South Coast AQMD

DRAFT SOUTH COAST AIR BASIN ATTAINMENT PLAN

for the 2012 Annual PM2.5 Standard

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EXECUTIVE SUMMARY

- **Despite great strides in cleaning the air over the past several decades, the Los Angeles area still has among the highest levels of fine particulate matter (PM2.5) pollution in the nation.**

- **The South Coast Air Basin fails to meet the 2012 annual PM2.5 national ambient air quality standard and is classified as a "serious" nonattainment area.**

- **South Coast AQMD submitted a plan to attain the 2012 annual PM2.5 standard by 2025 in 2017; however, the U.S. EPA failed to take timely action on that plan. Due to unforeseen challenges, that plan would no longer provide a path to attaining the standard.**

- **South Coast AQMD developed a new plan to meet the 2012 annual PM2.5 standard. To address the unforeseen challenges, this plan seeks an extension of the attainment date to 2030 as allowed by the Clean Air Act.**

- **The new plan requires accelerated implementation of control measures from the 2022 AQMP as well as limited additional measures to reduce ammonia and direct PM2.5 emissions.**

- **With the emission reductions expected from the strategy listed above, the South Coast Air Basin is expected to meet the 2012 annual PM2.5 standard by 2030.**

Overview

The 17 million residents of the greater Los Angeles area have suffered from some of the worst air quality in the nation. While air quality has improved greatly over the past decade, more needs to be done. The region has the worst levels of ground-level ozone (smog) and among the highest levels of fine particulate matter (PM2.5). PM2.5 is either directly emitted into the atmosphere (primary particles) or formed in the atmosphere through chemical reactions (secondary particles). Primary PM2.5 includes road dust, diesel soot, combustion products, and other sources of fine particles. Secondary PM2.5 products, such as sulfates, nitrates, and complex organic compounds, are formed from reactions with oxides of sulfur (SOx), oxides of nitrogen (NOx), volatile organic compounds (VOCs), and ammonia.

The PM2.5 air pollution levels in the region exceed both National and California Ambient Air Quality Standards. High levels of air pollution cause respiratory and cardiovascular disease, exacerbate asthma, and can lead to premature death. We also know that our Environmental Justice (EJ) communities experience the brunt of adverse health effects from air pollution. Approximately 42 percent of the South Coast Air Basin (Basin) residents live in EJ communities.

The United States Environmental Protection Agency (U.S. EPA) requires areas that do not meet a National Ambient Air Quality Standard (NAAQS or standard) to develop and implement strategies to reduce emissions so that healthy levels of air quality can be achieved in a timely manner. The strategy, along with other supporting elements, must be submitted to U.S. EPA for its review and approval into the State Implementation Plan (SIP). Regions must develop SIPs to attain NAAQS by specific dates or face the possibility of sanctions by the federal government and other consequences under the Clean Air Act (CAA). This can result in increased permitting fees, stricter restrictions for permitting new projects, and the loss of federal highway funds.

The Basin fails to meet the NAAQS for the 2012 annual PM2.5 standard and is currently classified as a "serious" nonattainment area. As such, the South Coast AQMD is required to develop a plan to meet the NAAQS. This document is the plan that provides the strategy and the underlying technical analysis for how the Basin will meet the 2012 annual PM2.5 NAAQS as expeditiously as practicable, but no later than December 31, 2030. This Plan does not address the Coachella Valley as that area already attains the 2012 annual PM2.5 NAAQS.

Challenges and Need for a New PM2.5 Plan

Effective April 15, 2015, the U.S. EPA designated the Basin as a "moderate" nonattainment area for the 2012 annual PM2.5 NAAQS.[1] The 2016 Air Quality Management Plan (AQMP) contained the original plan

[1] Air Quality Designations for the 2012 Primary Annual Fine Particle ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS), 80 Fed. Reg. 2206 (Jan. 15, 2015)

to meet the 2012 annual PM2.5 NAAQS. In that plan, staff concluded that attainment by the "moderate" area deadline of December 31, 2021 was not achievable. As provided for under the Clean Air Act, staff requested that the U.S. EPA reclassify the Basin to "serious" nonattainment, which provided for additional time to attain the standard. Accordingly, a "serious" area attainment plan, demonstrating attainment by December 31, 2025, was also included in the 2016 AQMP.

Despite the 2016 AQMP submittal, U.S. EPA did not act on the PM2.5 "serious" area plan for several years. On December 9, 2020, U.S. EPA reclassified the Basin from "moderate" to "serious" nonattainment for the 2012 annual PM2.5 NAAQS with an attainment deadline by December 31, 2025.[2] U.S. EPA simultaneously raised concerns regarding data from near-road monitors which were established in 2015. These monitors are located along the Interstate 710 (I-710) in Long Beach and the California State Route 60 (CA-60) in Ontario. At the time of 2016 AQMP adoption, neither of these monitors had collected enough data to be considered in plans. By January 1, 2020, however, these monitors had accumulated sufficient data to be considered in SIP attainment demonstrations. Based on 2020–2022 monitoring data, the CA-60 near-road monitoring site had the highest PM2.5 level in the Basin at 13.7 $\mu g/m^3$. U.S. EPA indicated that it could not approve the "serious" area plan included in the 2016 AQMP since, at the time the reclassification request was approved, the near-road monitors were eligible to be considered in attainment demonstrations. U.S. EPA subsequently requested a supplemental attainment demonstration for the near-road monitors.

On January 12, 2023, U.S. EPA was sued over its failure to take timely action on the "serious" area plan in the 2016 AQMP. To avoid potential disapproval of the plan by U.S. EPA, which would have triggered sanction clocks, South Coast AQMD withdrew the "serious" area plan. As a consequence of withdrawal, South Coast AQMD is required to develop a new plan to address attainment of the 2012 annual PM2.5 NAAQS.

While the 2016 AQMP had predicted attainment of the 2012 annual PM2.5 NAAQS by 2025, this PM2.5 Plan requests an attainment date extension to December 31, 2030 as allowed under CAA Section 188(e). There are multiple factors contributing to the extension of the attainment date. The addition of the near-road monitors, which were not considered in the 2016 AQMP, is one of the primary reasons for the longer timeframe needed for attainment. In addition, due to a lack of action at the federal level, sources such as interstate trucks, ships, locomotives, and aircraft have not been controlled sufficiently, which has resulted in emission reduction shortfalls for attainment of ozone standards. Other unforeseen challenges that have complicated attainment include unfavorable meteorology, wildfires, and increases in emissions in the goods movement sector during the COVID-19 pandemic.

[2] Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; California; South Coast Moderate Area Plan and Reclassification as Serious Nonattainment for the 2012 PM2.5 NAAQS, 85 Fed. Reg. 71264 (Nov. 9, 2020)

Control Measures and Attainment Strategy

U.S. EPA requires PM2.5 plans to address directly-emitted PM2.5 and the gases that form PM2.5 in the atmosphere. These gases are known as precursors, and they include SOx, NOx, VOCs, and ammonia. While the main sources of NOx are on-road and off-road mobile sources, direct PM2.5 emissions are driven by stationary area sources, such as cooking and resuspended particles from paved roads. Ammonia emissions are driven by both area and mobile sources. Control measures for VOCs and SOx are not included in the attainment strategy as these precursors have an insignificant contribution to PM2.5 in the Basin.

The reductions needed to meet the 2012 annual PM2.5 NAAQS will come from three categories.

1) **Already adopted rules and programs.** Rules and programs that have already been adopted by the South Coast AQMD will continue to bring emission reductions of PM2.5 and its precursors. These reductions are already reflected in the baseline (i.e., Business-As-Usual) emissions. Under baseline conditions, NOx and direct PM2.5 emissions are expected to decline by 45 percent and 4 percent from 2018 to 2030, respectively.

2) **Actions from the 2022 AQMP.** The NOx strategy committed in the 2022 AQMP to attain the 2015 8-hour ozone NAAQS by 2037 is expected to reduce both NOx and direct PM2.5 emissions by 2030. Among the control measures included in the 2022 AQMP, those that can be implemented by 2030 were identified and included in this Plan. Both NOx emission reductions and concurrent PM2.5 reductions from 2022 AQMP NOx control measures were quantified in this PM2.5 Plan.

3) **Limited additional reductions of ammonia and direct PM2.5**. These additional reductions will be pursued to satisfy U.S. EPA's stringency requirements. This PM2.5 Plan is required to satisfy U.S. EPA's requirements including Best Available Control Measures (BACM) and Most Stringent Measures (MSM). Demonstrating BACM and MSM is independent of attainment and therefore some control measures, which are surplus to the attainment strategy, are included. For details on the BACM and MSM requirements and analysis, refer to Appendix III.

South Coast AQMD proposes a total of 38 control measures for the PM2.5 Plan. Out of the 38 proposed control measures, 23 measures target reductions from stationary sources and the remaining 15 measures target reductions from mobile sources. The stationary source measures are grouped into the following categories: NOx measures, direct PM2.5 measures, ammonia measures, co-benefits from energy and climate change programs, and other measures. Meanwhile, the mobile source measures are grouped into the following categories: emission growth management measures, facility-based mobile source measures, on-road and off-road measures, incentive-based measures, and other measures. Overall, emissions of NOx and PM2.5 will reduce by 207.7 tons per day and 3.4 tons per day, respectively, between 2018 and 2030.

Attainment Demonstration

Air quality modeling is used to demonstrate future attainment of the PM2.5 standard and is an integral part of the planning process. Modeling shows the connection between emission reductions and a path to attainment. It reflects updated emissions estimates, new technical information, enhanced air quality modeling techniques, updated attainment demonstration methodology, and the control strategy.

The modeling platform consists of a suite of modeling tools that calculate air pollutant emissions, meteorological conditions that drive the transport of pollutants, and chemical transformation of pollutants to predict the concentrations of PM2.5 and its precursors. The modeling setup is an upgrade from the modeling platform used in the 2022 AQMP and incorporates new versions of the Weather Research Forecast (WRF) meteorological model and the Community Multiscale Air Quality (CMAQ) model. Emissions modeling incorporates detailed information from satellite observations, vehicle traffic sensor data, and communication platforms for aircraft and ocean-going vessels, to refine emissions spatial and temporal distribution.

For the first time in a South Coast Air Basin PM2.5 plan, the design site for the annual PM2.5 standard is a near-road monitor. That site is the near-road monitor that is located by the CA-60 freeway in Ontario. Modeling the air quality in this site presents challenges to regional air quality models commonly used in attainment demonstrations. The U.S. EPA modeling guidance for attainment demonstrations[3] recognizes the limitations of regional models to represent the steep gradients in PM2.5 around near-road sites and acknowledges that demonstrating attainment at near-road sites may require different treatment compared to other monitors. This PM2.5 plan employs a hybrid approach that combines traditional regional modeling with dispersion modeling around the near-road site. The hybrid modeling helps characterize the contribution of near-road sources to measured PM2.5 at the near-road monitor to better quantify the benefits of emission controls on on-road sources. Other than the near-road monitor at Ontario CA-60, the traditional regional modeling approach was employed to demonstrate attainment at all stations in the Basin.

With the proposed control measures and emissions reductions, the attainment strategy in this Plan will result in meeting the 2012 annual PM2.5 standard by 2030 at all the stations in the Basin.

Health Benefits

A Socioeconomic Impact Assessment, which includes quantification of public health benefits, is being prepared and will be released for public review at least 30 days prior to the Public Hearing.

[3] Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze, U.S. EPA, Office of Air Quality Planning and Standards. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

Collaboration, Public Process, and Outreach

The development of the PM2.5 Plan has been a regional, multi-agency effort that includes South Coast AQMD, CARB, the Southern California Association of Governments, and the U.S. EPA. The PM2.5 Plan also incorporates collaborative efforts by a wide range of stakeholders such as businesses, environmental and health organizations, community groups, and academia. As shown in Figure ES-1, development of the PM2.5 Plan involved numerous types of public meetings to promote collaboration and public participation. Meeting materials for the regional public hearings will be translated to Spanish and will feature live Spanish translation. Agendas and presentations for each meeting will be forthcoming.

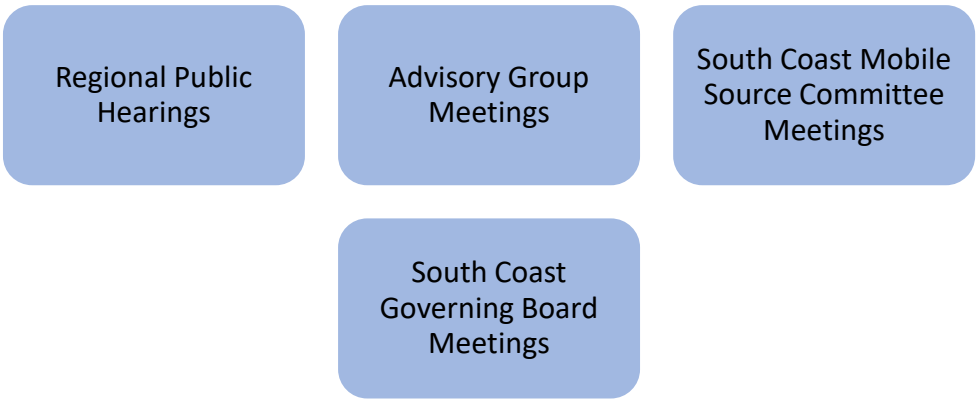

FIGURE ES-1
VENUES ACCOMMODATING STAKEHOLDER PARTICIPATION

Implications of a New PM2.5 Standard for the Basin

U.S. EPA recently revised the annual PM2.5 standard from its current level of 12 µg/m^3 to 9.0 µg/m^3.[4] The new standard is the result of an extensive scientific review conducted by U.S. EPA's Clean Air Scientific Advisory Committee (CASAC), which found that the 12 µg/m^3 standard does not sufficiently protect public health.

This PM2.5 Plan, together with the 2022 AQMP, serves as a steppingstone for attaining the 2024 PM2.5 NAAQS. However, even after implementing the control strategy of this Plan, air quality modeling predicts that the 2030 design value will be 11.7 µg/m^3, significantly higher than the new 9.0 µg/m^3 standard.

[4] Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, 89 Fed. Reg. 16202 (Mar. 6, 2024)

Preliminary results suggest that even implementation of the 2022 AQMP strategy, which targets attainment of the 2015 8-hour ozone NAAQS by 2037, will be insufficient to lower the design value to 9.0 $\mu g/m^3$. Substantial emission reductions especially of direct PM2.5 will therefore be required to meet the new standard. South Coast AQMD commits to develop the optimal attainment strategy that considers stakeholder feedback while ensuring expeditious attainment of the 2024 PM2.5 standard.

CHAPTER 1

Introduction

- **PM2.5 levels have improved dramatically in the South Coast Air Basin (Basin) over the past several decades, yet the region still experiences among the highest PM2.5 levels in the nation, leading to significant health issues.**

- **The Basin is in "serious" nonattainment of the 2012 annual PM2.5 standard and the Clean Air Act requires South Coast AQMD to develop and implement an emission reduction strategy to meet the standard.**

- **This document is the plan to meet the 2012 annual PM2.5 standard in the Basin by December 31, 2030.**

- **The emission reductions to be achieved through implementing this plan will assist the Basin in meeting the 2024 annual PM2.5 standard.**

Purpose

The greater Los Angeles area experiences some of the worst air pollution in the nation. While tremendous progress has been made in reducing levels of air pollution over that past several decades, the region still has the highest levels of ozone, and among the highest levels of fine particulate matter (PM2.5) in the country. These air pollutants cause substantial health impacts, including respiratory and cardiovascular disease, worsening asthma symptoms, and premature death.

The federal Clean Air Act (CAA or Act) requires areas that do not meet the health-based National Ambient Air Quality Standards (NAAQS or standards) to develop and implement an emission reduction strategy to attain healthy levels of air quality in a timely manner. The South Coast Air Basin (Basin) fails to meet the 2012 annual PM2.5 NAAQS and is currently classified as a "serious" nonattainment area for that standard. The South Coast Air Basin Attainment Plan for the 2012 Annual PM2.5 Standard (PM2.5 Plan or Plan) provides the strategy and the underlying technical analysis for how the region will meet the 2012 annual PM2.5 NAAQS in the Basin as expeditiously as practicable, but no later than December 31, 2030. This Plan does not address the Coachella Valley as that area already meets the 2012 annual PM2.5 NAAQS. It also does not address attainment of other NAAQS as those are addressed in the 2016 and 2022 Air Quality Management Plans (AQMPs).[1,2]

Federal 2012 Annual PM2.5 Standard

On December 14, 2012, the U.S. EPA strengthened the primary annual NAAQS for PM2.5 to 12 micrograms per cubic meter ($\mu g/m^3$).[3] Under the CAA, there are two tiers of nonattainment for areas that fail to meet PM2.5 standards; "moderate" and "serious." Nonattainment areas are classified by the U.S. EPA into one of these two tiers based on the levels of PM2.5 in the region. Effective April 15, 2015, the U.S. EPA designated the South Coast Air Basin (Basin) as a "moderate" nonattainment area for the 2012 annual PM2.5 NAAQS.[4] Pursuant to Clean Air Act (CAA) Section 189(a)(2)(B), "moderate" nonattainment areas must submit a plan showing how the region will meet the standard by the date required by the CAA.no later than 18 months from the date of designation. "Moderate" nonattainment areas are required to meet the 2012 annual PM2.5 standard as expeditiously as practicable, but no later than the end of the sixth calendar year after the designation (i.e., December 31, 2021) and "serious" nonattainment areas are required to attain the standard as expeditiously as practicable, but no later than the end of the tenth calendar year after the designation (i.e., December 31, 2025). Under CAA Section 188(e), "serious"

[1] Final 2016 Air Quality Management Plan, https://www.aqmd.gov/home/air-quality/clean-air-plans/final-2016-aqmp

[2] 2022 Air Quality Management Plan, https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan

[3] National Ambient Air Quality Standards for Particulate Matter, 78 Fed. Reg. 3086 (January 15, 2013)

[4] Air Quality Designations for the 2012 Primary Annual Fine Particle ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS), 80 Fed. Reg. 2206 (Jan. 15, 2015)

nonattainment areas may request an attainment date extension to no later than the end of the fifteenth calendar year after the designation (i.e., December 31, 2030).

California Annual PM2.5 Standard

The California Clean Air Act (CCAA),[5] enacted in 1988, provides a framework for air quality planning and established a legal mandate for CARB to achieve health-based state air quality standards for ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide at the earliest practicable date. Although not required by the CCAA, state standards for particulate matter are contained in Title 17 of the California Code of Regulations (CCR).[6] In June 2002, CARB promulgated the state annual average PM2.5 standard of 12 $\mu g/m^3$ for which the Basin is designated nonattainment. The CCAA specifies multiple requirements for ozone plans, such as requiring plans to be reviewed every three years, demonstrating plan effectiveness, implementing all feasible measures, reducing population exposure, and ranking control measures by cost-effectiveness.[7] However, these CCAA requirements do not directly apply to PM2.5 plans and no requirements were specified for PM2.5.

2016 AQMP

The South Coast AQMD developed the 2016 AQMP as the comprehensive blueprint for how the region will attain five NAAQS – three ozone standards (1979 1-hour, 1997 8-hour and 2008 8-hour), the 2006 24-hour PM2.5 standard and the 2012 annual PM2.5 standard. The 2016 AQMP concluded that attainment by the "moderate" area deadline of December 31, 2021, was impractical and requested reclassification of the Basin to "serious" nonattainment for the 2012 annual PM2.5 standard as provided in the CAA. Accordingly, South Coast AQMD included a "serious" area attainment plan in the 2016 AQMP that demonstrated attainment by December 31, 2025. The 2016 AQMP was adopted by the South Coast AQMD Governing Board on March 3, 2017, and submitted to U.S. EPA for approval on April 27, 2017, via the California Air Resources Board (CARB).

The CAA requires U.S. EPA to determine the completeness of any State Implementation Plan (SIP) submittal within 6 months of receipt and take final action on the submitted SIP by approving or disapproving, either in full or in part, within 12 months of the date the submittal has been deemed complete.[8] Despite the SIP being deemed complete by operation of law on October 27, 2017, U.S. EPA did not act on the PM2.5 "serious" area plan for several years. On December 9, 2020, U.S. EPA reclassified the Basin from "moderate" to "serious" nonattainment for the 2012 annual PM2.5 NAAQS per South Coast

[5] Health and Safety Code Sections 40910 et seq.
[6] CCR Title 17, § 70200
[7] Health and Safety Code Sections 40913, 40914, 40920, 40922, and 40925
[8] 42 U.S.C. § 7410(k)(1)–(4)

AQMD's previous request, establishing an attainment deadline of December 31, 2025.[9] U.S. EPA committed to evaluate and act on the PM2.5 "serious" area plan through subsequent rulemakings.

U.S. EPA's Concerns with the 2016 AQMP

Since the adoption of the 2016 AQMP, new challenges emerged that were not considered in the "serious" area plan. In 2015, two near-road monitors were established in the Basin, along the Interstate 710 (I-710) in Long Beach and the California State Route 60 (CA-60) in Ontario. When the U.S. EPA strengthened the annual PM2.5 NAAQS to 12 µg/m^3 on December 14, 2012, it added a requirement to monitor near the most heavily trafficked roadways in large urban areas. Particle pollution is expected to be higher along these roadways as a result of direct emissions from cars and heavy-duty diesel trucks and buses. The South Coast AQMD installed the two required PM2.5 monitors before January 1, 2015. The locations are I-710, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; and CA-Route 60, located west of Vineyard Avenue near Ontario, Mira Loma and Upland. At the time of 2016 AQMP adoption, these monitors had not collected sufficient data to establish valid design values, which requires three years of valid data. As a result, the data from the near-road monitors were excluded from the attainment demonstration. By January 1, 2020, these monitors had accumulated sufficient data to establish design values, allowing them to be considered in SIP attainment demonstrations.

Based on 2020–2022 monitoring data, the CA-60 near-road monitoring site had the highest PM2.5 level in the Basin at 13.7 µg/m^3. This is above the 2012 annual standard of 12 µg/m^3. U.S. EPA indicated that it could not approve the "serious" area attainment demonstration included in the 2016 AQMP since, at the time the reclassification request was approved, the near-road monitors were eligible to be considered in attainment demonstrations. U.S. EPA subsequently requested a supplemental attainment demonstration that included data from the near-road monitors.

Need for a New PM2.5 Plan

On January 12, 2023, the Center for Biological Diversity sued U.S. EPA over its failure to act on the "serious" area plan in the 2016 AQMP by the statutory due date. As U.S. EPA indicated that the 2016 plan was no longer approvable, South Coast AQMD submitted a request via CARB on March 29, 2023, to withdraw the 2016 AQMP "serious" area plan for the 2012 annual PM2.5 NAAQS. As a consequence of withdrawal, South Coast AQMD is required to develop a new plan to address attainment of the 2012 annual PM2.5 NAAQS.

While the 2016 AQMP had predicted attainment of the 2012 annual PM2.5 NAAQS by 2025, this PM2.5 Plan requests an attainment date extension to December 31, 2030, as allowed under CAA Section 188(e).

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[9] Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; California; South Coast Moderate Area Plan and Reclassification as Serious Nonattainment for the 2012 $PM_{2.5}$ NAAQS, 85 Fed. Reg. 71264 (November 9, 2020)

There are multiple factors contributing to the extension of the attainment date. The addition of the near-road monitors, which were not considered in the 2016 AQMP, is one of the primary reasons for the longer timeframe needed for attainment due to the high levels of PM2.5 at those monitors. In addition, the attainment strategy in the 2016 AQMP relied on co-benefits from measures to attain the 1997 8-hour ozone standard by 2023 and the 2008 8-hour ozone standard by 2031. Since the submittal of the 2016 AQMP, South Coast AQMD has implemented control measures and achieved emission reductions reflected in the 2016 AQMP attainment demonstration. However, a transition to low emission technologies did not occur across all sources, primarily due to a lack of action at the federal level to address emissions from aircraft, ships, trains, portions of heavy-duty trucks, and off-road equipment. These heavy-duty mobile sources contribute most of the pollution in the region and are subject to federal regulatory authority with limited ability for local regulation. Additional challenges that were not foreseen at the time of 2016 AQMP adoption include unfavorable meteorology, wildfires, increases in emissions in the goods movement sector during the COVID-19 pandemic, and the addition of the near-road monitors.

This PM2.5 Plan reviews the current status of PM2.5 air quality from all monitors in the region, develops a new strategy to attain the 2012 annual PM2.5 NAAQS as expeditiously as practicable, but no later than December 31, 2030, and satisfies all applicable “serious” area requirements.

Format of This Document

This document is organized into seven chapters, each addressing a specific topic. Each of the chapters is summarized here.

Chapter 1, “Introduction,” includes background on the annual PM2.5 standard, 2016 AQMP, U.S. EPA’s concerns with the 2016 AQMP, and the need for a new plan to address the standard.

Chapter 2, “Air Quality,” discusses the Basin’s current PM2.5 air quality in comparison with federal and State health-based air pollution standards and exceptional events.

Chapter 3, “Emissions Inventory,” summarizes the emissions inventory, estimates current emissions by source, and projects future emissions.

Chapter 4, “Control Strategy,” presents the control strategy, specific control measures for stationary and mobile sources, and implementation schedules to attain the 2012 annual PM2.5 standard by the specified attainment date.

Chapter 5, “Attainment Demonstration,” describes the air quality modeling approach used in the PM2.5 Plan.

Chapter 6, “Federal Clean Air Act Requirements,” discusses requirements associated with the request to extend the attainment date, the motor vehicle emissions budget, Reasonable Further Progress, quantitative milestones, and contingency measures.

Chapter 7, “Environmental Justice Communities,” describes air quality impacts experienced in environmental justice communities and outlines some of the steps South Coast AQMD is taking to address localized impacts.

Chapter 8, “Public Process and Participation,” describes South Coast AQMD’s public outreach effort associated with development of the PM2.5 Plan.

CHAPTER 2

Air Quality

- **PM2.5 concentrations were measured at 22 sites throughout the South Coast Air Basin in 2022 and have decreased significantly over the past two decades.**

- **PM2.5 levels are strongly influenced by meteorology, emissions of primary PM2.5 as well as the emissions of secondary PM2.5 precursors.**

- **While the 2022 annual PM2.5 design value exceeded the 2012 PM2.5 federal standard, the South Coast Air Basin reported the lowest annual average PM2.5 concentration in 2022 since PM2.5 monitoring began.**

Introduction

In this chapter, ambient fine particulate matter (PM2.5) as monitored by South Coast AQMD is summarized for the year 2022 and prior year trends in the South Coast Air Basin (Basin). The factors influencing PM2.5 concentrations are also discussed. South Coast AQMD's recent air quality is compared to the NAAQS and to the California Ambient Air Quality Standards (CAAQS or State standards). Data presented indicate the current attainment or nonattainment status for the various NAAQS and CAAQS PM2.5 standards, showing the progress made to date and assisting the South Coast AQMD in planning for future attainment.

The South Coast AQMD began regular monitoring of PM2.5 in 1999 following the U.S. EPA's adoption of the national PM2.5 standards in 1997. In 2022, ambient PM2.5 concentrations were monitored at 22 locations throughout the South Coast Air Basin, including two near-road sites. Two types of PM2.5 sampling methods are used in the region. Federal Reference Method (FRM) samplers pull ambient air through a filter over a 24-hour period. The filter is then removed and weighed to determine ambient PM2.5 concentrations during the sampling period. The Federal Equivalent Method (FEM) samplers used by South Coast AQMD are Beta Attenuation monitors that report hourly PM2.5 concentrations continuously, which are averaged over a 24-hour period to determine daily averages. While measurements from these two techniques produce similar concentrations, there still is some variation, with FEM samplers typically reading higher than collocated FRM samplers. The PM2.5 NAAQS are defined based on FRM measurements. Filter-based FRM PM2.5 sampling was employed at 14 of these stations. Seven of the FRM measurement stations, including the two near-road sites, sampled daily to improve temporal coverage beyond the required 1-in-3-day sampling schedule. Eighteen stations, including two near-road sites, employed continuous PM2.5 monitors and ten of these were collocated with FRM measurements. Among the 18 stations with continuous PM2.5 monitors, seven stations utilize FEM monitors, while three stations use special purpose monitors (SPM) for continuous PM2.5 measurement. FEM monitors undergo annual assessments by the U.S. EPA to determine their eligibility for NAAQS comparison.[1] In 2021,[2] all FEM monitors, except for the one at the Los Angeles-North Main Street station, successfully passed the comparability assessment. Therefore, the daily averages from these monitors can be used to supplement FRM measurements on days with missing data. The SPM monitors are newly established FEM monitors that have not collected three years of data required for the NAAQS-comparability assessment. They are eligible for comparison to NAAQS after they have been operated for more than 24 months unless a waiver has been granted by U.S. EPA. The continuous data is used for forecasting, real-time air quality alerts,

[1] The continuous PM2.5 monitors deployed by South Coast AQMD are FEM-designated Beta Attenuation Monitor (BAM) instruments. The U.S. EPA waiver from NAAQS compliance for the continuous samplers is re-evaluated annually as part of the South Coast AQMD Annual Air Quality Monitoring Network Plan [http://www.aqmd.gov/home/air-quality/clean-air-plans/monitoring-network-plan]

[2] At the time when this plan was drafted, the latest PM2.5 continuous monitor comparability assessment waiver approved by the U.S. EPA was for the design value period of 2019-2021

predictive air quality advisories, and for evaluating hour-by-hour variations. Figure 2-1 provides the location of all regulatory PM2.5 monitors within the Basin.

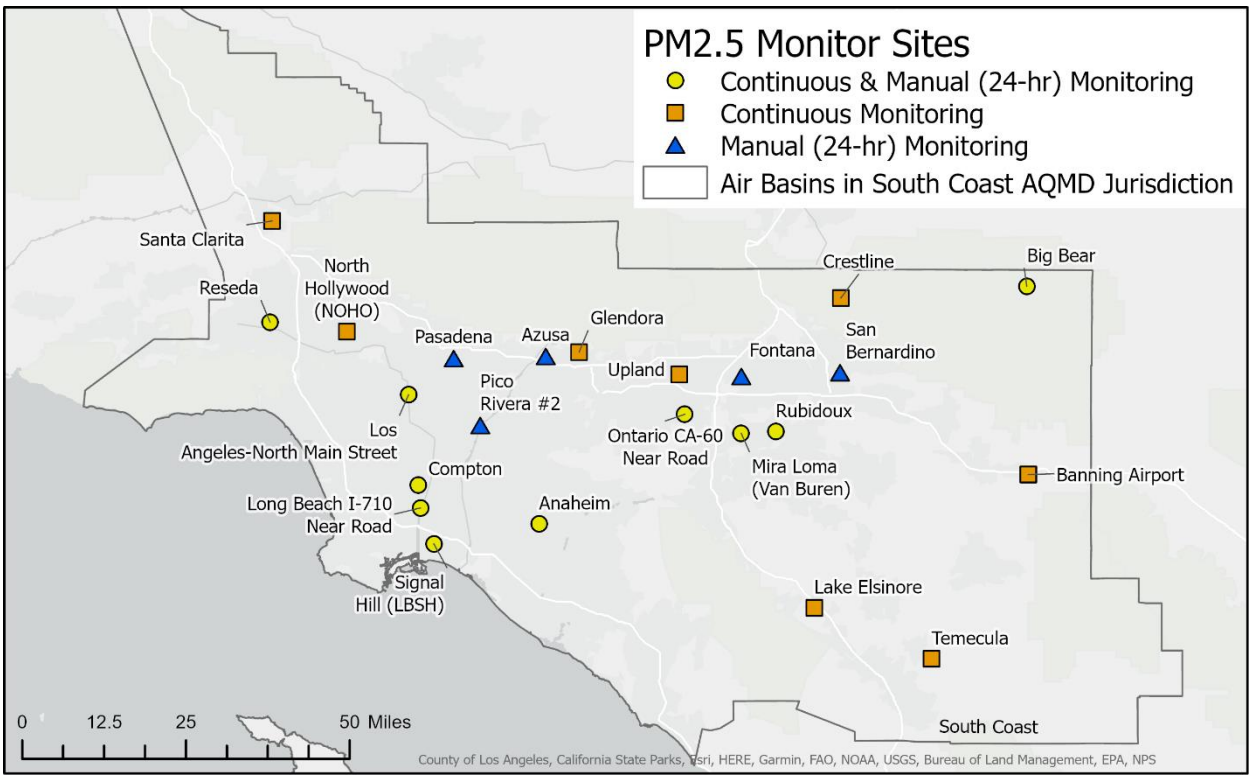


FIGURE 2-1
LOCATION OF ALL REGULATORY MONITORS IN THE SOUTH COAST AIR BASIN

Inhalation of fine particulate matter has been associated with a wide variety of health effects, including premature death. Other health impacts include exacerbation of symptoms in patients with respiratory or cardiovascular disease, decline in pulmonary function in children, increased risk of lung cancer, and potentially may be linked to adverse reproductive and cognitive effects. Some of the impacts of these health effects may be seen in increased asthma-related hospital admissions, increased school absences and lost workdays. Elevated PM2.5 concentrations also impair visibility. Detailed health effects information can be found in Appendix I: Health Effects in the 2022 AQMP[3] or in the U.S. EPA NAAQS documentation at https://www.epa.gov/naaqs.

[3] Available at www.aqmd.gov/2022aqmp

Factors that Influence PM2.5 Concentrations

The South Coast Air Basin's air pollution problems are a consequence of the combination of emissions from the nation's second largest urban area, meteorological conditions adverse to the dispersion of those emissions, and mountainous terrain surrounding the Basin that traps pollutants as they are pushed inland with the sea breeze. PM2.5 is a suspension of solid or liquid particles that are less than 2.5 micron in diameter. There are two forms of PM2.5 - primary and secondary. Primary PM2.5 particles are directly emitted by combustion sources such as vehicles, industrial processes, cooking, or fires. Secondary PM2.5 is formed in the atmosphere through a series of complex chemical reactions of PM2.5 precursors such as volatile organic compounds (VOCs), oxides of nitrogen (NOx), and ammonia (NH_3) (Figure 2-2). The precursors that form PM2.5 are from mobile, point and area sources, with the largest portion resulting from fuel combustion. Both directly emitted PM2.5 and secondary PM2.5 that is formed in the atmosphere contribute to measured PM2.5 concentrations, but in the South Coast Air Basin, secondary PM2.5 formation is responsible for approximately two thirds of the total PM2.5 mass (Figure 2-3). Because secondary PM2.5 is a substantial portion of overall PM2.5 levels in the region, control strategies to reduce PM must address both sources of direct emissions as well as the PM2.5 precursors.

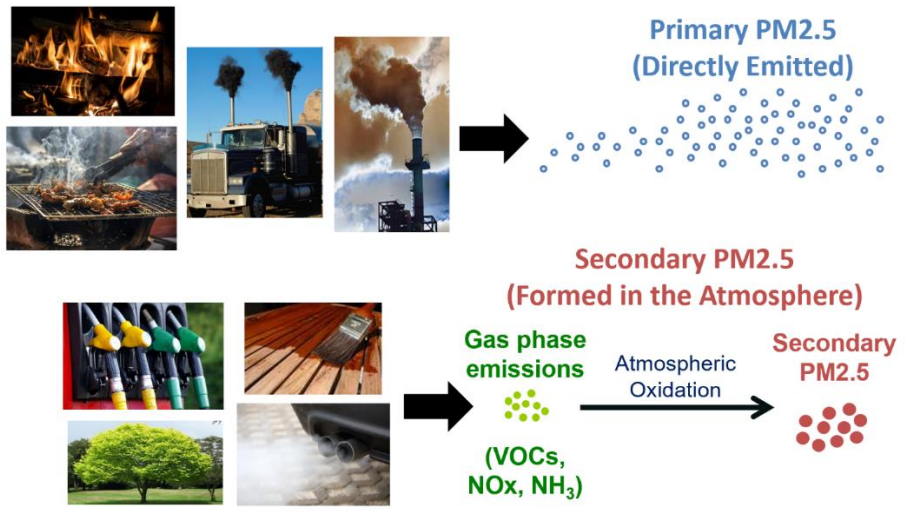


FIGURE 2-2
PM2.5 FORMATION MECHANISMS

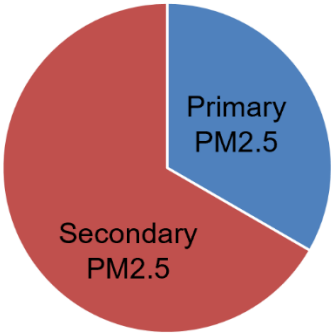


FIGURE 2-3
APPROXIMATE CONTRIBUTION OF SECONDARY AND PRIMARY PM2.5 IN THE SOUTH COAST AIR BASIN[4]

Most sources of PM2.5 and PM2.5 precursors have regular patterns of emissions that may vary by time of day, day of the week or by season. However, episodes of elevated PM2.5 can be caused by emission sources that occur infrequently such as wildfires, fireworks, or residential wood combustion. Wildfires are an important source of PM2.5 and PM2.5 precursors and can lead to multiple days of high PM2.5 levels, especially during the summer and fall months when fire activity is likely. Fireworks, either from commercial displays or personal use, are a significant source of PM2.5 on July 4th and 5th each year; concentrations recorded on these days are typically the highest measured in the entire year. Residential wood combustion is also an important source of PM2.5 and PM2.5 precursors, predominantly during the months of November through February. Residents are more likely to burn wood on cool nights, on the weekends, and during holiday periods. The spatial heterogeneity in PM2.5 emissions and micro meteorology lead to significant differences in PM2.5 measurements throughout the Basin.

While long term trends in PM2.5 concentrations are largely driven by changes in emissions, the observed day to day variations in PM2.5 concentrations are primarily the result of meteorological changes except on days with elevated atypical emissions such as fireworks, wildfires, or residential wood combustion. Elevated PM2.5 concentrations can occur in the Basin throughout the year but occur most frequently in fall and winter. This is mainly due to the unfavorable meteorological conditions that are more common in those months. Figure 2-4 summarizes the meteorological factors that influence PM2.5 concentrations.

[4] Fractions of primary and secondary PM were estimated using the PM2.5 speciation data measured at the Los Angeles-North Main street from June 2012 to July 2018. The total mass of the elemental carbon and metals was assigned as primary PM2.5. The total mass of inorganic ions was assigned as secondary PM2.5. For organic aerosols, we referred to Figure V-6-20 in the Appendix V of the South Coast AQMD's 2016 Air Quality Management Plan (AQMP) and assigned 30 percent of the organic aerosol as primary PM2.5 and 70% to the secondary PM2.5 fraction. Appendix V of the 2016 AQMP is available at https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-v.pdf?sfvrsn=10

FIGURE 2-4
IMPORTANT FACTORS THAT INFLUENCE PM2.5 CONCENTRATIONS

The average wind speed for Los Angeles is the lowest of the nation's 10 largest urban areas, resulting in reduced dispersion throughout the region. In addition, the summertime daily maximum mixing heights[5] in Southern California are the lowest, on average, due to strong temperature inversions in the lower atmosphere that effectively trap pollutants–both primary PM2.5 and the PM2.5 precursors–near the surface. Southern California also has abundant sunshine, which drives the photochemical reactions that form secondary PM2.5. Periods of fog or high humidity can also lead to elevated PM2.5 concentrations as chemistry in fog droplets can increase fine particle mass.

Weather disturbances and rainstorms, which predominantly occur during the winter months, are effective in reducing ambient PM2.5 concentrations. Enhanced ventilation and the breakup of elevated inversion layers facilitate atmospheric mixing. Rainfall is extremely effective in reducing PM2.5 concentrations in the atmosphere. The frequency of these disturbances can strongly influence both the 98th percentile highest daily average concentrations and the annual average concentrations, which are the key parameters to determine attainment of the 24-hour PM2.5 standard and the annual PM2.5 standard, respectively.

[5] The maximum mixing height is an index of how well pollutants can be dispersed vertically in the atmosphere. The greater the mixing height, the greater the ventilation, and the more that pollutants are dispersed

Ambient Air Quality Standards

Federal and State Standards

Ambient air quality standards have been set by both the federal government and the State of California for fine particulate matter. In this chapter, statistics capturing the number of days exceeding federal standards are presented along with concentration trends and design values calculated from measurement data. Exceedance metrics are instructive regarding trends and control strategy effectiveness. However, it should be noted that an exceedance of the concentration level of a federal standard does not necessarily mean that the NAAQS was violated or that it would cause nonattainment. The form of the standard must also be considered. For example, for 24-hour PM2.5, the form of the standard is the annual 98th percentile measurement of all the 24-hour PM2.5 daily samples at each station. At a station with daily measurements, this corresponds to the 8th highest daily PM2.5 measurement.

For PM2.5 NAAQS attainment/nonattainment decisions, the most recent three years of data are considered along with the form of the standard, to calculate a *design value* for each station.[6] Design values are the statistical metrics used to compare with the NAAQS to determine attainment. The overall design value for an air basin is the highest design value of all the stations in that basin. The California State air quality standards are values not to be exceeded, typically evaluated over a three-year period, and the data is evaluated in terms of a *State Designation Value*, which allows for some statistical data outliers and exceptional events. Attainment deadlines for the State standards are 'as soon as practicable.'

[6] Note that for modeling attainment demonstrations, the U.S. EPA modeling guidance recommends a 5-year weighted average for the design value instead of the 3-year

TABLE 2-1

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) AND DESIGN VALUE REQUIREMENTS FOR FINE PARTICULATE MATTER

Averaging Time**	NAAQS Level	Design Value Form of NAAQS*
24-Hour (2006)	**35 µg/m^3**	**Three-year average of the annual 98th percentile of daily 24-hour concentration**
24-Hour (1997) ***	65 µg/m^3	
Annual (2012)	**12.0 µg/m^3**	**Annual average concentration, averaged over three years** *(annual averages based on average of 4 quarters)*
Annual (1997) ***	15.0 µg/m^3	
Annual (2024)****	9.0 µg/m^3	

Bold text denotes the current and most stringent NAAQS.

* The NAAQS is attained when the design value (form of concentration listed) is equal to or less than the level of the NAAQS.

** Year of U.S. EPA NAAQS update review shown in parenthesis and revoked or revised status in brackets; for revoked or revised NAAQS, areas may have continuing obligations until that standard is attained.

*** On July 25, 2016 U.S. EPA finalized a determination that the Basin attained the 1997 annual (15.0 µg/m^3) and 24-hour PM2.5 (65 µg/m^3) NAAQS, effective August 24, 2016.

**** On March 6, 2024, U.S. EPA strengthened the annual PM2.5 NAAQS, effective May 6, 2024.

TABLE 2-2

CALIFORNIA AMBIENT AIR QUALITY STANDARDS (CAAQS) AND DESIGNATION VALUE REQUIREMENTS FOR FINE PARTICULATE MATTER

Averaging Time**	CAAQS Level	Designation Value Form of CAAQS*
Annual (2012)	12.0 µg/m^3	Annual average of the daily 24-hour concentrations. Maximum value in a three-year

* The CAAQS is attained when the designation value (form of concentration listed) is equal to or less than the level of the CAAQS.

Under the Exceptional Events Rule,[7] U.S. EPA allows certain air quality data to not be considered for NAAQS attainment status when that data is influenced by exceptional events that meet strict evidence requirements, such as high winds, wildfires, volcanoes, or some cultural events (such as Independence Day or New Year's fireworks). An exceptional event meets the following criteria:

- The event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation;
- The event was not reasonably controllable or preventable; and
- The event was caused by human activity that is unlikely to recur at a particular location or was a natural event.

For a few PM measurements in the Basin between 2016 and 2022, the South Coast AQMD applied the U.S. EPA Exceptional Events Rule to flag these PM2.5 data due to wildfires and fireworks on Independence Day. All of the PM exceptional event flags through 2022 have been submitted with the affected data to U.S. EPA's Air Quality System (AQS) database. PM2.5 attainment designation for the South Coast Air Basin will likely depend upon U.S. EPA's concurrence with the exceptional event flags and the analysis demonstrating that exceedances were caused by wildfire smoke and/or Independence Day fireworks.

Attainment Status of the Annual PM2.5 Standard

The 2022 PM2.5 annual federal design values are summarized in Table 2-3. Data likely to be approved as exceptional events by U.S. EPA are removed from this analysis. The highest 2022 PM2.5 federal annual design value of 13.7 µg/m^3 was measured in the Ontario CA-60 Near Road air monitoring station. The next highest 2022 PM2.5 federal annual design value was 13.4 µg/m^3, measured in the Metropolitan Riverside County area at the Mira Loma air monitoring station.

TABLE 2-3
2020–2022 ANNUAL FEDERAL DESIGN VALUES BY COUNTY*

County	2020–2022 PM2.5 Annual Design Value (µg/m^3)	Percent of Current (2012) PM2.5 NAAQS (12.0 µg/m^3)	Area of Design Value Max
Los Angeles	13.1	109	South San Gabriel Valley
Orange	10.9**	91	Central Orange County
Riverside	13.4	112	Metropolitan Riverside County
San Bernardino	13.7	114	Ontario CA-60 Near Road

* Data likely to be approved as exceptional events by U.S. EPA removed from analysis.
** Mission Viejo in the Saddleback Valley does not have a valid design value because measurements do not meet data completeness requirements.

[7] The Final 2016 U.S. EPA Exceptional Events Rule is available at https://www.epa.gov/air-quality-analysis/final-2016-exceptional-events-rule-supporting-guidance-documents-updated-faqs

The 2022 PM2.5 annual state designation values are summarized in Table 2-4. The 2022 PM2.5 annual state designation values measured in Los Angeles, Riverside, and San Bernardino Counties exceed the state standard of 12 µg/m^3. The highest 2022 PM2.5 state annual designation value of 18 µg/m^3 was measured at the Ontario CA-60 Near Road air monitoring station. State Designation Values are based on the maximum annual average recorded in the most recent three-year period, and therefore, they are less responsive to year-to-year changes in concentrations. Exceptional events were not removed when calculating these state designation values.

TABLE 2-4
2020–2022 ANNUAL STATE DESIGNATION VALUES BY COUNTY

County	2020–2022 PM2.5 Annual State Designation Value (µg/m^3)	Percent of Current PM2.5 CAAQS (12 µg/m^3)	Area of Designation Value Max
Los Angeles	16	142	East San Fernando Valley
Orange	12	100	Central Orange County
Riverside	16	142	Metropolitan Riverside County
San Bernardino	18	133	Ontario CA-60 Near Road

Figure 2-5 illustrates the spatial trend of the 2022 PM2.5 annual design values at all FRM PM2.5 stations in the South Coast Air Basin.[8] Data likely to be approved as exceptional events by U.S. EPA are removed from Figures 2-5 and 2-6. The highest PM2.5 annual averages are in the inland valley areas of Riverside and San Bernardino Counties and the southern portion of Los Angeles County.

[8] FEM PM2.5 data measured at Anaheim, Long Beach I-710 Near Road, Mira Loma, Ontario CA-60 Near Road, and Rubidoux stations were used to supplement missing FRM measurements

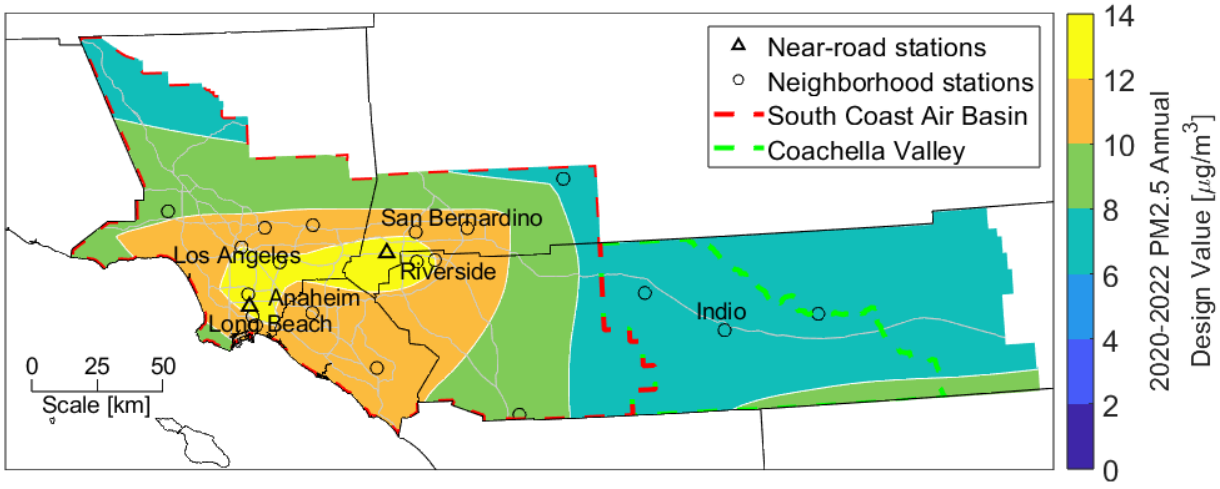


FIGURE 2-5
ALL FRM PM2.5 STATIONS IN THE SOUTH COAST AIR BASIN. NEAR-ROAD STATIONS ARE SHOWN AS TRIANGLES, WHILE OTHER STATIONS ARE SHOWN AS CIRCLES. THE COLORS REPRESENT THE 2020-2022 ANNUAL PM2.5 DESIGN VALUE

2022 PM2.5 annual design values measured at all stations with regulatory PM2.5 data that meet U.S. EPA completeness criteria in the South Coast Air Basin are presented in Figure 2-6. As shown in the Figure, the 2022 PM2.5 annual design value exceeded the federal standard at six stations: Ontario CA-60 Near Road, Mira Loma, Compton, Long Beach I-710 Near Road, Pico Rivera, and Los Angeles-North Main St., with design values of 13.7 µg/m^3, 13.4 µg/m^3, 13.1 µg/m^3, 12.7 µg/m^3, 12.5 µg/m^3, and 12.1 µg/m^3, respectively. These correspond to 114, 112, 109, 106, 104, and 101 percent of the annual NAAQS, respectively.

