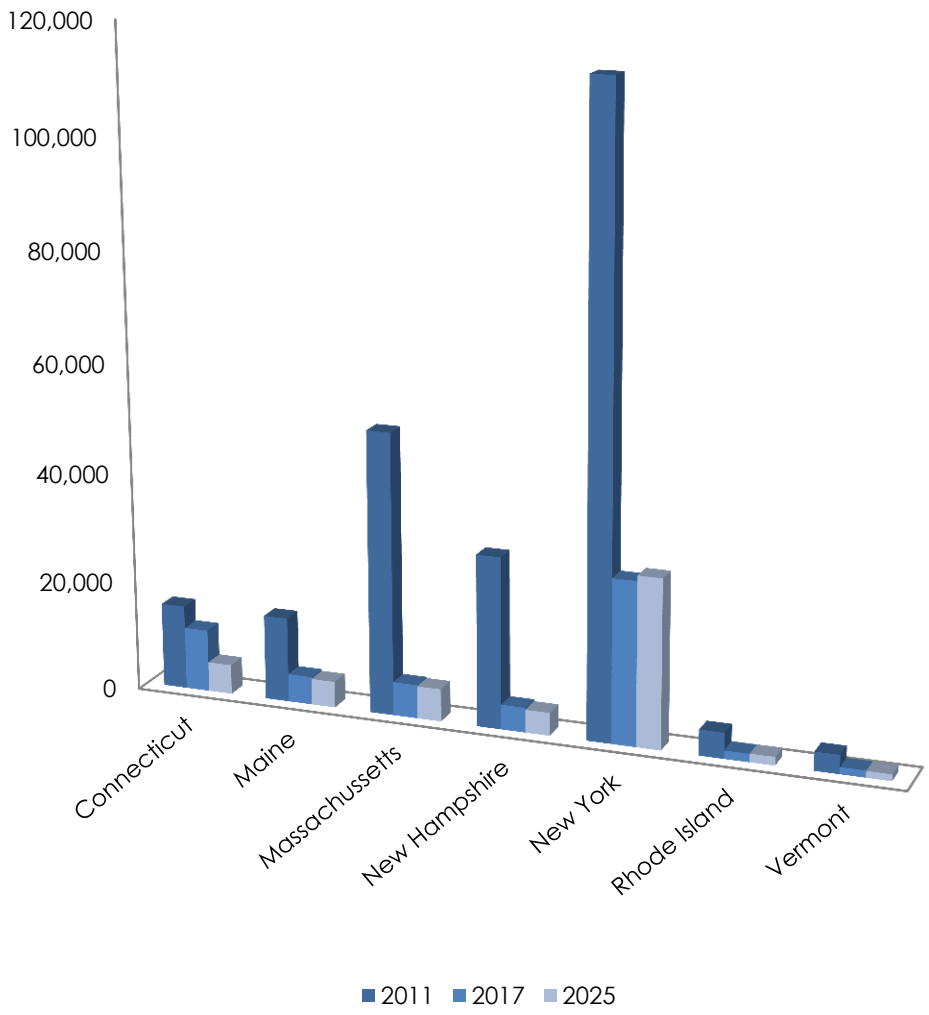
2002-2014, projections to 2023 (tons/year)



Source: MassDEP 2014 Periodic Emissions Inventory (unpublished) Table 1.5.
2023 projections from MARAMA SharePoint file - MARAMA 11-23 6/5/2017 -Emissions Summaries - MARAMA Gamma 2011-2023 Inventory Summaries 2017-06-05 -Susan McCusker

Figure 5: SO_2 Emissions Trends in the Region

Massachusetts and Neighboring States 2011-2025 (tons/year)



Source: EPA 2011v6 modeling platform v2 FTP site June 2017:
ftp://ftp.epa.gov/EmisInventory/2011v6/v2platform/reports/ Files:
2025eh_cb6v2_v6_11g_state_sector_totals.xlsx
2017eh_cb6v2_v6_11g_state_sector_totals.xlsx
2011eh_cb6v2_v6_11g_state_sector_totals.xlsx