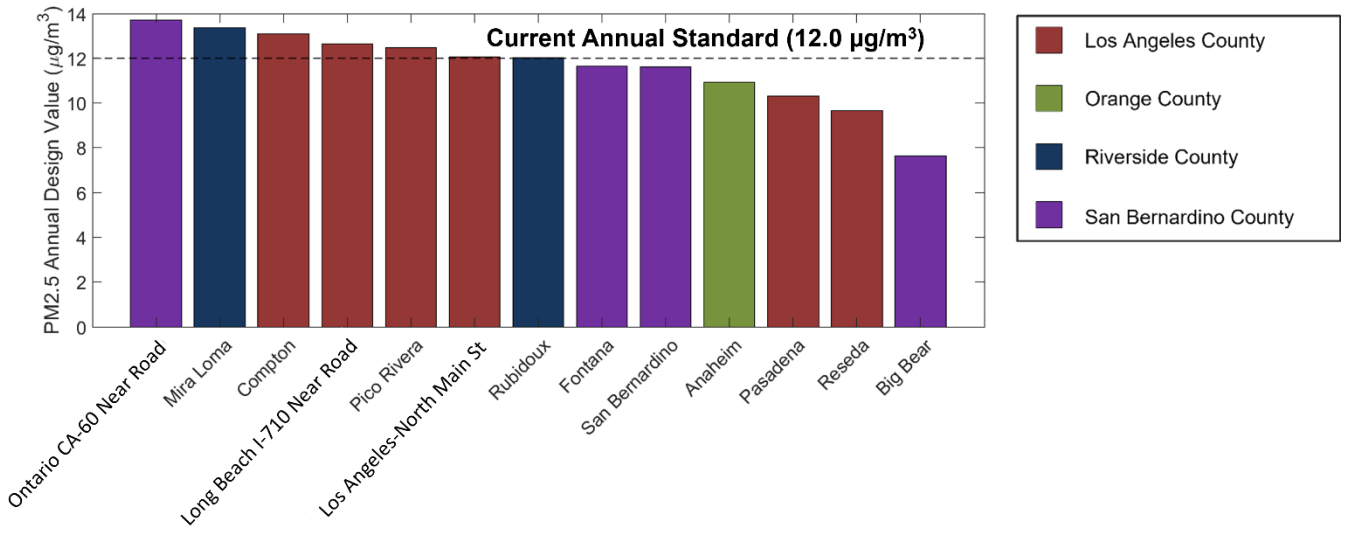


FIGURE 2-6
2020-2022 ANNUAL PM2.5 DESIGN VALUES MEASURED AT ALL STATIONS WITH COMPLETE DATA IN THE SOUTH COAST AIR BASIN. DATA LIKELY TO BE APPROVED AS EXCEPTIONAL EVENTS BY U.S. EPA REMOVED FROM ANALYSIS[9]

In summary, in 2022, the South Coast Air Basin does not attain both the annual PM2.5 NAAQS and CAAQS. The highest PM2.5 annual design values for both NAAQS and CAAQS were measured at the Ontario CA-60 Near Road air monitoring station. In general, the PM2.5 annual averages measured in the inland valley areas of Riverside and San Bernardino Counties and the southern portion of Los Angeles County are higher than other parts of the South Coast Air Basin.

Attainment Status of the 24-hour PM2.5 Standard

The 2022 PM2.5 24-hour design values are summarized in Table 2-2. Data likely to be approved as exceptional events by U.S. EPA are removed from this analysis. The highest 2022 PM2.5 24-hour design value of 35 μg/m^3 was measured in the South Central LA County area at the Compton air monitoring station and the Ontario CA-60 Near Road station. The next highest 2022 PM2.5 24-hour design value was 34 μg/m^3, measured in the Metropolitan Riverside County area at the Mira Loma air monitoring station. All 2022 PM2.5 24-hour design values were equal or below the 24-hour NAAQS (35 μg/m^3).

[9] Long Beach (North). Long Beach (South), Azusa, and Mission Viejo stations do not have complete data in 2022 due to site closure or modification

TABLE 2-5
2020–2022 24-HOUR PM2.5 DESIGN VALUES BY COUNTY*

County	2020–2022 PM2.5 24-Hour Design Value (µg/m^3)	Percent of Current (2006) PM2.5 NAAQS (35 µg/m^3)	Area of Design Value Max
Los Angeles	35**	100	South Central LA County
Orange	30***	86	Central Orange County
Riverside	34	97	Metropolitan Riverside County
San Bernardino	35	100	Ontario CA-60 Near Road

* Data likely to be approved as exceptional events by U.S. EPA removed from analysis.
** Subject to U.S. EPA approval of a waiver to only consider more accurate filter-based measurements at Compton by excluding measurements from a continuous instrument that does not meet performance goals. In the unlikely event that U.S EPA does not approve the waiver, the 2022 value at Compton is 37 µg/m^3.
*** Mission Viejo in the Saddleback Valley area does not have a valid design value because measurements do not meet data completeness requirements.

2022 PM2.5 24-hour design values measured at all stations in the South Coast Air Basin are presented in Figure 2-7. There is no state 24-hour PM2.5 standard. After removing data likely to be approved as exceptional events by U.S. EPA, all stations in the South Coast Air Basin met the 24-hour federal standard by 2022. The design value at Compton is subject to U.S. EPA approval of a waiver to only consider more-accurate filter-based measurements at Compton by excluding measurements from a continuous instrument that does not meet performance goals. In the unlikely event that U.S. EPA does not approve the waiver, the 2022 design value at Compton is 37 µg/m^3.

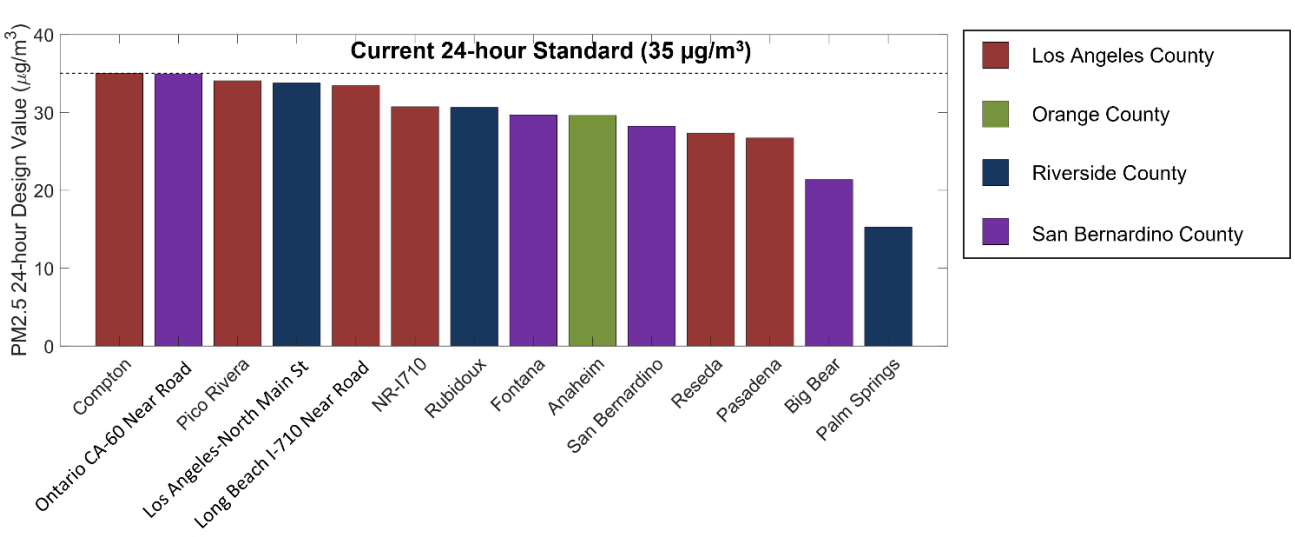


FIGURE 2-7
2020-2022 24-HOUR PM2.5 DESIGN VALUE MEASURED AT ALL STATIONS IN THE SOUTH COAST AIR BASIN. DATA LIKELY TO BE APPROVED AS EXCEPTIONAL EVENTS BY U.S. EPA REMOVED FROM ANALYSIS[10]

Figure 2-8 presents the number of days when the 24-hour PM2.5 exceed the 24-hour federal PM2.5 standard (35 µg/m^3)[11] in each month of 2022 at each FRM PM2.5 station in the South Coast Air Basin. As shown in the Figure, with the exception of exceedances recorded on the fourth and fifth of July due to Independence Day fireworks, all exceedances in 2022 occur in the months of October through January. Exceedances in the winter months are predominantly caused by cold and humid weather conditions that favor the formation of secondary PM2.5 and emissions of residential wood smoke. Limited ventilation in the atmosphere during winter months contributes to the elevated levels of PM2.5 as well. Year 2022 has less PM2.5 24-hour NAAQS exceedance days during the winter months (November-February) than past winter months.

[10] Long Beach (North). Long Beach (South), Azusa, and Mission Viejo stations do not have complete data in 2022 due to site closure or modification

[11] Due to rounding conventions, the threshold to meet the 24-hour PM2.5 NAAQS is 35.4 µg/m^3

Fairly clean period compared to past winter months.

July 4th and 5th Fireworks

Fairly clean period compared to past winter months.

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Compton	2	0	0	0	0	0	1	0	0	0	1	2
Pico Rivera #2	0	0	0	0	0	0	1	0	0	0	0	0
Ontario CA-60 Near Road	0	0	0	0	0	0	1	0	0	0	0	0
Rubidoux	0	0	0	0	0	0	1	0	0	0	0	0
San Bernardino	1	0	0	0	0	0	0	0	0	1	0	0
Long Beach I-710 Near Road	0	0	0	0	0	0	0	0	0	0	0	1
Fontana	0	0	0	0	0	0	0	0	0	1	0	0
Los Angeles-North Main Street	0	0	0	0	0	0	0	0	0	0	0	0
Reseda	0	0	0	0	0	0	0	0	0	0	0	0
Pasadena	0	0	0	0	0	0	0	0	0	0	0	0
Anaheim	0	0	0	0	0	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0	0	0	0	0	0
Mira Loma (Van Buren)	0	0	0	0	0	0	0	0	0	0	0	0
Big Bear	0	0	0	0	0	0	0	0	0	0	0	0

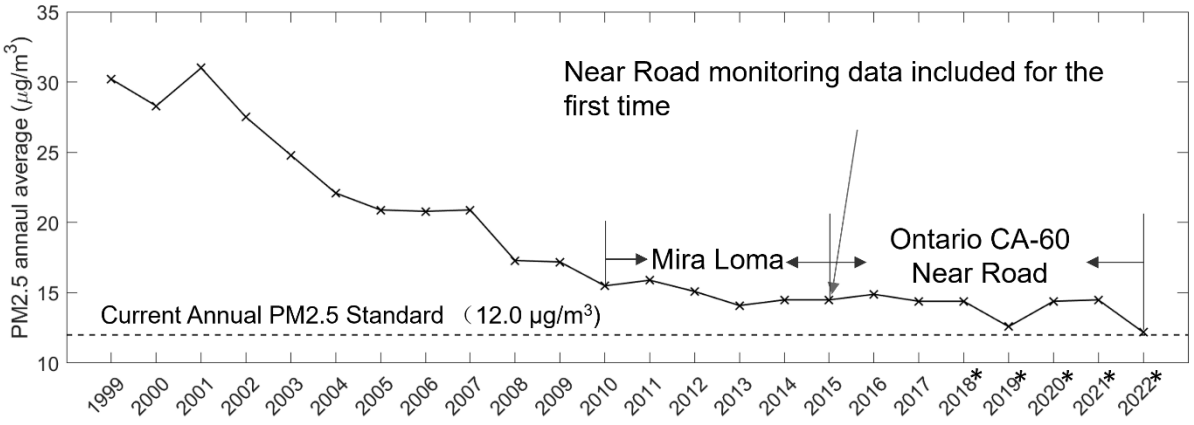
FIGURE 2-8

THE NUMBER OF DAYS WHEN THE 24-HOUR PM2.5 EXCEEDED THE 24-HOUR FEDERAL PM2.5 STANDARD (35 MG/M^3) IN EACH MONTH AT EACH FRM PM2.5 STATION IN THE SOUTH COAST AIR BASIN IN 2022. THE RED BOXES ARE EXCEPTIONAL EVENTS THAT ARE LIKELY TO BE APPROVED BY U.S. EPA

Historical Trends in Air Quality

Annual Standard

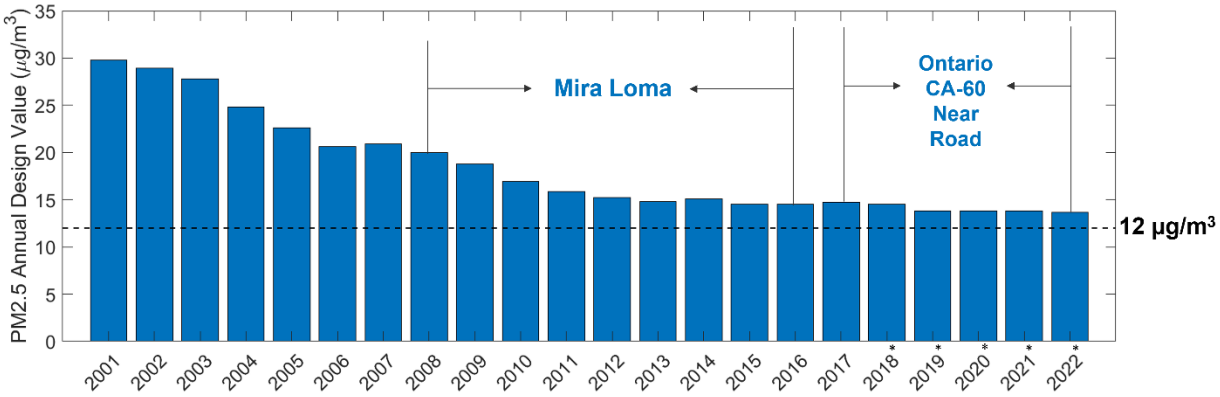
The historical trend of the annual average PM2.5 concentration measured in the South Coast Air Basin is presented in Figure 2-9. This parameter is an important metric for tracking progress towards clean air goals as the three-year average of the single year averages at each station represents the design value. As shown in the figure, the basin-maximum annual average PM2.5 has decreased significantly over the past two decades. The annual average recorded in 2022, which is the lowest on record, has decreased 60 percent compared with the value recorded in 2000, from 30.2 µg/m^3 to 12.2 µg/m^3. Between 2010 and 2015, the highest annual average PM2.5 concentration was recorded in Mira Loma. However, annual averages recorded at the Ontario CA-60 Near Road station exceed averages in Mira Loma since that monitor was established.



* Data likely to be approved as exceptional events by U.S. EPA removed from analysis.

FIGURE 2-9
BASIN-MAXIMUM ANNUAL AVERAGE PM2.5 CONCENTRATIONS MEASURED IN THE SOUTH COAST AIR BASIN FROM 1999-2022

Historical trends in the annual PM2.5 design values measured in the South Coast Air Basin are shown in Figure 2-10. The annual PM2.5 design value has decreased significantly over the past two decades. Compared with the design value in 2001, the annual PM2.5 design value in 2022 decreased by 54 percent, from 29.8 μg/m^3 to 13.7 μg/m^3. The Ontario CA-60 Near Road station currently has the highest annual design value. By the end of 2022, the annual PM2.5 design value in the South Coast Air Basin is 1.7 μg/m^3 higher than the 2012 annual PM2.5 federal standard. However, the 2022 design value is the lowest on record.



* Data likely to be approved as exceptional events by U.S. EPA removed from analysis.

FIGURE 2-10
ANNUAL AVERAGE PM2.5 DESIGN VALUE IN THE SOUTH COAST AIR BASIN FROM 2000-2022

24-hour Standard

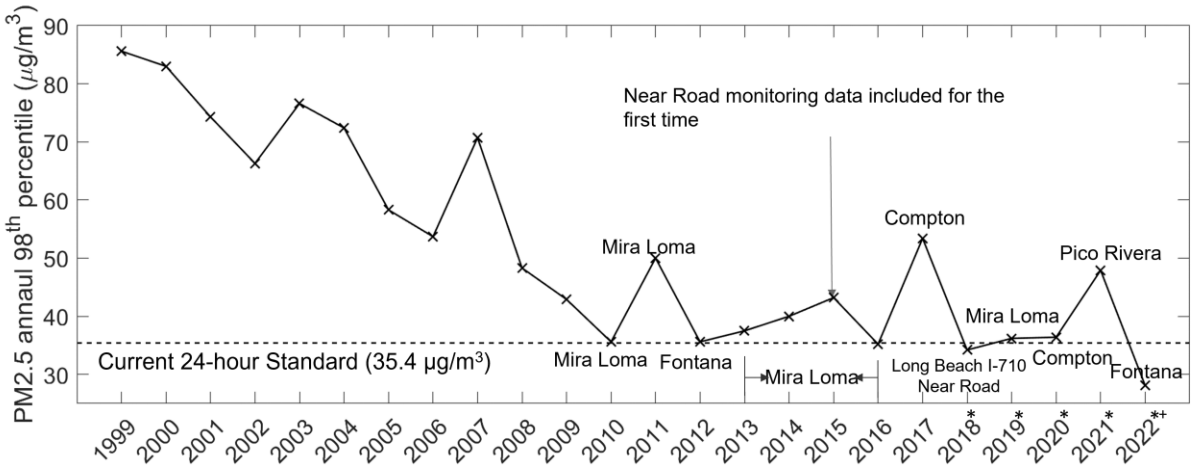
Over the past two decades, the number of 24-hour PM2.5 exceedance days have decreased significantly. The number of days when the basin-maximum 24-hour PM2.5 exceeded the 24-hour NAAQS in each month from 2000 to 2022 are shown in Figure 2-11. Among all past years on record, 2022 has the lowest number of 24-hour PM2.5 exceedance days. Compared with data collected in 2000, the number of days exceeding the standard in 2022 decreased by 92 percent, from 109 days to 9 days. In the early 2000s, exceedance days were recorded in every month. However, in recent years, the 24-hour standard is exceeded typically only in the colder months, from November to February, with the exception of exceedances resulting from Independence Day fireworks or wildfires.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2000	16	5	8	10	13	4	6	2	9	12	9	15	109
2001	12	1	15	8	21	7	7	7	12	19	18	11	138
2002	12	9	2	8	6	6	7	10	7	22	11	13	113
2003	13	2	7	0	12	12	4	0	14	18	4	8	94
2004	14	3	14	4	0	11	2	1	4	10	6	4	73
2005	4	0	5	1	2	2	3	1	3	8	8	13	50
2006	4	9	0	2	11	2	2	0	0	5	8	3	46
2007	1	4	5	5	6	1	2	0	0	5	16	2	47
2008	4	1	2	0	1	0	2	0	2	2	8	4	26
2009	4	2	3	0	4	0	1	4	1	0	6	5	30
2010	1	4	0	1	0	0	1	0	0	2	1	2	12
2011	0	1	0	0	0	0	1	0	0	5	3	5	15
2012	2	0	0	0	0	0	1	0	0	1	7	6	17
2013	1	3	1	0	0	0	0	0	0	4	2	1	12
2014	8	0	0	0	1	0	0	0	0	0	0	2	11
2015	13	10	3	3	0	0	1	0	0	0	0	0	30
2016	3	1	1	0	0	0	1	0	0	1	0	3	10
2017	1	0	1	0	1	0	2	0	0	1	5	8	19
2018	6	0	0	0	0	0	2	0	0	2	5	4	19
2019	2	0	0	0	0	0	2	0	0	0	7	1	12
2020	4	1	0	0	0	0	2	1	6	7	3	4	28
2021	2	1	0	0	0	0	2	0	1	0	9	8	23
2022	3	0	0	0	0	0	2	0	0	1	1	2	9

FIGURE 2-11
THE NUMBER OF DAYS WHEN THE BASIN-MAXIMUM 24-HOUR PM2.5 CONCENTRATIONS EXCEEDED THE 24-HOUR PM2.5 STANDARD (35 MG/M^3) IN EACH MONTH FROM 2000 TO JUNE 2022 IN THE SOUTH COAST AIR BASIN

The historical trend of the basin-maximum 98th percentile 24-hour PM2.5 measured in the South Coast Air Basin is presented in Figure 2-12. This parameter is an important metric for tracking progress towards clean air goals as the three-year average of the 98th percentile concentration at each station represents the design value. In addition, the annual 98th percentile concentrations better capture year-to-year variations in PM2.5 levels. As shown in the figure, the basin maximum 98th percentile 24-hour PM2.5 values have declined significantly over the past two decades. The value recorded in 2019 has decreased

by 67 percent compared with the value recorded in 2000, from 85.6 µg/m^3 to 28.1 µg/m^3. With the exception of 2012, Mira Loma has had the highest 98th percentile value at all years pre-2017. Compton had the highest 98th percentile value in 2017 due to three anomalous measurements. The highest 98th percentile in the Basin in 2021 and 2022 was recorded at Pico Rivera and Fontana, respectively. However, the basin-maximum 98th percentile 24-hour PM2.5 measured in 2022 is the lowest on record.



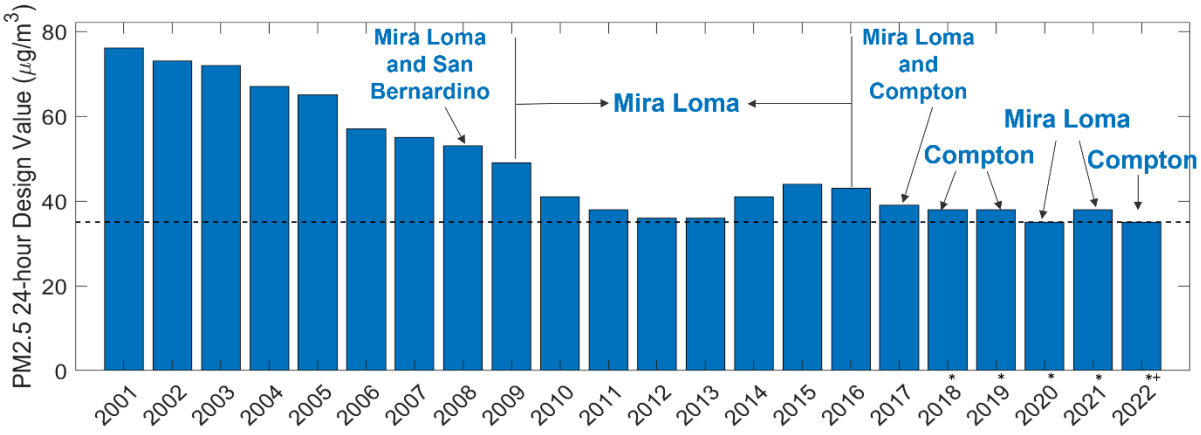
* Data likely to be approved as exceptional events by U.S. EPA removed from analysis.

$^+$ Subject to U.S. EPA approval of a waiver to only consider more accurate filter-based measurements at Compton by excluding measurements from a continuous instrument that does not meet performance goals. In the unlikely event that U.S. EPA does not approve the waiver, the 2022 value is 37 µg/m^3 measured at Compton.

FIGURE 2-12
BASIN-MAXIMUM 98TH PERCENTILE 24-HOUR PM2.5 CONCENTRATIONS MEASURED IN THE SOUTH COAST AIR BASIN FROM 1999-2022

The historical trend of the 24-hour basin-maximum PM2.5 design value measured in the South Coast Air Basin is shown in Figure 2-13. After removing exceptional events occurring in 2020, the 24-hour PM2.5 design meets the 24-hour PM2.5 federal standard (35 µg/m^3) subject to U.S. EPA approval of a waiver to only consider more accurate filter-based measurements at Compton by excluding measurements from a continuous instrument that does not meet performance goals. Compared with the design value in 2001, the 24-hour PM2.5 design value has declined by 54 percent, from 76 µg/m^3 in 2001 to 35 µg/m^3 in 2022. From 2009 to 2016, the highest design value was recorded in Mira Loma. However, since 2018, except 2020 and 2021, Compton has replaced Mira Loma as the station with highest 24-hour PM2.5 design value. The elevated 24-hour PM2.5 design values in 2014 are due in large part to extreme drought conditions

experienced in Southern California and the associated lack of periodic storm events in the winter months that facilitate dispersion and washout of pollutants.[12]



* Data likely to be approved as exceptional events by U.S. EPA removed from analysis.
+ Subject to U.S. EPA approval of a waiver to only consider more accurate filter-based measurements at Compton by excluding measurements from a continuous instrument that does not meet performance goals. In the unlikely event that U.S. EPA does not approve the waiver, the 2022 value is 37 µg/m^3 measured at Compton.

FIGURE 2-13
24-HOUR PM2.5 DESIGN VALUE IN THE SOUTH COAST AIR BASIN FROM 2001-2022

PM2.5 Speciation

Analysis of major chemical components of PM2.5 provides insight into the composition and sources of fine particulate matter in the Basin. These chemical components are measured through PM2.5 speciation samplers. Currently, PM2.5 speciation samplers are deployed at four representative locations in each of the Basin's counties. They are Anaheim, Fontana, Los Angeles, and Rubidoux stations. Integrated 24-hour filter samples are collected every six days and analyzed at the South Coast AQMD Laboratory. The speciation analysis presented in this chapter uses a different approach than the speciation analysis for the modeling attainment demonstration and therefore, should not be used for future projection of PM2.5 design values. FRM measurements that the NAAQS are based upon do not retain all the PM2.5 that is measured by chemical speciation samplers. Therefore, for the modeling attainment demonstration, an adjustment technique is used to estimate the species composition as measured on FRM filters to allow for

[12] 2016 South Coast AQMD Air Quality Management Plan. Available at https://www.aqmd.gov/home/air-quality/clean-air-plans/final-2016-aqmp

the projection of base year measurements into the future.[13] However, the speciation analysis in this chapter uses established techniques for analyzing measured PM2.5 speciation data and provides valuable insight on current and past PM2.5 species fractions.

Figure 2-14 shows trends in average annual concentrations of six PM2.5 component species: elemental carbon (EC), organic matter, sulfate, nitrate, ammonium ion, and crustal material from 2010-2022. Note that data from 2020 were not included due to a 3-month hiatus in PM2.5 speciation sampling at the beginning of the COVID-19 pandemic. EC, sulfate, nitrate, and ammonium ion were measured directly, while organic and crustal components were calculated from measurements of organic carbon (OC) and metal concentrations, respectively, according to guidance for the U.S. EPA Chemical Speciation Network (CSN).[14]

Organic Matter = 1.4 × Organic Carbon

Crustal Material = 2.2 × Aluminum + 2.49 × Silicon + 1.63 × Calcium + 2.42 × Iron + 1.94 × Titanium

Annual median field blank organic carbon concentrations across the four sites were subtracted from OC measurement data to account for the well-documented positive sampling artifact caused by absorption of gas-phase OC onto filters. This correction method is similar to the current OC artifact correction method used by the Interagency Monitoring of Protected Visual Environments (IMPROVE) network and CSN, except annual field blank median concentrations were used instead of monthly medians to increase the pool of available field blank data. Furthermore, it is important to note that there is considerable uncertainty in the conversion factor between measured organic carbon and organic matter, which can range from just above 1 for organic matter with a composition close to pure carbon to greater than 2 for highly oxidized organic matter. Thus, the trend shown in Figure 2-14 is an approximation assuming the average composition of organic matter in the Basin is relatively constant.

Reported concentrations below analytical detection limits also add some uncertainty to annual average concentrations, as the true concentration for a measurement below the detection limit may range from zero to the detection limit. To account for uncertainty in non-detect concentrations, annual means for each component were calculated by substituting zero and minimum detection limit concentrations for non-detects to calculate lower and upper limit means, respectively. As shown in Figure 2-14, crustal material was the only component that was significantly affected by non-detect concentration uncertainty.

Annual mean concentrations of most components show a generally decreasing trend over the ten-year period from 2010-2022 with more muted changes from 2015-2022. The largest decrease is observed for the EC component, with average concentrations dropping by more than 50 percent at all sites from 2010 to 2022. This reduction in EC concentrations reflects the continued success of regulatory efforts to control

[13] See https://www.epa.gov/sites/default/files/2020-10/documents/draft-o3-pm-rh-modeling_guidance-2014.pdf for details

[14] https://www.epa.gov/amtic/chemical-speciation-network-csn

diesel emissions and other sources of EC in the Basin. In contrast to other components, average crustal concentrations remained largely similar at all sites throughout this period. Crustal material is primarily derived from windblown soil and anthropogenic sources of dust (fugitive dust, road dust, construction, etc.). These sources are generally more difficult to control and may be exacerbated by drought and other meteorological conditions. The increase of the crustal materials, EC, and organic matter in 2020 was due to the increase of wildfire activities in 2020.

FIGURE 2-14
SOUTH COAST AIR BASIN PM2.5 SPECIATION NETWORK ANNUAL AVERAGE CONCENTRATION TRENDS, 2010–2022[15]

[15] Open symbols represent years with <75 percent data completeness (67-74 percent). The uncertainty associated with concentrations below analytical detection limits is represented with shading and different sized markers for the crustal component. For all other components, this uncertainty is negligible

FIGURE 2-15
SOUTH COAST AIR BASIN PM2.5 SPECIATION NETWORK WEIGHTED ANNUAL AVERAGE RELATIVE CONTRIBUTION TRENDS OF RELATIVE CONTRIBUTION TO MASS, 2010–2022[16]

[16] Open symbols represent years with <75 percent data completeness (67-74 percent). The uncertainty associated with concentrations below analytical detection limits is represented with shading and marker size for the crustal component. For all other components, this uncertainty is negligible.

Figure 2-15 shows the annual mean contribution of each component to measured PM2.5 mass, weighted by total mass (i.e., days with higher PM2.5 have more influence on annual average). Organic matter was the dominant fraction at all sites from 2010-2022, with estimated contributions ranging from 24-54 percent of total mass. Ammonium ion and nitrate contributions to PM2.5 mass have generally increased from 2015-2019 after reaching their lowest levels around 2014-2015. This increasing trend is driven by both slight increases in absolute nitrate and ammonium ion concentrations as well as decreasing contributions from other species such as EC. Sulfate and crustal material contributions to total mass generally show muted changes from 2010-2022, with slight increases in crustal contributions and slight decreases in sulfate contributions observed at some sites. Due to the influence of increased wildfire activities, the fractions of crustal material, EC, and organic matter increased in 2020, while the fraction of ammonia, nitrate, and sulfate decreased compared to previous years. In 2021 and 2022, fractions of all PM2.5 species were similar to what was measured between 2016 and 2019.

Average seasonal concentrations of PM2.5 components across all sites from 2015-2022 are shown in Figure 2-16. Organic matter was the dominant component in all seasons. Both nitrate and EC concentrations and relative mass contributions peaked in the winter, while sulfate concentration and mass contribution peaked in the summer. These seasonal trends are consistent with meteorological impacts on secondary ion formation and particulate accumulation, as well as changes in seasonal PM2.5 emissions (i.e., residential wood burning). Other components showed more complex seasonal patterns, reflecting the competing influences of meteorology, atmospheric chemical processes, and emission patterns.

The ratio of organic carbon to elemental carbon (OC/EC) can provide further insight into the sources of organic matter in the Basin, with lower OC/EC ratios associated with primary combustion sources (e.g., diesel and gasoline combustion) and higher ratios with secondary organic formation and other OC sources. As shown in Figure 2-17, annual median OC/EC ratios show a generally increasing trend from 2010-2022, which is consistent with the steady decline in EC concentrations during this period. This trend suggests that contributions of secondary and other sources of organic matter are becoming increasingly important as diesel emissions decrease.

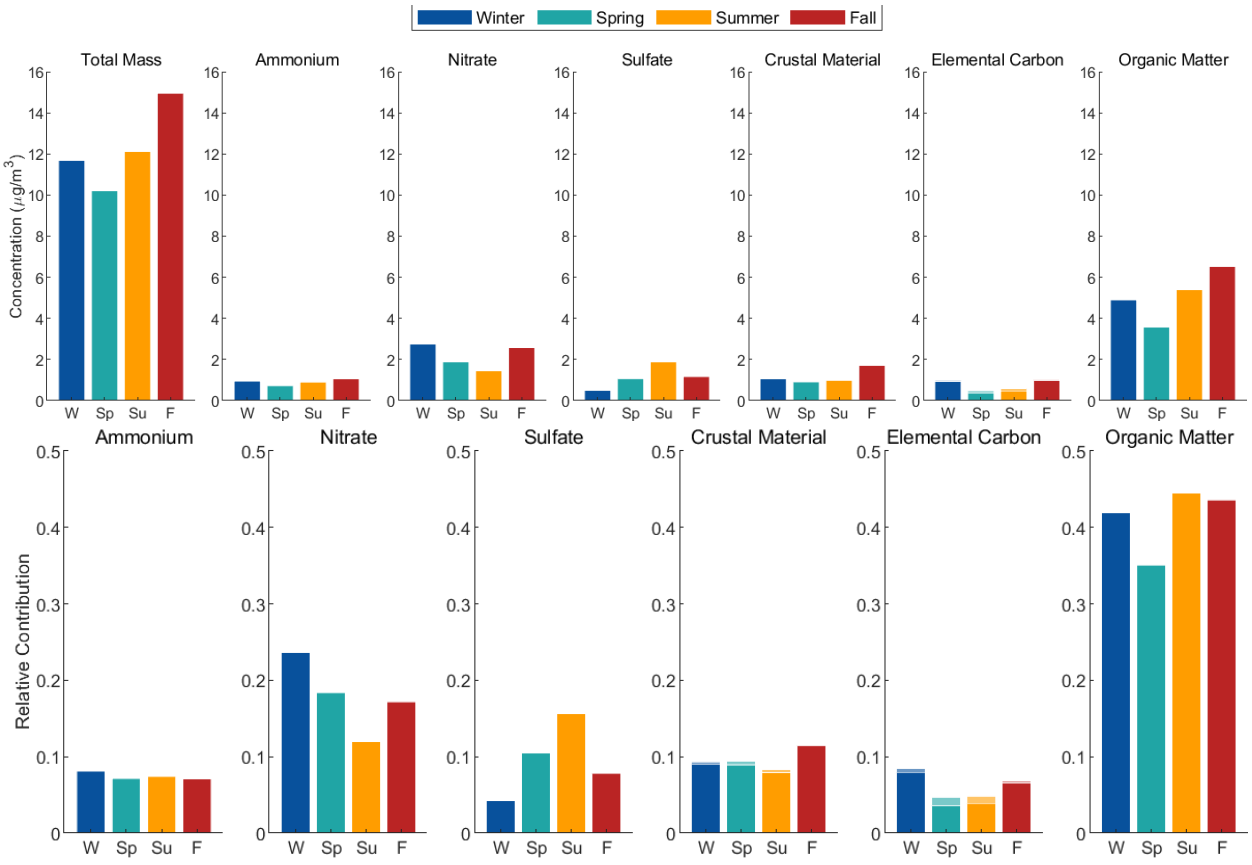


FIGURE 2-16
SEASONAL VARIATION IN CONCENTRATIONS OF PM2.5 COMPONENTS (TOP) AND RELATIVE CONTRIBUTION OF PM2.5 COMPONENTS TO TOTAL MASS (BOTTOM), 2015-2022[17]

[17]Winter, spring, summer, and fall are defined as DEC-FEB, MAR-MAY, JUN-AUG, SEP-NOV, respectively. The uncertainty associated with concentrations below analytical detection limits is represented with hatched shading at the top of each bar

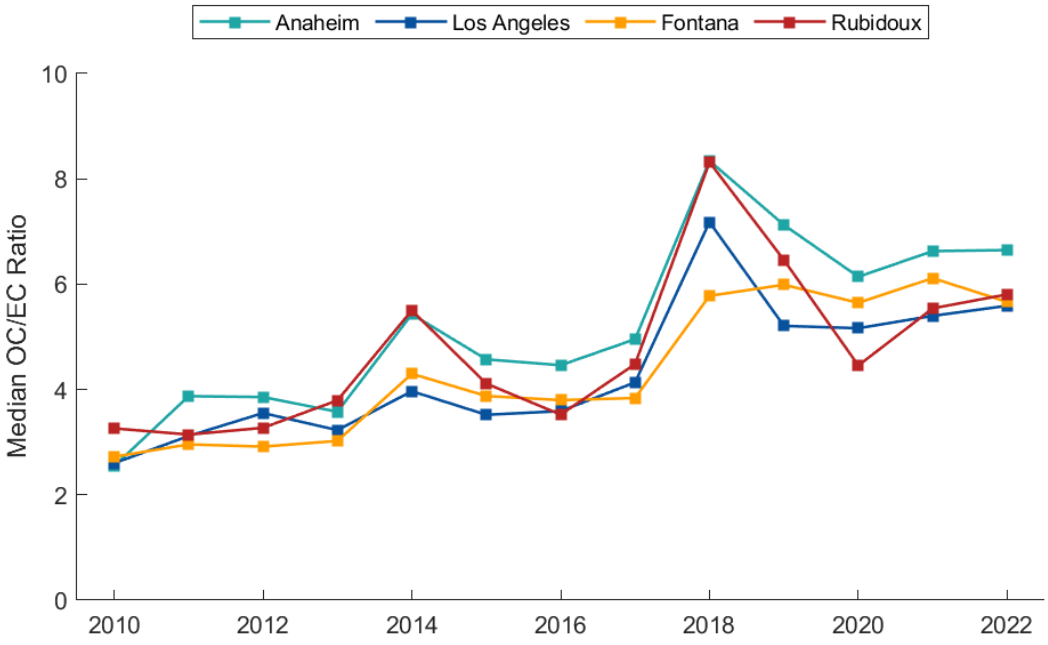


FIGURE 2-17
TRENDS OF SOUTH COAST AIR BASIN PM2.5 ORGANIC CARBON (OC) TO ELEMENTAL CARBON (EC) RATIO, 2010–2022[18]

Summary

PM2.5 concentrations have declined considerably since monitoring began in the early 2000s. PM2.5 levels are a strong function of meteorology, emissions of primary PM2.5 and emissions of PM2.5 precursors. The 2022 24-hour PM2.5 design value meets the federal standard subject to removal of likely exceptional events and U.S. EPA approval of a waiver to only consider more accurate filter-based measurements at Compton by excluding measurements from a continuous instrument that does not meet performance goals. In addition, the 98th percentile PM2.5 values measured in 2022 were the lowest on record. While the annual PM2.5 design values are still above the annual standard, 2022 saw the cleanest maximum annual average PM2.5 level ever recorded in the South Coast Air Basin.

[18] Annual median blank-corrected organic carbon to elemental carbon ratio at each site. Note that median ratios were calculated to limit effect of outliers associated with very low EC concentrations

CHAPTER 3

Emissions Inventory

- **With currently adopted regulations in place, direct PM2.5 emissions are projected to decline 4 percent from 2018 to 2030 in the South Coast Air Basin.**

- **Emissions of NOx, a PM2.5 precursor, are projected to decline by 45 percent, while ammonia emissions are expected to rise by 6 percent from 2018 to 2030.**

- **Top sources of directly emitted PM2.5 are from area sources and include commercial cooking, paved road dust and residential fuel combustion.**

- **Mobile sources continue to be the largest contributor to NOx emissions in both 2018 and 2030.**

- **Ammonia emissions are forecasted to increase due to factors such as population growth and widespread use of selective catalytic reduction in heavy-duty vehicles and catalysts in light-duty vehicles.**

Introduction

The South Coast Air Basin (Basin) is classified as a "serious" nonattainment area for the 2012 Annual PM2.5 standard and needs to attain the standard no later than 2030. This chapter summarizes criteria pollutant emissions in the Basin for the 2018 base year as well as projected emissions for the 2030 attainment year. A more detailed description of emissions and methodologies is presented in Appendix I.

The inventory provided here is derived from the emissions inventory developed for the 2022 Air Quality Management Plan. Major updates were introduced in on-road emissions due to the transition from EMFAC2017 to EMFAC2021, along with a minor adjustment made to construction equipment within the off-road category. This Draft PM2.5 Plan also includes emission estimates for filterable and condensable PM2.5 emissions. The 2018 base year emissions inventory reflects reported emissions from large facilities and estimated emissions for all other sources. The future baseline emissions inventory is based on economic projections and implementation of adopted regulations with both current and future compliance dates. A list of the South Coast Air Quality Management District (South Coast AQMD) rules and regulations that are part of the base year and future year baseline emissions inventories is presented in Appendix I. The South Coast AQMD continues to implement rules that are incorporated into the Draft PM2.5 Plan future baseline emissions inventories.

The emissions inventory is divided into two major source classifications: stationary and mobile sources. Stationary sources include point sources and area sources. The 2018 base year point source emissions are based principally on reported data from facilities subject to the South Coast AQMD's Annual Emissions Reporting (AER) Program. Area source emissions are estimated jointly by CARB and the South Coast AQMD using established inventory methods. Mobile sources include on-road emissions and off-road emissions. On-road emissions are calculated using CARB's EMFAC2021 model and travel activity data provided by the Southern California Association of Governments (SCAG) from their adopted 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). CARB provides emissions inventories for off-road sources, which include construction and mining equipment, industrial and commercial equipment, lawn and garden equipment, agricultural equipment, ocean-going vessels (OGV), commercial harbor craft, locomotives, cargo handling equipment, pleasure craft, recreational vehicles, and fuel storage and handling. Aircraft emissions are based on an updated analysis by the South Coast AQMD developed in conjunction with commercial airports in the region.

Future emissions forecasts are primarily based on demographic and economic growth projections provided by SCAG as well as the energy consumption projections by Southern California Gas Company (SoCalGas). In addition, emission reductions resulting from the South Coast AQMD's regulations amended or adopted by October 2020 and Rule 1109.1 and CARB regulations adopted by December 2021 are included in the future baseline projections. The South Coast AQMD's Rule 1109.1, Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations, was adopted in November 2021. The cutoff dates for regulations included in the baseline emissions are the same as in the 2022 AQMP. Heavy-Duty Inspection and Maintenance (HD I/M) and Small Off-Road Engines (SORE) regulations were adopted by

CARB in December 2021[12] and are reflected in the baseline emissions as well. South Coast AQMD rules that have been adopted after the cutoff dates and have NOx and PM2.5 emission reductions by 2030 are provided in Table 3-1. While these reductions are not reflected in the baseline, the reductions are included in the attainment demonstration presented in this Plan.

TABLE 3-1
RULES ADOPTED AFTER THE CUT-OFF DATE OF THE DRAFT PM2.5 PLAN FOR NON-RECLAIM SOURCES AND NOT REFLECTED IN THE BASELINE EMISSIONS

Adoption Date	District Rule	Implementation Schedule		Net SIP Reduction by 2030* (tpd)
		Start Year	End Year	
9/1/2023	Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces	2012	2050	-0.07**
5/6/2022	Rule 1147 – NOx Reductions from Miscellaneous Sources	2024	2059	0.28
8/6/2021	Rule 1147.1 - NOx Reductions from Aggregate Dryers	2025	2057	0.01
4/1/2022	Rule 1147.2 – NOx Reductions from Metal Melting and Heating Furnaces	2026	2057	0.06
2/5/2021	Rule 1150.3 – Emissions of Oxides of Nitrogen from Combustion Equipment at Landfills	2021	2031	0.04
8/4/2023	Rule 1153.1 – Emissions of Oxides of Nitrogen from Commercial Food Ovens	2024	2036	0.02
11/4/2022	Rule 1168 - VOC reductions from adhesive and sealant applications	2017	2028	-0.14**

*Reductions by 2030 for each rule are calculated with SIP baseline inventory and associated control factors based on rule-specific implementation schedules.

**The amendment allowed more time to comply with the rule requirements, which resulted in less reductions in 2030 than the earlier version. Negative values indicate the changes from the previous version reflected in the 2022 AQMP.

[1] Heavy-Duty Inspection and Maintenance Regulation. Information available at: https://ww2.arb.ca.gov/rulemaking/2021/hdim2021

[2] Small Off-Road Engines regulations. Information available at: https://ww2.arb.ca.gov/rulemaking/2021/sore2021

This chapter summarizes the major components of base year and future baseline inventories. More detailed information, such as growth factors, and demographic trends, are presented in Appendix I. In addition, the top source categories contributing to the 2030 emissions inventories are described in this chapter. Understanding the highest emitting source categories assists identifying potentially more effective control strategies for improving air quality in the basin.

Emission Inventory

The inventory presented here represents annual average day emissions for the base year and future milestone years. Detailed information regarding the emissions inventory development for base and future years and emissions by major source category for the base and future milestone years are presented in Appendix I. In an emissions inventory, base year is the year from which the future emissions are projected. Pollutants reported in the inventory include volatile organic compounds (VOCs), nitrogen oxides (NOx), carbon monoxide (CO), sulfur oxides (SOx), ammonia (NH3), total particulate matter (PM) and particulate matter with a diameter equal to or smaller than 2.5 microns (PM2.5). Attachments A and B to Appendix I list annual average and summer planning emissions by major source category for 2018, 2025, 2028, 2030, and 2031. Attachment C to Appendix I lists the top VOC, NOx, SOx, NH3 and PM2.5 point source facilities that emitted greater than or equal to 10 tons per year in 2018. Attachment D to Appendix I contains on-road emissions by vehicle class and pollutant. Attachment E to Appendix I shows emissions associated with diesel fuel internal combustion engines for various source categories. Attachment F to Appendix I provides a summary of road construction dust emissions in the South Coast Air Basin. Attachment G to Appendix I includes the contribution of condensable and filterable PM2.5 to total PM2.5 emissions.

Stationary Sources

Stationary sources are divided into two major subcategories: point sources and area sources. Point sources are permitted facilities with one or more emission sources at an identified location (e.g., power plants, refineries, and industrial processes factories) and subject to AER. These facilities generally have annual emissions of 4 tons or more of either VOCs, NOx, SOx, or PM, or annual emissions of over 100 tons of CO. Facilities are required to report their emissions of criteria pollutants and selected air toxics pursuant to Rule 301 to the South Coast AQMD on an annual basis, subject to audit, if any of these thresholds are exceeded. Point sources include emissions from the Regional Clean Air Incentives Market (RECLAIM) program, which mainly include fuel combustion emissions from power plants, oil and gas production, petroleum refining, and large facilities in manufacturing and industrial and service sectors. The 2018 annual reported emissions are used to update the stationary source inventory.

Area sources consist of many small emission sources (e.g., residential water heaters, architectural coatings, consumer products, and permitted sources that are smaller than the above thresholds) which are distributed across the basin and are not required to individually report their emissions. CARB and the South Coast AQMD jointly develop emission estimates for approximately 400 area source categories. Emissions from these sources are estimated using latest activity information and representative emission

factors if available. Activity data are usually obtained from survey data or scientific reports, e.g., U.S. Energy Information Administration (EIA) reports for fuel consumption other than natural gas fuel, natural gas consumption data from Southern California Gas Company (SoCalGas), and solvent, sealant and architectural coatings sales reports required under the South Coast AQMD Rules 314, 1113 and 1168. Some activity data, such as population, housing, and vehicle miles travelled (VMT), as well as a large portion for area sources are from SCAG. Emission factors are based on rule compliance factors, source tests, manufacturer's product or technical specification data, default factors (mostly from AP-42, the U.S. EPA's published emission factor compilation), or weighted emission factors derived from point source facilities' annual emissions reports. Additionally, emissions over a given area may be calculated using socioeconomic data, such as population, number of households, or employment in different industry sectors.

Mobile Sources

Mobile sources consist of two subcategories: on-road sources and off-road sources. On-road vehicle emissions were calculated with CARB's EMFAC2021 model and travel activity data provided by SCAG from their adopted 2020 RTP/SCS. Off-road emissions were calculated using CARB's category-specific inventory models.

On-Road

CARB's EMFAC2021 model has undergone extensive revisions from the previous version (EMFAC2017). With EMFAC2021, CARB has completed the transition from Fortran to Python and MySQL with the aim of maximizing user-friendliness and flexibility, allowing incorporation of larger amounts of data demanded by current regulatory and planning processes. For end users, EMFAC2021 includes a new web-based platform that includes all the features of previous EMFAC databases alongside new Project Analysis and Scenario Analysis features.

The U.S. EPA approved the EMFAC2021 emissions model for SIP and conformity purposes in November 2022.[3] EMFAC2021 calculates exhaust and evaporative emission rates by vehicle type for different vehicle speeds and environmental conditions. Temperature and humidity profiles are used to produce monthly, annual, and episodic inventories. Emission rate data in EMFAC2021 is collected from various sources, such as individual vehicles in a laboratory setting, tunnel studies, and certification data. The EMFAC2021 model interface and overall design have not significantly changed as compared to EMFAC2017, however, EMFAC2021 includes more state-of-the-art information to better represent the real-world emissions from on-road sources. Major improvements include:

- New modules accounting for Plug-in Hybrid Electric Vehicles, vehicle energy consumption;

[3] https://www.federalregister.gov/documents/2022/11/15/2022-24790/official-release-of-emfac2021-motor-vehicle-emission-factor-model-for-use-in-the-state-of-california

- Emission factors for NH3;
- New methodologies for brake and tire wear and evaporative emissions;
- New data and significant methodology changes for motor vehicle emission calculations and revisions to implementation data for control measures;
- Updated emission factors and activity data for cars and trucks, including emission reductions associated with new regulations on heavy-heavy duty diesel trucks and buses. New emission factors were developed based on data from U.S. EPA's In-Use Vehicle Program, CARB's Vehicle and Truck and Bus Surveillance Programs, CARB's Portable Emissions Measurement Systems (PEMS) and Transit Bus testing, dynamometer and Portable Emission Measurement Systems Data;
- Expanded heavy-duty truck categories;
- New approaches to light-duty activity forecasting, using up-to-date modeling approaches from academic and government agencies to assess historic trends in multiple economic indicators to forecast future vehicle activity;
- Additional novel forecasting frameworks for heavy-duty VMT and light duty ZEV sales;
- Updated transit bus emission factors using additional data from CARB transit bus testing, and Integrated Bus Information Systems of West Virginia, and the Federal Transit Administration; and
- Updates to the motor vehicle fleet age, vehicle types, and vehicle population based on 2013-2019 California Department of Motor Vehicle (DMV) data, International Registration Plan (IRP) data, Truck Regulation Upload, Compliance, and Reporting System (TRUCRS) data, Port Vehicle Identification Number (VIN) data, California Highway Patrol School Bus Inspections, and National Transit Database information. Each of these changes affect emission factors for each area in California.

The updates in vehicle population, emission factors, and forecasting parameters included in EMFAC2021 affect the on-road emission estimates for both the 2018 base year and future years. The factors that have the greatest effect on emissions changes from EMFAC2017 to EMFAC2021 are the increase in in-use emission factors for some vehicle classes, the updated vehicle age distribution for medium-heavy duty trucks that estimates an older fleet mix with respect to EMFAC2017, and the update on brake wear emission factors based on updated measurements. More detailed information on the changes incorporated in EMFAC2021 can be found in EMFAC2021's technical documentation.[4] The EMFAC2021 model incorporates recently adopted regulations, such as Advanced Clean Trucks (ACT),[5] and Heavy-Duty Low NOx Omnibus Regulations.[6] EMFAC2021 does not incorporate Heavy-Duty Inspection and Maintenance (I/M) Regulation, because this regulation was approved after the development of EMFAC2021. However, the effect of Heavy Duty I/M is incorporated in this plan as an external adjustment to EMFAC2021 emissions.

[4] EMFAC2021 Volume III Technical Document Version 1.0.1, April 2021. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-08/emfac2021_technical_documentation_april2021.pdf

[5] Advanced Clean Trucks, https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks.

[6] Heavy-Duty Low NOx Omnibus Regulations, Available at: https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox.

Figure 3-1 compares 2018 (top) and 2030 (bottom) on-road emissions estimates between the 2022 AQMP calculated using EMFAC2017 (blue) and the Draft PM2.5 plan calculated using EMFAC2021 (green). For year 2018, EMFAC2021 estimates notably higher VOC and NOx emissions, and lower emissions of PM2.5 than EMFAC2017. Estimates of NOx and VOC in EMFAC2021 are higher than in EMFAC2017 because newer vehicle test data show that light-duty vehicles have higher exhaust emissions, and updated DMV data for 2018 indicate that medium heavy-duty trucks are older than what was assumed in EMFAC2017. PM2.5 emissions are substantially reduced in EMFAC2021 with respect to EMFAC2017, as a result of updates on emissions and speed correction factors for brake wear obtained from newer emission testing. The differences in VOC and PM2.5 emissions are propagated through 2030, whereas NOx emissions only differ slightly between EMFAC2017 and EMFAC2021.

As shown on Figure 3-1 (bottom), both EMFAC2017 and EMFAC2021 project significantly lower emissions in the year 2030, which are attributable to the ongoing implementation of regulations and programs such as CARB's 2010 Truck and Bus rule, Advanced Clean Cars Program, Federal Phase 2 GHG Standards, Advanced Clean Truck (ACT) and Heavy-Duty (HD) Omnibus low NOx requirements. Despite growth in vehicular activities, emissions from on-road mobile sources are expected to decrease in future years. Specifically, vehicle emissions under the Draft PM2.5 plan calculated using EMFAC2021 are projected to decline from 2018 to 2030 by 49, 73, 19, and 34 percent for VOC, NOx, SOx, and PM2.5 emissions, respectively.

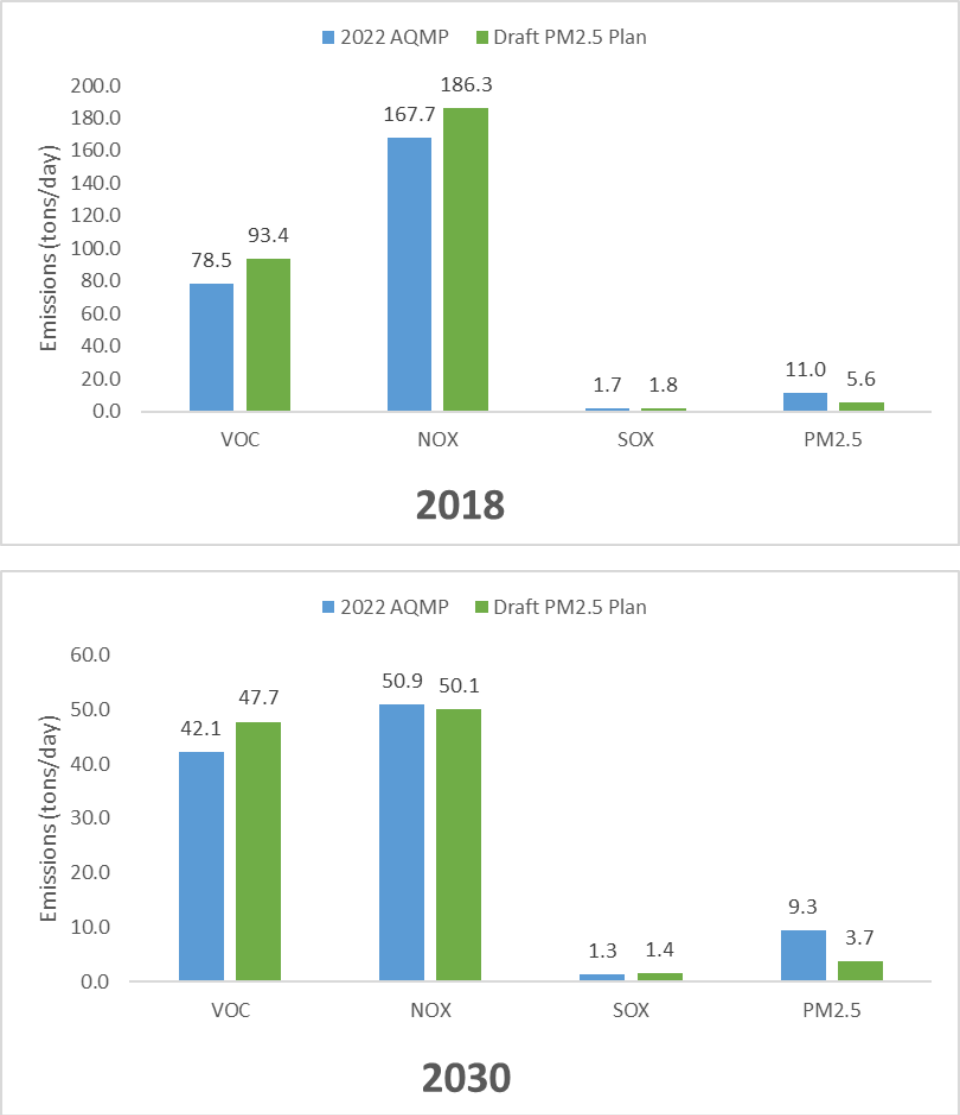


FIGURE 3-1
COMPARISON OF ON-ROAD EMISSIONS INCLUDED IN THE 2022 AQMP AND THE DRAFT PM2.5 PLAN.

Off-Road

Emissions from off-road vehicle categories are primarily based on estimated activity levels and emission factors using a suite of category-specific models or, where a new model was not available, the OFFROAD2007 model. Separate models have been developed for estimating emissions from different categories of off-road mobile sources.[7] The emissions presented here are consistent with the off-road emissions developed for the 2022 AQMP, except for a small change in construction equipment emissions.

[7] More information on the models for offroad sources can be found in the following link: https://ww3.arb.ca.gov/msei/msei.htm

After the development of the 2022 AQMP, an error was discovered in the emission allocations for in-use emissions from off-road construction equipment in Riverside County. This error only affected future year emissions and is now corrected in this Draft PM2.5 Plan. As Figure 3-2 shows emissions from off-road sources in this Draft PM2.5 Plan remain unchanged in 2018 with respect to the 2022 AQMP, whereas there is a slight increase in emissions of VOC and NOx in 2030.

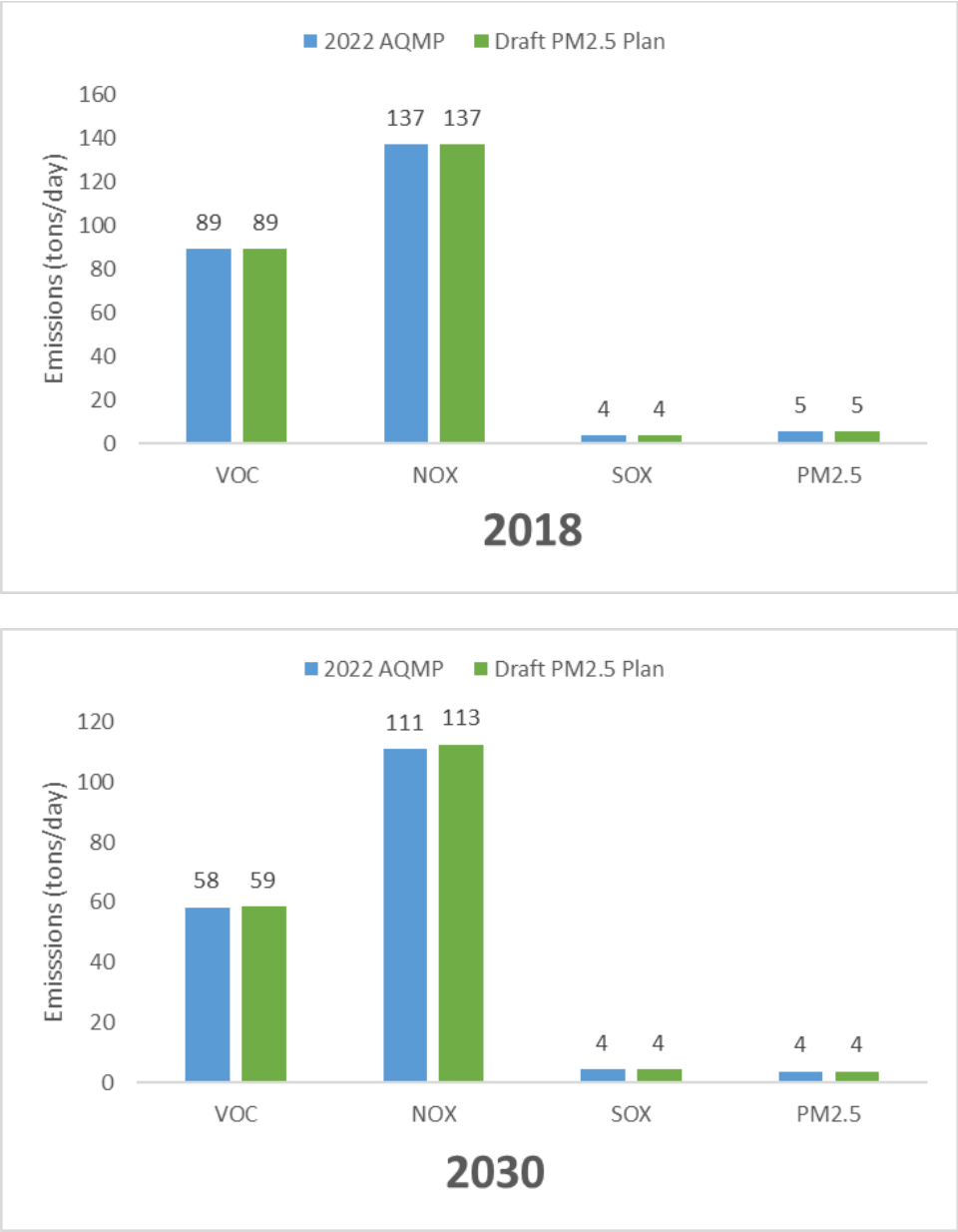


FIGURE 3-2
COMPARISON OF OFF-ROAD EMISSIONS BETWEEN 2022 AQMP AND DRAFT PM2.5 PLAN

Uncertainties in the Emissions Inventory

An effective AQMP and SIP development relies on a complete and accurate emissions inventory. Methods for quantifying different emission sources continue to improve, allowing for development of more effective control measures. Increased use of continuous monitoring and source testing has contributed to improved point source inventories. Technical assistance to facilities and auditing of reported emissions have also improved the accuracy of the emissions inventory. Area source inventories that rely on average emission factors and regional activities have inherent uncertainty. Industry-specific surveys and source-specific studies during rule development have provided much-needed refinement to these emissions estimates. Emission factors for many area sources are adapted from the U.S. EPA's AP-42, but some categories have not been updated for extended periods of time, posing additional uncertainties in estimated emissions. Mobile source inventories are also continuously updated and improved. As described earlier, many improvements are included in the on-road mobile source model EMFAC2021, which estimates emissions from trucks, automobiles, and buses. Overall, the Draft PM2.5 Plan is based on the most current data and methodologies, resulting in the most accurate inventory available.

There are many challenges inherent in making accurate projections based on future growth, such as where vehicle trips will occur, the distribution between various modes of transportation (such as trucks and trains), as well as estimates for population growth and the number and type of jobs. Forecasts are made with the best information available; nevertheless, there is uncertainty in emissions projections. AQMP/SIP updates are generally developed every three to four years, thereby allowing for frequent updates and improvements to the inventories.

Gridded Emissions

The air quality modeling domain extends to southern Kern County in the north, the Arizona and Nevada borders to the east, northern Mexico to the south and more than 100 miles offshore to the west. The modeling domain is divided into a grid system comprised of 4 km by 4 km grid cells. Both stationary and mobile source emissions are allocated to individual grid cells within this system. In general, emissions are modeled as total daily emissions. Variations in temperature, hours of operation, speed of motor vehicles, or other factors are considered in developing gridded motor vehicle emissions. The "gridded" emissions data used for the PM2.5 attainment demonstration differ from the annual average day inventory emission data in several ways: (1) the modeling region covers larger geographic areas than the Basin, (2) emissions represent day-specific instead of annual average conditions, and (3) emissions are adjusted with daily meteorological conditions such as temperature and humidity.

Base Year Emissions

2018 Emission Inventory

Table 3-2 compares the annual average emissions in the Draft PM2.5 Plan, and the emissions estimated in the 2022 AQMP for all PM2.5 precursors. As described above, the major differences between the 2022 AQMP and the Draft PM2.5 Plan was caused by the switch from EMFAC2017 to EMFAC2021 for on-road sources. The error in construction equipment category did not affect the base year emissions.

Overall, base year 2018 emissions of VOC, NOx and SOx in the Draft PM2.5 Plan are higher than in the 2022 AQMP by 4 percent, 5 percent and 1 percent, respectively. Conversely, overall PM2.5 emissions in the Draft PM2.5 Plan are 9 percent lower than in the 2022 AQMP.

Table 3-3 shows the 2018 annual average emissions inventory by major source category. Stationary sources are subdivided into point sources (e.g., petroleum production and electric utilities) and area sources (e.g., architectural coatings, residential water heaters, consumer products, and permitted sources smaller than the emission reporting threshold – generally 4 tons per year). Mobile sources consist of on-road (e.g., passenger cars and heavy-duty trucks) and off-road sources (e.g., locomotives and ships).

Figure 3-3 illustrates the relative contribution of each source category to the 2018 inventory. VOC and NH3 emissions are both largely driven by area sources, though specific area sources differ for the two pollutants. For VOC emissions, over half of area sources emissions are from architectural coatings and consumer products. For NH3 emissions, humans and pets contribute to half of all area source emissions. Mobile sources, stationary point source, and stationary area source categories are the top respective contributors to NOx, SOx, and PM2.5 emissions. Overall, total mobile source emissions account for almost 45 percent of VOC emissions and 85 percent of NOx emissions. The on-road mobile category alone contributes over 23 percent and 49 percent of VOC and NOx emissions, respectively. For directly emitted PM2.5, tailpipe and non-tailpipe emissions from mobile sources represent 18 percent of total emissions with an additional 15 percent from vehicle-related entrained dust from paved and unpaved roads. Stationary sources are responsible for most of the SOx emissions in the Basin, with the point source category (larger facilities subject to AER requirements) contributing 49 percent of total SOx emissions. Non-vehicle related area sources, such as commercial cooking and residential fuel combustion are the predominant source of directly emitted PM2.5 emissions, contributing 46 percent of total emissions.

Figure 3-4 shows the fraction of the 2018 inventory by responsible agency. The U.S. EPA, CARB, and South Coast AQMD split regulatory authority over these pollutants, with the U.S. EPA and CARB primarily responsible for mobile sources. Specifically, the U.S. EPA's authority applies to aircraft, locomotives, OGVs, military harbor craft, and other mobile categories, including California international registration plan (CAIRP) and out-of-state (OOS) medium- and heavy-duty trucks and pre-empt off-road equipment with less than 175 horsepower. CARB regulates other mobile sources, consumer products, and portions of area sources related to fuel combustion, and petroleum production and marketing. The South Coast AQMD has limited authority over mobile sources, which it exercises via fleet rules and facility-based mobile

source measurements. On the other hand, it exercises authority over most area sources and all point sources.

Figure 3-4 illustrates agency responsibility as it pertains to VOC, NOx, SOx, NH3, and directly emitted PM2.5 emissions. VOC, NOx, SOx, NH3 are PM2.5 precursors, forming secondary PM2.5 once emitted into the atmosphere. NOx and VOCs are important precursors to ozone and PM2.5 formation. As shown, most NOx and VOC emissions in the Basin are from sources that fall under the primary jurisdiction of the U.S. EPA or CARB. For example, 84 percent of NOx and 74 percent of VOC emissions are from sources primarily under CARB and the U.S. EPA control. Conversely, 61 percent of SOx emissions, 76 percent of NH3 emissions and 81 percent of directly emitted PM2.5 emissions are from sources under the South Coast AQMD control. This illustrates that actions at all levels of regulatory authorities including State, and federal level are necessary to ensure that the region attains the federal ambient air quality standards.

TABLE 3-2
COMPARISON OF THE 2018 BASE YEAR EMISSIONS
BETWEEN THE 2022 AQMP AND THE DRAFT PM2.5 PLAN (TONS PER DAY)

	On-Road Vehicles	Total Emissions
VOC		
2022 AQMP	78.5	387.0
Draft PM2.5 Plan	93.4	401.9
% Change	19	4
NOx		
2022 AQMP	167.7	364.7
Draft PM2.5 Plan	186.3	383.2
% Change	11	5
SOx		
2022 AQMP	1.7	14.3
Draft PM2.5 Plan	1.8	14.4
% Change	6	1
PM2.5		
2022 AQMP	11	61.5
Draft PM2.5 Plan	5.6	56.0
% Change	-49	-9
NH3		
2022 AQMP	16.3	74.5
Draft PM2.5 Plan	16.4	74.6
% Change	1	0

TABLE 3-3
SUMMARY OF EMISSIONS BY MAJOR SOURCE CATEGORY: 2018 BASE YEAR IN DRAFT PM2.5 PLAN (TONS PER DAY[1])

Source Category	PM2.5 PLAN				
	VOC	NOx	SOx	PM2.5	NH3
Fuel Combustion	5.4	21.1	2.1	5.3	7.8
Waste Disposal	14.7	1.4	0.4	0.3	5.7
Cleaning and Surface Coatings	36.9	0.0	0.0	1.4	0.1
Petroleum Production and Marketing	19.6	0.3	0.3	0.9	0.1
Industrial Processes	10.2	0.1	0.1	4.7	8.7
Misc. Processes					
Residential fuel combustion	8.9	19.1	0.3	6.8	0.1
Cooking	1.1	0.0	0.0	11.4	0.0
Paved & Unpaved Road Dust	0.0	0.0	0.0	10.3	0.0
Others	2.6	0.2	0.1	4.1	34.3
Solvent Evaporation	120.0	0.0	0.0	0.0	1.2
RECLAIM Sources		17.8	5.5		
Total Stationary Sources	**219.4**	**59.9**	**8.8**	**45.2**	**58.0**
On-Road Vehicles	93.4	186.3	1.8	5.6	16.4
Off-Road Vehicles	89.2	137.1	3.8	5.2	0.2
Total Mobile Sources	**182.6**	**323.3**	**5.6**	**10.8**	**16.5**
TOTAL	**401.9**	**383.3**	**14.4**	**56.0**	**74.6**

[1] Values may not sum due to rounding

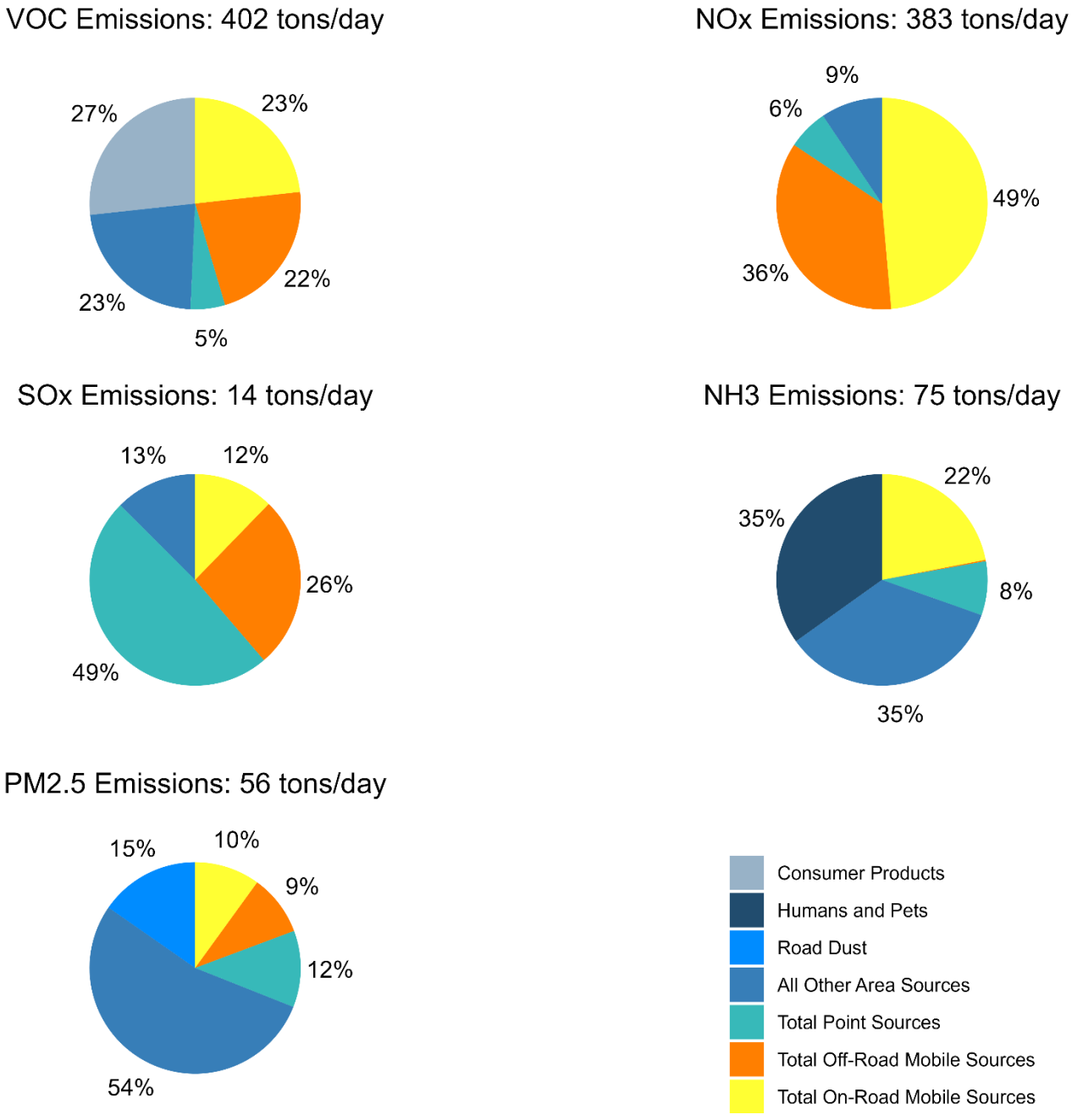


FIGURE 3-3

RELATIVE CONTRIBUTION BY MAJOR SOURCE CATEGORY TO 2018 EMISSIONS INVENTORY

(*ANNUAL AVERAGE, VALUES ARE ROUNDED AND MAY NOT SUM DUE TO ROUNDING*)

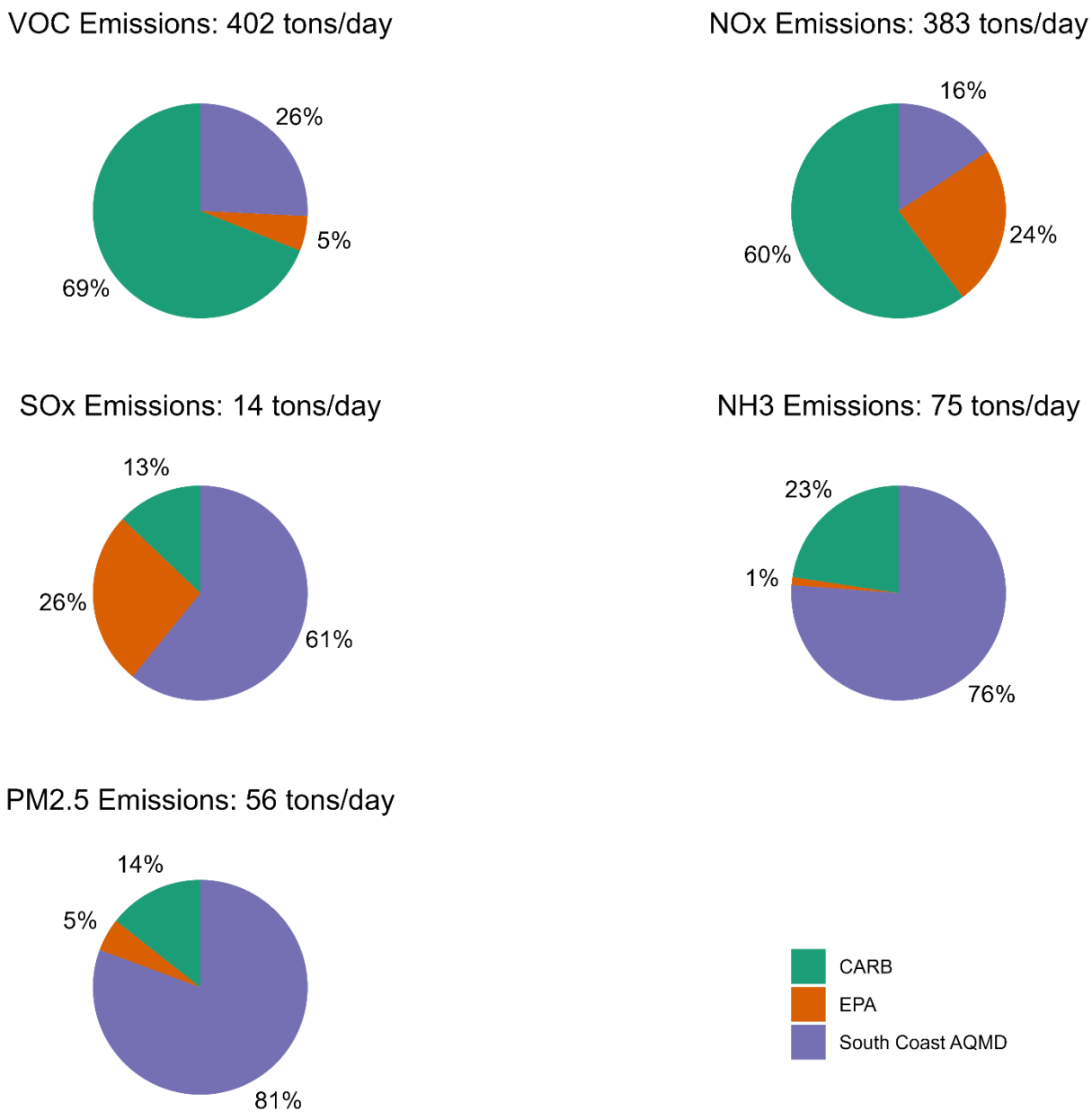


FIGURE 3-4
2018 EMISSION INVENTORY AGENCY PRIMARY RESPONSIBILITY
(*ANNUAL AVERAGE, VALUES ARE ROUNDED TO NEAREST INTEGER AND MAY NOT SUM DUE TO ROUNDING*)

Future Emissions

Inventory Development

Inventories were developed for 2018, the base year, 2030, the attainment year for the 2012 annual PM2.5 standard of 12 μg/m^3, and milestone years – 2025 and 2028– to demonstrate Reasonable Further Progress (RFP) and post attainment year, 2031. Detailed emissions inventories for all the milestone years are provided in Appendix I.

Future-year emissions were derived using: (1) emissions from the 2018 base year, (2) expected controls after implementation of the South Coast AQMD rules adopted by October 2020 and Rule 1109.1 and CARB regulations adopted by December 2021, and (3) activity growth in various source categories between the base and future years. CARB's H/D I & M was reflected in the baseline emissions as off-model adjustments as well.

Since the development of the 2022 AQMP, additional regulations pertaining to stationary sources have been implemented. These regulations affecting non-RECLAIM sources are detailed in Table 3-1, while those affecting RECLAIM sources are outlined in Table 3-4. Some regulations apply to both RECLAIM and non-RECLAIM sources, and thus, are listed in both tables. Notably, the regulations listed in Table 3-4 include those adopted prior to the October 2020 cutoff date for the 2022 AQMP. The reductions attributed to the non-shave portion of Rule 1109.1, which amount to 3.94 and 4.65 tons per day by 2030 and 2037, respectively, are already reflected in the baseline emissions (and not included in Table 3-4).

In accordance with the CMB-05 of the 2016 AQMP, multiple regulations targeting NOx emissions were enacted to transition the RECLAIM program into a traditional command-and-control regulatory framework. A portion of the emission reductions resulting from these regulations overlapped with the RECLAIM shave, reducing the allocation cap as stipulated in Rule 2002, which was adopted in December 2015. However, the 2022 AQMP did not incorporate the reductions from the landing rules, which were intended to phase out the RECLAIM program in favor of a command-and-control structure. At the time of the 2022 AQMP development, many of these rules were still in progress, and it was uncertain whether the reductions would be considered part of the RECLAIM shave. To prevent double counting, the reductions from the landing rules were assumed to be included in the RECLAIM shave in the 2022 AQMP. Subsequently, the majority of the landing rules have been adopted, and they are expected to achieve reductions exceeding the requirements of the RECLAIM shave over a longer timeframe. As of September 2023, 11 rules have been adopted, as listed in Table 3-4, and they are anticipated to reduce NOx emissions by 0.61 and 3.47 tons per day by 2022 and 2030, respectively. The 2022 reductions include only the rules adopted and implemented prior to 2022.

Given the maturity of the RECLAIM shave in 2022, any reductions in excess of the 2022 reductions are considered new reductions. Consequently, the net NOx reductions from landing rules beyond the shave are projected to be 2.86 and 3.01 tons per day by 2030 and 2037, respectively. The reductions from non-RECLAIM rules listed in Table 3-1 are 0.34 and 1.14 tons per day by 2030 and 2037, respectively. While

these additional reductions are not reflected in the baseline emissions, they have been factored into the attainment and Reasonable Further Progress (RFP) demonstrations.

Furthermore, adjustments have been made to the sunset timeline for RECLAIM emissions. In the 2022 AQMP, it was assumed that 2025 and 2026 would mark the initial years without RECLAIM programs for NOx and SOx, respectively, based on the best available information at the time of plan development. However, during the development of the landing rules, the sunset timeline was revised, delaying the sunset of the NOx RECLAIM program by one year and placing the sunset of the SOx RECLAIM program on hold to accommodate operational requirements and stakeholder feedback. Consequently, for this PM2.5 plan, 2026 is considered the first year without the NOx RECLAIM program, while the SOx RECLAIM program remains in effect. To maintain transparency and consistency with emissions included in previous AQMPs and SIPs, NOx emissions from former RECLAIM sources are provided as line-item information under “former-RECLAIM” for post-RECLAIM years.

Activity growth factors for future years are the same as the ones adopted for the 2022 AQMP. Future growth projections were based on demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry) developed by SCAG for their 2020 RTP/SCS. Industry growth factors for 2030 were also provided by SCAG. Table 3-5 summarizes key socioeconomic parameters used in the Draft PM2.5 Plan emissions inventory development. Appendix I provides further detail on growth surrogates for different source sectors.

TABLE 3-4
RECLAIM LANDING RULES ADOPTED IN 2017 AND AFTERWARDS BUT NOT REFLECTED IN THE BASELINE EMISSIONS OF THE DRAFT PM2.5 PLAN

Adopted/Amended Date	District Rule	Implementation Schedule		Total Reductions from RECLAIM Sources in 2030 (tpd)	2030 Reduction in excess of 2022 reductions (tpd)
		Start Year	End Year		
11/1/2019	Rule 1110.2 – Control of Emissions from Gaseous- and Liquid-fueled Engines	2020	2029	0.25	0.21
1/4/2019	Rule 1118.1 – Control of Emissions from Non-Refinery Flares	2022	2025	0.03	0.03
4/5/2019	Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines	2024	2027	1.66	1.66
11/2/2018	Rule 1135 – Electricity Generating Facilities	2020	2025	0.30	0.18
12/7/2018	Rule 1146 & 1146.1 – Emissions of Oxides of Nitrogen from Industrial, Institutional, Commercial Boilers, Steam Generators, and Process Heaters	2019	2033	0.36	0.08
12/7/2018	Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Heaters and Small Boilers and Process Heaters	2022	2023	0.002	0.002
5/6/2022	Rule 1147 – NOx Reductions from Miscellaneous Sources	2024	2059	0.40	0.40
8/6/2021	Rule 1147.1 – NOx Reductions from Aggregate Dryers	2025	2057	0.01	0.01
4/1/2022	Rule 1147.2 – NOx Reductions from Metal Melting and Heating Furnaces	2026	2057	0.49	0.36
8/4/2023	Rule 1153.1 – Emissions of Oxides of Nitrogen from Commercial Food Ovens	2024	2036	0.02	0.02
Cumulative reductions from the landing rules listed above*				3.47	2.86

* Reductions are calculated for each rule individually. Because some sources are affected by more than one rule, the compounded emission reductions are slightly lower than the sum of reductions from individual rules.

TABLE 3-5
BASELINE DEMOGRAPHIC FORECASTS FOR THE SOUTH COAST AIR BASIN EMPLOYED IN THE DRAFT PM2.5 PLAN

Category	2018	2030	% Growth from 2018 to 2030
Population (Millions)	16.7	18.0	7.9
Housing Units (Millions)	5.3	6.0	11.7
Total Employment (Millions)	7.7	8.3	7.3
Daily VMT (Millions)	388	395	1.8

Current forecasts indicate that this region will experience population growth of 7.9 percent between 2018 and 2030, with a 1.8 percent increase in VMT. Housing units show the largest change of the socioeconomic indicators with a projected 11.7 percent increase from 2018 to 2030.

Summary of Future Baseline Emissions

To illustrate trends in future baseline annual average inventories, emissions by source category and by pollutant for 2030 are presented in Table 3-6. Baseline inventories are projected future emissions that reflect already adopted regulations and programs but do not incorporate additional controls proposed in this Draft PM2.5 Plan. The 2018 base year emission inventory, which captures actual 2018 emissions, is used as the basis for future projections.

Even without any additional control measures, VOC and NOx emissions are expected to decrease due to existing South Coast AQMD and CARB regulations and programs, such as controls for on- and off-road equipment, new vehicle standards, and Rule 1109.1 for refinery emissions. For VOC and NOx, these updated regulations result in 15 and 46 percent lower emissions in 2030 than 2018. These decreases are not uniform across sources; per Figures 3-3 and 3-5, mobile source contributions to VOC emissions decline by 45 percent but area sources, including consumer products, continue to be a significant source of VOC emissions. For NOx emissions, amidst an overall decrease in emissions from 2018 to 2030, relative contributions change dramatically, where on-road contributions decrease from 49 to 24 percent while contributions from off-road sources increase from 36 to 54 percent. On-going implementation of adopted regulations contributes to the changes. For example, controls on heavy-duty vehicles are expected to reduce NOx emissions significantly but could lead to increased NH3 emissions due to ammonia slip. The contribution of on-road vehicle emissions to NH3 increases from 22% in 2018 to 27% in 2030.

Similarly, projected economic growth results in a corresponding 3 percent projected increase in SOx emissions. Stationary sources are projected to remain the predominant source of SOx, with point sources

contributing almost half of total SOx emissions in 2030. However, OGVs are significant source of SOx emissions in the Basin, and growing shipping and OGV activity in future years is expected to increase SOx emissions at a faster rate than growth in point source emissions, driving the 3 percent increase. The highest-ranking source categories in the 2018 and 2030 inventories are discussed in a later section.

For directly emitted PM2.5, mobile sources account for 14 percent of total emissions in the 2030 inventory, a 4 percent decrease from the total mobile source contribution in 2018. This estimate excludes entrained paved/unpaved road dust sources, which shows a modest increase from 15 percent in the 2018 inventory to 17 percent in the 2030 inventory. Area sources excluding entrained paved/unpaved road dust sources are projected to remain the predominant source of directly emitted PM2.5, contributing 54 percent of emissions in 2018 and 57 percent in 2030. This is mainly due to the increases in population, VMT and economic activities.

Figure 3-6 shows the fraction of the 2030 inventory by responsible agency for VOC, NOx, SOx, NH3 and directly emitted PM2.5 emissions. In 2030, slightly larger fractions of NOx and VOC emissions will fall under the South Coast AQMD control (31 percent for VOC and 23 percent for NOx) due to different relative rates of emission reductions among sources controlled by the three agencies. Despite changes, the majority of VOC and NOx emissions will remain primarily under CARB and U.S. EPA jurisdiction. NOx sources under federal control, such as OGVs (33 tons per day), locomotives (18 tons per day), aircraft (24 tons per day), out-of-state and international heavy-duty trucks (4 tons per day), military portion of commercial harbor craft (1 ton per day), and pre-empted off-road equipment (4 tons per day) contribute 36 percent of total NOx emissions in the Basin in 2030, compared to 25 percent in 2018, indicating growing disparity between regulations on federal sources and sources under State and local control. VOC emissions from consumer products, which are regulated by CARB, are projected to reach 122 tons per day in 2030, representing 39 percent of total VOC emissions in the Basin. This increase in emissions, which mostly originate from the use of personal care, hygiene, and cleaning products, reflects projected population growth in the region. The fraction of SOx emissions that falls under the South Coast AQMD regulatory authority will remain largely unchanged from the 2018 base year inventory.

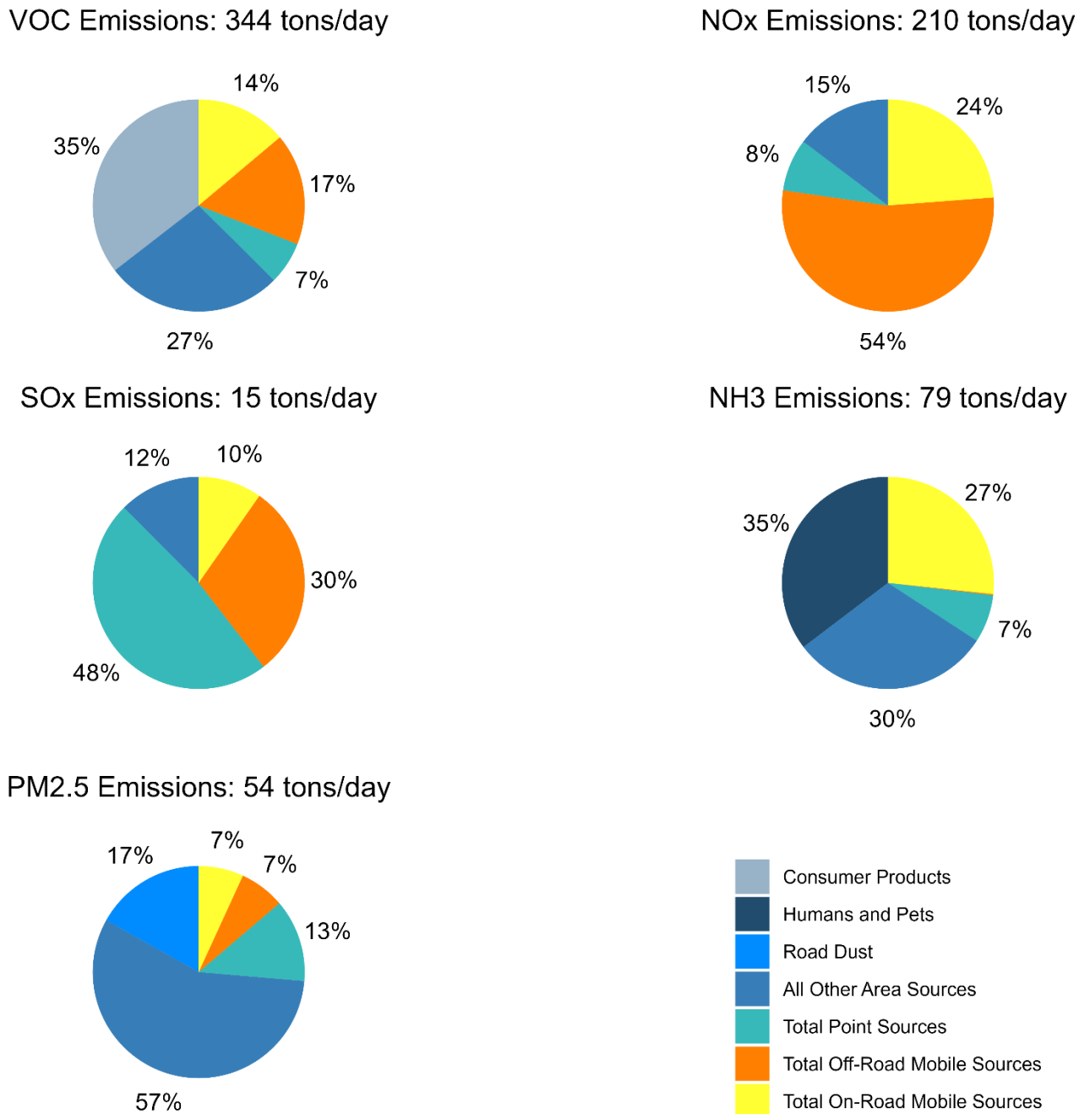


FIGURE 3-5

RELATIVE CONTRIBUTION BY SOURCE CATEGORY TO 2030 EMISSIONS INVENTORY

(ANNUAL AVERAGE, VALUES ARE ROUNDED AND MAY NOT SUM DUE TO ROUNDING)

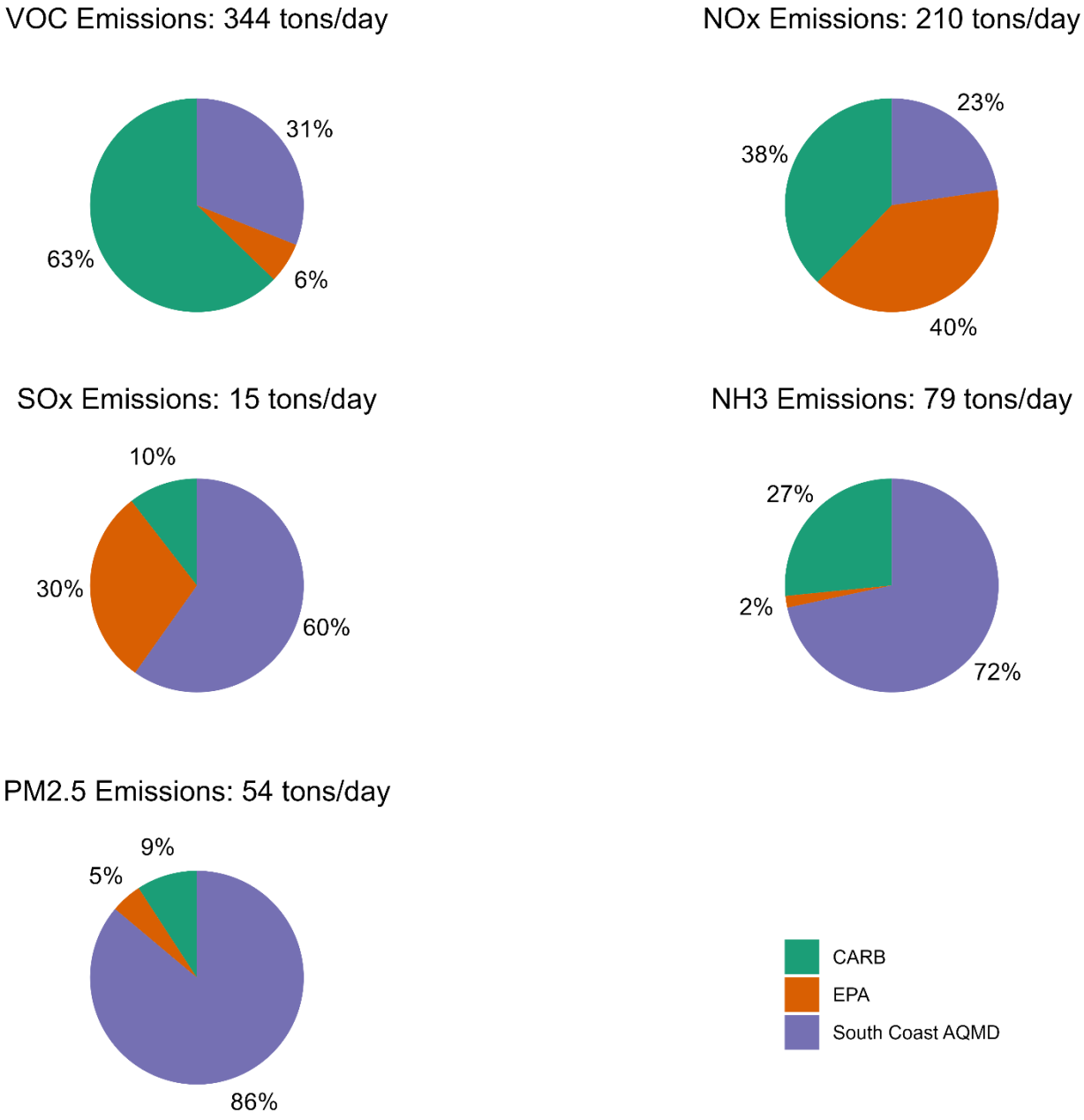


FIGURE 3-6
2030 EMISSIONS INVENTORY AGENCY RESPONSIBILITY
(*ANNUAL AVERAGE, VALUES ARE ROUNDED TO NEAREST INTEGER AND MAY NOT SUM DUE TO ROUNDING*)

TABLE 3-6
SUMMARY OF EMISSIONS BY MAJOR SOURCE CATEGORY: 2030 BASELINE
DRAFT PM2.5 PLAN (TONS PER DAY[1])

Source Category	DRAFT PM2.5 PLAN					
	VOC	NOx	CO	SOx	PM25	NH3
Fuel Combustion	5.4	29.4	75.3	6.1	5.2	7.3
Waste Disposal	15.7	1.6	0.7	0.5	0.3	6.4
Cleaning and Surface Coatings	39.2	0.0	0.1	0.0	1.6	0.2
Petroleum Production and Marketing	18.7	0.6	2.6	1.5	0.9	0.1
Industrial Processes	10.7	0.8	0.8	0.6	5.4	8.7
Misc. Processes						
Residential fuel combustion	8.9	15.2	47.4	0.3	6.6	0.1
Cooking	1.2	0.0	0.0	0.0	12.3	0.0
Paved & Unpaved Road Dust	0.0	0.0	0.0	0.0	11.6	0.0
Others	1.59	0.2	5.9	0.0	3.5	34.2
Solvent Evaporation	136.0	0.0	0.0	0.0	0.0	1.2
Total Stationary Sources	**237.4**	**47.8**	**132.7**	**9.0**	**46.6**	**58.0**
On-Road Vehicles	47.7	50.1	438.1	1.4	3.7	21.2
Off-Road Vehicles	58.6	112.6	595.7	4.4	3.7	0.1
Total Mobile Sources	**106.3**	**162.7**	**1033.8**	**5.8**	**7.4**	**21.3**
TOTAL	**343.7**	**210.4**	**1166.5**	**14.8**	**54.1**	**79.3**

[1] Values are rounded to nearest integer and may not sum due to rounding

Impact of Growth

The Draft PM2.5 Plan forecasts the 2030 emissions inventories ‘‘with growth’’ through a detailed consultation process with SCAG. The region is projected to see 8 percent growth in population, 12 percent growth in housing units, 7 percent growth in employment, and 2 percent growth in VMT between 2018 and 2030. To illustrate the impact of demographic growth on emissions, “no growth” emissions were estimated by removing the growth factors from 2030 baseline emissions. Table 3-7 presents a comparison of projected 2030 emissions with and without growth. The growth impacts to 2030 VOC, NOx, SOx, NH3 and directly emitted PM2.5 emissions are 27.5, 30.0, 1.0, 5.4, and 3.3 tons per day, respectively.