4. SO_2 Sources in Massachusetts

The largest sources of SO_2 in Massachusetts have closed in recent years. Brayton Point Power Station was the largest SO_2 point source and emitted 1,455 tons of SO_2 in 2014, 1,445 tons in 2015, and 876 tons in 2016, and permanently ceased operations on May 31, 2017. Other large sources of SO_2 that existed in Massachusetts have either retired or repowered to natural gas. In 2014, Salem Harbor Station ceased operations and is being replaced by gas-fired turbines. In 2015, the Mount Tom coal-fired power plant in Holyoke relinquished its permit following an extended idle period. In 2015, the only coal-fired industrial unit in Massachusetts (the Solutia plant in Springfield) permanently switched from coal and oil to natural gas.[16] These closures have significantly lowered SO_2 emissions in Massachusetts.

Massachusetts had very few SO_2 point sources emitting greater than 100 tons per year based on 2015 data. Table 1 lists these facilities. Brayton Point and Solutia are no longer in this emission category due to closure and repowering, respectively.

None of the remaining Massachusetts sources in Table 1 are near the border with another state. The closest are the Wheelabrator municipal waste combustor in Millbury (20 km from Connecticut) and the SEMASS (now Covanta) waste combustor in Rochester (32 km from Rhode Island).

The Central New Hampshire SO_2 Nonattainment Area is the only potential maintenance receptor that is close to Massachusetts. New Hampshire submitted an attainment plan for this area on January 31, 2017[17]. New Hampshire did not identify sources in Massachusetts that would have enough impact to be included in the modeling for this plan. New Hampshire's plan relied on controls on the Merrimack Generating Station to address the nonattainment.

New Hampshire also modeled SO_2 emissions from the Schiller Station to address the Data Requirements Rule and cited this modeling in the New Hampshire Good Neighbor SIP.[18] [19] This modeling included a single interactive source in Massachusetts – the

[16] AIR QUALITY PLAN APPROVAL for Solutia Inc. – Transmittal No.: X261407 Application No.: WE-14-013 AQID: 0420086 FMF No.: 298974. February 4, 2015.

[17] Appendix A Rationale for New Hampshire's 1-Hour Sulfur Dioxide Attainment Areas (attachment to letter from Governor Wood Hassan, December 23, 2016, regarding Designation of Attainment/Attainment-Unclassifiable for the 2010 SO2 NAAQS for portions of New Hampshire). New Hampshire Department of Environmental Services. http://www.des.nh.gov/organization/divisions/air/do/sip/documents/nh-so2-designation-rationale.pdf

[18] Central New Hampshire Nonattainment Area Plan for the 2010 Primary 1-Hour Sulfur Dioxide NAAQS. New Hampshire Department of Environmental Services. January 20, 2017.

[19] Amendment to New Hampshire 2010 Sulfur Dioxide NAAQS Infrastructure SIP to Address the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I). New Hampshire Department of Environmental Services. June 16, 2017.

Wheelabrator municipal waste combustor facility in North Andover, which is 5 km from the New Hampshire border. Wheelabrator emitted 57 tons, 41 tons, and 51 tons of SO_2 in 2013, 2014, and 2015 respectively. The modeling also indirectly included other SO_2 emissions from Massachusetts as part of monitored background (total background concentrations ranging from 1.70 – 4.46 ppb). That modeling showed that attainment would be maintained even under the worst-case 100% load at the Schiller Station. Therefore, the nearby Wheelabrator facility along with other emissions from Massachusetts would not interfere with maintaining attainment in southern New Hampshire.