While economic growth is beneficial for the region, it presents a challenge to air quality improvement efforts as projected growth could offset the progress made in reducing VOC, NOx, SOx, and PM2.5 emissions through adopted regulations from the South Coast AQMD and CARB. Meeting the U.S. EPA’s current 2012 Annual PM2.5 standard of 12 $\mu g/m^3$ and other NAAQS will require continued emission reduction efforts with shared responsibility from all levels of government.

TABLE 3-7
GROWTH IMPACT TO 2030 EMISSIONS IN TONS PER DAY

With Growth	VOC	NOX	SOX	PM2.5	NH3
Stationary Point and Area	237.4	47.8	9.0	35.8	58.0
Road Dust	0.0	0.0	0.0	10.8	0.0
On-Road	47.7	50.1	1.4	3.7	21.2
Off-Road	58.6	112.6	4.4	3.7	0.1
Total	**343.7**	**210.4**	**14.8**	**54.1**	**79.3**
No Growth	**VOC**	**NOX**	**SOX**	**PM25**	**NH3**
Stationary Point and Area	217.6	47.4	8.8	34.0	56.1
Road Dust	0.0	0.0	0.0	10.3	0.0
On-Road	45.4	38.1	1.3	3.3	17.8
Off-Road	53.2	94.9	3.8	3.2	0.1
Total	**316.2**	**180.4**	**13.9**	**50.8**	**74.0**
Impact of Growth	**VOC**	**NOX**	**SOX**	**PM25**	**NH3**
Stationary Point and Area[1]	19.8	0.4	0.2	1.9	1.9
Road Dust	0.0	0.0	0.0	0.5	0.0
On-Road	2.3	11.9	0.2	0.4	3.4
Off-Road	5.4	17.7	0.6	0.5	0.0
Total	**27.5**	**30.0**	**1.0**	**3.3**	**5.4**

[1] Overall growth in Electric Utilities is projected as a composite factor of employment growth, efficiency improvements and renewable portfolio standards. For this analysis, the growth portion is based on employment growth alone, which is the surrogate for overall electricity demand growth. Proposed control measures promoting zero emissions technology will increase electricity demand significantly, beyond what these baseline projections suggest.

Top Ten Source Categories in 2018 and 2030

The top ten source contributors to 2018 and 2030 annual average emissions inventories for VOC, NOx, SOx, directly emitted PM2.5 and NH3 for years 2018 and 2030 are shown in Figures 3-7 to 3-14 and briefly discussed in this section.

Figures 3-7 to 3-8 provide the top ten source categories for VOC emissions in 2018 and 2030. These top ten categories account for approximately 82.8 and 81.5 percent of the total VOC inventories in 2018 and 2030, respectively. Consumer products, Light and Medium Duty Vehicles, and Off-Road Equipment are the three highest-emitting categories in both years. Emissions from Light and Medium Duty Vehicles and Off-Road Equipment decline substantially, which reflects the effect of regulations on vehicles and off-road equipment. On the other hand, emissions from Consumer Products, Coatings and Related Processes, and Architectural Coatings and Related Solvents emissions continue to rise due to increase in population and industrial activities.

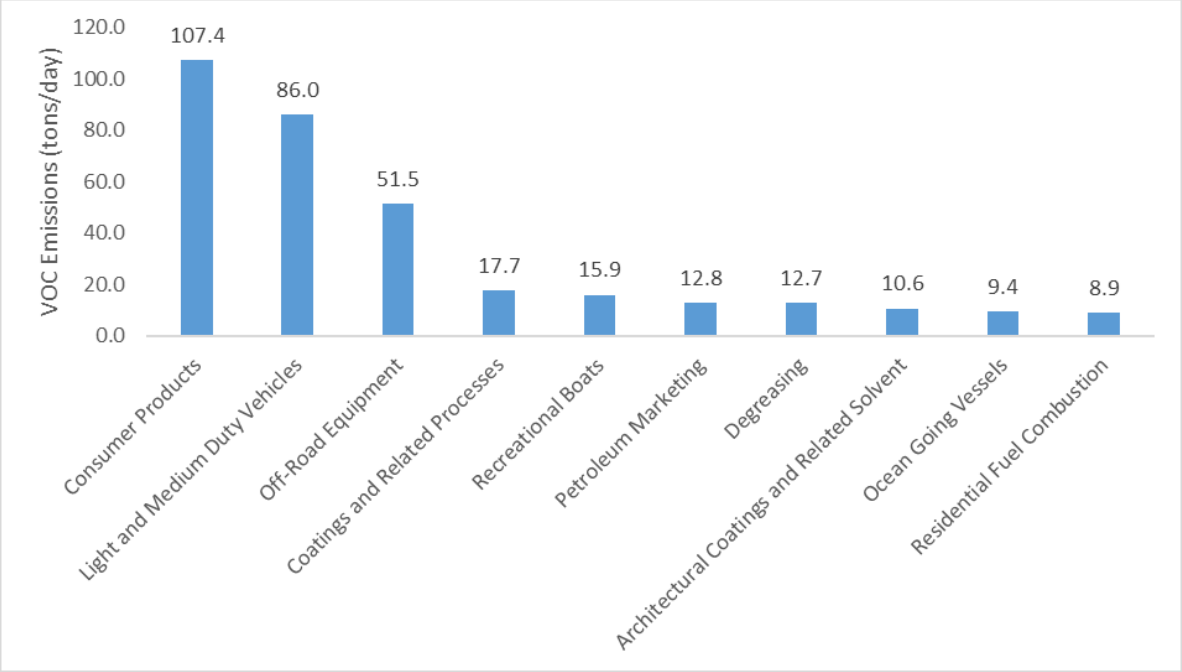


FIGURE 3-7
TOP TEN EMITTER CATEGORIES FOR VOC IN 2018
(ANNUAL AVERAGE)

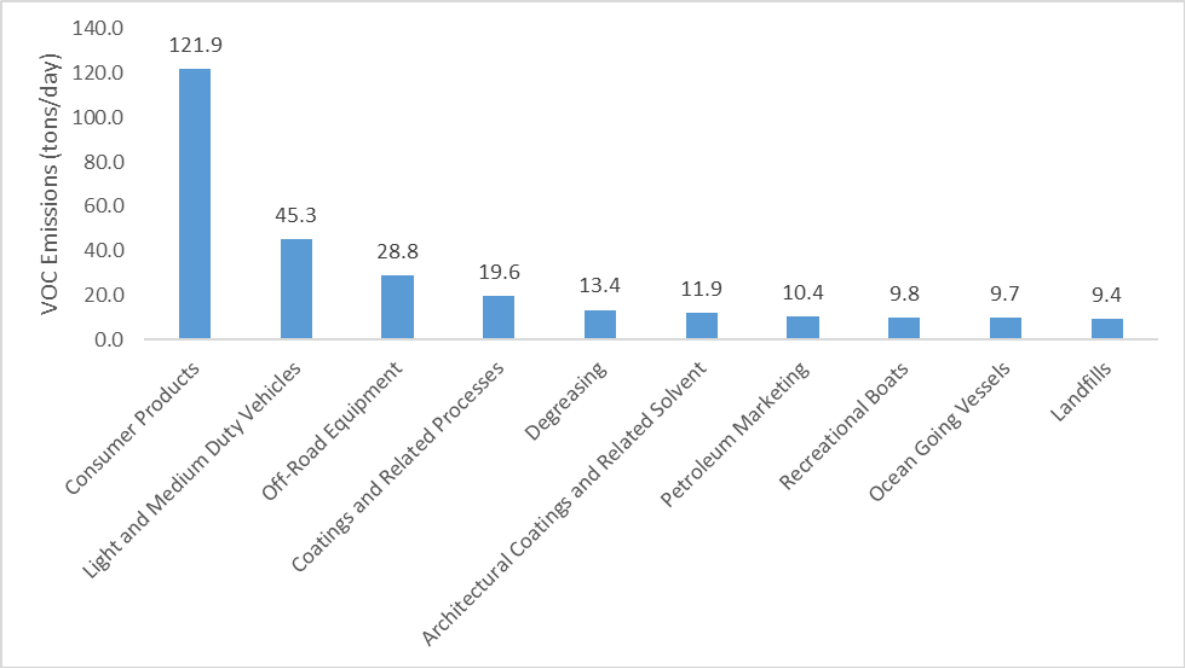


FIGURE 3-8
TOP TEN EMITTER CATEGORIES FOR VOC IN 2030
(ANNUAL AVERAGE)

Figures 3-9 to 3-10 show the top ten categories for NOx emissions in base year 2018 and future attainment year 2030. The top ten categories account for 90.8 percent of the total NOx inventory in 2018 and 89.6 percent in 2030. Mobile source categories remain the predominant contributor to NOx emissions. Heavy-Duty Trucks, Light and Medium Duty Vehicles, Off-road equipment, and OGVs are the top emitters in 2018. Heavy-Duty Trucks is the top source in 2018 but their emissions are projected to decrease substantially through 2030 because of emission regulations. Other sources that are projected to decline due to regulations include Light and Medium Duty Vehicle, Off-Road Equipment and Residential Fuel Combustion. On the contrary, emissions from OGV, Aircrafts and Trains are projected to increase through 2030 driven by increases activities in those sectors.

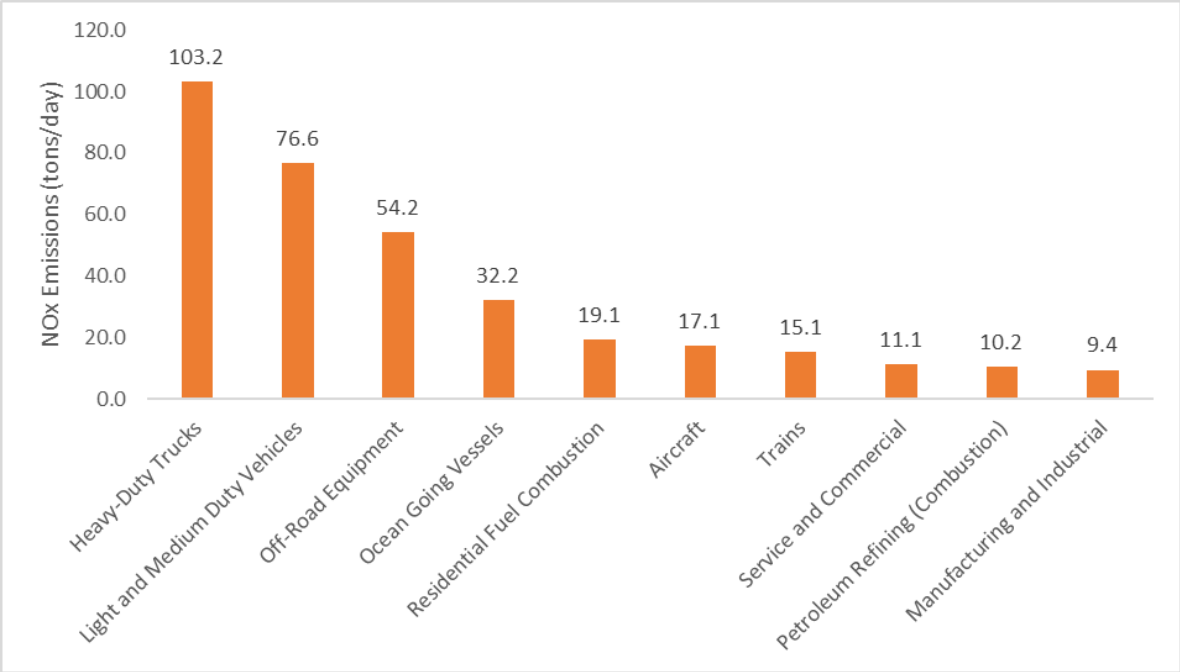


FIGURE 3-9
TOP TEN EMITTER CATEGORIES FOR NOx IN 2018
(ANNUAL AVERAGE)

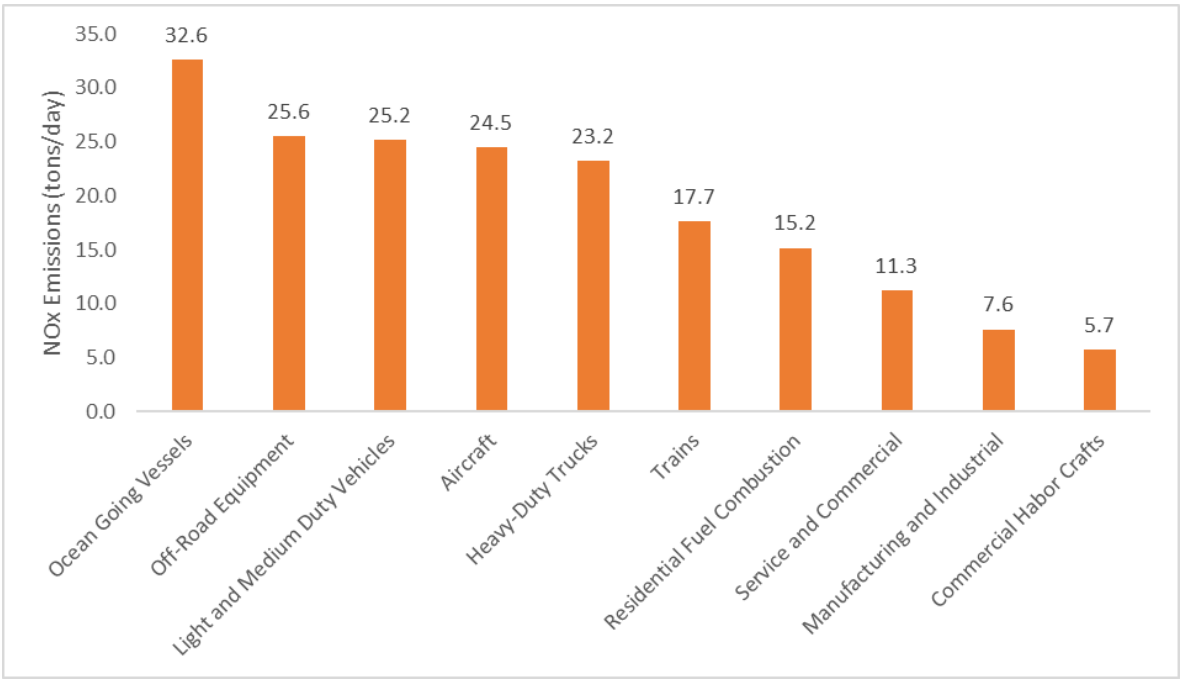


FIGURE 3-10
TOP TEN EMITTER CATEGORIES FOR NOx IN 2030
(ANNUAL AVERAGE)

Figures 3-11 to 3-12 show the top source categories for SOx emissions in 2018 and 2030. The top ten categories represent approximately 92 percent of total SOx inventory in 2018 and 2030. SOx emissions are projected to not change substantially from 2018 to 2030. Combustion in Petroleum Refining is the largest source in the Basin in both 2018 and 2030. OGV and Aircraft are the only sources that are expected to grow due to the expected increase in activity on those sectors and the limited regulations applicable to those sources. On the other hand, regulations and turnover to cleaner vehicles result in a marginal reduction in SOx from Light and Medium Duty Vehicles.

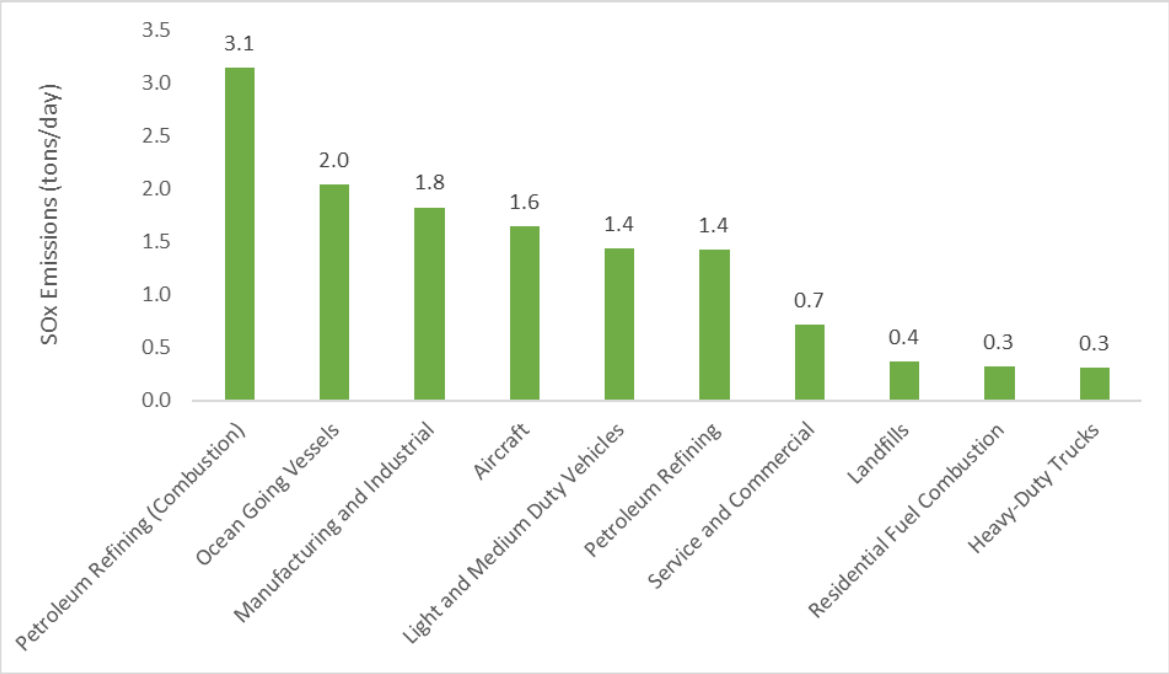


FIGURE 3-11
TOP EMITTER CATEGORIES FOR SOx IN 2018
(*ANNUAL AVERAGE)*

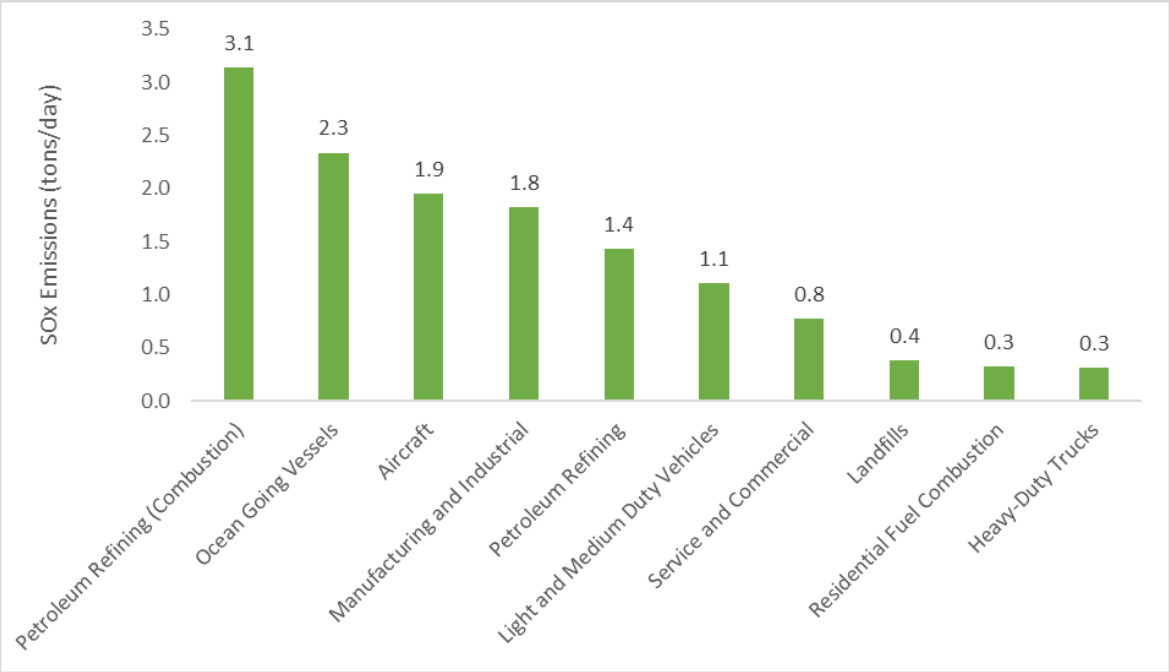


FIGURE 3-12
TOP EMITTER CATEGORIES FOR SOx IN 2030
(*ANNUAL AVERAGE)*

Figures 3-13 to 3-14 show the top ten source categories for annual average directly emitted PM2.5 in 2018 and 2030. The top 10 categories represent 76.4 percent of the total directly emitted PM2.5 inventory in 2018 and 78.6 percent in 2030. Commercial cooking, paved road dust, and residential fuel combustion are the largest contributors to total direct PM2.5 emissions. Emissions from cooking and paved road dust are projected to grow through 2030 because of the increase in population and vehicle activity. On the other hand, tailpipe emissions from vehicles are expected to decline due to vehicle emission regulations, despite the increase in vehicle miles traveled, however non-tailpipe emissions such as tire and break ware emissions are expected to grow due to increased VMT. Emissions from residential fuel combustion are also projected to decline through 2030 due to efficiency improvements and emissions regulations, despite the increase in population. Emissions from wood and paper industries, and from construction and demolition are among the top ten sources and are expected to grow through 2030 due to the projected increase in industrial activity in those sectors.

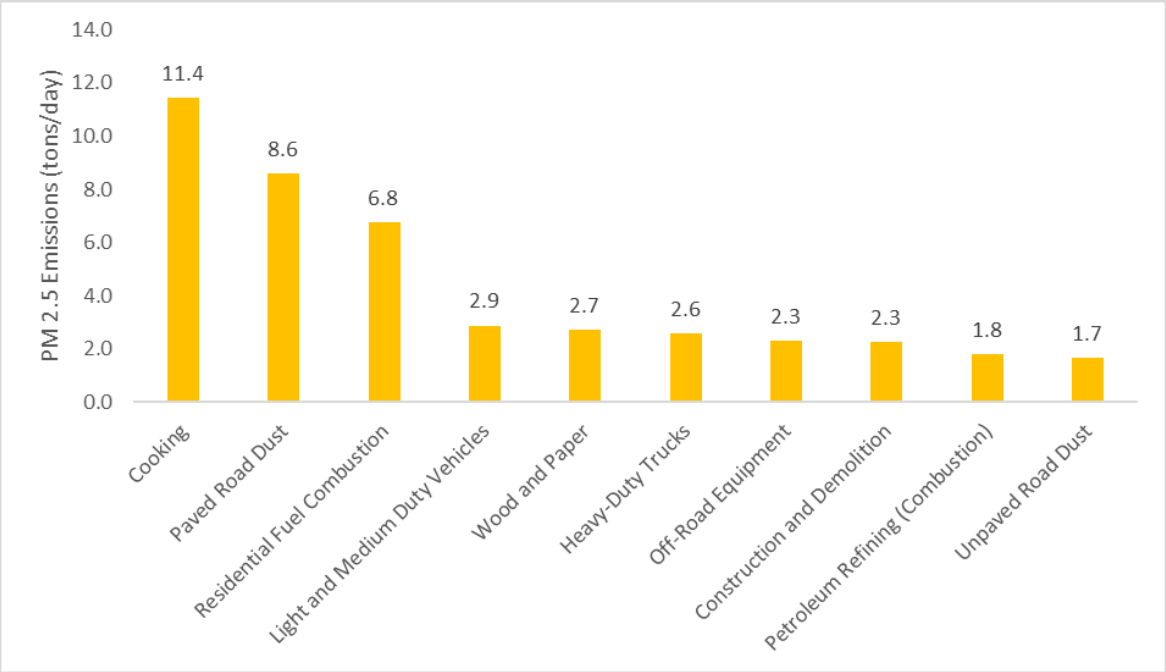


FIGURE 3-13
TOP TEN EMITTER CATEGORIES FOR DIRECTLY EMITTED PM2.5 IN 2018
(*ANNUAL AVERAGE*)

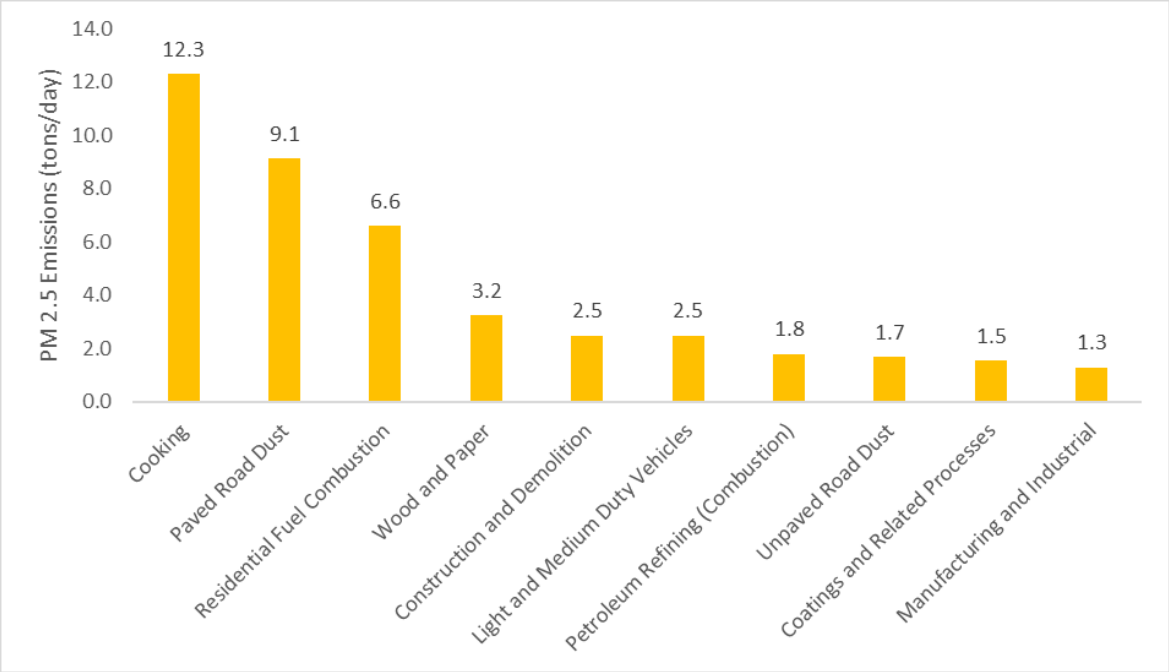


FIGURE 3-14
TOP TEN EMITTER CATEGORIES EMITTED PM2.5 IN 2030
(*ANNUAL AVERAGE*)

Figures 3-15 to 3-16 show the top ten source categories for NH3 emissions in 2018 and 2030. The largest source of ammonia is a group of miscellaneous sources that include human and pet perspiration. This source is expected to grow through 2030 as population grows in the basin. Emissions from vehicles are expected to grow through 2030 as well. Emissions of NH3 from gasoline vehicles are produced as a reaction in the catalytic converter. NH3 emitted by heavy-duty diesel trucks originates from the use of selective catalytic reactors to control NOx emissions from diesel vehicles.[8] The projected increase in vehicle activity for light-, medium- and heavy-duty vehicles leads to the increase in NH3 emissions. On the other hand, emissions from farming operations are projected to decline over the years as it is projected that some farming will gradually move away from the basin.[9]

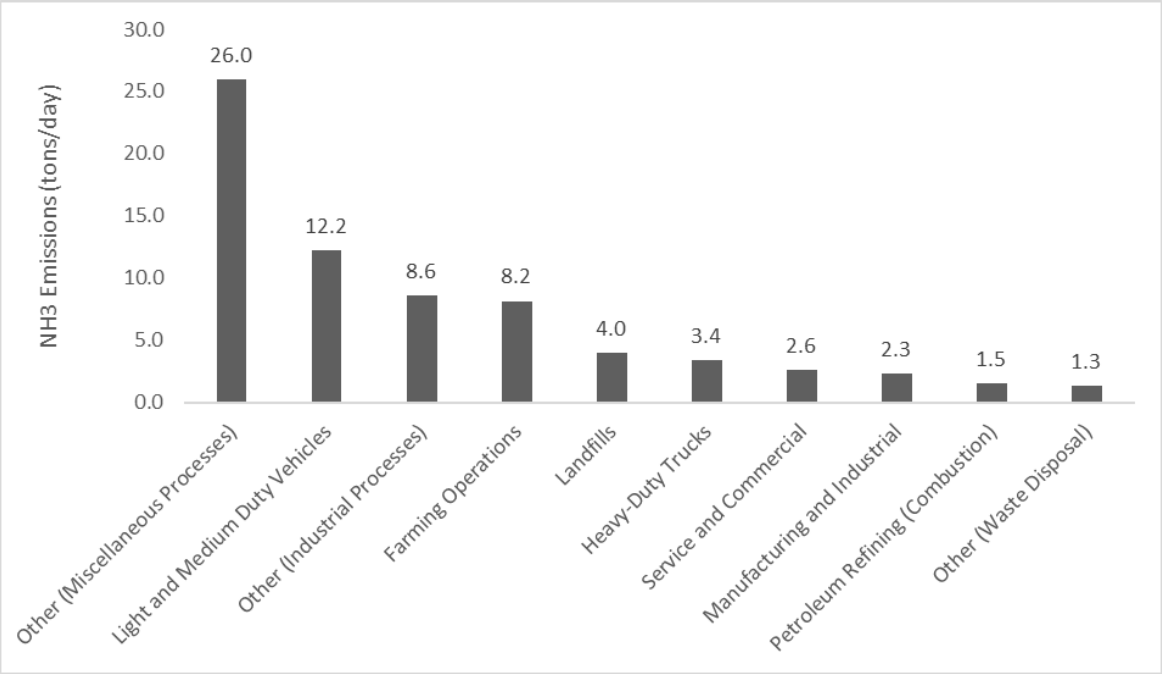


FIGURE 3-15
TOP TEN EMITTER CATEGORIES EMITTED NH3 IN 2018
(*ANNUAL AVERAGE*)

[8] Ammonia emissions from Selective Catalytic Reaction (SCR) systems is generally referred to as *ammonia slip*. SCR technology reduces NOx emissions by converting them into harmless nitrogen and water vapor through a reaction with ammonia. However, if the SCR system injects more ammonia than required for the NOx reduction process, or if the catalyst becomes inefficient, unreacted ammonia can escape into the exhaust stream.

[9] Farming operations include emissions from livestock operations, with dairy cattle being the largest source in the basin. Cattle emissions are primarily based on the 2012 Census of Agriculture. Historical trends from the Santa Ana Water Control Board show a 39% decrease in the number of cows in the basin from 2008 to 2018. Growth profiles are based on CARB's projections of Census of Agriculture's historical livestock population trends, 2012. Additional information on CARB's methodology for farming operations is available at: https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-farming-operations

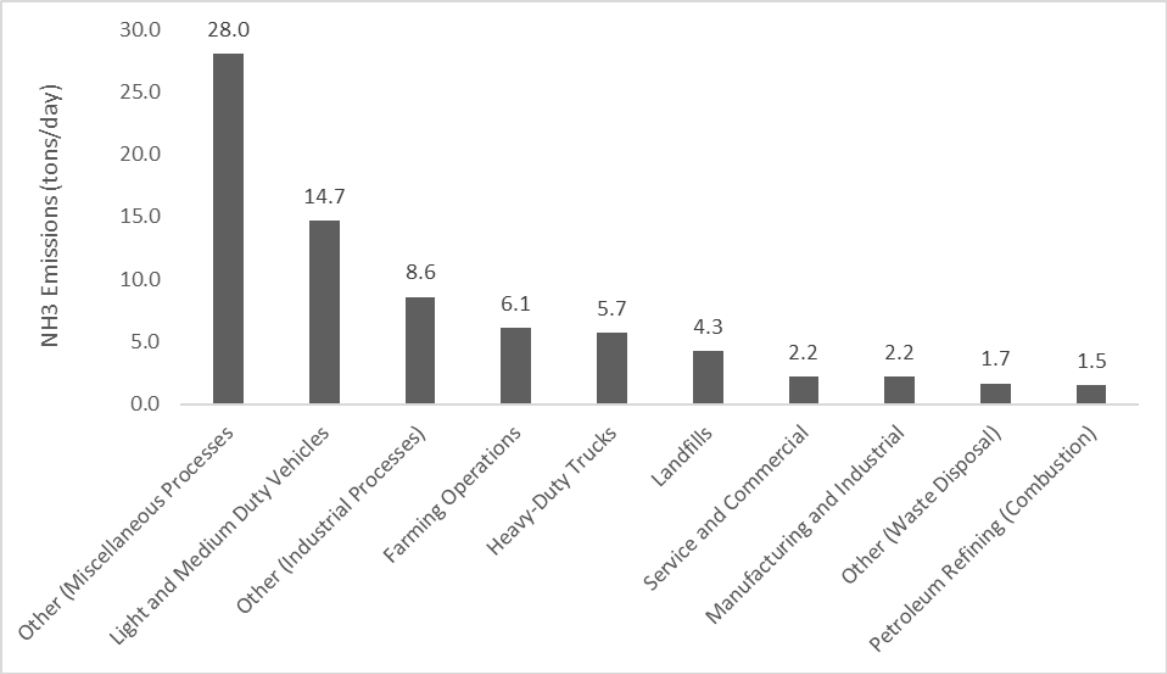


FIGURE 3-16
TOP TEN EMITTER CATEGORIES EMITTED NH3 IN 2030
(*ANNUAL AVERAGE*)

Condensable and Filterable Portions of PM2.5 Emissions

Per PM2.5 NAAQS final implementation rule,[10] the SIP emissions inventory is required to identify the condensable and filterable portions of PM2.5 separately, in addition to primary PM2.5 emissions. Primary PM emissions consist of condensable and filterable portions. Condensable PM is the material that is in vapor phase in stack conditions. Filterable PM comprises "particles that are directly emitted by a source as a solid or liquid [aerosol] at stack or release conditions." The U.S. EPA's Air Emissions Reporting Requirements (AERR) requires states to report annual emissions of filterable and condensable components of PM2.5 and PM10, "as applicable," for large sources for every inventory year and for all sources every third inventory year, beginning with 2011.[11] Subsequent emissions inventory guidance[12]

[10] 40 CFR 51.1008(a)(1)(iv).

[11] 40 CFR §51.15(a)(1) and §51.30(b)(1).

[12] USEPA. 2017. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. Available at: https://www.epa.gov/sites/production/files/2017- 7/documents/ei_guidance_may_2017_final_rev.pdf.

from the U.S. EPA clarifies the meaning of the phrase "as applicable" by providing a list of source types "for which condensable PM is expected by the AERR."

Category specific conversion factors developed by CARB and used in the Imperial County 2018 SIP[13] were applied in the current analysis to estimate condensable PM and then filterable PM was calculated by subtracting the condensable from the total PM2.5 primary emissions. This approach is consistent with South Coast AQMD's South Coast PM2.5 Plan for 2006 PM2.5 Standard.[14] The baseline 2018, future attainment year 2030 are included in the analysis. Figure 3-17 shows the annual average emissions of primary (or direct), condensable, and filterable PM2.5 emissions for 2018 and 20230. Details on the condensable and filterable PM2.5 emissions are provided in Appendix I of this Plan.

As shown on Figure 3-17, total primary PM2.5 emissions increase between base and future years from 45.2 tons per day in 2018 to 46.6 tons per day in 2030. The increase in total primary PM2.5 appears in both condensable and filterable portions with 0.8 tons per day and 0.6 tons per day increase, respectively, between 2018 and 2030. These increases can be attributed to the growth in population and economic activities in the Basin.

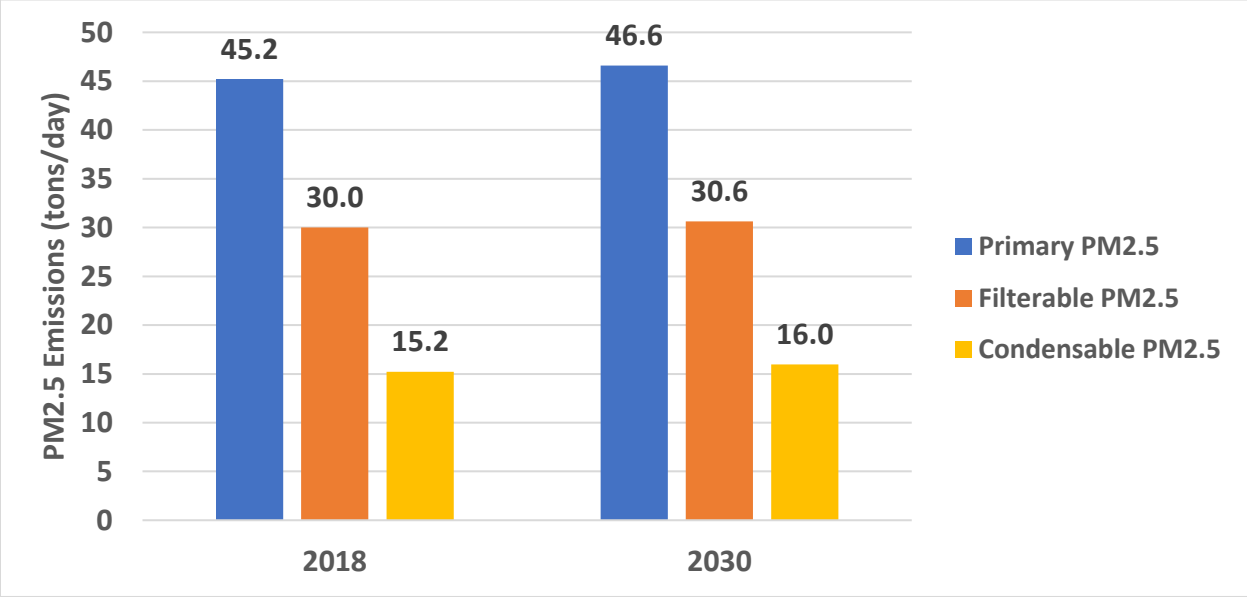


FIGURE 3-17
ANNUAL AVERAGE PRIMARY, FILTERABLE AND CONDENSABLE PM2.5 EMISSIONS FROM STATIONARY SOURCES

[13] Imperial County 2018 Annual Particulate Matter less than 2.5 microns in Diameter State Implementation Plan, April 2018. Available at https://ww3.arb.ca.gov/planning/sip/planarea/imperial/final_2018_ic_pm25_sip.pdf.

[14] Available at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/2-final-attainment-plan-for-2006-24-hour-pm2-5-standard-for-the-south-coast-air-basin.pdf?sfvrsn=6

Table 3-8 presents the top five source categories for condensable PM2.5 in 2018 and future milestone years. The majority of condensable PM2.5 is emitted from the "Cooking" category, which accounts for 75.1 percent and 76.8 percent of the total condensable PM2.5 in 2018 and 2030, respectively. The sum of the top five condensable PM2.5 categories represents 95.7 percent and 95.9 percent of the total condensable PM2.5 both in 2018 and 2030, respectively. Table 3-9 shows the top five categories for filterable PM2.5. The "Paved Road Dust" source category is the top emitter of filterable PM2.5. The top five filterable PM2.5 emissions categories account for approximately 70.7 percent (2018) and 72.9 percent (2030) of the total filterable PM2.5 emissions. This points to a marginally higher contribution of top five filterable categories to total filterable PM2.5 emissions in future years. Detailed emissions by major source category are included in Appendix I of this Plan.

TABLE 3-8
TOP 5 CATEGORIES EMITTING CONDENSABLE PM2.5 (TONS PER DAY)

Category	2018	2030
Cooking	11.41	12.27
Petroleum Refining (Combustion)	1.00	1.00
Residential Fuel Combustion	0.79	0.77
Manufacturing and Industrial	0.75	0.72
Service and Commercial	0.61	0.57

TABLE 3-9
TOP 5 CATEGORIES EMITTING FILTERABLE PM2.5 (TONS PER DAY)

Category	2018	2030
Paved Road Dust	8.59	9.11
Residential Fuel Combustion	5.98	5.82
Wood and Paper	2.70	3.23
Construction and Demolition	2.27	2.49
Unpaved Road Dust	1.67	1.67

CHAPTER 4

Control Strategy

- **The bulk of the emission reductions needed to attain the 2012 annual PM2.5 standard will come from continued implementation of already adopted rules and regulations.**

- **The PM2.5 Plan advocates for a control strategy aimed at expediting implementation of 2022 AQMP NOx measures, leveraging PM2.5 co-benefits from these NOx measures, and reducing ammonia and direct PM2.5 emissions through selected controls mandated by the U.S. EPA.**

- **The control strategy complies with U.S. EPA's requirements including Best Available Control Measures and Most Stringent Measures.**

Introduction

The control strategy in the South Coast Air Basin Attainment Plan for the 2012 Annual PM2.5 Standard provides the path to achieving emission reductions needed to meet the 2012 annual PM2.5 NAAQS. Implementation of the PM2.5 Plan will be based on a series of control measures and strategies that vary by source type (i.e., stationary or mobile) as well as by pollutant, i.e., NOx, ammonia (NH3), or direct PM2.5. This chapter outlines the proposed control strategy and the schedules to adopt and implement the PM2.5 Plan to meet the 2012 annual PM2.5 standard in the South Coast Air Basin (Basin). The PM2.5 Plan control strategy includes a variety of implementation approaches such as regulation, accelerated deployment of available cleaner technologies, best management practices, co-benefits from existing programs (e.g., climate and energy efficiency), and incentives. Table 4-1 provides an overview of the criteria used in evaluating and selecting feasible control measures.

TABLE 4-1
CRITERIA FOR EVALUATING THE PM2.5 PLAN CONTROL MEASURES (LISTED ALPHABETICALLY)

Criteria	Description
Cost-Effectiveness	The cost of a control measure per reduction of emissions of a particular pollutant (cost includes purchasing, installing, operating, and maintaining the control technology).
Emission Reduction Potential	The total amount of pollution that a control measure can reduce.
Enforceability	The ability to ensure compliance with a control measure.
Legal Authority	Ability of the South Coast AQMD or other adopting agency to legally implement the measure.
Public Acceptability	The likelihood that the public will approve or cooperate in the implementation of a control measure.
Rate of Emission Reduction	The time it will take for a control measure to reduce a certain amount of air pollution.
Technological Feasibility	The likelihood that the technology for a control measure is or will be available.

Overall Strategy

The PM2.5 Plan relies primarily on previously adopted control measures from the 2022 AQMP and the 2022 State SIP Strategy. The Plan also relies on limited new controls for directly-emitted PM2.5 and key precursor pollutants, including NOx and NH3. By 2030, directly-emitted PM2.5 needs to be reduced by 6

percent from 2018 levels and NOx needs to be reduced by 54 percent. Although emissions of NH3 will increase by 2 percent, the Basin is still expected to meet the standard by 2030.

NOx is the primary precursor that will have the most impact on reducing PM2.5 levels in the Basin between 2018 and 2030. Approximately 383 tons per day of Basin total NOx emissions in 2018 need to be reduced to 176 tons per day by 2030. Continued implementation of adopted rules and regulations (i.e., baseline measures) are already projected to decrease emissions to 210 tons per day by the 2030 attainment year. Control measures included in this Plan are projected to reduce an additional 10 tons per day of NOx by 2030 and recently adopted regulations not included in the baseline will further reduce NOx emissions by 25 tons per day.

The 2022 AQMP and 2022 State SIP strategy were focused on reducing ozone levels, and its control measures therefore maximized NOx emission reductions. These Plans' overall approach required broad adoption of zero emission technologies across all emission sources when cost-effective and feasible, and low NOx emission technologies where zero emission technologies are not yet feasible – all with a goal of achieving federal ozone standard by 2037. Selected 2022 AQMP and 2022 State SIP Strategy measures with potential NOx emission reductions that can be achieved by 2030 are included in the PM2.5 Plan and directly-emitted PM2.5 co-benefits have been quantified.

The PM2.5 Plan also includes limited strategies to reduce directly-emitted PM2.5 and NH3 emissions to assist with attainment and to fulfill CAA requirements. If only baseline measures are considered, directly-emitted PM2.5 emissions are projected to decrease from 56 tons per day in 2018 to 54 tons per day in 2030 while NH3 emissions are projected to increase from 75 tons per day in 2018 to 79 tons per day in 2030. Recently adopted regulations not included in the baseline will reduce directly-emitted PM2.5 and NH3 emissions by 0.83 tons per day and 2.96 tons per day, respectively, by 2030. Control measures proposed in this Plan seek to lower directly-emitted PM2.5 and NH3 emissions by an additional 0.54 tons per day and 0.25 tons per day, respectively, by 2030.

In addition to implementing a control strategy for attainment, the PM2.5 Plan is required to satisfy U.S. EPA's requirements including Best Available Control Measures (BACM) and Most Stringent Measures (MSM). Demonstrating compliance with BACM and MSM requirements is independent of attainment and therefore some control measures are included which are not needed for attaining the standard. For details on the BACM and MSM requirements and analysis, refer to Appendix III.

South Coast AQMD Proposed Annual PM2.5 Strategy

South Coast AQMD's proposed annual PM2.5 attainment strategy consists of two parts: stationary source measures and mobile source measures. In this PM2.5 Plan, the South Coast AQMD is proposing a total of 38 control measures. Only one of these measures is new and not carried over from the 2022 AQMP or the 2016 AQMP. Out of the 38 proposed control measures, 23 measures target reductions from stationary sources and the remaining 15 measures target reductions from mobile sources.

South Coast AQMD Proposed Stationary Source Measures

A control measure is a set of specific technologies and methods identified for potential implementation to reduce emissions to attain an air quality standard. The proposed stationary source PM2.5 measures are designed to assist with attainment of the 2012 annual PM2.5 standard primarily through NOx emission reductions with concurrent NH3 and direct PM2.5 reductions. Co-benefits from GHG emission reduction policies and other measures are included as well.

Stationary source measures include Best Control Measures (BCM) that seek to reduce NOx emissions from residential and large industrial combustion sources, NH3 emissions from livestock waste and greenwaste disposal, and direct PM2.5 emissions from combustion and non-combustion sources. Some of the NOx measures pursue co-benefits from Energy and Climate Change Programs (ECC) measures and from other BCM measures. While all control measures seek to reduce emissions, not all measures have quantified reductions. The majority of stationary source measures are anticipated to be developed in the next several years and implemented in whole or in part prior to 2030.

Table 4-2 provides a list of the South Coast AQMD proposed PM2.5 measures for stationary sources along with anticipated emission reductions in 2030. The following sections provide a brief description of the proposed stationary source measures. Detailed descriptions of the measures are provided in Appendix IV-A.

TABLE 4-2
SOUTH COAST AQMD PROPOSED STATIONARY SOURCE MEASURES

Number	Title [Pollutant]	Previous Plan Measure Was Included	Emission Reductions (2030) (tons per day)
South Coast AQMD Stationary Source NOx Measures:			
BCM-01	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Water Heating* [PM2.5, NOx]	2022 AQMP (R-CMB-01)	TBD
BCM-02	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Space Heating* [PM2.5, NOx]	2022 AQMP (R-CMB-02)	TBD
BCM-03	Emission Reductions from Residential Cooking Devices [PM2.5, NOx]	2022 AQMP (R-CMB-03)	TBD
BCM-04	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Other Combustion Sources [PM2.5, NOx]	2022 AQMP (R-CMB-04)	TBD

Number	Title [Pollutant]	Previous Plan Measure Was Included	Emission Reductions (2030) (tons per day)
BCM-05	Emission Reductions from Emergency Standby Engines [PM2.5, NOx]	2022 AQMP (L-CMB-04)	0.04 [PM2.5] 0.36 [NOx]
BCM-06	Emission Reductions from Diesel Electricity Generating Facilities [NOx]	2022 AQMP (L-CMB-06)	0.16
BCM-07	Emission Reductions from Incinerators [NOx]	2022 AQMP (L-CMB-09)	0.81
	Total Quantified PM2.5 and NOx Reductions		**0.04 [PM2.5] 1.33 [NOx]**
South Coast AQMD Co-Benefits from Energy and Climate Change Programs Measures:			
ECC-01	Co-benefits from Existing and Future Greenhouse Gas Programs, Policies, and Incentives [All Pollutants]	2022 AQMP (ECC-01)	TBD
ECC-02	Co-benefits from Existing and Future Residential and Commercial Building Energy Efficiency Measures [All Pollutants]	2022 AQMP (ECC-02)	TBD
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [All Pollutants]	2022 AQMP (ECC-03)	TBD
South Coast AQMD NH3 Measures:			
BCM-08	Emission Reductions from Livestock Waste at Confined Animal Facilities* [NH3]	2016 AQMP (BCM-04)	0.27
BCM-09	Ammonia Emission Reductions from NOx Controls [NH3]	2016 AQMP (BCM-05)	TBD
BCM-10	Emission Reductions from Direct Land Application of Chipped and Ground Uncomposted Greenwaste* [NH3]	2016 AQMP (BCM-10)	0.08
BCM-11	Emission Reductions from Organic Waste Composting [NH3]	2016 AQMP (BCM-10)	TBD
	Total Quantified NH3 Reductions		**0.35**
South Coast AQMD Direct PM2.5 Measures:			
BCM-12	Further Emission Reductions from Commercial Cooking* [PM2.5]	2016 AQMP (BCM-01)	TBD

Number	Title [Pollutant]	Previous Plan Measure Was Included	Emission Reductions (2030) (tons per day)
BCM-13	Emission Reductions from Cooling Towers [PM2.5]	2016 AQMP (BCM-02)	TBD
BCM-14	Further Emission Reductions from Paved Road Dust Sources [PM2.5]	2016 AQMP (BCM-03)	TBD
BCM-15	Emission Reductions from Abrasive Blasting Operations [PM2.5]	2016 AQMP (BCM-06)	TBD
BCM-16	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM2.5]	2016 AQMP (BCM-07)	TBD
BCM-17	Emission Reductions from Prescribed Burning for Wildfire Prevention [PM2.5]	2022 AQMP (MCS-02)	TBD
BCM-18	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves* [PM2.5]	2016 AQMP (BCM-09)	TBD
BCM-19	Emission Reductions from Unpaved Road Dust Sources [PM2.5]	New	TBD
	Total Quantified Direct PM2.5 Reductions		**TBD**
South Coast AQMD Other Measures:			
BCM-20	Application of All Feasible Measures [All Pollutants]	2022 AQMP (MCS-01)	TBD

* These measures are included to satisfy MSM requirements.
Note: TBD are reductions to be determined once the measure is further evaluated, the technical assessment is complete, and inventories and cost-effective control approaches are identified, and are not relied upon for attainment demonstration purposes.