Table 1: SO_2 Emissions from Sources > 100 tons/year in 2015 (tons / year)

FACILITY	AQID	TOWN	2013	2014	2015	2016	DISTANCE (km)*
BRAYTON POINT ENERGY LLC *(retired)*	1200061	SOMERSET	7605	1456	1446	876	2
MYSTIC STATION	1190128	CHARLESTOWN	802	910	729	766	39
NRG CANAL LLC	1200054	SANDWICH	47	700	492	38	53
SEMASS PARTNERSHIP	1200001	ROCHESTER	387	324	192	na	32
SOLUTIA INC *(ceased burning coal as of December 2016)*	0420086	SPRINGFIELD	699	668	523	na	13
VEOLIA ENERGY BOSTON INC	1190507	BOSTON	35	115	117	na	43
WHEELABRATOR MILLBURY INC	1180419	MILLBURY	295	302	224	na	20

* Distance from nearest state border.

na = not available

Source: MassDEP Source Registration filings by the facilities. 2016 from EPA Air Markets Program Data website (https://ampd.epa.gov/ampd/).

5. Massachusetts SO_2 Control Programs

Listed below are key Massachusetts regulations that limit SO_2 emissions.

Low Sulfur Fuel. MassDEP's low sulfur fuel rule (310 CMR 7.05(1)(a)) reduces the sulfur content of oil combusted in stationary sources. The first phase went into effect on July 1, 2014 and reduced sulfur content of distillate oil to 500 ppm. The next phase takes effect on July 1, 2018 and will further reduce sulfur to 15 ppm. 310 CMR 7.05(1)(a)(3) also requires the use of low sulfur fuel for large stationary engines and turbines based on EPA requirements for diesel fuel (now at 15 ppm). For residual oil the rule reduced sulfur to 0.5% in 2014 for electric generating units and will further reduce sulfur to 0.5% in 2018 for all other uses (except in the Berkshire Air Pollution Control District). Therefore, sulfur emissions from stationary sources will continue to decrease over time based on MassDEP's fuel rule.

*Emissions Standards for Power Plants***.** 310 CMR 7.29 Emissions Standards for Power Plants establishes a facility-wide rolling 12-month SO_2 emissions rate of 3.0 pounds per megawatt-hour and a monthly average emissions rate of 6.0 pounds per megawatt-hour. This regulation allows the use of 310 CMR 7.29 SO_2 Early Reduction Credits (on a 1 ton credit to 1 ton excess emission basis) and the use of federal Acid Rain SO_2 Allowances (on a 3 ton allowance to 1 ton excess emission basis) for compliance with the 3.0 pounds per megawatt-hour emissions rate. 310 CMR 7.29 applies to Mystic Station and Canal Station, the largest remaining SO_2 sources in Massachusetts.

SO_2 Limits on Municipal Waste Combustors (MWC). In 1998 MassDEP issued 310 CMR 7.08 to control emissions from municipal waste combustors. Although targeted primarily at mercury, this rule included limits on SO_2 and required the facilities to establish emissions control plans. This regulation applies to all MWCs in Massachusetts (Covanta Haverhill, Covanta Pittsfield, Covanta SEMASS, Covanta Springfield (Agawam), Wheelabrator Millbury, Wheelabrator North Andover, Wheelabrator Saugus) including the great than100 ton SO_2 MWC sources identified in Table 1.

Statewide Permitting Program. 310 CMR 7.02 establishes a pre-construction Plan Approvals for sources that requires Best Available Control Technology for pollutants that will be emitted, including SO_2. MassDEP's permitting program ensures that projects that require Plan Approvals will limit SO_2 emissions.

6. Certification

Because there are no large sources of SO_2 emissions in Massachusetts that significantly affect any neighboring state, SO_2 emissions continue to decline due to regulatory

programs and facility retirements, and monitored SO_2 levels in Massachusetts and adjacent states are substantially below the 2010 SO_2 NAAQS, MassDEP certifies that sources in Massachusetts do not contribute to nonattainment or interfere with maintenance of attainment of the 2010 SO_2 NAAQS in any neighboring states.

This Certification fulfills the interstate transport requirements in Section 110(a)(2)(D)(i) of the CAA and completes MassDEP's Infrastructure SIP Certification in accordance with Sections 110(a) (1) and (2) of the CAA for the 2010 SO_2 NAAQS.