South Coast AQMD Stationary Source NOx Measures

There are seven NOx measures as listed below:

- BCM-01: Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Water Heating
- BCM-02: Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Space Heating

- BCM-03: Emission Reductions from Residential Cooking Devices
- BCM-04: Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Other Combustion Sources
- BCM-05: Emission Reductions from Emergency Standby Engines
- BCM-06: Emission Reductions from Diesel Electricity Generating Facilities
- BCM-07: Emission Reductions from Incinerators

BCM-01: EMISSION REDUCTIONS FROM REPLACEMENT WITH ZERO EMISSION OR LOW NOX APPLIANCES – RESIDENTIAL WATER HEATING: This control measure, based on 2022 AQMP control measure R-CMB-01, seeks to reduce NOx emissions from residential building water heating sources that are subject to Rule 1121 – Control of Oxides of Nitrogen (NOx) from Residential Type, Natural Gas-Fired Water Heaters. The measure proposes to: (1) develop a rule to require zero emission water heating units for installations in both new and existing residences; and (2) allow low NOx technologies as a transitional alternative when installing a zero emission unit is determined to be infeasible (e.g., colder climate zones, or architecture design obstacles). This control measure would include incentive funds to facilitate the transition to zero emission technologies and promote further emission reductions earlier than required.

BCM-02: EMISSION REDUCTIONS FROM REPLACEMENT WITH ZERO EMISSION OR LOW NOX APPLIANCES – RESIDENTIAL SPACE HEATING: This control measure, based on 2022 AQMP control measure R-CMB-02, seeks to reduce NOx emissions from residential space heating sources regulated by Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces. The measure proposes to: (1) develop a rule to require zero emission space heating units for installations in both new and existing residences; and (2) allow low NOx technologies as a transitional alternative when installing a zero emission unit is determined to be infeasible. This control measure would also provide incentive funds to facilitate adoption of zero emission technologies that would promote further emission reductions earlier than required.

BCM-03: EMISSION REDUCTIONS FROM RESIDENTIAL COOKING DEVICES: This control measure, based on 2022 AQMP control measure R-CMB-03, seeks to reduce NOx emissions from residential cooking devices including stoves, ovens, griddles, broilers, and others in new and existing buildings. Replacing the existing gas burners with electric cooking devices, induction cooktops, or low NOx gas burner technologies will reduce NOx emissions. NOx reductions will be pursued through a combination of regulatory approaches and incentives, and/or efficiency standards. Proposed method of control consists of two steps. Step one includes a technology assessment of emissions testing of various cooking devices to establish emissions rates. Once emissions rates are defined, step two supports future rule development and incentive programs. The rule would apply to manufacturers, distributors, and installers establishing emission limits. The incentive programs would provide funds to encourage and promote adoption of zero and low NOx emission technologies.

BCM-04: EMISSION REDUCTIONS FROM REPLACEMENT WITH ZERO EMISSION OR LOW NOX APPLIANCES – RESIDENTIAL OTHER COMBUSTION SOURCES: This control measure, based on 2022 AQMP control measure R-CMB-04, seeks to reduce NOx emissions from residential combustion sources that are not water heating (See BCM-01), space heating (See BCM-02) and cooking equipment (See BCM-03). BCM-04 sources are miscellaneous, but primarily comprised of natural gas and liquified petroleum gas (LPG) fired swimming pool heaters, laundry dryers, and barbecue grills. The measure proposes to: (1) develop a rule to require zero emission technologies for some emission sources in both new and existing residences; and (2) allow low NOx technologies as an alternative for the rest of emission sources. Mitigation fees may be required for certain lower NOx technology applications which will be evaluated during the future rulemaking process. During the rulemaking, staff will assess the universe of equipment. Incentive funds will be considered to facilitate adoption of zero emission technologies that would promote further emission reductions earlier than required.

BCM-05: EMISSION REDUCTIONS FROM EMERGENCY STANDBY ENGINES: South Coast AQMD regulations require permits for stationary Internal Combustion Engines (ICEs) rated over 50 brake horsepower. The permits currently limit emergency standby ICE usage to less than 200 hours per year which includes a limit of 20 to 50 hours for maintenance and testing purposes. Rule 1470 requires the use of CARB diesel fuel for all diesel-fueled ICEs rated over 50 brake horsepower. This control measure, based on 2022 AQMP control measure L-CMB-04, seeks to maximize PM2.5 and NOx emission reductions by requiring the use of renewable diesel as a drop-in replacement for CARB diesel fuel for all emergency standby ICEs that are not equipped with Tier 4 Final controls.

BCM-06: **EMISSION REDUCTIONS FROM DIESEL ELECTRICITY GENERATING FACILITIES:** This control measure, based on 2022 AQMP control measure L-CMB-06, seeks to reduce NOx emissions from electric generating units regulated by Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities. This measure proposes to implement low NOx and zero emission technologies and to require the use of renewable diesel in engines used for backup power. The target of this approach is to replace existing diesel internal combustion engines with lower-emitting technologies and utilize renewable diesel for fueling the remaining diesel engines used for backup power.

BCM-07: EMISSION REDUCTIONS FROM INCINERATORS: This control measure, based on 2022 AQMP control measure L-CMB-09, seeks emission reductions of NOx by replacement or retrofits with low NOx emission technologies on incinerators and other combustion equipment associated with incinerators and better control of NH3 injection used to control NOx. The South Coast AQMD has adopted a series of rules to promote clean, lower emission technologies, while encouraging economic growth and providing compliance flexibility. Burner technologies and combustion controls are utilized to reduce NOx emissions. The target of this approach is to reduce ammonia emissions by utilizing a closed loop feed-forward control system and reduce NOx emissions with improved burner technologies.

South Coast AQMD Co-Benefits from Energy and Climate Change Programs Measures

There are three energy and climate change programs co-benefit measures as listed below:

- ECC-01: Co-Benefits from Existing and Future Greenhouse Gas Programs, Policies, and Incentives
- ECC-02: Co-Benefits from Existing and Future Residential and Commercial Building Energy Efficiency Measures
- ECC-03: Additional Enhancements in Reducing Existing Residential Building Energy Use

ECC-01: CO-BENEFITS FROM EXISTING AND FUTURE GREENHOUSE GAS PROGRAMS, POLICIES, AND INCENTIVES: This control measure, based on 2022 AQMP control measure ECC-01, seeks to quantify and take credit for the criteria pollutant co-benefits associated with programs to reduce GHG emissions. The processes that emit criteria pollutants and their precursors also typically emit GHGs. Mandates and programs that reduce GHG emissions will therefore also reduce criteria pollutant emissions. Significant efforts are currently being planned and implemented to reduce GHG emissions under State programs such as California Governor Executive Order B-55-18 and SB 100 (California Renewables Portfolio Standard Program: Emissions of Greenhouse Gases), which established reduction goals for 2030, 2045, and 2050.

ECC-02: CO-BENEFITS FROM EXISTING AND FUTURE RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES: This control measure, based on 2022 AQMP control measure ECC-02, seeks to quantify and take credit for criteria pollutant co-benefits resulting from the implementation of energy efficiency mandates such as California's Title 24 program. In addition, there are multiple programs that provide incentives, rebates, and loans for residential and commercial building efficiency projects. Improvements in weatherization and other efficiency measures provide emission reductions through reduced energy use for heating, cooling, lighting, cooking, and other needs. South Coast AQMD staff will work with agencies, utilities, and other stakeholders to implement innovative measures that provide energy savings along with emission reductions.

ECC-03: ADDITIONAL ENHANCEMENTS IN REDUCING EXISTING RESIDENTIAL BUILDING ENERGY USE: This control measure, based on 2022 AQMP control measure ECC-03, seeks to provide incentive funding to enhance the objectives of ECC-02. Incentives will be used to further promote programs reducing energy use associated with space heating, water heating, and other large residential energy sources, achieving emission reductions beyond the levels expected from program mandates. Residential incentive programs would be developed to facilitate weatherization, replace older appliances with highly efficient technologies and encourage renewable energy adoption. Incorporating efficient appliance technologies, improving weatherization, and encouraging renewables such as solar thermal and photovoltaics will reduce energy demand and provide additional emission reductions within the residential sector. The South Coast AQMD will collaborate with utilities, agencies, and organizations to help leverage funding and coordinate incentives with existing programs.

South Coast AQMD Stationary Source NH3 Measures

There are four NH3 measures as listed below:

- BCM-08: Emission Reductions from Livestock Waste at Confined Animal Facilities
- BCM-09: Ammonia Emission Reductions from NOx Controls
- BCM-10: Emission Reductions from Direct Land Application of Chipped and Ground Uncomposted Greenwaste
- BCM-11: Emission Reductions from Organic Waste Composting

BCM-08: EMISSION REDUCTIONS FROM LIVESTOCK WASTE AT CONFINED ANIMAL FACILITIES: This control measure seeks to reduce NH3 emissions from livestock waste at large Confined Animal Facilities (CAFs). The first approach aims to lower the applicability thresholds in South Coast AQMD Rule 223 to align with the more stringent thresholds in San Joaquin Valley Air Pollution Control District (SJVAPCD) Rule 4570 – Confined Animal Facilities. The second approach aims to introduce additional mitigation measures to reduce ammonia emissions at CAFs.

BCM-09: AMMONIA EMISSION REDUCTIONS FROM NOX CONTROLS: This control measure seeks to reduce NH3 emissions from NOx controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR). These systems are capable of effectively reducing NOx emissions from combustion sources. However, their use also results in potential emissions of NH3 that "slip" past the control equipment and into the atmosphere. Upgraded SCRs can be tuned/optimized by improving the Ammonia Injection Grid (AIG) to achieve the required NOx limits and simultaneously reduce the NH3 slip.

BCM-10: EMISSION REDUCTIONS FROM DIRECT LAND APPLICATION OF CHIPPED AND GROUND UNCOMPOSTED GREENWASTE: This control measure seeks reductions in NH3 emissions from direct land application (DLA) of chipped and ground uncomposted greenwaste to agricultural land, public land for erosion control or roadway management, and consumers' properties for gardening or landscaping purposes. This control measure proposes to require composting of chipped and ground greenwaste, in accordance with the Best Management Practices (BMP) requirements of Rule 1133.3, prior to DLA.

BCM-11: EMISSION REDUCTIONS FROM ORGANIC WASTE COMPOSTING: This control measure seeks emission reductions of NH3 from the processing of organic waste materials including foodwaste, greenwaste, and agricultural waste. Control approaches include foodwaste co-digestion and integration of anaerobic digestion (AD) with composting. If foodwaste is the only feedstock input to AD, the resulting digestate could be included into greenwaste composting where emission control is governed by Rule 1133.3. This control measure proposes to expand the applicability of Rules 1133.2 and 1133.3 to regulate the co-digestion of foodwaste with biosolids and the integration of foodwaste digestate with greenwaste composting for further emission reductions. An integrated AD-composting system will result in less overall waste and a more useful product.

South Coast AQMD Stationary Source Direct PM2.5 Measures

There are eight direct PM2.5 measures as listed below:

- BCM-12: Further Emission Reductions from Commercial Cooking
- BCM-13: Emission Reductions from Cooling Towers
- BCM-14: Further Emission Reductions from Paved Road Dust Sources
- BCM-15: Emission Reductions from Abrasive Blasting Operations
- BCM-16: Emission Reductions from Stone Grinding, Cutting and Polishing Operations
- BCM-17: Emission Reductions from Prescribed Burning for Wildfire Prevention
- BCM-18: Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves
- BCM-19: Emission Reductions from Unpaved Road Dust Sources

BCM-12: FURTHER EMISSION REDUCTIONS FROM COMMERCIAL COOKING: This control measure seeks emission reductions from commercial cooking by lowering the applicability threshold for chain-driven charbroilers in Rule 1138. Other actions may be pursued such as revising the emissions inventory for charbroilers and evaluating the feasibility of under-fired control technology. The current emissions inventory for this category is based on a restaurant survey conducted in 1998, indicating the need for an update. A charbroiler registration program and/or survey may be considered to assist with revising the inventory. Additionally, projects to develop economically viable under-fired charbroiler control technology and pilot studies to test the efficacy of such control technologies will be considered.

BCM-13: EMISSION REDUCTIONS FROM INDUSTRIAL COOLING TOWERS: This control measure seeks reductions of PM emissions from industrial process cooling towers with drift eliminator technologies used for a variety of industrial operations including power plants, petroleum refineries, petrochemical plants, and natural gas processing plants. Prior to developing a policy to implement controls, an emissions inventory and an equipment universe must be established. Registration submittals collected through Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II, may be used as a starting point to develop an equipment universe.

BCM-14: FURTHER EMISSION REDUCTIONS FROM PAVED ROAD DUST SOURCES: Existing South Coast AQMD regulations implement paved road dust controls based on U.S. EPA guidance through both preventative and mitigative controls such as street sweeping. Mandating increased street sweeping frequencies has unknown impacts on PM2.5 levels and studies that examine the effect of street sweeping on ambient PM2.5 levels are scarce. A pilot project along with a comprehensive atmospheric measurement campaign would be needed to assess the effectiveness of street sweeping as a method to reduce ambient PM2.5.

BCM-15: EMISSION REDUCTIONS FROM ABRASIVE BLASTING OPERATIONS: This control measure seeks to reduce PM2.5 emissions from abrasive blasting operations. This control measure proposes voluntary applications of a portable blasting enclosure/booth with a dust collection system by providing incentives, primarily focusing on dry abrasive blasting operations conducted in open areas using portable blasting equipment with or without a South Coast AQMD permit.

BCM-16: EMISSION REDUCTIONS FROM STONE GRINDING, CUTTING AND POLISHING OPERATIONS: South Coast AQMD Rule 401 – Visible Emissions, prohibits from discharging of air contaminant that exceeds Ringelmann Chart No. 1 (equivalent to a 20 percent opacity) and Rule 403 – Fugitive Dust, prohibits fugitive dust emissions from any onsite mechanical activities such as cutting from being visible beyond the property line of the emission source. Various control measures to reduce the fugitive emissions are required as well. Rule 403 also prohibits the dust emissions from exceeding a 20 percent opacity limit, if dust emissions are the result of movement of a motorized vehicle. This control measure seeks to reduce PM emissions from stone grinding, cutting and polishing operations which are not regulated in Rule 401 or Rule 403. Moreover, Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II, does not require permits for machining equipment exclusively used for polishing, cutting, surface grinding, etc. Both dry and wet dust control options are available to reduce dust emissions from such operations. Wet systems involve spraying water onto the rotating cutting disc to reduce dust emissions. Dry cutting emissions can be controlled at the point of operation using a portable dust collector, air scrubber and negative air machine to prevent dust from being released into the atmosphere. Financial incentives will be considered to exchange existing dry/wet equipment with new equipment that includes integrated add-on controls.

BCM-17: EMISSION REDUCTIONS FROM PRESCRIBED BURNING FOR WILDFIRE PREVENTION: This control measure, based on 2022 AQMP control measure MCS-02, seeks particulate matter emission reductions and property defensible space enhancements from fuel reduction efforts via hand-thinning, mechanical thinning, and the use of chipping equipment (chipping) to mitigate excess fuels at properties located in the residential urban-wild-interface (UWI) areas of the San Bernardino National Forest (SBNF). The proposed method of control is to coordinate with other agencies to provide funding for chipping operations for the remaining untreated area in the Mountain Rim Fire Safe Council's UWI. With the chipping program in place, homeowners in the UWI are much more compliant and engaged with assisting with fuel load reduction by trimming and removing excess hazardous vegetation, such as dead trees and leaf litter, for chipping than without the program.

BCM-18: FURTHER EMISSION REDUCTIONS FROM WOOD-BURNING FIREPLACES AND WOOD STOVES: This control measure seeks additional emission reductions from residential wood burning activities. Staff analysis determined that the wood burning curtailment program in Rule 445 is potentially less stringent compared to similar programs in other districts. In order to satisfy U.S. EPA's stringency requirements, this control measure proposes to retain the sole-source of heat exemption and remove the low-income exemption in Rule 445. South Coast AQMD may also consider lowering the Basin-wide curtailment threshold if future analyses demonstrate that this would be needed to maintain the stringency of Rule 445.

BCM-19: EMISSION REDUCTIONS FROM UNPAVED ROAD DUST SOURCES: This control measure seeks to evaluate the potential to reduce PM2.5 emissions from well-traveled unpaved lots, roads, shoulders, and other surfaces by applying paving materials. There are approximately 1,900 miles of unpaved roads in the Basin. However, not all of these roads are well-traveled or highly used and therefore, the suitability for paving will be determined on a case-by-case basis. Vehicle miles traveled, proximity to AB 617 communities, whether the road exists in natural or protected lands, and the effects of paving on climate-related drought conditions and heatwaves will be taken into account in determining the suitability for paving.

South Coast AQMD Stationary Source Other Measures

There is one proposed measure in this category, BCM-20: Application of All Feasible Measures.

BCM-20: APPLICATION OF ALL FEASIBLE MEASURES: This control measure, based on 2022 AQMP control measure MCS-01, seeks to explore all feasible measures that achieve criteria pollutant reductions. Existing rules and regulations reflect current Best Available Retrofit Control Technology (BARCT). However, BARCT continually evolves as new technology becomes available that is feasible and cost-effective. South Coast AQMD staff would continue to review new emission limits or controls introduced through federal, State or local regulations to determine if South Coast AQMD regulations remain equivalent or more stringent than rules in other regions. If not, a rulemaking process will be initiated to perform a BARCT analysis and potential rule amendments if deemed feasible. In addition, the South Coast AQMD will consider adopting and implementing new retrofit technology control standards, based on research and development and other information, that are feasible and cost-effective.

South Coast AQMD Proposed Mobile Source Measures

While the bulk of the authority to regulate mobile sources rests with CARB and the federal government, the South Coast AQMD also has a role in achieving emission reductions from these sources. The proposed South Coast AQMD mobile source measures are based on a variety of control technologies that are commercially available and/or technologically feasible to implement prior to the attainment year of 2030. The focus of these measures includes accelerated retrofits or replacement of existing vehicles or equipment, acceleration of vehicle turnover through voluntary vehicle retirement programs, and greater use of cleaner fuels in the near-term. The measures will encourage greater deployment of low NOx and zero emission vehicle and equipment technologies such as plug-in hybrids, battery-electric, and fuel cells to the maximum extent feasible as such technologies are commercialized and become available.

The South Coast AQMD proposes a total of 15 mobile source measures which are categorized into five groups – emission growth management, facility-based mobile sources, on-road and off-road, incentives, and other (see Table 4-3). Two emission growth management measures (EGM-01 and EGM-02) are proposed to identify actions to help mitigate and potentially provide emission reductions due to new development and redevelopment projects. Four facility-based mobile source measures (FBMSMs) (MOB-01 to MOB-04) seek to identify actions that will result in additional emission reductions at commercial

marine ports, rail yards, warehouse distribution centers, and commercial airports. FBMSMs for marine ports and rail yards are currently undergoing a process to develop Indirect Source Rules. Six on-road and off-road mobile measures focus on on-road light/medium/heavy-duty vehicles, international shipping vessels, passenger locomotives and small off-road engines. Additionally, incentive-based measures such as MOB-11 will use established protocols such as Carl Moyer Program guidelines and report to the Governing Board periodically. MOB-12, Pacific Rim Initiative for Maritime Emission Reductions (PRIMER) seeks NOx emission reductions from partnership with local, State, federal and international entities. One other measure (MOB-13) focuses on fleet vehicle mitigation options and the development of a work plan to support and accelerate the deployment of zero emission infrastructure needed for the widespread adoption of zero emission vehicles and equipment that is described in more detail in Appendix IV-A.

TABLE 4-3
SOUTH COAST AQMD PROPOSED MOBILE SOURCE MEASURES

Number	Title [Pollutant]	Previous Plan Measure Was Included	Emission Reductions by 2030 (tons per day)
South Coast AQMD Emission Growth Management Measures:			
EGM-01	Emission Reductions from New Development and Redevelopment [All Pollutants]	2022 AQMP (EGM-01)	TBD
EGM-02	Emission Reductions from Clean Construction Policy [All Pollutants]	2022 AQMP (EGM-03)	TBD
South Coast AQMD Facility-Based Measures:			
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, PM]	2022 AQMP (MOB-01)	TBD
MOB-02	Emission Reductions at New and Existing Rail Yards [NOx, PM]	2022 AQMP (MOB-02A & B)	TBD
MOB-03	Emission Reductions at Warehouse Distribution Centers [NOx, PM2.5]	2022 AQMP (MOB-03)	TBD
MOB-04	Emission Reductions at Commercial Airports	2022 AQMP (MOB-04)	TBD
South Coast AQMD On-Road and Off-Road Measures:			
MOB-05	Accelerated Retirement of Light-Duty and Medium-Duty Vehicles [NOx, PM]	2022 AQMP (MOB-05)	TBD
MOB-06	Accelerated Retirement of On-Road Heavy-Duty Vehicles [NOx, PM]	2022 AQMP (MOB-06)	TBD

Number	Title [Pollutant]	Previous Plan Measure Was Included	Emission Reductions by 2030 (tons per day)
MOB-07	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	2022 AQMP (MOB-07)	TBD
MOB-08	Small Off-Road Engine Equipment Exchange Program [VOCs, NOx, PM]	2022 AQMP (MOB-08)	TBD
MOB-09	Further Emission Reductions from Passenger Locomotives [NOx, PM]	2022 AQMP (MOB-09)	TBD
MOB-10	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	2022 AQMP (MOB-10)	TBD
South Coast AQMD Incentive-Based Measures:			
MOB-11	Emission Reductions from Incentive Programs [NOx, PM]	2022 AQMP (MOB-11)	TBD
MOB-12	Pacific Rim Initiative for Maritime Emission Reductions [NOx, PM]	2022 AQMP (MOB-12)	TBD
South Coast AQMD Other Mobile Source Measures:			
MOB-13	Rule 2202 – On-Road Motor Vehicle Mitigation Options [NOx, PM2.5]	2022 AQMP (MOB-14)	TBD

South Coast AQMD Mobile Source Emission Growth Management Measures

There are two proposed control measures within this category:

- EGM-01: Emission Growth Management from New Development and Redevelopment
- EGM-02: Emission Reductions from Clean Construction Policy

EGM-01: EMISSION GROWTH MANAGEMENT FROM NEW DEVELOPMENT AND REDEVELOPMENT: The goal of this measure is to identify emission reduction opportunities and to mitigate and, where appropriate, reduce emissions from new development or redevelopment projects such as residential, commercial, and industrial projects that are otherwise not included in other FBMSMs identified in the 2022 AQMP. This proposed control measure, based on 2022 AQMP control measure EGM-01, seeks PM2.5 co-benefit emission reductions primarily from project construction activities by increasing the deployment of zero emission and low NOx emission technologies for on-road and off-road mobile sources. South Coast AQMD staff has held three Working Group meetings for the development of EGM-01. South

Coast AQMD staff will continue soliciting stakeholders' input towards the development of a method of control for EGM-01. Emission reductions and their SIP creditability will be determined dependent on the final method of control to be implemented.

EGM-02: EMISSION REDUCTIONS FROM CLEAN CONSTRUCTION POLICY: The purpose of this control measure is to identify potential approaches to mitigate and control emissions from construction activities in the South Coast Air Basin. This control measure, based on 2022 AQMP control measure EGM-03, will seek to develop a Clean Construction Policy (CCP) which can be utilized for reference and voluntary implementation by local municipalities and public agencies. The South Coast AQMD will work in collaboration with local municipalities, construction industry, and other affected stakeholders to develop such a policy and will consider existing control measures and best management practices that are currently being implemented by entities throughout California.

South Coast AQMD Facility-Based Measures

FBMSMs are derived from the 2022 AQMP and are included in the PM2.5 Plan for the purpose of evaluating whether their implementation can be accelerated. FBMSMs are aimed at reducing the emissions from indirect sources – facilities that do not emit much air pollution directly, but instead attract mobile sources which contribute significant emissions. There are four proposed control measures within this category:

- MOB-01: Emission Reductions at Commercial Marine Ports
- MOB-02: Emission Reductions at New and Existing Rail Yards
- MOB-03: Emission Reductions at Warehouse Distribution Centers
- MOB-04: Emission Reductions at Commercial Airports

MOB-01: EMISSION REDUCTIONS AT COMMERCIAL MARINE PORTS: This measure seeks to reduce NOx, VOC, and PM emissions related to on-road heavy-duty vehicles, ocean going vessels, cargo handling equipment, locomotives, and harbor craft that go to and from the Ports of Los Angeles and Long Beach (Ports). As a follow up to implementation of MOB-01 from the 2016 AQMP, the South Coast AQMD is working on a variety of measures, including Proposed Rule 2304, to address emissions from marine ports. Through a public process, rule concepts and other measures will be proposed to address emissions from these sources. Rule development will continue to focus on deploying the cleanest technologies possible and supporting zero emissions fueling charging infrastructure as quickly as feasible. Incentive funding that supports the transition to cleaner technologies will also continue to be pursued to assist in implementing this measure.

MOB-02: EMISSION REDUCTIONS AT NEW AND EXISTING RAIL YARDS: This measure seeks to reduce NOx and PM emissions related to on-road heavy-duty vehicles, off-road equipment, and locomotives at new and existing rail yards. Through a public process, the South Coast AQMD will assess and identify potential

actions that could result in further emission reductions at new facilities. This measure may include voluntary measures as well as additional actions which could include development of a rule as well as pursuit of incentive funding that can achieve and/or facilitate additional emission reductions. Emission reductions may also be achieved if new regulations are developed and implemented at the state or federal level.

MOB-03: EMISSION REDUCTIONS AT WAREHOUSE DISTRIBUTION CENTERS: The goal of this measure to reduce NOx and PM emissions related to mobile sources and other equipment associated with warehouses. The strategy utilizes a menu-based point system in Rule 2305 (adopted in May 2021) to implement MOB-03 from the 2016 AQMP, where warehouses subject to the rule must annually earn points based on the amount of truck traffic at their facility. The menu includes actions that warehouse operators can take to reduce emissions, or to facilitate emission reductions from their operations. Required actions result in emission reductions when compared to conventional diesel technology, assist in implementation of other related measures, promote the demand for zero emission and low NOx technology, foster early action of compliance, and infrastructure installation to support new or emerging zero emission technologies. Implementation of this measure will include ensuring that applicable warehouses comply with Rule 2305, quantifying the air quality benefits of Rule 2305 as they occur and seeking to incorporate those benefits as SIP-creditable emission reductions, evaluating the state of technology every five years and recommending if Rule 2305 should potentially be amended.

MOB-04: EMISSION REDUCTIONS AT COMMERCIAL AIRPORTS: The Facility-Based Mobile Source Measure for Commercial Airports, which controls non-aircraft mobile sources at commercial airports, was adopted by the South Coast AQMD on December 6, 2019. The measure consists of Memoranda of Understanding (MOUs) between the South Coast AQMD and five commercial airports in the Basin to develop and implement air quality improvement plans. The MOUs were executed with Los Angeles International Airport, John Wayne Orange County Airport, Hollywood Burbank Airport, Ontario International Airport, and Long Beach Airport. Each MOU contains performance targets for cleaner ground support equipment, airport shuttle buses, and heavy-duty trucks. Based on the measures in the MOUs, the South Coast AQMD committed to achieve 0.52 and 0.37 tons per day NOx reductions in 2023 and 2031, respectively. Implementation of this measure will include ensuring that applicable airports comply with the performance targets in the MOUs. South Coast AQMD will encourage airports to accelerate implementation of the MOU measures ahead of 2031 so that emission reductions in 2030 can be quantified.

South Coast AQMD On-Road and Off-Road Measures

A total of six on-road and off-road mobile source measures derived from the 2022 AQMP are proposed to be included in the PM2.5 Plan as listed below.

- MOB-05: Accelerated Retirement of Light-Duty and Medium-Duty Vehicles
- MOB-06: Accelerated Retirement of On-Road Heavy-Duty Vehicles
- MOB-07: On-Road Mobile Source Emission Reduction Credit Generation Program
- MOB-08: Small Off-Road Engine Equipment Exchange Program
- MOB-09: Further Emission Reductions from Passenger Locomotives
- MOB-10: Off-Road Mobile Source Emission Reduction Credit Generation Program

MOB-05: ACCELERATED RETIREMENT OF LIGHT-DUTY AND MEDIUM-DUTY VEHICLES: The purpose of this control measure is to achieve emission reductions by accelerating retirement of older gasoline- and diesel-powered vehicles with up to 8,500 lbs. gross vehicle weight rating (GVWR). These vehicles include passenger cars, sports utility vehicles, vans, and light-duty pick-up trucks. The South Coast AQMD has been implementing the Replace Your Ride (RYR) Program since 2015 which provides a rebate to low- and moderate-income applicants for replacing their existing cars with newer, cleaner conventionally powered vehicles, plug-in hybrid electric vehicles or dedicated zero emission vehicles. This measure seeks to retire up to 2,000 light- and medium-duty vehicles annually through continued implementation of the RYR Program with incentives up to $12,000 for residents in a Disadvantaged Community (DAC) zip code. For plug-in hybrid and battery electric vehicles, an additional incentive of up to $2,000 is also provided for the installation of electric vehicle charging equipment.

MOB-06: ACCELERATED RETIREMENT OF ON-ROAD HEAVY-DUTY VEHICLES: This proposed control measure seeks additional emission reductions from existing heavy-duty vehicles with GVWR greater than 8,500 lbs through an accelerated vehicle replacement program with zero or low NOx emission vehicles. One of the options being considered is a plus-up program to leverage existing incentive programs such as Carl Moyer and Prop 1B or other grant funding opportunities by providing supplemental funding to help truck owners and fleets with the purchase of cleaner engine vehicles, including zero emission trucks. This type of program would be especially helpful for individual operators and owners with limited financial resources to purchase or lease zero emission trucks which are still relatively costly compared to conventional vehicles.

MOB-07: ON-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM: This proposed measure seeks to develop mechanisms to incentivize the early deployment of low NOx and zero emission on-road heavy-duty trucks through the generation of mobile source emission reduction credits (MSERCs) which can be used as an alternative means of compliance with certain South Coast AQMD

regulations. These MSERCs will be used only by entities affected by the 2022 AQMP control measures MOB-01 through MOB-04, EGM-01, and EGM-03. South Coast AQMD staff will develop amendments to South Coast AQMD Rules 1612 and/or 1612.1 to provide greater flexibility, such as expanding the eligibility of vehicle types and projects as well as providing more flexibility in the application and use of MSERCs, for accelerated deployment of low NOx and zero emission heavy-duty vehicles in the Basin and Coachella Valley.

MOB-08: SMALL OFF-ROAD ENGINE EQUIPMENT EXCHANGE PROGRAM: This measure seeks to reduce NOx emissions by promoting the accelerated turn-over of in-use small off-road engines and other engines, such as those used in larger diesel-powered lawn and garden equipment, through expanded voluntary exchange programs. Since 2003, the South Coast AQMD has sponsored a lawn mower exchange programs for residential users of old lawn mowers which is now known as the Electric Lawn Mower Rebate Program. Since its inception, this program has replaced approximately 59,000 high polluting gasoline-powered lawn mowers with electric lawn mowers. The South Coast AQMD also launched the Commercial Electric Lawn and Garden Equipment Incentive and Exchange Program (Commercial L&G Equipment Program) in 2018 to accelerate the replacement of old gasoline- or diesel-powered commercial lawn and garden equipment with zero emission, battery electric technology. This program provides a point-of-sale discount of up to 75 percent off the purchase price of a variety of new electric equipment including lawn mowers (ride-on, stand-on and walk-behind mowers), handheld trimmers, chainsaws, and pruners in addition to backpack and handheld leaf blowers. More recently, the South Coast AQMD has also started a new battery rebate program for commercial lawn and garden equipment that funds up to 75 percent of the rechargeable battery cost with a maximum limit of three batteries per equipment. Moving forward, the South Coast AQMD will increase the number of outreach and exchange events as well as continue to seek additional funding opportunities and resources to expand the scope and types of equipment and engines that can be funded by these programs.

MOB-09: FURTHER EMISSION REDUCTIONS FROM PASSENGER LOCOMOTIVES: This measure seeks to promote earlier and cleaner replacement or upgrade of existing passenger locomotives with Tier 4 or cleaner locomotives. The South Coast AQMD is continuing to work collaboratively with other stakeholders to explore the feasibility of zero and low NOx emission locomotive technologies such as battery electric or fuel cell engine-driven systems. For example, the South Coast AQMD has been actively participating in the development and demonstration of zero emission battery-operated switcher locomotives in CARB-funded projects in the San Pedro Bay Ports since 2018. Through this measure, the South Coast AQMD will continue to not only promote earlier replacement or upgrade of existing passenger trains with Tier 4 locomotives, but also support the development and adoption of zero or low NOx emission technologies.

MOB-10: OFF-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM: This measure seeks to develop mechanisms to incentivize the early deployment of Tier 4, low NOx, and zero off-road mobile combustion equipment, where applicable, through the generation of MSERCs. These MSERCs will be used only by entities affected by the 2022 AQMP control measures MOB-01 through MOB-04, EGM-01, and EGM-02; and cannot be used to offset emissions from stationary sources. These MSERCs will be discounted to provide additional emission reductions to help meet air quality standards. South

Coast AQMD staff seeks to amend Rule 1620 to provide greater flexibility for entities to initiate projects to accelerate the deployment of zero and low NOx emission off-road mobile equipment in the South Coast Air Basin and Coachella Valley.

South Coast AQMD Incentive-Based Measures

Two incentive-based mobile source measures are also included:

- MOB-11: Emission Reductions from Incentive Programs
- MOB-12: Pacific Rim Initiative for Maritime Emission Reductions

MOB-11: EMISSION REDUCTIONS FROM INCENTIVE PROGRAMS: This control measure seeks to apply the administrative mechanism, as initially proposed in the 2016 AQMP and revisited in the 2022 AQMP, to quantify and take credit for the emission reductions achieved through the implementation of South Coast AQMD-administered incentive programs for SIP purposes. The South Coast AQMD has been implementing a variety of incentive programs including, but not limited to, Carl Moyer Memorial Air Quality Standards Attainment Program, Proposition 1B, Lower Emission School Bus, Community Air Protection Program, and Volkswagen Environmental Mitigation Trust. Examples of projects funded by these programs include heavy-duty vehicle/equipment replacements, installation of retrofit units, and engine repowers. The emission reductions from these incentive programs will be calculated in two parts. First, the actual emission reductions associated with existing projects that were funded by 2021 with the remaining project life through 2030 are quantified. Second, potential reductions that are projected from the implementation of future projects to be funded through these incentive programs are quantified. These reductions will be estimated based on the projected level of funding for the programs and average emission reductions achieved by past projects, discounted by control factors for future years.

MOB-12: PACIFIC RIM INITIATIVE FOR MARITIME EMISSION REDUCTIONS: This measure, initially developed in the 2022 AQMP, seeks to reduce emissions from OGV through an incentive-based program to encourage the deployment of cleaner OGV to the Ports. This approach includes collaborating with international port authorities and shipping lines to establish common goals to reduce criteria pollutants from OGV. Incentives could be monetary (e.g., a per-visit payment for cleaner ships) or non-monetary (e.g., preferred berthing for cleaner ships). The cleanest commercially available OGV currently meet Tier III emission standards, however this class of vessels is not expected to be widely deployed for many years, in part due to the high cost of constructing new vessels and the difficulty in retrofitting existing vessels to Tier III standards. This measure would quicken the return on investment for these cleaner vessels by ensuring that shipping lines receive a benefit for every clean ship visit to a port with an incentive program. Clean ships could include Tier III vessels, retrofitted vessels that surpass Tier II standards, and eventually zero emissions shipping when it becomes available.

South Coast AQMD Other Mobile Source Measures

There is one proposed other mobile source measure, MOB-13: Rule 2202 – On-Road Motor Vehicle Mitigation Options, which is based on 2022 AQMP control measure MOB-14.

MOB-13: RULE 2202 – ON-ROAD MOTOR VEHICLE MITIGATION OPTIONS: This control measure proposes to reduce emissions by evaluating potential amendments to Rule 2202. Rule 2202 has been developed to reduce emissions associated with work commute trips. Specifically, larger employers in the region with more than 250 employees are required to mitigate employee commute trips into the worksite. Rule 2202 provides employers with a menu of options to select from to implement a combination of emission reduction strategies to meet an emission reduction target (ERT) for their worksite. During the Coronavirus (COVID-19) pandemic in 2020 and 2021, many Rule 2202 regulated employers (where applicable) incorporated widespread telecommuting practices which further reduced emissions by reducing commute trips into the worksite. Based on conditions observed and reported during the time-period, Rule 2202 was amended on August 4, 2023. The amended Rule 2202 includes two phases. The first phase (adopted August 4, 2023) focused on data collection and reporting that will be used to inform a potential second phase of rulemaking. Specifically, the first phase requires new limited reporting for all regulated worksites, including the reporting of telecommute activity, VMT data, and business type/classification for all worksites. The second phase will consider using VMT as an option to evaluate travel patterns, re-assess rule targets, explore multiple compliance options for zero emission vehicles and infrastructure, evaluate options to continue the use of credit, and consider modifying rideshare options. The new option will include placing a larger focus on telecommuting strategies.

Summary of South Coast AQMD Control Strategy

The PM2.5 Plan primarily requires NOx emission reductions to meet the 2012 annual PM2.5 standard. The pathway to achieving the standard involves accelerated implementation of the 2022 AQMP and 2022 State SIP Strategy, with a limited control strategy for NH3 and direct PM2.5 sources.

The control strategies in the PM2.5 Plan include both regulations and incentive programs. The control strategy is described in greater detail in Appendix IV-A. Tables 4-4 and 4-5 list emission reductions by 2030 and proposed adoption/implementation dates of the stationary source control measures and mobile source control measures, respectively. South Coast AQMD will develop, adopt, submit, and implement the control measures in Tables 4-4 and 4-5 as expeditiously as possible in order to meet or exceed the commitments needed to attain the 2012 annual PM2.5 standard, and to substitute any other measures as necessary to make up any emission reduction shortfall.

TABLE 4-4
EMISSION REDUCTIONS AND ADOPTION AND IMPLEMENTATION SCHEDULE OF STATIONARY SOURCE CONTROL MEASURES

Number	Title [Pollutant]	Emission Reductions by 2030 (tons per day)	Proposed Adoption Date	Proposed Implementation Timeframe
South Coast AQMD NOx Measures:				
BCM-01	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Water Heating [PM2.5, NOx]	TBD	2024	2029
BCM-02	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Space Heating [PM2.5, NOx]	TBD	2024	2029
BCM-03	Emission Reductions from Residential Cooking Devices [PM2.5, NOx]	TBD	2027	2029
BCM-04	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Other Combustion Sources [PM2.5, NOx]	TBD	2027	2029
BCM-05	Emission Reductions from Emergency Standby Engines [PM2.5, NOx]	0.04 [PM2.5] 0.36 [NOx]	2025	2030
BCM-06	Emission Reductions from Diesel Electricity Generating Facilities [NOx]	0.16	2027	2030
BCM-07	Emission Reductions from Incinerators [NOx]	0.81	2024	2029
South Coast AQMD Co-Benefits from Energy and Climate Change Programs Measures:				
ECC-01	Co-benefits from Existing and Future Greenhouse Gas Programs, Policies, and Incentives [PM2.5, NOx]	TBD	N/A	N/A
ECC-02	Co-benefits from Existing and Future Residential and Commercial Building Energy Efficiency Measures [PM2.5, NOx]	TBD	N/A	N/A

Number	Title [Pollutant]	Emission Reductions by 2030 (tons per day)	Proposed Adoption Date	Proposed Implementation Timeframe
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [PM2.5, NOx]	TBD	N/A	N/A
South Coast AQMD NH3 Measures:				
BCM-08	Emission Reductions from Livestock Waste at Confined Animal Facilities [NH3]	TBD	2025	2030
BCM-09	Ammonia Emission Reductions from NOx Controls [NH3]	TBD	N/A	N/A
BCM-10	Emission Reductions from Direct Land Application of Chipped and Ground Uncomposted Greenwaste [NH3]	TBD	2026	2030
BCM-11	Emission Reductions from Organic Waste Composting [NH3]	TBD	N/A	N/A
South Coast AQMD Direct PM2.5 Measures:				
BCM-12	Further Emission Reductions from Commercial Cooking [PM2.5]	TBD	2027	2030
BCM-13	Emission Reductions from Cooling Towers [PM2.5]	TBD	N/A	N/A
BCM-14	Further Emission Reductions from Paved Road Dust Sources [PM2.5]	TBD	N/A	N/A
BCM-15	Emission Reductions from Abrasive Blasting Operations [PM2.5]	TBD	N/A	N/A
BCM-16	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM2.5]	TBD	N/A	N/A
BCM-17	Emission Reductions from Prescribed Burning for Wildfire Prevention [PM2.5, NOx]	TBD	N/A	N/A
BCM-18	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM2.5]	TBD	2026	2030

Number	Title [Pollutant]	Emission Reductions by 2030 (tons per day)	Proposed Adoption Date	Proposed Implementation Timeframe
BCM-19	Emission Reductions from Unpaved Road Dust Sources [PM2.5]	TBD	N/A	N/A
South Coast AQMD Other Measures:				
BCM-20	Application of All Feasible Measures [PM2.5, NOx]	TBD	N/A	N/A

TABLE 4-5
EMISSION REDUCTIONS AND ADOPTION AND IMPLEMENTATION SCHEDULE OF MOBILE SOURCE CONTROL MEASURES

Number	Title [Pollutant]	Emission Reductions by 2030 (tpd)	Proposed Adoption Date	Proposed Implementation Timeframe
South Coast AQMD Emission Growth Management Measures:				
EGM-01	Emission Reductions from New Development and Redevelopment [All Pollutants]	TBD	2025	2025-2030
EGM-02	Emission Reductions from Clean Construction Policy [All Pollutants]	TBD	2025	2025-2030
South Coast AQMD Facility-Based Measures:				
MOB-01	Emission Reductions at Commercial Marine Ports [PM2.5, NOx]	TBD	2024	2025-2030
MOB-02	Emission Reductions at New and Existing Rail Yards [PM2.5, NOx]	TBD	2024	2025-2030
MOB-03	Emission Reductions at Warehouse Distribution Centers [PM2.5, NOx]	TBD	Adopted 2021 (Reassess every three years)	2022-2030
MOB-04	Emission Reductions at Commercial Airports [PM2.5, NOx]	TBD	Adopted 2019	2020-2030
South Coast AQMD On-Road and Off-Road Measures:				
MOB-05	Accelerated Retirement of Light-Duty and Medium-Duty Vehicles [PM2.5, NOx]	TBD	N/A	Ongoing
MOB-06	Accelerated Retirement of On-Road Heavy-Duty Vehicles [PM2.5, NOx]	TBD	N/A	Ongoing
MOB-07	On-Road Mobile Source Emission Reduction Credit Generation Program [PM2.5, NOx]	TBD	TBD	TBD
MOB-08	Small Off-Road Engine Equipment Exchange Program [PM2.5, NOx]	TBD	N/A	Ongoing

Number	Title [Pollutant]	Emission Reductions by 2030 (tpd)	Proposed Adoption Date	Proposed Implementation Timeframe
MOB-09	Further Emission Reductions from Passenger Locomotives [PM2.5, NOx]	TBD	N/A	Ongoing
MOB-10	Off-Road Mobile Source Emission Reduction Credit Generation Program [PM2.5, NOx]	TBD	TBD	TBD
South Coast AQMD Incentive-Based Measures:				
MOB-11	Emission Reductions from Incentive Programs [PM2.5, NOx]	TBD	N/A	Ongoing
MOB-12	Pacific Rim Initiative for Maritime Emission Reductions [PM2.5, NOx]	TBD	N/A	Ongoing
South Coast AQMD Other Mobile Source Measures:				
MOB-13	Rule 2202 – On-Road Motor Vehicle Mitigation Options [PM2.5, NOx]	TBD	2023	2023-2030

Proposed CARB Commitment for the South Coast

Overview of Commitment

SIPs may contain enforceable commitments to achieve the level of emissions necessary to meet federal air quality standards, as defined by the attainment demonstration. CARB's 2022 State Strategy for the State Implementation Plan[1] (2022 State SIP Strategy) lists new SIP measures for which potential emissions reduction SIP commitments for the South Coast in 2030 are now estimated based on the measures identified and quantified to date. Adoption of the 2022 State SIP Strategy and the measure schedule by the CARB Board on September 22, 2022, formed the basis of the commitments for emission reductions by the 2030 attainment deadline for South Coast that will be proposed for CARB Board consideration alongside the 2024 South Coast PM2.5 SIP. The commitments consist of two components:

[1] https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf

1. A commitment to bring an item to the CARB Board for defined new measures or take other specified actions within CARB's authority; and

2. A commitment to achieve aggregate emission reductions by specific dates.

As part of each SIP needing emission reductions from the State, the total aggregate emission reductions and the obligation to make certain proposals to the CARB Board or take other actions within CARB's authority specified in the 2022 State SIP Strategy would become enforceable upon approval by U.S. EPA. While the 2022 State SIP Strategy discusses a range of measures and actions, those measures and actions are still subject to CARB's formal approval process and would not be final until the CARB Board takes action.

Commitment to Act on Measures

For each of the SIP measures shown in Table 4-6, CARB committed in the 2022 State SIP Strategy to address each measure as described. For each measure committed to, CARB staff would undertake the actions detailed for each measure. In the instance of measures that involve the development of a rule under CARB's regulatory authority, CARB committed to bring a publicly noticed item before the CARB Board that is either a proposed rule, or is a recommendation that the CARB Board direct staff to not pursue a rule covering that subject matter at that time. This recommendation would be based on an explanation of why such a rule is unlikely to achieve the relevant emission reductions in the relevant timeframe, and would include a demonstration that the overall aggregate commitment will be achieved despite that rule not being pursued. This public process and CARB hearing would provide additional opportunity for public and stakeholder input, as well as ongoing technology review, and assessments of costs and environmental impacts.

The measures, as proposed by staff to the CARB Board or adopted by the CARB Board, may provide more or less than the initial emission reduction estimates. In addition, action by the CARB Board may include any action within its discretion.

TABLE 4-6
2022 STATE SIP STRATEGY MEASURES AND SCHEDULE

Measure	Agency	Action	Implementation Begins
On-Road Heavy-Duty			
Advanced Clean Fleets Regulation	CARB	2023	2024
Zero-Emissions Trucks Measure	CARB	2028	2030
On-Road Light-Duty			
Clean Miles Standard	CARB	2021	2023
Off-Road Equipment			
Tier 5 Off-Road Vehicles and Equipment	CARB	2025	2029
Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation	CARB	2022	2024
Transport Refrigeration Unit Regulation Part 2	CARB	2026	2028
Commercial Harbor Craft Amendments	CARB	2022	2023
Cargo Handling Equipment Amendments	CARB	2027	2030
Other			
Zero-Emission Standard for Space and Water Heaters	CARB	2025	2030
Primarily-Federally and Internationally Regulated Sources – CARB Measures			
In-Use Locomotive Regulation	CARB	2023	2024

Commitment to Achieve Emission Reductions

The following section describes the estimated emission reduction and potential commitment from the SIP measures identified and quantified to date for the South Coast. The aggregate commitment of emissions reductions from State sources to be proposed for CARB Board consideration will be found in CARB's staff report for the 2024 South Coast PM2.5 SIP when it is brought to the CARB Board and is summarized below.

While CARB includes estimates of the emission reductions in 2030 from each of the individual new measures, CARB's overall commitment is to achieve the total emission reductions necessary from State-regulated sources to attain the federal air quality standards, reflecting the combined reductions from the existing control strategy and new measures. Therefore, if a particular measure does not get its expected emission reductions, the State's overall commitment to achieving the total aggregate emission reductions still exists. If actual emission decreases occur that exceed the projections reflected in the current emission

inventory, CARB will submit an updated emissions inventory to U.S. EPA as part of a SIP revision. The SIP revision would outline the changes that have occurred and provide appropriate tracking to demonstrate that aggregate emission reductions sufficient for attainment are being achieved through enforceable emission reduction measures. CARB's emission reduction commitments may be achieved through a combination of actions including but not limited to the implementation of control measures; the expenditure of local, State or federal incentive funds; or through other enforceable measures.

Emission Reductions

CARB's control programs, including the measures in the 2022 State SIP Strategy provide emission reduction benefits throughout the State. Although the existing control program will provide mobile source emission reductions necessary to meet the attainment needs of many areas of the State, the new measures in the 2022 State SIP Strategy are needed to provide further reductions to achieve the 12 µg/m^3 PM2.5 annual standard in the South Coast and enhance statewide air quality progress towards the 9 µg/m^3 annual PM2.5 standard promulgated in 2024.

Emission Reductions from Current Programs

Table 4-7 provides the mobile source emissions under CARB and district current programs for the South Coast. Ongoing implementation of current control programs is projected to reduce mobile source emissions of direct PM2.5 and NOx by 3.3 tpd and 160.6 tpd in the South Coast in 2030 compared to 2018 levels, respectively. Although the current mobile source baseline shows an increase in ammonia (NH3) emissions in 2030 compared to 2018 levels, this baseline does not reflect emissions reductions from a number of recently-adopted CARB regulations identified in Table 4-5. When taking these reductions taken into account, NH3 emissions are projected to only increase by 1.8 tpd in 2030 compared to 2018 levels. Achieving the benefits projected from the current control program will continue to require significant efforts for implementation and enforcement and thus represents an important element of the overall strategy.

TABLE 4-7
SOUTH COAST BASELINE MOBILE SOURCE EMISSIONS[2]

Pollutant	2018 Emissions (tpd)	2030 Emissions (tpd)	Change
PM2.5	10.8	7.4	-31%
NOx	323.3	162.6	-50%
NH3	16.5	21.3	29%

[2] Source: MSC_NAA_CEPAM_v101B; does not reflect emissions reductions from recently-adopted CARB regulations identified in Table 5

Although most of the 2016 State SIP Strategy measure commitments have been adopted, there remains the Zero-Emission Forklift measure which will be acted upon by the CARB Board in 2024. Table 4-8 below shows the timeline and anticipated emission reductions for this measure.

TABLE 4-8
SOUTH COAST REDUCTIONS FROM REMAINING 2016 STATE SIP STRATEGY MEASURE[3]

Measure	Action	Implementation Begins	2030 NOx (tpd)	2030 PM2.5 (tpd)	2030 NH3 (tpd)
Zero-Emission Forklift	2024	2026	0.8	<0.1	NYQ*

* Not yet quantified.

Emission Reductions from 2022 State SIP Strategy Measures

In addition to controlling direct PM2.5, air quality modeling has determined that NOx and ammonia are significant precursors for the 12 µg/m^3 annual PM2.5 standard in the South Coast, and that ammonium nitrate contributes 20 to 35 percent of total PM2.5 in the region, varying by season and location. Further, modeling indicates that total NOx emissions from all sources in the South Coast will need to decrease by approximately 55 percent from 2018 levels in order to attain the 12 ug/m^3 annual PM2.5 standard in 2030. A significant fraction of the needed reductions will come from the existing control program already in the baseline emission inventory. In addition, as described above, one measure commitment included in the 2016 State SIP Strategy has not yet been acted upon, and a number of measure commitments included in both the 2016 and 2022 State SIP Strategies were very recently adopted and are thus not yet in the baseline emissions inventory, as outlined in Table 4-8 above and Table 4-9 below.

The measures contained in the 2022 State SIP Strategy commitment reflect a variety of State actions across on-road and off-road vehicle and appliance sectors. Collectively, emissions reductions from CARB's current control program, reductions from the 2016 and 2022 State SIP Strategy measures adopted but not yet in the baseline, reductions from the remaining 2016 State SIP Strategy measure, and reductions estimated from the future measures identified in the 2022 State SIP Strategy and quantified below will provide the reductions needed from State sources to support attainment of the 12 µg/m^3 annual PM2.5 standard in the South Coast. Table 4-9, 4-10, and 4-11 summarize the reductions from the identified and quantified measures. In Table 4-9, the reductions estimated from the remaining 2016 State SIP Strategy measure and future measures identified in the 2022 State SIP Strategy are described as the "potential CARB aggregate emissions reductions commitment" until staff proposes and the CARB Board adopts the aggregate emissions reductions commitment for the year 2030.

[3] Numbers may not add up due to rounding

TABLE 4-9
2030 SOUTH COAST EMISSIONS REDUCTIONS FROM CARB PROGRAMS[4]

CARB Programs in South Coast	NOx (tpd)	PM2.5 (tpd)	NH3 (tpd)
Current Control Program[5]	172.8	1.9	-4.7[6]
2016 and 2022 State SIP Strategy Measures Adopted (Not yet in baseline inventory)	20.5	0.8	2.9
Potential CARB Aggregate Emissions Reductions Commitment	9.1	0.5	0.2
2016 State SIP Strategy Measure Remaining	0.8	<0.1	NYQ*
2022 State SIP Strategy Measures Remaining	8.2	0.5	0.2
Total Reductions	**202.4**	**3.2**	**-1.4**

* Not yet quantified.

Table 4-10 reflects the 2016 and 2022 State SIP Strategy measure commitments that the CARB Board has recently adopted. The associated emissions reductions from these recently adopted measures are not yet all accounted for in the baseline emissions inventory. Nonetheless, CARB measure commitments are achieving emissions reductions and will contribute towards attainment of the 12 µg/m^3 annual PM2.5 standard in South Coast in 2030.

[4] Numbers may not add up due to rounding

[5] Current Control Program represents the current baseline emissions out to 100 nautical miles with adopted CARB and district measures excluding those recently-adopted CARB regulations identified in Table 5 (Source: MSC_NAA_CEPAM_v101B)

[6] Negative number indicates growth in emissions

TABLE 4-10
SOUTH COAST EXPECTED EMISSIONS REDUCTIONS FROM 2016 AND 2022 STATE SIP STRATEGY RECENTLY ADOPTED MEASURES

2016 and 2022 State SIP Strategy Measures	2030 NOx (tpd)	2030 PM2.5 (tpd)	2030 NH3 (tpd)
On-Road Heavy-Duty			
Advanced Clean Fleets Regulation	4.7	<0.1	0.8
Total On-Road Heavy-Duty Reductions	4.7	<0.1	0.8
On-Road Light-Duty			
Advanced Clean Cars II	1.4	0.1	2.1
Clean Miles Standard	<0.1	<0.1	<0.1
Total On-Road Light-Duty Reductions	1.5	0.1	2.1
Off-Road Equipment			
Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation	1.9	0.1	NYQ*
Commercial Harbor Craft Amendments	2.0	<0.1	NYQ
Transport Refrigeration Unit Part I	0.3	<0.1	NYQ
Total Off-Road Equipment Reductions	4.3	0.3	NYQ
Primarily-Federally and Internationally Regulated Sources – CARB Measures			
In-Use Locomotive Regulation	9.9	0.2	NYQ
Total Primarily-Federally and Internationally Regulated Sources – CARB Measures Reductions	9.9	0.2	NYQ
Emissions Reductions	**20.5**	**0.8**	**2.9**

* Not yet quantified.

TABLE 4-11
SOUTH COAST EXPECTED EMISSIONS REDUCTIONS FROM THE REMAINING 2022 STATE SIP STRATEGY MEASURES[7]

2022 State SIP Strategy Measures	2030 NOx (tpd)	2030 PM2.5 (tpd)	2030 NH3 (tpd)
On-Road Heavy-Duty			
Zero-Emissions Trucks Measure	2.9	<0.1	0.2
Total On-Road Heavy-Duty Reductions	2.9	<0.1	0.2
Off-Road Equipment			
Tier 5 Off-Road Vehicles and Equipment	0.2	<0.1	NYQ*
Transport Refrigeration Unit Regulation Part 2	1.7	<0.1	NYQ
Cargo Handling Equipment Amendments	0.7	<0.1	NYQ
Total Off-Road Equipment Reductions	2.7	<0.1	
Other			
Zero-Emission Standard for Space and Water Heaters[8]	2.5	0.4	<0.1
Total Other Reductions	2.5	0.4	<0.1
Emissions Reductions	**8.2**	**0.5**	**0.2**

* Not yet quantified.

Title VI of the Civil Rights Act of 1964

Title VI of the Civil Rights Act of 1964 (Title VI) provides that no person in the United States shall, on the basis of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. As a recipient of federal funds, CARB must ensure it complies with Title VI and U.S. EPA's Title VI implementation regulations in its relevant programs and policies. In developing the 2022 State SIP Strategy's robust suite of control measures, CARB staff engaged in a thorough public process that addresses the requirements of Title VI. CARB will continue to address the requirements of Title VI in

[7] Numbers may not add up due to rounding

[8] Reductions may be achieved through CARB and/or complementary South Coast AQMD control measures for this sector

implementation of the 2022 State SIP Strategy and related Clean Air Act implementation activities. Written guidance from U.S. EPA is needed to provide additional detail on Title VI requirements and expectations and support for effective implementation efforts.

Many low-income and disadvantaged communities in nonattainment areas, and across the State, continue to experience disproportionately high levels of air pollution and the resulting detrimental impacts to their health. Research shows large disparities in exposure to pollution between disadvantaged communities and other communities. There are disparities between white and non-white populations in California, with Black and Latino populations experiencing significantly greater air pollution impacts than white populations. Mobile source pollution exposures show some of the highest disparities. Mobile sources are the largest sources of pollution exposure disparity for Black populations and disadvantaged community residents, when compared to the average population in California. Specifically, mobile sources accounted for 45 percent of exposure disparity for the Black population, and 37 % of exposure disparity for people in disadvantaged communities. While significant progress has been made in reducing mobile and stationary source pollution in California through regulatory and other program activities, disparities in the location of pollution and cumulative exposures continue.

In 2023, CARB adopted the following Vision for Racial Equity to guide our external work, including the implementation of the Community Air Protection Program: CARB commits to just social change by working at all levels within the organization and externally to address environmental injustices and advance racial equity in the achievement of its mission. CARB works toward a future where all Californians breathe healthy and clean air, benefit from actions to address climate change, and where race is no longer a predictor of life outcomes. In working to realize this vision, CARB prioritizes environmental justice, uses tools to operationalize racial equity, and conducts meaningful community engagement in its policy and planning efforts and programs to address the longstanding environmental and health inequities from elevated levels of toxic air contaminants, criteria pollutants, and secondary impacts of climate change. It is imperative to optimize California's control programs to maximize emissions reductions and provide targeted near-term benefits in those communities that continue to bear the brunt of poor air quality. Specific efforts include a commitment to apply a racial equity lens in considering benefits and burdens of CARB's programs and policies, including regulatory actions. A racial equity lens is a set of questions to estimate impacts and benefits on the basis of race, ethnicity or other relevant categories, and considering alternatives.

Using a racial equity lens also requires a commitment to meaningful community engagement. In support of this commitment, CARB recently contracted with a number of community experts to vet and refine a model framework for community engagement. As noted above, while significant progress has been made to address air pollution statewide and in local communities, ensuring all Californians have access to healthy air quality is imperative.

In addition to these important efforts, the 2022 State SIP Strategy measures such as the Advanced Clean Fleets and In-Use Locomotive Regulations will reduce mobile source emissions from heavy-duty trucks

and other sources around warehouses, railyards, and ports, as well as reducing other emissions, which in turn will reduce corresponding health risk in California's most impacted communities.

CARB prioritized public participation as an essential part of developing the measures included in the 2022 State SIP Strategy. CARB initiated the public process with a workshop in July 2021. After the workshop, CARB staff reached out to and met with a number of community-based organizations who provided input on the potential control measures. CARB released the 2022 State SIP Strategy: Draft Measures document which considered the input from the community-based organizations and comments during the first workshop.

CARB staff held a second workshop discussing the Draft Measures document in October 2021 and received additional input from a broad array of interested parties. The workshop presented a detailed discussion on the potential measures and allowed for the public and interested parties to comment on every facet of each potential measure. CARB staff also participated in the South Coast measure workshops as part of their SIP development process. CARB staff released the Draft 2022 State SIP Strategy in January 2022, prior to a third workshop, and presented an informational update to the Board at the Board Meeting in February 2022 to discuss and obtain public feedback. The input from numerous interested parties and community-based organizations framed the control measures in the Strategy such as the Zero-Emissions Trucks and Pesticide Measures.

These workshops and Board updates provided forums in both English and Spanish and afforded any special accommodations if requested to facilitate discussing the proposed measures in a public setting and to provide additional opportunity for public feedback, input, and ideas. And finally, CARB released the Proposed 2022 State SIP Strategy and hosted our 4th workshop in August 2022, prior to the CARB Board adopting the 2022 State SIP Strategy in September 2022. The workshops were well attended by a wide range of interested parties including community-based organizations. CARB staff listened to interested parties, evaluated their recommendations, and included some of these recommendations as measures that were appropriate for the 2022 State SIP Strategy. In order for a public suggestion to be included as a SIP measure, it needed to meet U.S. EPA-required integrity elements. SIP measures are required to be quantifiable, enforceable, surplus, and permanent. Measures suggested by the public that were ultimately adopted in the 2022 State SIP Strategy include a regulation to reduce emissions of reactive organic gas from pesticides in collaboration with the California Department of Pesticide Regulation and a zero-emission truck measure to help ensure that smaller trucking companies have more consistent access to zero-emission truck incentives.

Following the Board's approval of the 2022 State SIP Strategy, the public processes continue as each measure within the strategy goes through its own public process to engage with impacted communities and interested parties to further develop the measures prior to being brought to the Board for consideration as a regulation or other program. As development and implementation of these measures progress, CARB staff will continue to identify and implement opportunities to mitigate air pollution associated with racial inequities and meaningfully engage and partner with communities most impacted to address long standing disparities and challenges. As CARB cannot do this alone, CARB will also continue

to partner with other authorities such as air districts including the South Coast AQMD, other State agencies, and the federal government to ensure emissions reduction are achieved.

These connected efforts, as well as interagency efforts, will provide additional pathways to address Title VI requirements and support achieving the goal where zip code or race does not predict air pollution exposures. CARB has reviewed U.S. EPA and U.S. Department of Justice resources for Title VI and environmental justice policies, and looks forward to written guidance from U.S. EPA to address Clean Air Act section 110(a)(2)(E) as the State develops future clean air plans.

Civil Rights Policy and Discrimination Complaint Process

Under CARB's written Civil Rights Policy and Discrimination Complaint process (Civil Rights Policy), CARB has a policy of nondiscrimination in its programs and activities and implements a process for discrimination complaints filed with CARB, which is available on CARB's website. The Civil Rights Officer coordinates implementation of CARB's nondiscrimination activities, including as the Equal Employment Opportunity (EEO) Officer for employment purposes, and who can be reached at *EEOP@arb.ca.gov*, or (279) 208-7110.[9]

The Civil Rights Policy and Discrimination Complaint Process provides the following information about the nondiscrimination policy and its applicability:

> It is CARB policy to provide fair and equal access to the benefits of a program or activity administered by CARB. CARB will not tolerate discrimination against any person(s) seeking to participate in, or receive the benefits of, any program or activity offered or conducted by CARB. Members of the public who believe they were unlawfully denied full and equal access to a CARB program or activity may file a civil rights complaint with CARB under this policy. This non-discrimination policy also applies to people or entities, including contractors, subcontractors, or grantees that CARB utilizes to provide benefits and services to members of the public. [. . .]

As described in the Civil Rights Policy and Discrimination Complaint Process, the Civil Rights Officer coordinates implementation of nondiscrimination activities:

> CARB's Executive Officer will have final authority and responsibility for compliance with this policy. CARB's Civil Rights Officer, on behalf of the Executive Officer, will coordinate this policy's implementation within CARB, including work with the Ombudsman's Office, Office of Communications, and the staff and managers within a program or activity offered by CARB. The Civil Rights Officer coordinates compliance efforts, receives inquiries concerning non-discrimination requirements, and ensures CARB is complying with state and federal reporting

[9] CARB. California Air Resources Board and Civil Rights. *https://ww2.arb.ca.gov/california-air-resources-board-and-civil-rights,* Civil Rights Policy and Discrimination Compliant Process. November 1, 2016. *https://ww2.arb.ca.gov/sites/default/files/2023-01/2016-11-03%20CARB%20Civil%20Rights%20Policy%20Revised%20Final.pdf*

> and record retention requirements, including those required by Code of Federal Regulations, Title 40, Section 7.10 et seq.

The Civil Rights Policy and Discrimination Complaint Process also describes in detail the complaint procedure, as follows:

> A Civil rights complaint may be filed against CARB or other people or entities affiliated with CARB, including contractors, subcontractors, or grantees that CARB utilizes to provide benefits and services to members of the public. The complainant must file his or her complaint within one year of the alleged discrimination. This one-year time limit may be extended up to, but no more than, an additional 90 days if the complainant first obtained knowledge of the facts of the alleged violation after the expiration of the one-year time limit. [. . .]
>
> The Civil Rights Officer will review the facts presented and collected and reach a determination on the merits of the complaint based on a preponderance of the evidence. The Civil Rights Officer will inform the complainant in writing when CARB has reached a determination on the merits of the discrimination complaint. Where the complainant has articulated facts that do not appear discriminatory but warrants further review, the Civil Rights Officer, in his or her discretion, may forward the complaint to a party within CARB for action. The Civil Rights Officer will inform the complainant, either verbally or in writing, before facilitating the transfer. [. . .]
>
> CARB will not tolerate retaliation against a complainant or a participant in the complaint process. Anyone who believes that they have been subject to retaliation in violation of this policy may file a complaint of retaliation with CARB following the procedures outlined in this policy.

There is a Civil Rights Complaint Form available[10] on the webpage, which should be used by members of the public to file a complaint of discrimination against CARB that an individual believes occurred during the administration of its programs and services offered to the public. As described on CARB's webpage, for all complaints submitted, the Civil Rights Officer will review the complaint to determine if there is a prima facie complaint (which means, if all facts alleged were true, would a violation of the applicable policy exist). If the Civil Rights Officer identifies a prima facie complaint in the jurisdiction of the Civil Rights Office, the Civil Rights Office will investigate and determine whether there is a violation of the policy.

The laws and regulations that CARB implements through this policy include:

- Code of Federal Regulations, Title 40 Parts 5 and 7;
- Title VI of the U.S. Civil Rights Act of 1964, as amended;
- Section 504 of the Rehabilitation Act of 1973;

[10] CARB. Civil Rights Complaint Form. July 2019. https://ww2.arb.ca.gov/sites/default/files/2023-01/eo_eeo_033_civil_rights_complaints_form.pdf

- Age Discrimination Act of 1975;
- Title IX of the Education Amendments of 1972;
- California Government Code, Title 2, Division 3, Part 1, Chapter 2, Article 9.5, *Discrimination*, Section 11135 et seq.; and
- California Code of Regulations, Title 2, Section 10000 et seq.

As part of its overarching civil rights and environmental justice efforts, CARB is in the process of updating its Civil Rights Policy and will make those publicly available once complete. These updates will reflect available U.S. EPA and U.S. Department of Justice resources for Title VI and environmental justice policies. CARB encourages U.S. EPA to issue additional guidance to further clarify Title VI requirements and expectations to assist state implementation efforts.

CARB's Mobile Source Measures

On-Road Heavy-Duty

Advanced Clean Fleets Regulation

The Advanced Clean Fleets Regulation was adopted by CARB on April 27, 2023. This measure accelerates zero-emission vehicle (ZEV) adoption in the medium- and heavy-duty sectors by setting zero-emission requirements for fleets and a 100 percent ZEV sales requirement in California for manufacturers of Class 2b through 8 vehicles starting in 2036. The Advanced Clean Fleets Regulation focuses on strategies that ensure the cleanest vehicles are deployed by government, business, and other entities in California while meeting their transportation needs. The requirements are phased-in on varying schedules for different fleets including drayage trucks, high priority private and federal fleets, and state and local government fleets. All drayage trucks operating at seaports and intermodal railyards are required to be zero-emission by 2035. Drayage trucks also have new registration and reporting requirements, starting in 2023. High priority private and federal fleets must only add ZEVs or near-zero-emission vehicles with minimum all electric range to the California fleet starting January 1, 2024. However, to provide flexibility, these fleets may opt into the ZEV milestone schedule which is a ZEV phase-in as a percentage of the California fleet and targets vehicles that are well suited for electrification starting in 2025. State and local government fleets are required to phase-in a ZEV purchase requirement starting at 50 percent of new purchases in 2024 and 100 percent starting in 2027 or these fleets may opt into the ZEV milestone schedule.

Zero-Emission Trucks Measure

This measure would increase the number of ZEVs and require cleaner engines to achieve emissions reductions from fleets that are not affected by the Advanced Clean Fleets Regulation. This would include potential zero-emissions zone concepts around warehouses and sensitive communities if CARB is given

new authority to enact indirect source rules in combination with strategies to upgrade older trucks to newer and cleaner engines. This would be a transitional strategy to achieve zero-emissions medium- and heavy-duty vehicles everywhere feasible by 2045.

On-Road Light-Duty

Clean Miles Standard

The Clean Miles Standard was adopted by CARB on May 20, 2021. The primary goals of this measure are to reduce GHG emissions from ride-hailing services offered by transportation network companies (TNCs) and promote electrification of the fleet by setting an electric vehicle mile target, while achieving criteria pollutant co-benefits. TNCs would be required to achieve zero grams CO_2 emissions per passenger mile traveled and 90 percent electric VMT by 2030.

Off-Road Equipment

Tier 5 Off-Road Vehicles and Equipment

This measure would reduce NOx and particulate matter (PM) emissions from new off-road compression-ignition (CI) engines by adopting more stringent exhaust standards for all power categories, including those that do not currently utilize exhaust aftertreatment such as diesel particulate filters and selective catalytic reduction. This measure would be more stringent than required by current CARB, U.S. EPA and European Stage V nonroad regulations and would require the latest generations of emission control technologies.

For this measure, CARB staff would develop and propose standards for new off-road CI engines including the following: lower PM standards for engines less than 19 kilowatt (kW) (25 horsepower [hp]), lower NOx and PM standards for engines greater than or equal to 19 kW (25 hp) and less than 56 kW (75 hp), and more stringent aftertreatment-based PM and NOx standards for engines greater than or equal to 56 kW (75 hp). Other possible elements include new manufacturer-based in-use testing requirements, proposing more representative useful life periods, and developing a low load certification test cycle. It is expected that this comprehensive offroad Tier 5 regulation would rely heavily on technologies that manufacturers are developing to meet the recently approved low NOx standards and enhanced in-use requirements for on-road heavy-duty engines.

Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation

The amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation were adopted by CARB on November 17, 2022. This measure further reduces NOx and PM emissions from the in-use off-road diesel equipment sector by adopting more stringent requirements that target the oldest and dirtiest equipment that were previously allowed to operate indefinitely.

The amendments include a phase out schedule for most Tier 0, 1, and 2 engines between 2024 and 2036. This will allow a 12-year phase out of these oldest engines. Along with the engine tier phase out, adding vehicle provisions in the current regulation are extended to phase in a restriction on the adding of vehicles with Tier 3 and Tier 4 interim engines to fleets. The amendments also include new requirements for fleets to use renewable diesel (with some limited exemptions), new contracting requirements for prime contractors and public works awarding bodies to increase the enforceability and awareness of the regulation, and two optional flexibility provisions for fleet adoption of zero-emission vehicles. Additional modifications include clarifications to implementation, sunset of year-by-year low use, the addition of flexibility to permanent low-use, and the sunset of a provision that would have allowed small fleets to continue to operate vehicles that could not be retrofitted with a verified diesel emission control strategy indefinitely.

Transport Refrigeration Unit Regulation Part 2 (Non-Truck TRUs)

This measure is the second part of a two-part rulemaking to transition diesel-powered transport refrigeration units (TRUs) to zero-emission technologies. This measure would require zero-emission equipment for non-truck TRUs (trailer TRUs, domestic shipping container TRUs, railcar TRUs, and TRU generator sets).

Commercial Harbor Craft Amendments

The amendments to the Commercial Harbor Craft Regulation were adopted by CARB on March 24, 2022. The amended regulation requires that starting in 2023 and phasing in through 2031, most commercial harbor crafts (CHCs) (except for commercial fishing vessels and categories listed below) are required to meet the cleanest possible standard (Tier 3 or 4) and retrofit with diesel particulate filters (DPFs) based on a compliance schedule. The prior regulated CHC categories are ferries, excursion, crew and supply, tug/tow boats, barges, and dredges. The amendments impose in-use requirements on the rest of vessel categories except for commercial fishing vessels, including workboats, pilot vessels, commercial passenger fishing, and all barges over 400 feet in length or otherwise meeting the definition of an ocean-going vessel. The amendments require engines on new build commercial fishing vessels to meet the most stringent marine standards (Tier 3 or Tier 4) or Tier 4 Final off-road emission standards. The amendments also remove the exemption for engines less than 50 hp.

The regulation also requires that, starting in 2025, all new and newly acquired excursion vessels to be plug-in hybrid vessels that are capable of deriving 30 percent or more of combined propulsion and auxiliary power from a zero-emission tailpipe emission source. Starting in 2026, all new, newly acquired and in-use short run ferries are required to be zero-emission; and starting in 2030 and 2032, all in-use commercial fishing vessels would need to meet a Tier 2 standard at minimum.

Cargo Handling Equipment Amendments

This measure would start transitioning Cargo Handling Equipment (CHE) to full zero-emission by 2030, with over 90 percent penetration of ZE equipment by 2036. Based on the current state of zero-emission

CHE technological developments, the transition to zero-emission would most likely be achieved largely through the electrification of CHE. This assumption about aggressive electrification is supported by the fact that currently some electric RTG cranes, electric forklifts, and electric yard tractors are already commercially available. The zero-emission phase-in schedule will be determined by technology feasibility determinations and discussions with public stakeholders during the rulemaking process.

Other

Zero-Emission Standard for Space and Water Heaters

For this measure, CARB would develop and propose zero-emission GHG standards for new space and water heaters sold in California; CARB could also work with air districts to further tighten district rules to drive zero-emission technologies. This measure would not mandate retrofits in existing buildings, but some buildings would require retrofits to be able to use the zero-emission technology that this measure would require. Beginning in 2030, 100 percent of sales of new space and water heaters (for either new construction or replacement of burned-out equipment in existing buildings) would need to meet zero-emission standards. It is expected that this regulation would rely heavily on heat pump technologies currently being sold to electrify new and existing buildings.

Primarily-Federally and Internationally Regulated Sources – CARB Measures

In addition to reducing emissions from the above sources, it is critical to achieve emissions reductions from sources that are primarily regulated at the federal and international level. It is imperative that the federal government and other relevant regulatory entities act decisively to reduce emissions from these primarily-federally and internationally regulated sources of air pollution. CARB and the air districts in California have taken actions to not only petition federal agencies for action, but also to directly reduce emissions using programmatic mechanisms within our respective authorities. CARB continues to explore additional actions, many of which may require a waiver or authorization under the Clean Air Act, as described below.

In-Use Locomotive Regulation

The In-Use Locomotive Regulation was adopted by CARB April 27, 2023. This measure uses mechanisms available under CARB's regulatory authority to accelerate the adoption of advanced, cleaner technologies, and include zero-emission technologies, for locomotive operations. The In-Use Locomotive Regulation applies to all locomotives operating in the State of California with engines that have a total rated power of greater than 1,006 horsepower, excluding locomotive engines used in training of mechanics, equipment designed to operate both on roads and rails, and military locomotives. The measure reduces emissions by increasing use of cleaner diesel locomotives and zero-emission locomotives through a spending account, in-use operational requirements, and by an idling limit. By July 1, 2024, a spending account is established for each locomotive operator. Funds in the account is only to be used toward Tier 4 or cleaner locomotives

until 2030, and at any time toward zero-emission locomotives, zero-emission pilot or demonstration projects, or zero-emission infrastructure.

For the in-use operational requirements, beginning January 1, 2030, only locomotives built after January 1, 2007, may operate in California. Each year after January 1, 2030, only locomotives less than 23 years old may operate in California. Additionally, under the in-use operational requirements, starting January 1, 2030, all switch, industrial, and passenger locomotives operating in California with an original engine build date 2030 or newer will be required to be zero-emission. Starting January 1, 2035, all freight line haul locomotives operating in California with an original engine build date 2035 or newer must be zero-emission. Locomotives equipped with automatic engine stop/start systems are to idle no more than 30 minutes unless an exemption applies. Also, locomotive operators would report locomotive engine emissions levels and activity on an annual basis.

U.S. EPA's Clean Trucks Rule

Effective March 27, 2023, the U.S. EPA adopted a final rule titled "Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards."[11] This rule is part of the U.S. EPA's Clean Trucks Plan (CTP) that aims to reduce ozone and PM2.5 air pollution from heavy-duty trucks and buses. The rule applies to manufacturers of heavy-duty engines and vehicles. It will result in lower NOx emissions from new heavy-duty vehicles beginning in model year (MY) 2027 by setting more stringent emission standards that cover a wider range of heavy-duty engine operating conditions and require those standards to be met for a longer period of time of when these engines operate on the road. The rule also changes key provisions of the existing heavy-duty vehicle emission control program, such as the test procedures, regulatory useful life, emission-related warranty, and other requirements. U.S. EPA's CTP will result in emission benefits by 2030 and South Coast AQMD includes those benefits as a line item adjustment to the baseline emissions in this PM2.5 Plan (see Table 4-12).

SCAG's Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures

The PM2.5 Plan includes Transportation Control Measures (TCMs) from Southern California Association of Government's (SCAG) Regional Transportation Plan/Sustainable Communities Strategy to address attainment of the 2012 annual PM2.5 standard in the South Coast Air Basin. The TCMs are based on SCAG's Final 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy (2020 RTP/SCS, also known as Connect SoCal) and 2023 Federal Transportation Improvement Program (FTIP), as amended.

[11] Control of Air Pollution From New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards, 88 Fed. Reg. 4296 (January 24, 2023)

The RTP/SCS and FTIP were developed in consultation with federal, state and local transportation and air quality planning agencies and other stakeholders. The four County Transportation Commissions (CTCs) in the South Coast Air Basin, namely Los Angeles County Metropolitan Transportation Authority, Riverside County Transportation Commission, Orange County Transportation Authority and the San Bernardino County Transportation Authority, were actively involved in the development of the regional transportation measures of this Appendix. While SCAG will soon adopt the 2024 RTP/SCS, this PM2.5 Plan is based on the 2020 RTP/SCS as it was the latest approved RTP/SCS at the time of plan development. Refer to Appendix IV-B for more details.

SIP Emission Reduction Commitment

The SIP emission reduction commitment in the PM2.5 Plan reflects the estimated emission reductions from adopted rules and proposed measures. These are the emission reductions that we use to show progress in reducing emissions in an expeditious manner, and how the region will be able to meet the 2012 annual PM2.5 standard. Not all emission reductions that occur are SIP-creditable – meaning they do not count for purposes of showing how an area will be able to meet federal air quality standards. To be SIP-creditable, emission reductions must meet specific U.S. EPA criteria (e.g., integrity elements) to provide confidence that the emission reductions relied upon to meet the standards will occur. The following sections first describe the methodology for calculating SIP emissions and SIP-creditable reductions, then describe what procedures will be followed to ensure fulfillment of the commitment.

SIP Emission Reduction Tracking

For purposes of tracking progress in emission reductions, the baseline annual average emissions for the year 2030 will be used, regardless of any subsequent new inventory information that may reflect more recent knowledge. This is to ensure that the same “currency” is used in measuring progress as was used in designing the AQMP and that there is an “apples to apples” comparison in evaluating emissions.

Any emission reductions achieved beyond the existing South Coast AQMD regulations are creditable only if there is also a mechanism to ensure that the commitments to achieve those emission reductions are enforceable. Therefore, in certain instances, the South Coast AQMD may have to adopt regulations to reflect the existing industry practices in order to claim SIP reduction credit, with the understanding that there may not be additional reductions beyond what has already occurred. Exceptions can be made where reductions are real, quantifiable, surplus to the baseline inventory, and enforceable through other State and/or federal regulations. Further, any emission inventory revisions, which have gone through a peer review and public review process, can also be SIP creditable.

The PM2.5 Plan includes emission reductions from voluntary incentive measures to help meet the 2012 annual PM2.5 standard. With reliance on voluntary incentive measures to achieve attainment of the federal PM2.5 standard and for those measures to be SIP-approved, the South Coast AQMD must design programs such that the emission reductions from these incentive measures are proven to be real, quantifiable, surplus, enforceable, and permanent.

There are key components required of a SIP submittal in order to rely on discretionary incentive programs to satisfy the CAA emission reduction requirements. These components include a demonstration addressing the "integrity elements" (the five requirements listed above), federally enforceable "backstop" commitments, technical support, funding, legal authority, public disclosure and provisions to track results that are common among the various voluntary incentive programs. The "backstop" commitments include a requirement to monitor emission reductions achieved by the voluntary incentive measures and to report annually to the U.S. EPA the amount of reductions achieved. If the U.S. EPA determines that insufficient progress has been made, then substitute measures must be implemented to rectify the shortfall prior to the statutory implementation deadline. The South Coast AQMD is committed to developing detailed guidelines for voluntary incentive programs for individual incentive measures in accordance with the U.S. EPA's economic incentive programs guidelines. The following section describes the necessary criteria that will be included in each of the incentive measures.

Integrity Elements to Ensure Emission Reductions from Incentive Programs

To be SIP-creditable, emission reductions from voluntary incentive measures must meet the U.S. EPA's integrity elements. The emission reductions must be real, quantifiable, surplus, enforceable, and permanent. This demonstration must include project type(s); project life; applicable incentive program guidelines by title and year; and analysis of applicable incentive program guidelines for consistency with the integrity elements. For the purposes of this demonstration, the following defines and provides examples of the key elements:

Quantifiable

Emission reductions are quantitatively measurable, supported by existing and acceptable technical data. The quantification should use well-established, publicly available, and approved emission factors and accepted calculation methodology. There must be procedures to evaluate and verify over time the level of emission reductions that are actually achieved.

Surplus

Emission reductions must be above and beyond all current and known future District, State, or federal regulations already included in the SIP. Annual tracking will account for any potential overlapping future regulations that could conflict with the surplus reductions. Emission reductions used to meet air quality attainment requirements are surplus as long as they are not otherwise relied on in the SIP, SIP-related requirements, and other State air quality programs adopted but not in the SIP, a consent decree, or federal rules that focus on reducing criteria pollutants or their precursors. In the event that a voluntary incentive program's emission reductions are already relied on to meet air quality-related program requirements, they are no longer surplus. In addition, the emission reductions are available only for the remaining useful life of the equipment being replaced (e.g., if the equipment being replaced had a remaining useful life of five years, the additional emission reductions from the new equipment are available for SIP or conformity purposes under this guidance only for five years).

Enforceable

The South Coast AQMD will be responsible for assuring that the emission reductions credited in the SIP will occur. Emission reductions and other required actions are enforceable if:

a. They are independently verifiable;

b. Program violations are defined;

c. Those liable for emission reductions can be identified;

d. The South Coast AQMD and the U.S. EPA maintain the ability to apply penalties and secure appropriate corrective action where applicable;

e. The general public has access to the emissions-related information obtained from the source;

f. The general public can file suits against sources for violations (with the exception of those owned and operated by Tribes); and

g. They are practically enforceable in accordance with other U.S. EPA guidance on practicable enforceability.

Actual emission reductions, for example, can be assured through replacement equipment registration, recordkeeping and reporting, and inspections (initial inspection after installation and subsequent inspections on a regular basis thereafter, if needed) throughout the term of project. Specific enforcement mechanisms will be addressed in the guidelines for the individual incentive measures.

Permanent

The emission reductions are permanent if they occur over the duration of the voluntary incentive program, and for as long as they are relied on in the SIP. For example, those awarded incentives would need to ensure the projects are properly implemented and the reductions are occurring and will continue to occur. Recipients of the incentive awards would therefore agree to contract provisions, such as recordkeeping and reporting to track reductions and agreements that newly installed equipment would not be removed without concurrence of the South Coast AQMD (i.e., permanent placement) and the proof that the replaced equipment would be destroyed or at least not be operated in the Basin (e.g., pictures, certification). Detailed procedures to ensure permanent reductions will be described in the guidelines for the individual incentive measures.

Reductions from South Coast AQMD Control Measures

For purposes of implementing an approved SIP, the South Coast AQMD is committed to adopt and implement control measures that will achieve, in aggregate, emission reductions to demonstrate expeditious progress toward meeting the federal 2012 annual PM2.5 standard. The South Coast AQMD is

committed to adopt the control measures in Tables 4-2 and 4-3 unless these measures or a portion thereof are found infeasible, and other substitute measures that can achieve equivalent reductions in the same adoption or implementation timeframes are adopted. Findings of infeasibility will be made at a regularly scheduled meeting of the South Coast AQMD Governing Board with proper public notification. For purposes of the SIP commitment, infeasibility means that the proposed control technology is not reasonably likely to be available by the implementation date in question, or achievement of the emission reductions by that date is not technically or economically feasible. The reductions in Tables 4-2 and 4-3 are committed only to the extent needed to achieve attainment by the 2030 attainment deadline. If any substitution is needed, the alternative measures will need to achieve the same emission reductions or air quality benefit. The aggregate emission reduction commitments, along with the anticipated specific control measures to meet that reduction commitment are made with the understanding that if there is a shortfall in the individual measures for a particular year, emission reductions from other control measures could be substituted. The South Coast AQMD acknowledges that this commitment is enforceable under CAA section 304(f). The U.S. EPA will not credit SIP reductions unless the control measures are adopted and approved into the SIP at the time the U.S. EPA takes action on the plan.[12]

Reductions from CARB Control Measures

The CARB proposed control measures presented in Table 4-6, combined with ongoing implementation of current control programs, will provide further reductions to enhance air quality progress and achieve the 2012 annual PM2.5 standard.

Overall Emission Reductions

Table 4-12 identifies projected reductions for the South Coast Air Basin based on the annual inventory for NOx and direct PM2.5 emissions for 2030. These reductions reflect the emission reductions associated with implementation of control measures under State and local jurisdiction. Table 4-12 also includes emission reductions from recently adopted regulations as line item adjustments.

[12] U.S. EPA has in the past allowed about 10 percent of required reductions to be in the form of “enforceable commitments”

TABLE 4-12
EMISSION REDUCTIONS FOR 2030 BASED ON ANNUAL EMISSIONS INVENTORY
(TONS PER DAY)

	NOx	PM2.5
Year 2030 Baseline	210.31	54.05
Emission Reductions:		
South Coast AQMD Stationary Source Measures	1.33	0.04
CARB Stationary Source Measure	2.58	0.41
CARB Mobile Source Measures	6.08	0.09
U.S. EPA's Clean Trucks Plan	0.61	-
Stationary and Mobile Source Line Item Adjustments^	24.34	0.83
Total Reductions	**34.94**	**1.36**
2030 Remaining Emissions	**175.37**	**52.69**

^ Includes stationary and mobile source baseline emissions inventory line item adjustments. For a complete list of adopted regulations included as line item adjustments, refer to Appendix I.

CHAPTER 5

Future Air Quality

- **Modest additional emission reductions are required for the Basin to attain the 2012 annual PM2.5 standard in 2030.**

- **The emissions of direct PM2.5, NOx, and ammonia must be reduced by 1.4, 34.9, and 3.2 tons per day respectively, beyond the 2030 baseline levels to attain the standard in 2030.**

- **The control strategy discussed in Chapter 4 provides a path to attain the standard by 2030, with a design value at our highest monitoring site of 12.0 µg/m³.**

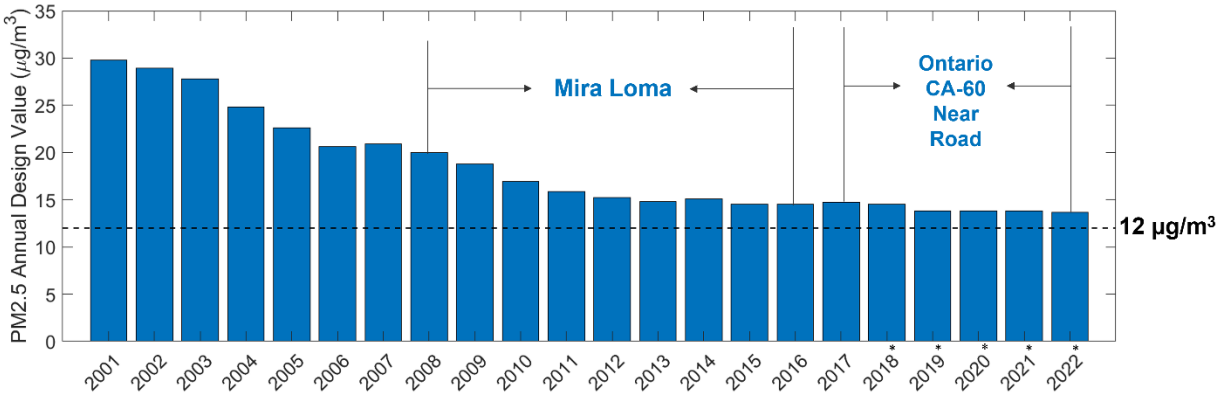
- **With the control strategy outlined in Chapter 4 of this Plan, it is anticipated that annual PM2.5 levels in all areas of the Basin will be below 12.0 µg/m³ by 2030.**

Introduction

The primary objective of the 2024 PM2.5 Plan is to address attainment of the federal 2012 annual average PM2.5 standard, set at 12 μg/m^3. Air quality modeling to demonstrate future attainment of the PM2.5 standard is an integral part of the planning process to achieve clean air. Attainment demonstration is the modeling exercise that shows how emission reductions will result in lower concentrations of air pollutants, presenting the path to attainment. The demonstration reflects updated emissions estimates, new technical information, enhanced air quality modeling techniques, updated attainment demonstration methodology, and the control strategy.

Base Design Value

A design value is a statistical metric used to show whether a region is in attainment with the NAAQS. The base design value is the starting point of the modeling analysis to show the pathway to attainment. U.S. EPA guidance recommends the use of multiple year averages of design values where appropriate in establishing the base design value. This approach helps mitigate the impacts of single-year anomalies on air quality trends, which may arise due to factors including exceptional or adverse meteorological conditions or radical changes in local emissions profiles. The trend in the Basin's annual PM2.5 design values, determined from routine Federal Reference Method (FRM) samples, from 2001 through 2022 reveal substantial reductions in concentrations over this timeframe (see Figure 5-1). However, it's noteworthy that the rate of decrease in annual design values has decelerated since 2012.



*Data likely to be approved as exceptional events by U.S. EPA removed from analysis.

FIGURE 5-1
SOUTH COAST AIR BASIN ANNUAL PM2.5 DESIGN VALUES FROM 2001 TO 2022

Overall, since 2001, the annual PM2.5 design values have decreased by over 50%, from 30 µg/m^3 in 2001 to 13.7 µg/m^3 in 2022. The deceleration in PM2.5 reduction in recent years can be attributed to a variety of factors, including meteorology, increased activities at ports, and additional sources of PM2.5 precursors. Additionally, in January 2015, two new near-road monitors started operating and providing valid data: the Ontario CA-60 and the Long Beach I-710 near-road monitors. PM2.5 concentrations are often higher at near road monitors, reflecting higher levels of resuspended dust, vehicle exhaust and brake and tire wear. Since 2017, the Ontario CA-60 near-road station has served as the design site in the basin.

Modeling Base Design Value Calculation

The PM2.5 annual design value for a specific year is determined by averaging the annual PM2.5 concentrations over a three-year period that includes the given year and the two preceding years. However, U.S. EPA guidance on modeling the attainment demonstration[1] recommends using a 5-year weighted design value centered on the base year selected for the attainment demonstration as the modeling Base Design Value (DVB). This 5-year weighted average approach recommended by EPA is to reduce year-to-year variability compared to a single 3-year design value. In the context of this plan, the DVB for each monitoring station is calculated as the average of the design values for 2018 through 2020 (denoted as DV 2018, DV 2019, and DV 2020 in Figure 5-2). This calculation covers a 5-year period from 2016 through 2020, centered at the base year 2018. Under certain circumstances, the U.S. EPA allows modification of DVB calculation, such as in the case of exceptional events. Figure 5-2 presents the U.S. EPA-recommended DVB calculation on the left. The 2020 DV calculation includes the year 2020, which was marked by several extraordinary events that significantly altered PM2.5 concentrations in the basin. These events include the COVID-19 pandemic and associated changes in human activity, and record-setting wildfires. To address this anomalous year this PM2.5 plan uses a modified DVB for 2018 that excludes the 2020 DV from DVB calculations and replaces it with the average of 2018 and 2019 annual means (Figure 5-2, right). In addition, exceptional events on July 4 and 5 due to Fourth of July fireworks are also excluded. Justification to exclude these days from DVB calculations is included in Appendix II.

[1] Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze, U.S. EPA, November 2018. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

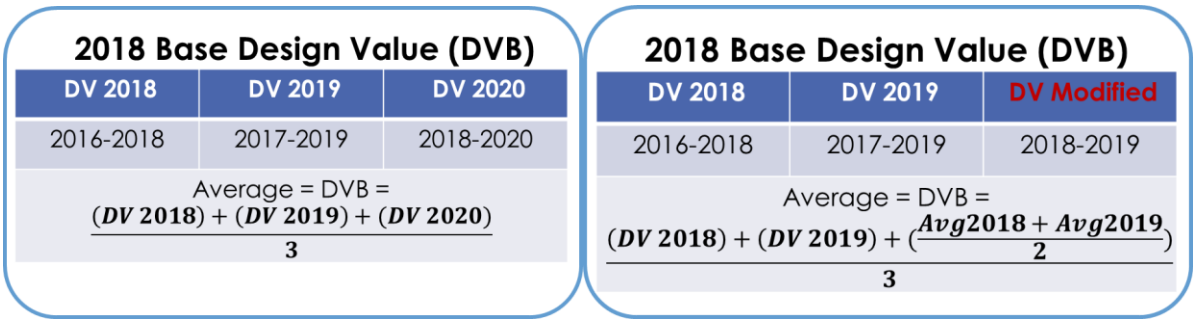


FIGURE 5-2
PM2.5 5-YEAR WEIGHTED AVERAGE FOR 2018 BASE DESIGN VALUE.
U.S. EPA'S DEFAULT METHODOLOGY (LEFT PANEL) AND MODIFIED METHODOLOGY TO EXCLUDE YEAR 2020 (RIGHT PANEL). DV REFERS TO A 3-YEAR DESIGN VALUE.

Table 5-1 shows the annual 2018 DVB values for all monitoring stations within the Basin, and it includes the 2012 DVB presented in the 2016 AQMP. Notably, the Ontario CA-60 near-road monitor has the highest design value in 2018 (13.98 μg/m^3) making it the designated design site for this PM2.5 plan. Mira Loma was the design site in the 2016 AQMP before data from the Ontario CA-60 near-road was available, but its DVB in 2018 is the second highest, with a decline from 14.87 μg/m^3 in 2012 to 13.53 μg/m^3. In general, the stations reported in the 2016 AQMP experienced a decrease in DVB from 2012 to 2018. While the DVB values for 2012 included the exceptional events of Fourth of July fireworks, which might amplify the reductions in DVB from 2012 to 2018 slightly, trends show that the annual PM2.5 concentrations keep improving.

TABLE 5-1
WEIGHTED ANNUAL PM2.5 DESIGN VALUES FOR 2012 FROM THE 2016 AQMP AND FOR 2018 CALCULATED FOR THE DRAFT PM2.5 PLAN (μg/m³)

Monitoring Site	Annual 2012 DVB from the 2016 AQMP	Annual 2018 DVB*
Anaheim-Pampas Lane	10.57	10.55
Azusa	-	10.13
Big Bear	-	6.35
Los Angeles-North Main Street	12.43	11.97
Compton-700 North Bullis Road	-	12.25
Fontana-Arrow Highway	12.60	11.35
Long Beach-Route 710 Near Road	-	12.28
North Long Beach	-	10.53
Mira Loma Van Buren	14.87	13.53
Mission Viejo-26081 Via Pera	-	7.94
Ontario- Route 60 Near Road	-	13.98
Pasadena-S Wilson Avenue	-	9.68
Pechanga	-	6.36
Pico Rivera-4144 San Gabriel	-	11.87
Reseda	-	9.74
Riverside-Rubidoux	13.13	12.13
South Long Beach	-	10.58
San Bernardino-4th Street	-	10.87

* Calculated based on the modified methodology illustrated in Figure 5-2

PM2.5 Speciation

PM2.5 species profiles for the base year are required to project future design values of PM2.5. The PM2.5 species required in the calculation of future design values are the following: sulfate (SO4), nitrate (NO3), ammonium (NH4), elemental carbon (EC), sea salts (Salt), crustal species, organic carbon (OC), particle-bound water (PBW), and a blank. There are a total of four monitoring stations from the Chemical Speciation Network (CSN) that routinely measure PM2.5 speciation data in the Basin. These CSN monitors are collocated where their corresponding FRM monitors are located. With one site in each county, the

four CSN sites are strategically located to represent aerosol characteristics in the four counties within the Basin. Historically, Riverside-Rubidoux served as the design site, a location with the highest annual PM2.5 concentration in the Basin. Fontana and Anaheim experienced elevated concentrations within their respective counties, and the Central Los Angeles site was intended to capture the characteristics of an emission source area.

The measurements of individual species obtained from the CSN sites may differ from the retained mass of a specific species in the FRM filter, due to the inherent differences in the measurement techniques. To reconcile the expected differences between speciated and FRM measurements, species are adjusted following the SANDWICH method[2], which is described in the U.S. EPA modeling guidance.[3] This adjustment results in reduced nitrates (relative to the amount measured by routine speciation networks), higher mass associated with sulfates and nitrates (reflecting water included in gravimetric FRM measurements), and an estimate of organic carbonaceous mass, which is derived from the difference between FRM-measured PM2.5 and the sum of all components except measured organic carbon. EPA's mas balance method sets a ceiling for OC mass (OCM) to be 80 percent of the total PM2.5 mass. However, based on scientific literature on PM2.5 speciation data taken in the greater Los Angeles area,[4,5] this ceiling was set as the 50 percent of PM2.5 FRM mass. EPA's guidance also sets a floor value for OCM to be the measured OC value. However, the sum of individual species measured from CSN is sometimes larger than the FRM mass. Under this condition, the measured OC as floor would erroneously exaggerate the OC fraction while reducing the other species, therefore, the OC floor was scaled by the ratio of FRM mass divided by the total CSN mass.

Directly measured ammonium (associated with nitrate and sulfate) at CSN stations, which is equivalent to particulate ammonium retained on FRM filters, was used for the speciation profiles. These measurements, however, were capped with fully neutralized ammonium, which is calculated as follows:

$$Ammonium\ ceiling = 0.375 \times sulfate + 0.29 \times retained\ nitrate$$

PBW was estimated using a polynomial regression equation fitted to the equilibrium model Aerosol Inorganic Matter (AIM) as a function of sulfate, nitrate, and adjusted ammonium concentrations. Most

[2] Frank, Neil. (2006). Retained Nitrate, Hydrated Sulfates, and Carbonaceous Mass in Federal Reference Method Fine Particulate Matter for Six Eastern U.S. Cities. Journal of the Air & Waste Management Association (1995). 56. 500-11. 10.1080/10473289.2006.10464517.

[3] Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze, U.S. EPA, November 2018. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

[4] Hayes et al., 2013. Organic aerosol composition and sources in Pasadena, California, during the 2010 CalNex campaign. Journal of Geophysical Research, 118, 9233-9257

[5] Shirmohammadi et al., 2016. Fine and Ultrafine Particulate Organic Carbon in the Los Angeles Basin: Trends in Sources and Composition. Science of Total Environment, 541, 1083-1096

FRM monitors in the Basin lack a co-located CSN monitor. Thus, as recommended by EPA guidance[6], the individual speciation components from nearby CSN monitors were interpolated to the locations of FRM monitors that do not have a co-located CSN monitor using Inverse Distance Squared Weights. The interpolated speciated component at a given unmonitored location in the Basin is calculated using a weighted average of CSN monitor values, with weights of a monitor calculated as a function of the inverse squared distance from said monitor.

Figure 5-3 and Figure 5-4 compare PM2.5 speciation fraction profiles estimated for the 2016 AQMP and the current Draft PM2.5 Plan at the Central LA and Riverside-Rubidoux monitoring stations, respectively. Speciated monitor data from 2017 through 2019 was used for the Draft PM2.5 Plan speciation fraction profile, while the 2016 AQMP speciation profile was calculated using the data collected in 2012. Generally, nitrate, elemental carbon (EC), and ammonium fractions have declined between the 2016 AQMP and the Draft PM2.5 Plan across all seasons. This reduction reflects the effect of existing rules and regulations aimed at reducing primary PM2.5 and its precursor emissions.

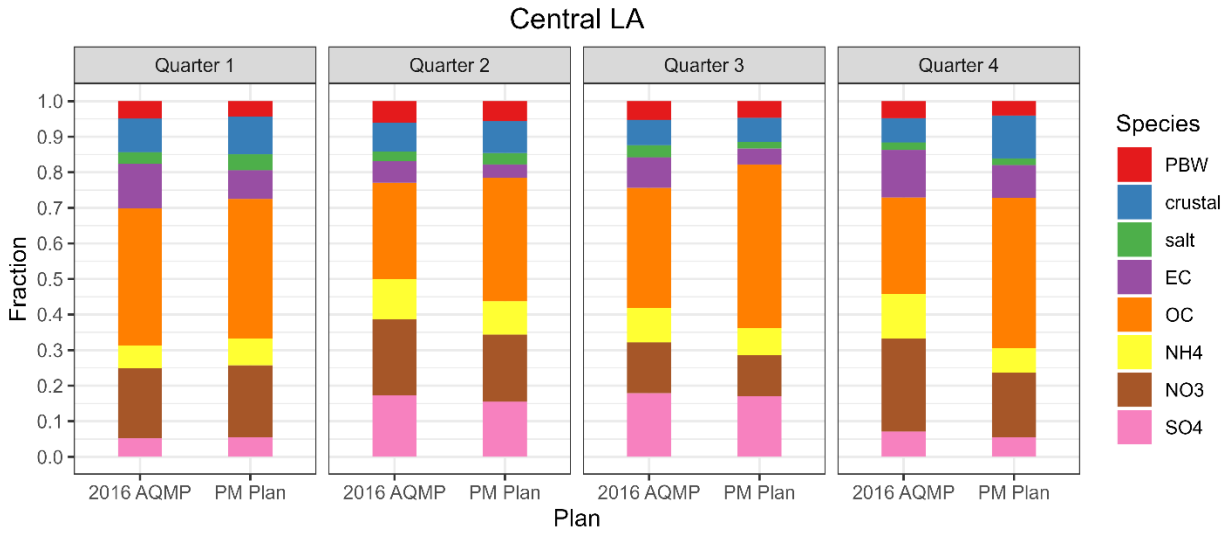


FIGURE 5-3
COMPARISON OF CENTRAL LA PM2.5 SPECIATION FRACTION PROFILE INCLUDED IN THE 2016 AQMP AND THE DRAFT PM2.5 PLAN

[6] Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze, U.S. EPA, November 2018. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

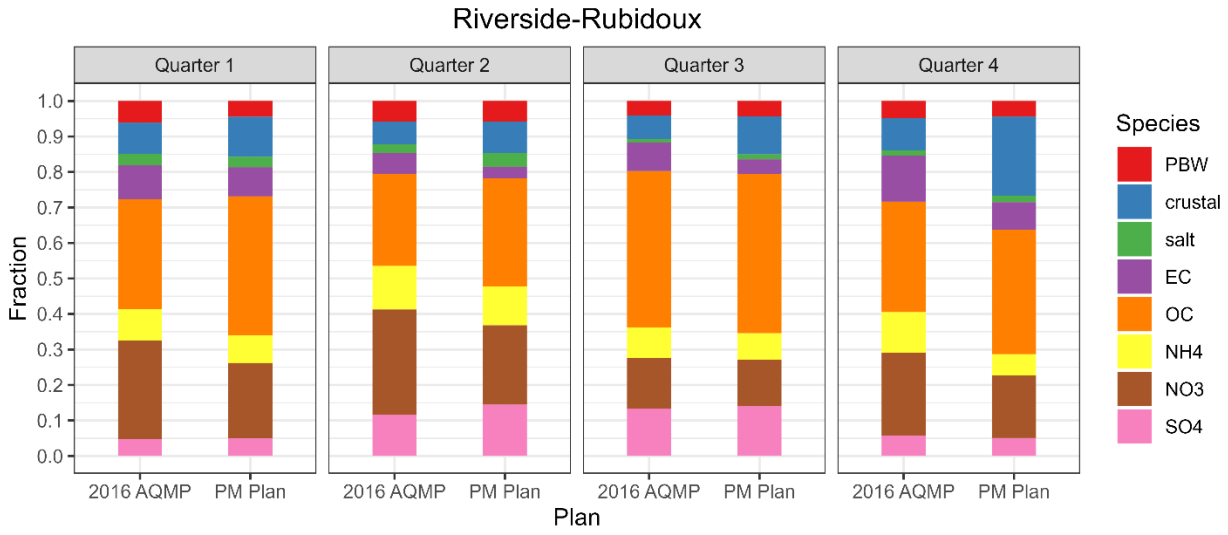


FIGURE 5-4
COMPARISON OF RIVERSIDE PM2.5 SPECIATION FRACTION PROFILE INCLUDED IN THE 2016 AQMP AND THE DRAFT PM2.5 PLAN

Annual PM2.5 Modeling Approach

Simulations for PM2.5 concentrations were conducted for the 2018 base year and the 2030 attainment year. CMAQ simulations covered the entire year of 2018 (from January 1st to December 31st). These simulations encompassed 8,760 consecutive hours from which daily 24-hour average PM2.5 concentrations were calculated. PM2.5 is divided into primary particles – which are directly emitted into the atmosphere – and secondary particles – which are formed from precursor gases. Sources of primary PM2.5 include but are not limited to road dust, diesel soot, and combustion products. Secondary products, such as sulfates, nitrates, and complex organic carbon compounds, are formed through chemical reactions involving oxides of sulfur (SOx), oxides of nitrogen (NOx), VOCs, and ammonia (NH3). The following section summarizes the PM2.5 modeling approach adopted for this Plan. The comprehensive modeling system used for this Plan includes photochemical reactions involved in the formation of PM2.5, horizontal and vertical transport, and removal mechanisms such as deposition. More detailed information on the PM2.5 modeling is presented in Appendix II.

Meteorology, Emissions, and Air Quality Model Configuration

The emissions inventory and meteorological conditions were developed for 2018, which was selected as the base year for emissions and meteorology. U.S. EPA requires the base year to be one of the three years

of which DV was used in designation/re-classification,[7] and 2018 was the year that U.S. EPA relied on to re-classify the Basin from "moderate" to "serious" non-attainment area.[8] In addition, the Multiple Air Toxics Exposure Study V (MATES V)[9] conducted during 2018 involved comprehensive monitoring and numerical modeling. This effort contributed to the development of a robust dataset to evaluate modeling performance and to improve capabilities for modeling year 2018.

The PM2.5 Plan attainment demonstration framework is an upgrade from the modeling platform used in the 2022 AQMP and more recent SIP revisions. The framework uses the U.S. EPA-supported CMAQ modeling platform (version 5.3.3), incorporating the Statewide Air Pollution Research Center (SAPRC) 07 chemistry, and uses meteorological fields from the Weather Research and Forecasting Model (WRF). The modeling platform tracks primary pollutants, including precursors of ozone and particulate matter (PM2.5) as well as the formation of secondary pollutants like ozone and particles that result from chemical reactions occurring in the atmosphere. The simulations were conducted over an area with a western boundary over 100 miles west of the Ports of Los Angeles and Long Beach. The eastern boundary extends slightly beyond the Colorado River, while the northern and southern boundaries of the domain extend to the San Joaquin Valley and the Northern portions of Mexico, respectively. CMAQ was performed at a 4 km by 4 km grid resolution. For the PM2.5 Plan, WRF was updated to the most recent version (4.4.2) available at the time of protocol preparation. The WRF simulations were initialized using National Centers for Environmental Prediction (NCEP) re-analysis data[10] and run for three-day increments with four-dimensional data assimilation (FDDA).

Spatial and temporal allocation of emissions followed the same methodology used in the 2022 AQMP. Point source emissions were extracted from the South Coast AQMD's Annual Emissions Reporting Program and were allocated to specific days of the year using temporal allocation factors developed by CARB. On-road mobile source emissions were calculated using CARB's EMFAC2021 emissions model, incorporating vehicle travel activity data provided by Southern California Association of Governments (SCAG). Vehicle emissions accounted for meteorological effects on operational and evaporative emissions (temperature and relative humidity effects) which were derived from daily meteorological variables predicted with WRF. In addition, hourly vehicle activity profiles based on the California Department of Transportation (Caltrans) Performance Measurement System (PeMS) were used to refine the temporal variation of vehicle emissions. Spatial and temporal allocation of emissions from area sources and most off-road emissions sources were calculated using the latest spatial and temporal surrogates developed by CARB, which were released in January 2021. In addition, ocean-going vessel emissions were spatially allocated using data from the Automated Identification System (AIS), and aircraft emissions from major airports within the basin were allocated using aircraft location information data derived from the Aircraft Communication Addressing and Reporting System (ACARS). Gridded hourly biogenic emissions were calculated using the Model of Emissions of Gases and Aerosols from Nature version 3.0 (MEGAN3.0)

[7] 40 CFR 51.1008
[8] 85 FR 40026
[9] http://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf?sfvrsn=6.
[10] NCEP Reanalysis data provided by the NOAA/OAR/ESRL PSL, Boulder, Colorado, USA, from their Web site at: https://psl.noaa.gov/data/gridded/data.narr.html.

driven by the meteorological inputs from WRF. More details on the modeling approach, data retrieval, model development and enhancement, model application, emissions inventory development, and interpretation of results is presented in Appendix II.

Design Values and Relative Response Factors (RRF)

To bridge the gap between air quality model predictions and measurements, U.S. EPA guidance[11] has recommended the use of relative response factors (RRFs). In this approach, future year concentration predictions require two elements: base year design values and RRFs. The RRF is simply a ratio of the future year predicted air quality to the simulated air quality in the base year, representing the model predicted change in air quality in response to predicted emissions changes. For the annual PM2.5 attainment demonstration, base year and future modeled concentrations are calculated as a quarterly average of a 3-by-3 grid centered at each station for each specific component. The ratio of base to future year quarterly mean concentrations for each component is the RRF for that component. Individual RRFs are calculated for NH4, NO3, SO4, EC, OC, salt, and a combined grouping of crustal compounds and metals (Others). Future year design values were calculated by multiplying species- and site-specific RRFs by the corresponding quarterly design values. Once the future values for NH4, NO3 and SO4 are calculated using RRFs, future PBW quarterly values are computed using the same polynomial fitting used in the SANDWICH method. The total future quarterly values at each site are then calculated by adding all the individual components and the blank. The four quarterly average concentrations are then averaged at each site to determine the future annual design values.

Model Performance Evaluation

The U.S. EPA recommends operational evaluations to assess how accurately the model predicts observed concentrations. The basis for this recommendation is that if the model can characterize base year PM2.5, then greater confidence can be placed in the model-prediction of future concentrations. Figure 5-5 depicts the modeled and measured daily PM2.5 concentrations at stations of Los Angeles, Compton, Mira Loma, and Ontario CA-60 near-road during January 1 through December 31 of 2018. PM2.5 mass was measured every day for all stations in this Figure, except Compton at which PM2.5 was measured every three days. CMAQ predicts daily PM2.5 mass and seasonal variation of PM2.5 reasonably well with overestimation in winter months and underestimation in summer months. A comprehensive model performance evaluation for PM2.5, NH4, NO3, SO4, organic matter (OM), EC, and crustal species concentrations is presented in Appendix II.

Figure 5-6 shows the modeled (orange) and measured (blue) annual PM2.5 species concentrations at Anaheim, Central Los Angeles, Fontana, and Riverside in 2018. The model tends to overestimate

[11] Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM and Regional Haze. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/draft-o3-pm-rh-modeling_guidance-2014.pdf

concentrations at Central Los Angeles, which is near major sources of emissions. Conversely, the model tends to underestimate PM2.5 species concentrations at inland stations in Fontana and Riverside. Overall, the model predicts NH4 ion, SO4, nitrate, EC, and OM concentrations reasonably well. Model results accurately capture the relative contributions of PM2.5 species and show that nitrate and OM are the largest contributors to total PM2.5.

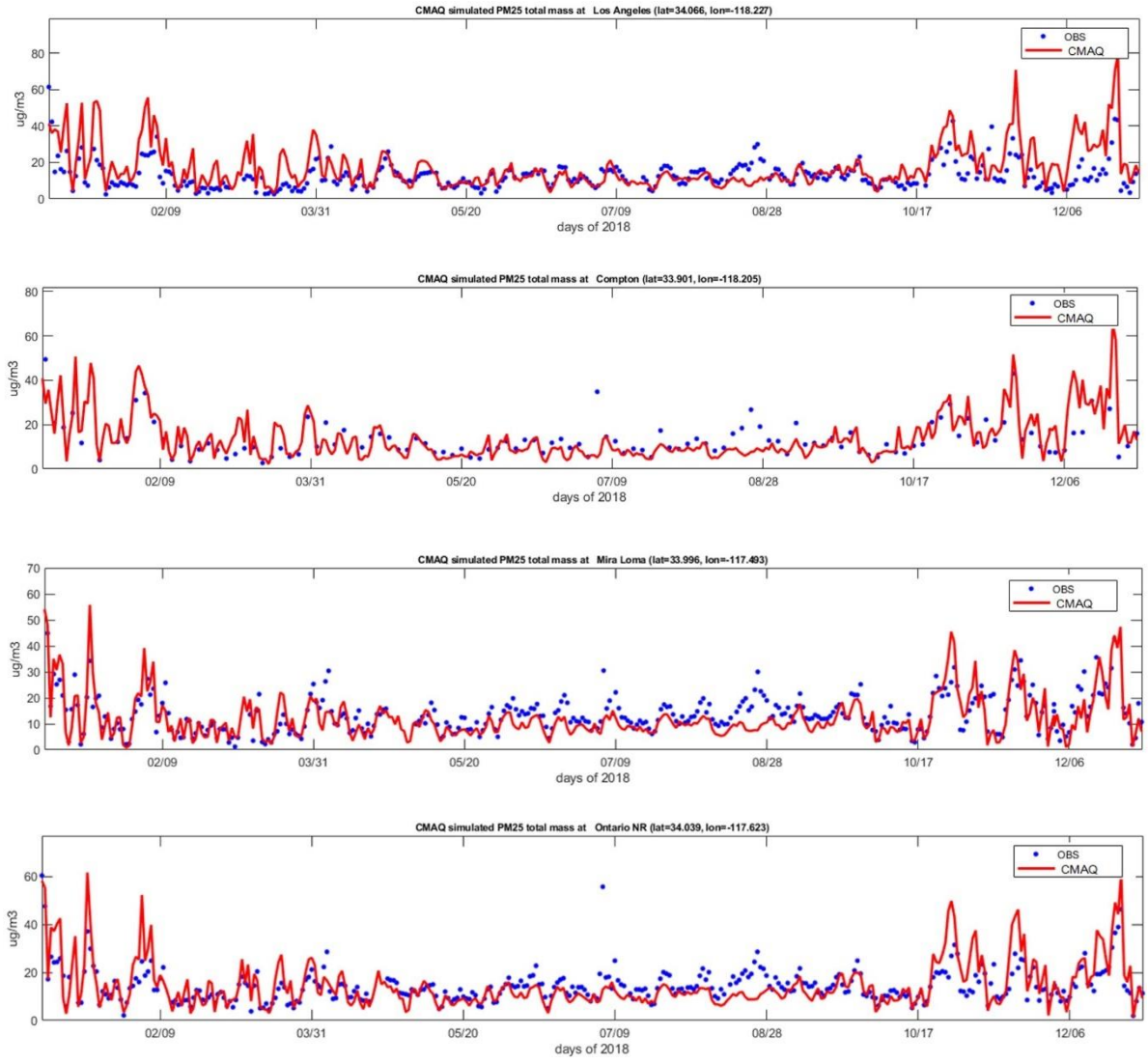


FIGURE 5-5
MODELED AND OBSERVED DAILY PM2.5 CONCENTRATIONS AT (TOP TO BOTTOM) LOS ANGELES, COMPTON, MIRA LOMA, ONTARIO NEAR-ROAD DURING JAN 1 THROUGH DEC 31, 2018

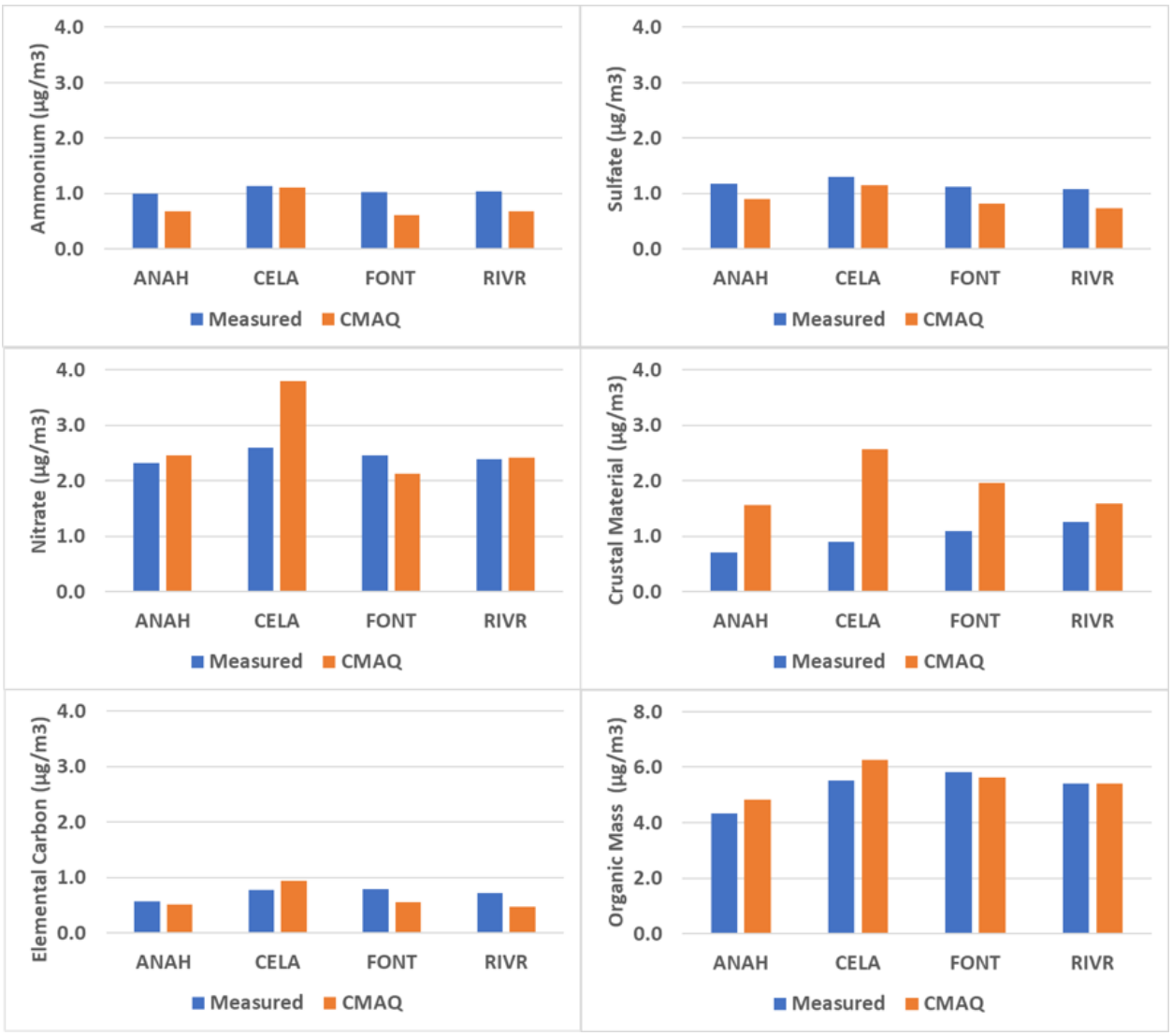


FIGURE 5-6
MODELED (ORANGE) AND OBSERVED (BLUE) ANNUAL PM2.5 SPECIES CONCENTRATIONS IN ANAHEIM (ANAH), CENTRAL LOS ANGELES (CELA), FONTANA (FONT), RIVERSIDE (RIVR) DURING 2018

Figure 5-7 shows the modeled (orange) and observed (blue) seasonal variation of nitrate and OM concentrations at Anaheim, Central Los Angeles, Fontana, and Riverside in 2018. The model predicts the seasonality of nitrate (top) and OM (bottom), accurately capturing peak nitrate and OM concentrations during winter months, and their subsequent drops during the summer. This is due to increased humidity, cooler temperatures, and frequent nocturnal inversions, conditions which favor the formation of ammonium nitrate, a significant component of secondary PM2.5. Summer months, in contrast, increase the volatility of nitrate, leading to relatively lower pollutant concentrations.

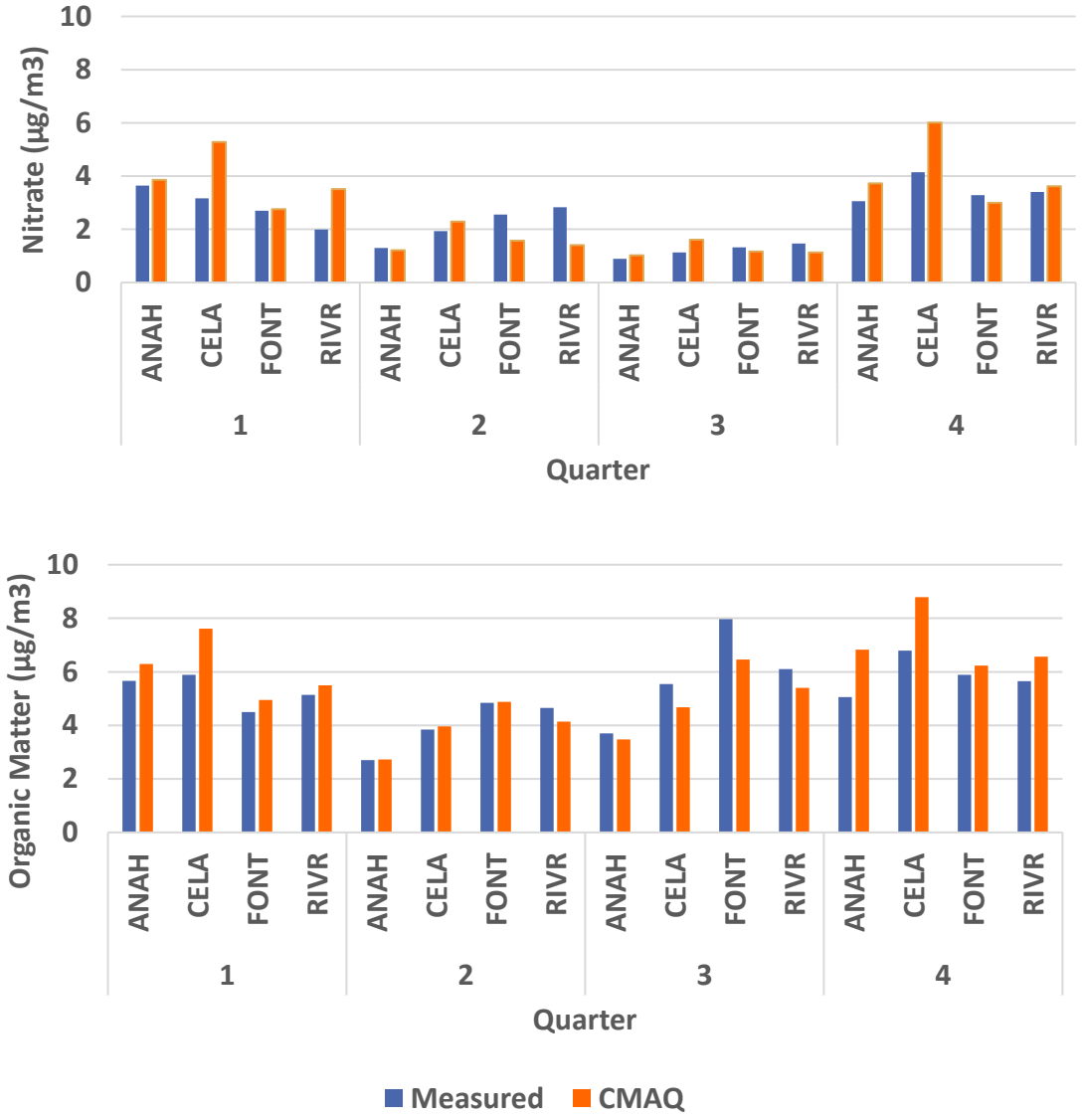


FIGURE 5-7
MODELED AND OBSERVED SEASONAL VARIATION OF NITRATE AND ORGANIC MATTER AT ANAHEIM (ANAH), CENTRAL LOS ANGELES (CELA), FONTANA (FONT), RIVERSIDE (RIVR) IN 2018

CMAQ performance evaluation segments the modeling domain into several sub-regions or zones. Table 5-2 lists the station locations and their assigned performance evaluation zone used to assess base-year simulation performance. Figure 5-8 maps the location of each station in the Basin. The "Urban Source" region typically has the highest emissions of PM2.5 and its precursors in the Basin, whereas the "Urban Receptor" region tends to experience high concentrations of secondary pollutants. Table 5-3 shows the model performance for daily PM2.5 in 2018 in each zone. While CMAQ underestimates PM2.5 mass in the San Fernando region and overestimates PM2.5 in over the Foothills and Urban Source regions, it shows the best model performance over the Urban Receptor region, which includes the Basin's design site.

TABLE 5-2
STATION INFORMATION OF PERFORMANCE EVALUATION ZONES

Station Location	Performance Evaluation Zone
Long Beach	Coastal
Mission Viejo	Coastal
South Long Beach	Coastal
Azusa	Foothills
Pasadena	Foothills
Reseda	San Fernando
Fontana	Urban Receptor
Mira Loma	Urban Receptor
Ontario Near Road	Urban Receptor
Riverside	Urban Receptor
San Bernardino	Urban Receptor
Anaheim	Urban Source
Compton	Urban Source
Los Angeles	Urban Source
Pico Rivera	Urban Source

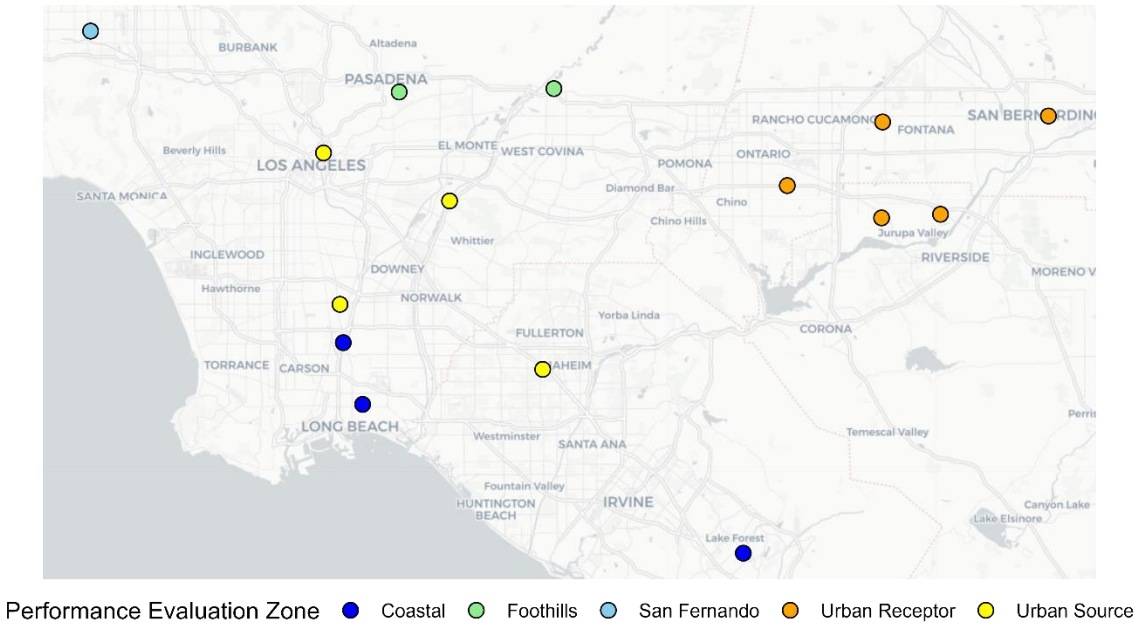


FIGURE 5-8
MAP OF PERFORMANCE EVALUATION ZONES

TABLE 5-3
MODEL PERFORMANCE FOR DAILY PM2.5 OF 2018

	Observation ($\mu g/m^3$)	Simulation ($\mu g/m^3$)	Correlation R2	Normalized Mean Bias (%)	Normalized Mean Error (%)
Coastal	10.5	11.4	0.66	7.8	43.0
San Fernando	10.5	10.1	0.53	-3.5	33.1
Foothills	10.6	15.1	0.49	38.5	56.8
Urban Source	12.7	14.4	0.68	12.4	41.4
Urban Receptor	12.7	12.9	0.68	0.6	33.8

Future PM2.5 Air Quality

Annual concentrations of PM2.5 were simulated for the base year 2018 and two future milestone years: 2025 and 2030. Both baseline and control scenarios were analyzed for 2030, the future attainment year. The outcomes are detailed in Figure 5-9 and Table 5-4.

The CA-60 Ontario near-road monitor is the base year's design site with a value of 13.98 $\mu g/m^3$ and is predicted to maintain the highest PM2.5 concentrations in the basin based on the baseline simulations for 2025 and 2030 (Figure 5-9). The projected design values at that site for 2025 is 13.09 $\mu g/m^3$, failing to meet the standard of 12 $\mu g/m^3$. Similarly, Mira Loma is projected to exceed the standard in 2025, with a design value of 12.62 $\mu g/m^3$. This demonstrates that the basin requires additional time beyond 2025 to meet the annual PM2.5 standard.

The simulation of the 2030 baseline also indicates that Ontario CA-60 near-road and Mira Loma will still exceed the annual PM2.5 standard. The 2030 baseline includes emission reductions of 173 tons per day of NOx, 58 tons per day of VOC, and 2 tons per day of PM2.5 with respect to 2018 base year emissions. As shown in Table 5-4, CA-60 Ontario near-road remains with the highest design value of 12.88 $\mu g/m^3$ under the 2030 baseline scenario. Additionally, the Mira Loma site is projected to exceed the 2012 annual PM2.5 standard with a design value of 12.48 $\mu g/m^3$. As a result, the 2030 baseline scenario falls short of demonstrating attainment, underscoring the need of additional emission reductions.

The strategy to attain the annual PM2.5 standard by 2030 includes co-benefits from the ozone strategy in the 2022 AQMP, as well as other proposed control measures within this PM2.5 Plan. However, the ozone strategy outlined in the 2022 AQMP includes 182(e)(5) measures that are permitted in the SIP/AQMP for ozone 'extreme' non-attainment status, but that are not permitted in this PM2.5 Plan. Thus, the 2030 attainment scenario outlined in this PM2.5 Plan relies on defined control measures and excludes 182(e)(5) measures from the 2022 AQMP, such as reductions from ocean-going vessels by 2030. Reflecting control measures presented in Chapter 4, emissions of NOx, NH3, and PM2.5 decrease by 17%, 4% and 3%, respectively.

Measures targeting mobile source emissions are the primary drivers of NOx emissions reductions as over 80% of the NOx in the Basin are from these sources. Reductions of PM2.5 are equally attributable to measures directed at reducing stationary and mobile source emissions. See Table 4-12 for the emission reductions of NOx and PM2.5 included in the attainment scenario. Detailed descriptions of control measures and their expected reductions are also outlined in Chapter 4 and Appendix II. These reductions guarantee attainment of the 2012 federal annual PM2.5 standard by 2030 at all stations except CA-60 Ontario. The demonstration of attainment at the Ontario CA-60 near-road monitor requires a specific methodology that better represents the impact of on-road emissions on the near-road monitor. This novel methodology for the attainment demonstration at near-road sites is summarized in the following section.

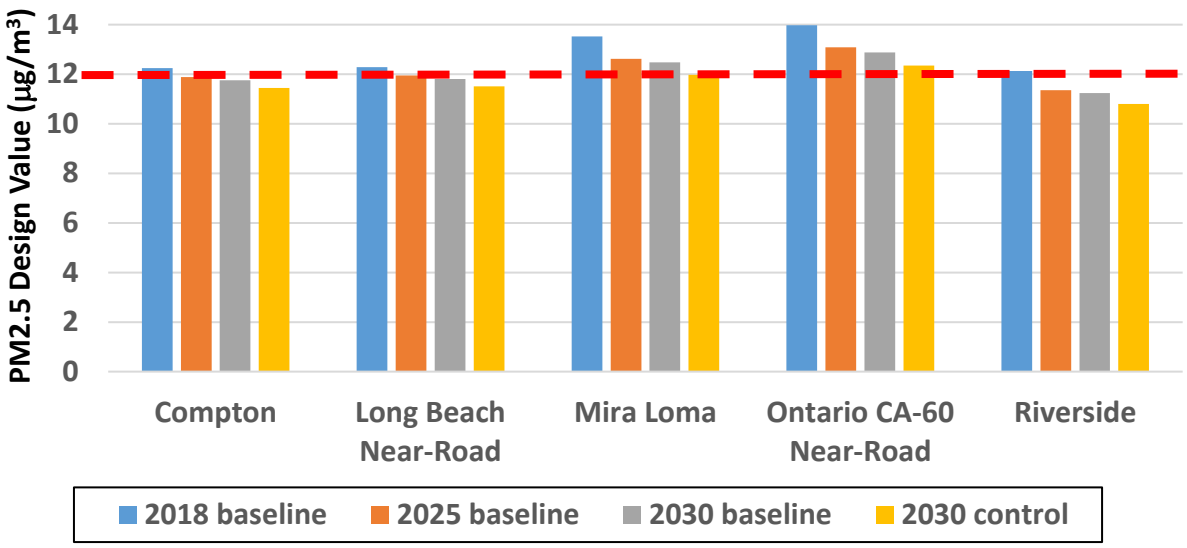


FIGURE 5-9
ANNUAL PM2.5 DESIGN VALUES. THE 2012 ANNUAL PM2.5 NAAQS IS DENOTED WITH A HORIZONTAL RED DASHLINE

TABLE 5-4
RRF-BASED ANNUAL PM2.5 DESIGN VALUES FOR BASE AND FUTUER YEARS (μg/m³)

Station	2018	2025 Baseline	2030 Baseline	2030 Attainment Scenario
Anaheim	10.54	10.22	10.15	9.90
Azusa	10.13	9.7	9.54	9.23
Big Bear	6.34	5.87	5.86	5.67
Los Angeles	11.96	11.48	11.36	11.02
Compton	12.25	11.89	11.75	11.44
Fontana	11.35	10.66	10.51	10.04
Long Beach near-road	12.28	11.95	11.81	11.51
Long Beach	10.53	10.25	10.14	9.90
Mira Loma	13.52	12.62	12.48	11.98
Mission Viejo	7.95	7.61	7.51	7.31
Ontario Near-road	13.98	13.09	12.88	11.59*
Pasadena	9.68	9.31	9.22	8.95
Pico Rivera	11.87	11.48	11.32	10.99
Reseda	9.73	9.06	9.01	8.73
Riverside	12.13	11.35	11.24	10.80
South Long Beach	10.57	10.31	10.21	9.96
San Bernardino	10.88	10.12	10.00	9.56

*Design Value from the hybrid approach for the Ontario Near-Road monitor. If the CMAQ based RRF is used, the future DV would be 12.35 μg/m³

Attainment Demonstration for the Near-Road Monitor

The current design site in the basin is the near-road monitor located by CA-60 freeway in Ontario. The monitor is sited just 16 meters away from the freeway, as shown in Figure 5-10, and is heavily influenced by the emissions released from vehicles as well as resuspended particles caused by moving traffic. The Ontario CA-60 near-road monitor was established before 2015 and the monitored data became available for regulatory purposes since 2015. Since then, the station recorded the highest annual average PM2.5 concentration in the basin. This monitor surpassed the concentrations at the previous design site in Mira Loma, which is located approximately 12 km eastward. However, the differences in annual PM2.5 concentrations between Mira Loma and CA-60 near-road have narrowed since 2015, as shown in Figure 5-11. This trend can be attributed to the fact that emissions from on-road sources have decreased substantially more than all other sources in the basin (see Figure 5-12), and as a result, PM2.5 concentrations at near-road monitors are decreasing faster than concentrations at regional monitors that represent air quality of wider areas.

FIGURE 5-10
LOCATION OF THE ONTARIO CA-60 NEAR-ROAD MONITOR

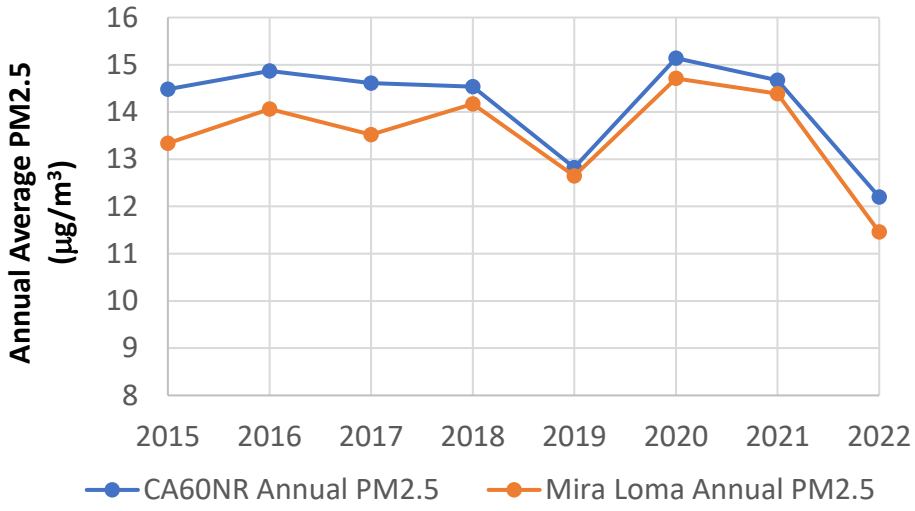


FIGURE 5-11
ANNUAL AVERAGE PM2.5 CONCENTRATIONS AT THE CA-60 NEAR-ROAD AND MIRA LOMA MONITORS SINCE THE DEPLOYMENT OF THE CA-60 NEAR-ROAD MONITOR

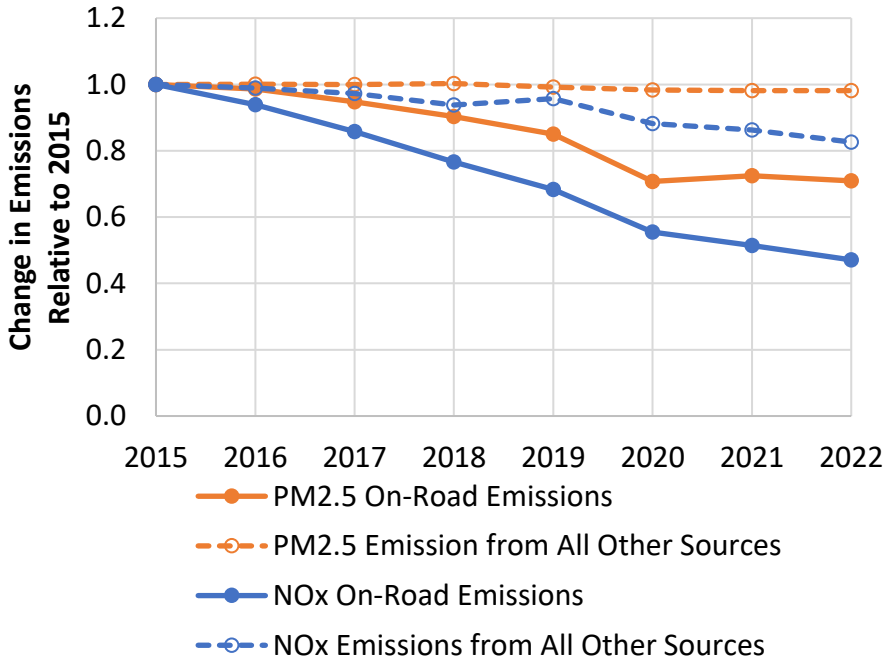


FIGURE 5-12
TRENDS IN EMISSIONS OF DIRECT PM2.5 AND NOX FROM ON-ROAD COMPARED TO THE REST OF EMISSION SOURCES FROM 2015 TO 2022

Regional chemical transport modeling is designed to calculate air quality that is representative at the grid resolution of the model. This attainment demonstration uses a model resolution of 4 km by 4 km grid, and thus, should model concentration at monitors that are representative of a similar area. Near-road sites are heavily impacted by near-road sources and thus, are not representative of the overall grid. For monitors affected by localized sources like the CA-60 Ontario near-road site, the U.S. EPA modeling guidance suggests additional modeling techniques that would support the attainment demonstration. These techniques include increasing model resolution to a finer grid or using dispersion modeling to assess the impact of primary PM2.5 emissions from near sources on the monitor.

Approach to Model the Effect of Near-road Sources

As the modeling guidance suggests, a regional chemical transport model may not be sufficient to represent the large gradients in PM2.5 concentrations at near-road monitors. As depicted in Figure 5-13, measurements at the near-road monitor observe a large contribution from near-road sources, whereas a regional model only observes those near-road impacts averaged over the entire area of the modeling grid. Thus, regional modeling is used to represent the air quality resulting from all regional sources plus the grid-average impacts of the near-road sources, whereas dispersion modeling is used to represent the near-road increment (NRI) that is the result from the monitor being next to freeway CA-60. Because of the proximity of the monitor to the freeway, it is reasonable to assume that the NRI is primarily due to direct PM2.5 emissions and that contribution of secondary PM2.5 to this NRI is negligible.

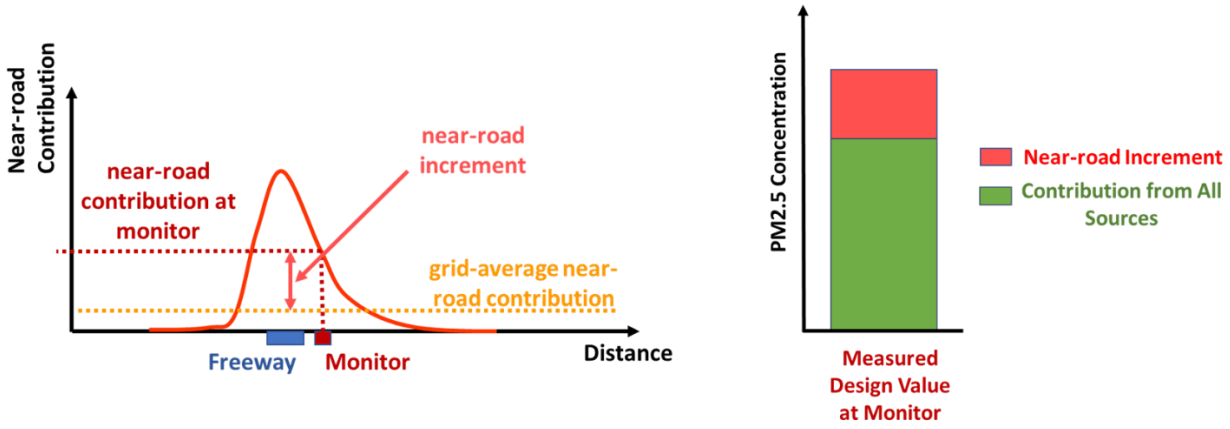


FIGURE 5-13
ILLUSTRATION OF THE NEAR-ROAD INCREMENT MODELED BY DISPERSION MODELING

The dispersion modeling is conducted using AERMOD, which is one of the official EPA dispersion models recommended for State Implementation Plan (SIP) revisions for existing sources and for New Source Review (NSR) and Prevention of Significant Deterioration (PSD) programs.[12] The modeling set-up only includes the emission sources along freeway CA-60 and its on- and off-ramps. Emission sources are grouped into 10 groups so that each category is modeled using distinctive emissions temporal and chemical profiles that can be tracked throughout the modeling. These emissions are derived from SCAG's vehicle activity dataset, which is also used in the regional modeling set-up. SCAG's dataset includes vehicle activity for 5 different vehicle classes: light and medium duty vehicles, light heavy-duty trucks, medium heavy-duty trucks, heavy heavy-duty trucks, and buses. EMFAC 2021 is used to calculate an aggregated emissions factor on a per-mile basis for these 5 groupings that includes exhaust, and tire and brake wear emissions. In addition, road dust emissions are estimated by using SCAG's vehicle activity and road information dataset and by using the road dust methodology described in Attachment H of Appendix III from the 2022 AQMP. In total, five vehicle categories and two emission processes per vehicle class for a total of ten sources of emissions are modeled using AERMOD. Detailed description of the AERMOD modeling setup is presented in Chapter 6 of Appendix II of this plan.

The estimated contributions of the near-road sources to annual PM2.5 at the CA60NR monitor determined by AERMOD for both 2018 and the 2030 attainment case are presented in Figure 5-14, by individual PM2.5 species. The annual average contribution of near-road sources at the monitor calculated using AERMOD in the 2018 base year is 3.13 $\mu g/m^3$, which represents 22% of the base year design value. The contribution of near-road sources in the 2030 attainment case is projected to be 2.32 $\mu g/m^3$, which corresponds to an overall 26% decrease from 2018. These results are used to determine the RRF for each PM2.5 species for the portion of the base year design value associated to the NRI.

[12] Air Quality Dispersion Modeling - Preferred and Recommended Models, Support Center for Regulatory Atmospheric Modeling (SCRAM), U.S. EPA, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

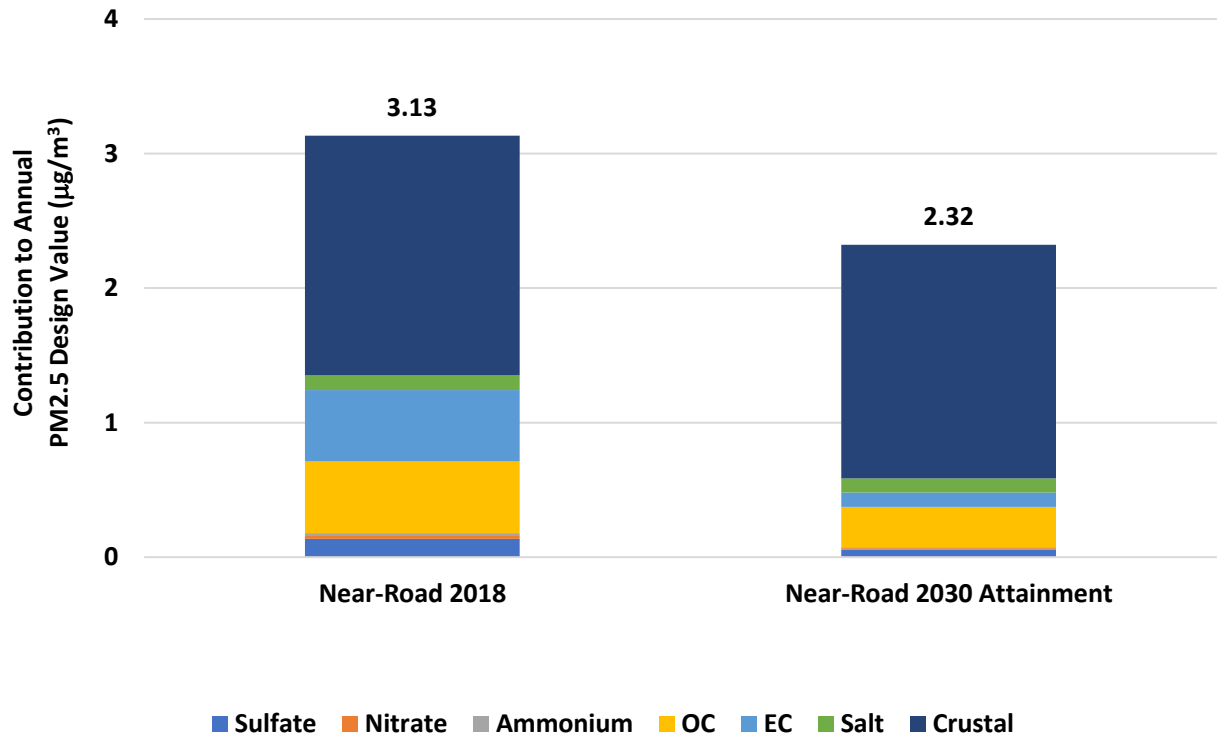


FIGURE 5-14
AERMOD ESTIMATED CONTRIBUTIONS FROM NEAR-ROAD SOURCES FOR 2018 AND THE 2030 ATTAINMENT CASE

The NRI is calculated using the concentration at the monitor estimated with AERMOD and the grid cell average contribution of near road sources determined by modeling PM2.5 concentrations with CMAQ. The near-road contribution averaged over the CMAQ grid cell where the monitor is located at is 0.15 µg/m^3, which subtracted from the near-road source contribution at the monitor (3.13 µg/m^3) results in an annual average NRI of 2.98 µg/m^3. Alternative approaches to determine the NRI are discussed in Chapter 6 of Appendix II of this Plan. More conservative estimates for NRI lower the values down to 1.64 µg/m^3.

Once the NRI is disaggregated from the regional air quality impacts contribution, future design value can be estimated by applying two differentiated RRF values to these two components. As illustrated in Figure 5-15, the regional air quality impacts are projected using the quarterly RRF calculated from regional air quality modeling, and the NRI portion is projected using the quarterly RRF calculated using the dispersion modeling results. The resulting design value for Ontario CA-60 using this hybrid approach is 11.59 µg/m^3. The future design value calculated using this hybrid approach is sensitive to the magnitude of NRI. Because emissions from on-road sources are expected to decline faster than the overall emissions in the basin, the NRI portion is projected to decline faster than the overall design value. With more conservative estimates of NRI, the projected design value calculated using this hybrid modeling tends to be higher. Using the most

conservative NRI of 1.64 µg/m^3, the resulting DV at Ontario CA-60 is projected to be 11.91 µg/m^3, still demonstrating attainment of the annual PM2.5 standard. A more comprehensive description of the hybrid modeling methodology and calculation of design values using this novel approach is described in Chapter 6 of Appendix II.

Unlike the conventional modeling method, which suggests that the CA-60 near-road monitor would not meet the standard under the 2030 control scenario, this hybrid approach, specifically tailored to account for the sharp PM2.5 concentration gradients around the freeway, indicates that the projected annual PM2.5 concentration will remain below 12 µg/m^3.

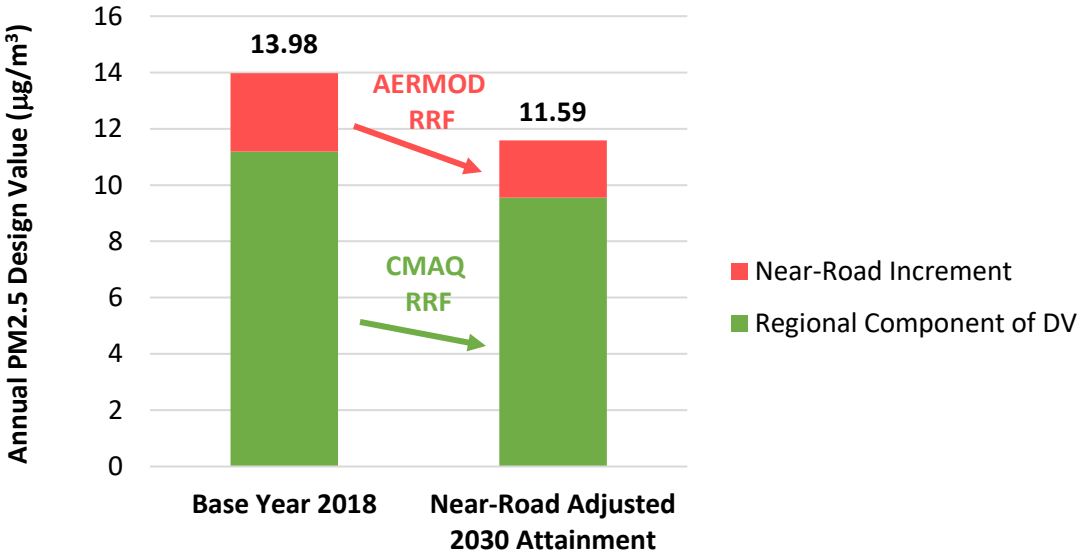


FIGURE 5-15
COMPARISON OF DESIGN VALUE PROJECTIONS BETWEEN THE TRADITIONAL APPROACH AND THE HYBRID APPROACH TO ADJUST FOR NEAR-ROAD SOURCES

Spatial Projections of Annual PM2.5 Design Values

Figure 5-16 shows the Basin-wide spatial distribution of annual PM2.5 design values in the base year 2018 calculated based on interpolated design values using inverse distance-weighting of monitored DVs and model gradient-adjustment. Figures 5-17 and 5-18 show the Basin-wide spatial distribution of RRF-based annual PM2.5 design values for both the 2030 baseline and 2030 attainment scenario, respectively. By 2030 under baseline conditions (business-as-usual, Figure 5-17), design values exceeding the 12 $\mu g/m^3$ federal standard are confined to a small region surrounding the Mira Loma and Ontario CA-60 monitoring stations in the northwestern boundary of Riverside and San Bernardino Counties. With the PM2.5 precursors reductions associated with the control measures proposed in this PM2.5 plan (Figure 5-18), the Basin is expected to meet the federal PM2.5 standard throughout the Basin.

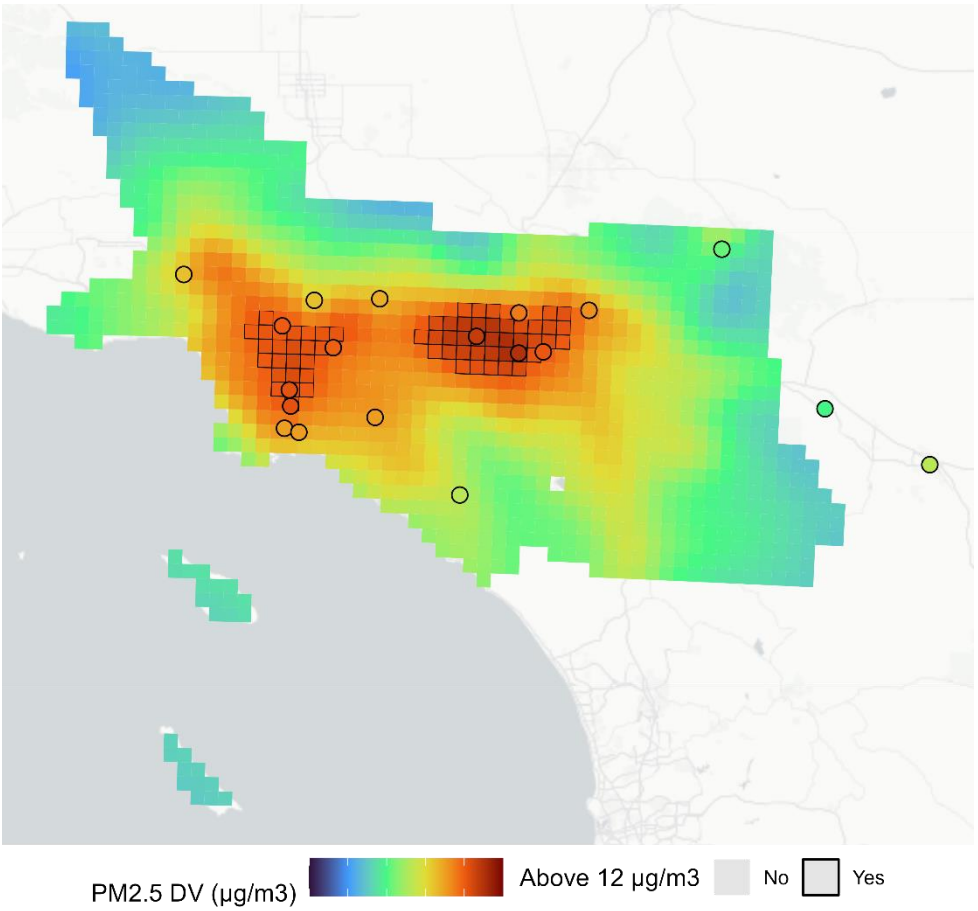


FIGURE 5-16
ANNUAL PM2.5 DESIGN VALUES (µg/m^3) FROM THE 2018 BASELINE SCENARIO. CELLS EXCEEDING 12 µg/m^3 ARE OUTLINED IN BLACK.

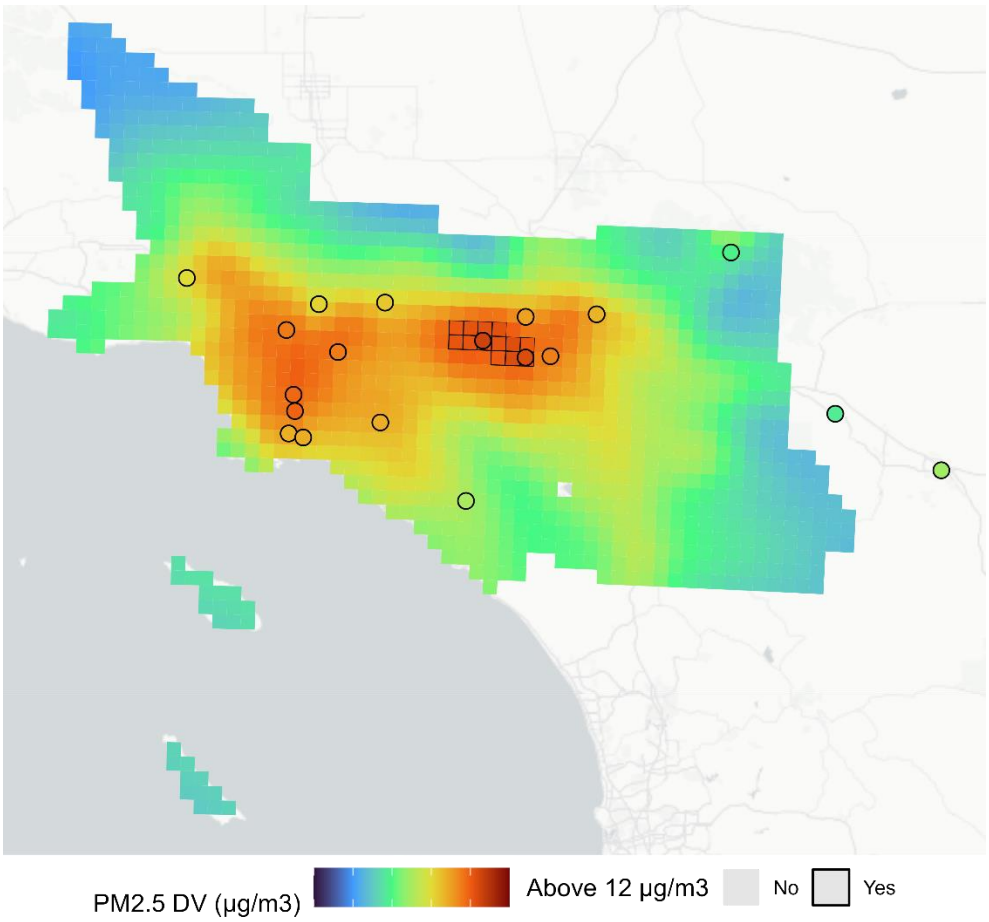


FIGURE 5-17
ANNUAL PM2.5 DESIGN VALUES (µg/m^3) FROM THE 2030 BASELINE SCENARIO. CELLS EXCEEDING 12 µg/m^3 ARE OUTLINED IN BLACK.

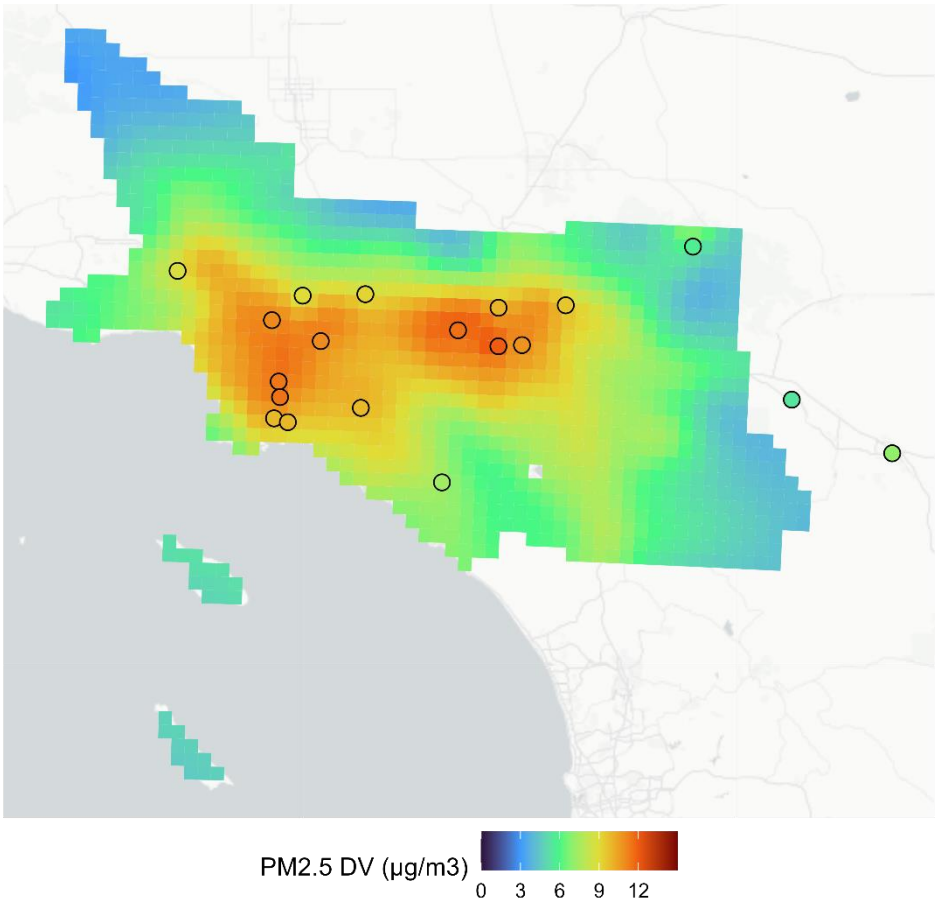


FIGURE 5-18
2030 ATTAINMENT ANNUAL PM2.5 RRF DESIGN VALUE CONCENTRATIONS.

Summary and Conclusions

Figure 5-19 presents the 2018 observed and 2030 projected future design values for annual PM2.5. Mira Loma and Ontario CA-60 near-road stations are expected to exceed the annual PM2.5 standard under the 2030 baseline scenario. This 2030 baseline scenario projects emissions based on the rules that are in place by the cutoff date of this plan and represents a 'business-as-usual' projection. The emissions reductions beyond the baseline emission levels proposed in this Plan would enable the Basin to meet the 2012 annual PM2.5 standard. Table 5-5 summarizes the design values at the Mira Loma and Ontario CA-60 monitors, the two stations with the highest PM2.5 annual levels in the 2018 base year and the 2030 attainment year. Based on the design values for 2030 and model sensitivity analyses, the design value for 2029 at Mira Loma is projected to be above 12.04 µg/m^3, exceeding the 2012 annual PM2.5 standard. Therefore, the earliest that the PM2.5 standard can be met in the South Coast Air Basin is projected to be 2030.

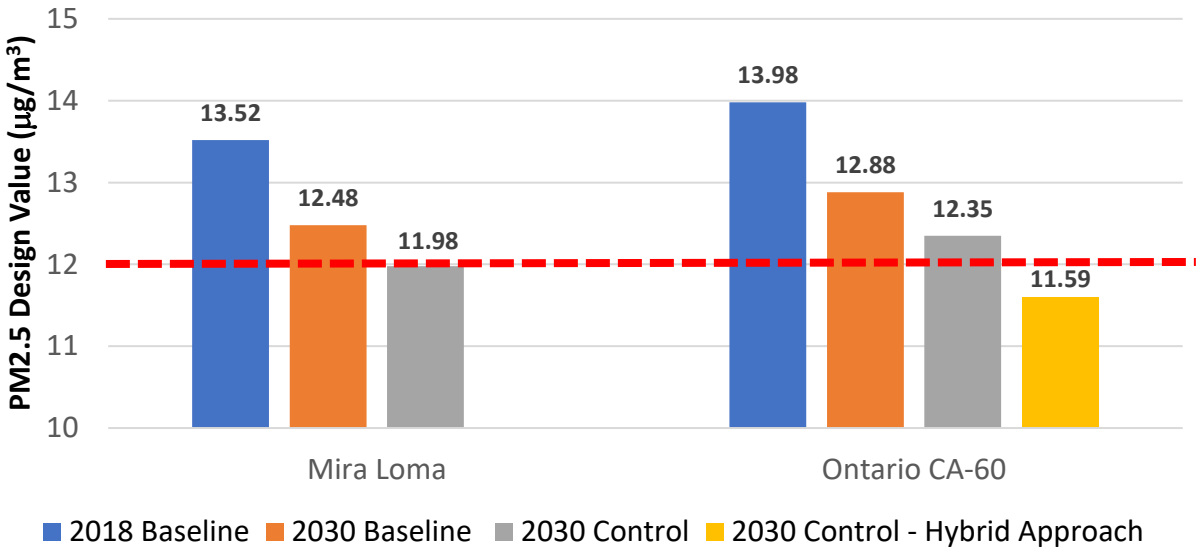


FIGURE 5-19
PROJECTION OF FUTURE ANNUAL PM2.5 AIR QUALITY IN THE BASIN IN COMPARISON WITH 2012 FEDERAL ANNUAL PM2.5 STANDARDS

TABLE 5-5
FUTURE DESIGN VALUES OF ANNUAL AVERAGE PM2.5 AT MIRA LOMA AND ONTARIO CA-60 (in µg/m³)

	Mira Loma		Ontario CA-60	
Calendar Year	Baseline	with Controls	Baseline	with Controls
2025	12.6	--	13.1	--
2030	12.5	12.0	12.9	11.6

CHAPTER 6

Federal Clean Air Act Requirements

- **Due to unforeseen challenges such as adverse meteorology and high levels of PM2.5 recorded at near road monitors, it is impractical to attain the 2012 annual PM2.5 standard by the statutory "serious" area attainment date, December 31, 2025.**

- **This Plan requests an extension of the attainment date to December 31, 2030, as allowed by the Clean Air Act Section 188(e). With the control strategy proposed in this Plan, the South Coast Air Basin is expected to attain the 2012 annual PM2.5 standard by 2030.**

- **The PM2.5 Plan complies with SIP planning requirements including, but not limited to, reasonable further progress, quantitative milestones, a comprehensive emissions inventory, the implementation of best available control measures and most stringent measures, control strategies, contingency measures, transportation conformity, motor vehicle emissions budget, and new source review.**

Other Federal Clean Air Act Requirements

This Plan addresses all "serious" PM2.5 nonattainment area Clean Air Act (CAA) planning requirements as shown in Table 6-1. Chapters 3 to 5 of this Plan fulfill the requirements related to the updated emissions inventory, control strategy, and attainment demonstration. This chapter addresses other CAA requirements.

TABLE 6-1

FEDERAL CLEAN AIR ACT REQUIREMENTS FOR THE 2012 PM2.5 NAAQS

Requirement	CAA Section	Definition	Location in Plan
Emissions Inventory	172(c)(3)	A comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants.	Chapter 3
BACM/BACT	189(b)(1)(B)	Provisions to assure that the Best Available Control Measures (BACM) for the control of PM2.5 shall be implemented no later than 4 years after the date the area is reclassified as a "serious" nonattainment area. BACM includes Best Available Control Technology (BACT).	Chapter 4, Appendix III, Appendix IV
Attainment Demonstration	189(b)(1)(A), 188(e)	Attainment date shall be as expeditiously as practicable but no later than the end of the fifteenth calendar year after designation as nonattainment.	Chapter 5
Extension of Attainment Date for Serious Areas	188(e)	Demonstrations that 1) attainment by the statutory "serious" area attainment date is impracticable, 2) the State has complied with all requirements and commitments pertaining to the area in the SIP, and 3) the State demonstrates that the Plan includes the most stringent measures (MSM) feasible for the area.	Chapter 6, Appendix III
Reasonable Further Progress	172(c)(2)	Plan provisions shall require reasonable further progress (RFP).	Chapter 6
Transportation	176(c)	Plan provisions addressing transportation	Chapter 6

Requirement	CAA Section	Definition	Location in Plan
Conformity		conformity, including motor vehicle emissions budgets for RFP milestone years and the attainment year.	
Quantitative Milestones	189(c)	The Plan shall contain quantitative milestones which are to be achieved every three years until the area is redesignated attainment and which demonstrate reasonable further progress toward attainment by the applicable attainment date.	Chapter 6
Nonattainment New Source Review	189(a)(1)(A), 189(b)(3), 189(e)	A permit program requiring permits for the construction and operation of new and modified major stationary sources of PM. Control requirements applicable to major stationary sources of PM2.5 shall also apply to major stationary sources of PM2.5 precursors.	Chapter 6
Contingency Measures	172(c)(9)	Fully adopted rules or control measures that are ready to be implemented, should U.S. EPA issue a final rule that the Basin failed to meet a regulatory requirement necessitating implementation of a contingency measure. Contingency measures must take effect without significant additional action by the state or local agency or by U.S. EPA.	Chapter 6, Appendix V

Request for Extension of Attainment Date to 2030

Through this plan, South Coast AQMD is formally requesting an extension of the attainment deadline from December 31, 2025 to December 31, 2030 as allowed under CAA Section 188(e). U.S. EPA requires that additional elements accompany the attainment deadline extension request in order to consider it. First, an impracticability demonstration must be provided, showing that the area cannot practicably attain by the end of the tenth calendar year following designation of the area. Second, the State Implementation Plan (SIP) must provide for the implementation of Most Stringent Measures (MSM). Finally, a demonstration of compliance with all requirements and commitments in the applicable SIP must be included.

Impracticability Demonstration

The 2016 AQMP included a strategy to attain the 2012 annual PM2.5 standard by 2025. The strategy primarily relied on co-benefits from the measures to attain the 1997 8-hour ozone standard by 2023 and the 2008 8-hour ozone standard by 2031. Since the submittal of the 2016 AQMP, South Coast AQMD has implemented control measures and achieved emission reductions reflected in the 2016 AQMP attainment demonstration. However, progress in achieving the needed emission reductions was hampered by a variety of circumstances. These include a lack of action at the federal level for sources such as aircraft, ships, trains, interstate trucks, and offroad equipment. Such sources are the dominant source of NOx emissions in the region and are subject to federal regulatory authority. Additionally, the region experienced unforeseen challenges including unfavorable meteorology, wildfires, increases in emissions in the goods movement sector during the COVID-19 pandemic, and the addition of the near-road monitors. All of these factors resulted in higher than expected PM2.5 concentrations.

Prior to the submittal of the 2016 AQMP, U.S. EPA established a requirement to monitor PM2.5 levels at near-road locations. Two near-road monitoring stations along the Interstate 710 (I-710) in Long Beach and the California State Route 60 (CA-60) in Ontario began PM2.5 measurements in 2015. At the time of 2016 AQMP adoption, neither of these monitors had sufficient data to be considered in the attainment demonstration. By January 1, 2020, however, these monitors had accumulated sufficient data to be considered in attainment demonstrations and the CA-60 monitor was measuring the highest PM2.5 levels in the Basin. The 2022 design value at the CA-60 monitor was 13.7 µg/m^3.

U.S. EPA did not act on the submitted plan for a few years and, by the time the South Coast Air Basin was reclassified to “serious” nonattainment in 2020, U.S. EPA stated that near-road monitors must now be included in a supplemental attainment demonstration. South Coast AQMD subsequently determined that demonstrating attainment by 2025, especially at the CA-60 monitor, was impractical.

Currently, model-predicted design values for 2025, the statutory “serious” area attainment year, are well above 12.0 µg/m^3 at multiple monitors (see Chapter 5, Table 5-4). This scenario reflects baseline emissions with adopted regulations and programs by South Coast AQMD and CARB. It is impractical and infeasible to implement additional reductions beyond already adopted regulations by December 31, 2024, given the amount of time needed to adopt and implement rules and regulations. The control strategy also requires that South Coast AQMD undertake multiple rulemakings, each with its own extensive public process. The proposed attainment year, 2030, reflects the challenges and complexities associated with this plan while balancing expeditious attainment and the time needed to adopt a SIP revision, develop rules, and achieve emission reductions.

Implementation of MSM

Appendix III presents a comprehensive BACM demonstration which also serves to demonstrate MSM. U.S. EPA interprets MSM to mean the maximum degree of emission reduction that has been required or achieved from a source or source category in any other attainment plans or in practice in any other states

and that can feasibly be implemented in the area seeking the extension. In Appendix III, potential control measures identified via MSM evaluation are assessed for technological and economic feasibility and incorporated as control measures if they are feasible. If potential MSM are rejected as infeasible, a reasoned justification is provided.

Compliance With the Applicable SIP

The final element that is required to accompany an attainment date extension request is a demonstration of compliance with commitments made in the applicable SIP. In this case, the applicable SIP is the "moderate" area plan for the 2012 annual PM2.5 standard which was submitted as part of the 2016 AQMP. U.S. EPA approved all but the contingency measure element of the 2016 AQMP as meeting applicable "moderate" area requirements.[1] With respect to the contingency measure element, U.S. EPA granted conditional approval based on South Coast AQMD's commitment to adopt and submit a contingency measure for approval. In response, Rule 445 was amended twice in 2020 to add PM2.5 and ozone contingency provisions. Rule 445 was subsequently approved by U.S. EPA, excluding paragraph (g) (Ozone Contingency Measures) and paragraph (k) (Penalties), as fulfilling the commitment to adopt a contingency measure for PM2.5.[2]

With respect to the Reasonably Available Control Measures (RACM)/Reasonably Available Control Technology (RACT) analysis, the "moderate" area plan in the 2016 AQMP concluded that South Coast AQMD's existing rules were generally equivalent to, or more stringent than, those developed by other air districts. Thus, there were no control measures identified as RACM/RACT. There were, however, four control measures in the 2016 AQMP identified as additional reasonable measures with full or partial implementation by 2020 (see Table 6-2). U.S. EPA approved these additional reasonable measures including CMB-02, CMB-03, BCM-04, and BCM-10.[3]

[1] Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; California; South Coast Moderate Area Plan and Reclassification as Serious Nonattainment for the 2012 PM2.5 NAAQS, 85 Fed. Reg. 71264 (Nov. 9, 2020)
[2] Air Plan Approval; California; Los Angeles — South Coast Air Basin, 87 Fed. Reg. 12866 (March 8, 2022)
[3] Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; California; South Coast Moderate Area Plan and Reclassification as Serious Nonattainment for the 2012 PM2.5 NAAQS, 85 Fed. Reg. 40026 (July 2, 2020)

TABLE 6-2
SUMMARY OF ADDITIONAL REASONABLE MEASURES FOR ANNUAL PM2.5 IN THE 2016 AQMP

CM Number	Title	Adoption	Implementation Period	Commitment Satisfied?
CMB-02	Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications [NOx]	2018	2020-2031	Yes, Rule 1111
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2018	2020	Yes, Rule 1118.1
BCM-04	Emission Reductions from Manure Management Strategies [NH3]	2019	2020	Yes, substitute reductions achieved
BCM-10	Emission Reductions from Greenwaste Composting [NH3]	2019	2020	Yes, substitute reductions achieved

South Coast AQMD fulfilled CMB-02 and CMB-03 commitments through amendments to Rule 1111 and adoption of Rule 1118.1, respectively, while the 2016 AQMP control measures BCM-04 and BCM-10 have not yet been adopted as rules. However, the quantified reductions from these measures are less than 0.5 percent of all ammonia emissions. The air quality benefit of the surplus NOx and PM reductions achieved in 2022, discussed in detail later, is expected to greatly exceed the potential benefit of the relatively small ammonia reductions from BCM-04 and BCM-10. Additionally, updated analysis conducted for the PM2.5 Plan shows that ammonia emissions from livestock are considerably lower than assumed in the 2016 AQMP. Total ammonia emissions for dairy cattle, poultry layers, and swine are 1.2 tons per day lower than the projected emissions for the 2025 attainment year in the 2016 AQMP (see Table 6-3). Therefore, the reductions achieved in practice far exceed the reductions sought by BCM-04 and BCM-10.

TABLE 6-3
COMPARISON OF 2030 LIVESTOCK AMMONIA EMISSIONS IN THE 2016 AND 2022 AQMPS

		NH3 emissions (tpd)	
CES	Category Description	2016 AQMP	2022 AQMP
89516	LIVESTOCK HUSBANDRY - DAIRY CATTLE	4.55	5.08
89557	LIVESTOCK HUSBANDRY - LAYERS	1.92	0.28
89573	LIVESTOCK HUSBANDRY - SWINE	0.15	0.02
Total		**6.62**	**5.38**

Implementation of certain control measures not only depends on South Coast AQMD, but also on state actions. South Coast AQMD determined that state legislation has achieved many of the same objectives as BCM-10 and this control measure has therefore been implemented statewide. The BCM-10 proposed control methods included potential emission reductions to be achieved through increased diversion of foodwaste from landfills to anaerobic digestion (AD), along with pollution control technology, and restricted direct land application (DLA) of chipped and ground uncomposted greenwaste.

BCM-10 was tied with implementation of AB 341 (Chesbro, Chapter 476, Statutes of 2011) and AB 1826 (Chesbro, Chapter 727, Statutes of 2014). AB 341 required mandatory commercial recycling, composting, or source reduction of 75 percent by 2020. AB 1826 introduced organic waste recycling requirements for businesses starting April 1, 2016, depending on the amount of waste they generate per week. For the purpose of AB 1826, organics were meant to include foodwaste, greenwaste, landscape/pruning waste, nonhazardous wood, and food-soiled paper waste mixed with foodwaste. Organics accounted for 34 percent of California's disposed waste stream in 2014.[4] While AB 341 established a 75 percent recycling target by 2020, the actual statewide recycling rate (through source reduction, recycling, and composting) was only 42 percent in 2020.[5] AB 1826 had phased-in requirements for businesses over time. In September 2020, CalRecycle reduced the threshold to 2 cubic yards of solid waste (the total of trash, recycling, and organics) generated by covered businesses.

More recently, other legislation has been enacted to decrease emissions from landfills. SB 1383 (Lara, Chapter 395, Statutes of 2016) is the most significant landfill waste reduction mandate adopted in California. Its goal is to reduce organic waste landfill disposal by 50 percent from 2014 levels by 2020 and 75 percent by 2025. However, implementation of SB 1383 has faced challenges. In 2020, organic waste in landfills increased by a million tons above the 2014 baseline.[6] The reasons for this increase may include: 1) residential organic waste separation and collection were not fully in effect until January 2022, and 2) more residential foodwaste was generated because of COVID-19. Due to restaurants shifting from dine-in to take-out and customers buying groceries in bulk, the generation of foodwaste increased as did the associated packaging waste.[7]

Since January 2022, approximately 72 percent of California communities have implemented residential organic waste collection, while 126 out of 615 jurisdictions (~20 percent) have requested more time to reach compliance.[8] Rural and low population jurisdictions have waivers and exemptions from organic waste collection requirements. Data on the effectiveness of the residential organic waste collection program in achieving emission reductions is lacking.

In BCM-10, AD was one of the proposed control methods to handle the increased diversion of organic waste (mostly foodwaste) from landfills, resulting in emission reductions. State laws have been enacted

[4] Mandatory Commercial Organics Recycling - CalRecycle Home Page
[5] CalRecycle, State of Disposal and Recycling in California for Calendar Year 2020. 2021
[6] Little Hoover Commission, Reducing California's Landfill Methane Emissions: SB 1383 Implementation, Report #274, June 2023: https://lhc.ca.gov/sites/lhc.ca.gov/files/Reports/274/Report%20274.pdf
[7] CalRecycle, Analysis of the Progress Toward the SB 1383 Organic Waste Reduction Goals. August 18, 2020
[8] California's Climate Progress on SB 1383 - CalRecycle Home Page

to achieve the intent of BCM-10 since the adoption of the 2016 AQMP. While implementation of those laws has not proceeded as envisioned, the legal requirement to increase diversion of waste from landfills exists. Therefore, staff concludes that state actions have fulfilled the BCM-10 commitment.

Quantitative milestones provide another means to demonstrate continued compliance with the applicable SIP. CAA Section 189(c) requires that quantitative milestones must be achieved every 3 years until the area is redesignated attainment which demonstrate Reasonable Further Progress (RFP) toward attainment. South Coast AQMD submitted the 2022 Quantitative Milestone Report (QMR) to U.S. EPA demonstrating continued compliance with all applicable commitments for the 2012 annual PM2.5 standard.[9] The 2016 AQMP projected that 7 tpd of surplus NOx reductions would be needed to meet the 2022 RFP target, while all other pollutants would meet RFP based on baseline measures. Total surplus reductions were determined to be 15.90 tpd NOx and 0.51 tpd PM2.5, significantly exceeding the 7 tpd of NOx reductions needed for RFP.

A significant portion of the reductions came from mobile source incentive measures. The 2016 AQMP included MOB-14 – Emission Reductions from Incentive Programs and provided a mechanism to ensure that emission reductions were SIP creditable. The incentive programs include the Carl Moyer Program, Proposition 1B – Air Quality Improvement Fund, Lower-Emission School Bus Program (LESBP), and the Community Air Protection Program (CAPP). The Carl Moyer Program funds projects that reduce NOx, VOC and PM caused by the combustion of diesel and gasoline in on-road vehicles and off-road engines. The program also funds after-treatment devices such as diesel oxidation catalysts and PM filters. The emission reductions from Proposition 1B are the result of the deployment of cleaner locomotives and heavy-duty trucks. Since 2018, LESBP has funded the replacement of 201 school buses with newer, cleaner models and CAPP incentives have resulted in emission reductions from locomotives, heavy-duty trucks, cargo handling equipment, harbor craft, and other sources that impact disadvantaged communities. Table 6-4 summarizes the emission reductions from these incentive programs.

[9] Submitted to U.S. EPA via CARB on June 7, 2023

TABLE 6-4
SURPLUS NOX AND PM2.5 REDUCTIONS IN 2022 FROM
MOBILE SOURCE INCENTIVE PROGRAMS

Program	Source Category	NOx (tpd)	PM2.5 (tpd)
Carl Moyer	Metrolink[10]	3.00	Not Quantified
	Harbor Craft	3.32	0.128
	Off-road	3.80	0.139
	On-road	0.17	0.003
	Locomotives	0.11	0.002
Prop 1B	Freight Locomotives	0.61	0.023
	On-road HD Trucks	0.38	0.000
LESBP	School Buses	0.10	0.005
CAPP	Harbor Craft	0.27	0.012
	Off-road	1.41	0.041
	On-road	0.14	0.000
	Locomotives	0.67	0.023
	Total	**13.99**	**0.377**

The 2022 QMR quantified additional reductions resulting from the unused portion of the general conformity set-aside account. Pursuant to Clean Air Act Section 176(c) (42 U.S.C. 7506) and the U.S. EPA's implementing regulations (40 CFR Part 93, Subpart B and 40 CFR Part 51, Subpart W), general conformity is required for NAAQS nonattainment and maintenance areas. The intent of general conformity is to prevent the air quality impacts of a proposed federal action, under Title 23 U.S.C., from causing or contributing to new violations of the air quality standards, exacerbating existing violations, or interfering with the purpose of the applicable implementation plan.

In order to streamline a conformity evaluation process, SIP set-aside accounts were allocated in the 2016 AQMP. The revised set-aside account to accommodate projects subject to general conformity included a balance of: 2.0 tpd of NOx and 0.5 tpd of VOC each year from 2017 to 2030, and 0.5 tpd of NOx and 0.2 tpd of VOC in 2031. Emissions from general conformity projects are tracked by South Coast AQMD and debited from the account on a first-come-first-serve basis. In 2022, the set-aside account had a remaining

[10] Funded with Carl Moyer and other programs. Since February 2013, South Coast AQMD awarded Metrolink a total of $101.85 million for the replacement of 37 Tier 0 & Tier 2 locomotives with Tier 4 locomotives and the new purchase of three Tier 4 locomotives. As of April 2021, 39 Tier 4 locomotives had been delivered to Metrolink and delivery of a final Tier 4 locomotive was expected by June 2021. Beginning in fiscal year 2022, Metrolink anticipated operating 40 trainsets serviced by a fleet of 48 to 52 locomotives. The emission reductions from the Tier 4 conversions and the purchase of the new Tier 4 locomotives, which are surplus to the 2016 AQMP inventory, are estimated to be 3 tpd in 2022

balance of 1.15 tpd NOx and 0.32 tpd VOC since approved projects had not consumed the entire allocation.

A summary of the overall NOx reductions quantified as part of the 2022 QMR is presented in Table 6-5. In addition to the incentive measures and general conformity set-aside account, the Regional Clean Air Incentives Market (RECLAIM) shutdown credit, Rule 445, and Rule 1179.1 reductions are considered.

The RECLAIM shutdown incorporates reductions from the decommissioning of a coke calciner in 2022 by Marathon Petroleum Corporation. The reductions from Rule 445 - Wood Burning Devices - stem from the June 2020 amendment which established PM2.5 contingency provisions that would be automatically triggered in the event that the U.S. EPA determines that the Basin failed to meet any RFP requirement, meet any quantitative milestone, submit a quantitative milestone report, or attain applicable PM2.5 NAAQS by the attainment date. The amendment also expanded the curtailment to the entire Basin instead of using a source receptor area approach. The South coast Air Basin failed to attain the 2006 24-hour PM2.5 standard by the statutory attainment date, December 31, 2019, which triggered a contingency measure in Rule 445 and lowered the curtailment threshold to 29 $\mu g/m^3$ in 2020.[11] Overall, the amendment resulted in a total of 0.13 tpd of PM2.5 reductions. Finally, Rule 1179.1 - Emission Reductions from Combustion Equipment at Publicly Owned Treatment Works Facilities - was adopted in October 2020 and established NOx emission limits for boilers, process heaters and engines burning digester gas or those units capable of burning digester and natural gas.

TABLE 6-5
SURPLUS REDUCTIONS IN 2022 BASED ON REGULATIONS AND INCENTIVES

Regulation/Incentive	Surplus NOx Reduction in 2022 (tpd)	Surplus PM2.5 Reduction in 2022 (tpd)
Rule 445	Not Quantified	0.13
Rule 1179.1	0.05	Not Quantified
RECLAIM Shutdown Credit (Rule 1109.1)	0.71	Not Quantified
Mobile Source Incentive Programs	13.99	0.38
General Conformity Set-Aside Credit	1.15	N/A
Total	**15.90**	**0.51**

In summary, South Coast AQMD determined that all annual PM2.5 “moderate” area plan commitments have been fulfilled. The additional reasonable measures identified in the 2016 AQMP have either been implemented or substitute reductions have been achieved. In the 2016 AQMP, South Coast AQMD committed to achieve emission reductions in aggregate to accommodate necessary changes during

[11] Finding of Failure To Attain the 2006 24-Hour Fine Particulate Matter Standards; California; Los Angeles- South Coast Air Basin, 85 Fed. Reg. 57733 (Sept. 16, 2020)

rulemaking, during which emission reduction commitments of individual control measures are adjusted to reflect stakeholder's needs, technological maturity, commercial availability and other economic needs. The reductions quantified as part of the 2022 QMR, which are surplus to the 2016 AQMP baseline and count towards the aggregate reduction commitment, exceed the level of reductions needed to demonstrate RFP. Therefore, South Coast AQMD concludes that commitments to adopt control measures and meet RFP targets have been achieved.

Reasonable Further Progress and Quantitative Milestones

Reasonable Further Progress

The CAA requires that SIPs for most nonattainment areas demonstrate Reasonable Further Progress (RFP) towards attainment through emission reductions phased in from the base year until the attainment date. Per CAA Section 171(1), RFP is defined as:

> "*such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date.*"

Emission reductions required under an RFP plan for PM2.5 are directly emitted PM2.5 and applicable precursors. Appendix VI of this Plan presents a precursor demonstration to exclude VOCs and SOx from certain planning requirements including the RFP demonstration. Therefore, this RFP demonstration focuses on NOx, direct PM2.5, and ammonia as the pollutants with a significant impact on PM2.5 levels.

To determine RFP for the attainment date, U.S. EPA guidance states that the plan should rely only on emission reductions achieved from sources within the nonattainment area. Section 172(c)(2) of the CAA requires that attainment plans show ongoing annual incremental emission reductions toward attainment, which is commonly expressed in terms of target emission levels to be achieved by certain interim milestone years.

For PM2.5 nonattainment areas, in addition to the RFP requirements, CAA Section 189(c)(1) requires states to achieve quantitative milestones, which are designed to track RFP to ensure expeditious attainment. U.S. EPA requires that all "serious" area PM2.5 attainment plans define appropriate quantitative milestones to be achieved 7.5 years from the original designation of the area and every 3 years thereafter until the area is re-designated as attainment.[12] The South Coast Air Basin was originally designated nonattainment for the 2012 annual PM2.5 NAAQS effective April 15, 2015.[13] Therefore, the first "serious" area quantitative milestone occurred on October 15, 2022. The 2022 Quantitative

[12] CFR §51.1013(a)(2)(i)

[13] Air Quality Designations for the 2012 Primary Annual Fine Particle (PM2.5) National Ambient Air Quality Standards (NAAQS), 80 Fed. Reg. 2206 (Jan. 15, 2015)

Milestone Report was submitted to U.S. EPA to address compliance with this milestone.

U.S. EPA requires that RFP plans contain projected emissions for each calendar year in which quantitative milestones must be met. Since the first "serious" area quantitative milestone is in the past (October 15, 2022), the first quantitative and RFP milestone year considered in this plan is 2025. The quantitative milestones recur every 3 years and continue through 2031, the post-attainment milestone year.

As described in Chapter 3 – Base-Year and Future Emissions, the base year of this Plan is 2018, which also serves as the base year for the purposes of tracking RFP. Alignment of the RFP and modeling base year is clarified in U.S. EPA's implementation rule for PM2.5 NAAQS:[14]

> "Because the statute does not clearly establish the applicable baseline year from which to begin calculating annual emissions reductions for purposes of demonstrating RFP, the EPA is finalizing a requirement that states use the same year as the base year inventory used for developing the control strategy and associated air quality modeling demonstrating that the area will attain expeditiously."

U.S. EPA requires that all SIPs contain RFP projected emissions and that those emissions demonstrate either: (i) Generally linear progress toward the projected attainment date; or (ii) stepwise progress toward the projected attainment date with proper justification.[15] This analysis demonstrates generally linear RFP for NOx and direct PM2.5 and stepwise RFP for ammonia.

Stepwise RFP Justification

The RFP demonstrations for NOx and PM2.5 were conducted following the generally linear approach, while RFP for ammonia was demonstrated using the stepwise approach. This is due to the nature of ammonia emissions in the Basin, technologies anticipated to bring ammonia reductions, and the timeline to develop and implement rules to achieve reductions.

Attainment of the 2012 annual PM2.5 NAAQS requires NOx and PM2.5 emissions reductions of 54 percent and 6 percent, respectively, from 2018 to 2030. While portions of the needed reductions come from continued implementation of already adopted rules and regulations, new reductions from the proposed control measures are necessary for attainment. In Chapter 4, Tables 4-4 and 4-5 present South Coast AQMD's commitment to adopt and implement the proposed control measures. CARB's commitments are provided in Tables 4-6 and 4-11, which includes adoption and implementation dates for each measure. The adoption and implementation dates are as expeditious as possible and reflect best estimates of the time required to develop and implement each proposed measure.

In addition, the nature of ammonia emissions needs to be considered. The South Coast Air Basin is a highly

[14] Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements, 81 Fed. Reg. 58009 (Aug. 24, 2016)
[15] CFR § 51.1012(a)(4)

urbanized area with limited agricultural activities and dairy operations. The majority of ammonia emissions come from area sources such as humans and pets in the Basin. Other large sources include on-road vehicles, industrial processes, and farming. Area source emissions are expected to grow in the future due to increases in the population of humans and pets. While the ammonia emissions from mobile or stationary point sources can be controlled by transitioning to zero emissions, ammonia from humans and pets cannot be controlled with current technology. Although there are limited ammonia controls proposed in control measures BCM-08 through BCM-11, the majority of ammonia reductions are anticipated from the deployment of zero emission vehicles. This contrasts with the widespread availability of control technologies targeting NOx and PM2.5 from combustion sources. For NOx, SCR and low-NOx burners are available and, for PM2.5, Diesel Particle Filters are available for certain applications. Such controls are already required by adopted regulations and will continue to lower NOx and PM2.5 emissions to meet generally linear progress toward attainment. However, such NOx and PM2.5 control technologies often do not reduce ammonia concurrently and transition to zero emissions technologies is often the only pathway to achieve significant amount of ammonia reductions. Although the deployment of zero emission technologies is complex and requires more time to implement, ammonia emissions will be sufficiently controlled to attain the 2012 annual PM2.5 standard in 2030.

In summary, it is necessary to rely on a stepwise RFP demonstration for ammonia. Generally linear progress is not feasible due to the type of control technologies relied on for attainment, and time required to develop and implement rules.

Adoption Dates

The committed adoption dates in Table 4-4, Table 4-5, and Table 4-6 are based on the best estimate of the amount of time required to develop a measure. Time spent in this developmental phase is influenced by the level of interest from stakeholders and conflicts of interest, if any, among stakeholders. Maturity of technology, market capacity for at-scale deployment, infrastructure to support the new technology, and cost effectiveness determine the timeline to develop a proposed control measure to a rule/regulation. In addition, once the proposed measure has been developed, it must be adopted through a public process, which entails procedural requirements with their own timing.

Implementation Dates

The committed implementation dates in Table 4-4, Table 4-5, and Table 4-6 are based on the best estimate of the amount of time required for measure adoption and procedural elements as well as the implementation phase. For example, CARB regulations, once adopted, undergo a prescribed review process by the State Office of Administrative Law (OAL) to ensure compliance with California's Administrative Procedure Act before the measure can be codified in the California Code of Regulations. The effective date of an OAL-approved regulation can be a year or more from the date of CARB adoption. Following development and adoption, in all cases, the implementation schedule of a measure must account for the time needed by the affected entities to comply with the requirements in the measure. This includes planning for, and investing in, the resources to implement the required controls—to change,

buy, or install new technology, if applicable. Specific challenges related to the timing of implementation of innovative South Coast AQMD and CARB measures are described in further detail below.

South Coast AQMD Stationary Source Measures

As outlined in Table 4-4, South Coast AQMD has committed to adopt stationary source control measures beginning in 2024, and not later than 2027. Implementation is set to begin as expeditiously as possible for each measure. For example, for BCM-10 - Emission Reductions from Direct Land Application of Chipped and Ground Uncomposted Greenwaste, is scheduled to adopt in 2026 but will be implemented starting in 2030. This is to allow composting facilities sufficient lead time to expand their operations to accommodate the increased demand for greenwaste composting.

Further understanding of the applicability of control technologies, the cost-effectiveness of controls, and the socioeconomic impacts of potential regulations are necessary before regulations can be adopted. The market availability of control equipment capable of reducing emissions further than the already stringent limits required by South Coast AQMD's technology-forcing rules is an additional consideration in implementing new regulatory requirements.

Time after rule adoption will be necessary for manufacturers and vendors to make available compliant equipment, and for facility operators to source, purchase, and install new units or compliant retrofit equipment. Dependent on the source category, construction of controls may include engineering, site preparation and infrastructure upgrades, unit installation, and operator training on proper operation. Potential control technologies have significant costs to affected facilities, and these operations will also require time to plan for these investments. Based on these challenges, rule implementation is not expected to be feasible prior to the implementation date listed in Table 4-4.

Considering the factors mentioned earlier, the emission reductions resulting from the proposed control measures are projected to materialize around 2030 rather than in the immediate future. This necessitates a stepwise RFP demonstration for ammonia. The expeditious implementation of some measures, where feasible, may result in emission reductions that occur before 2030. South Coast AQMD commits to demonstrate and discuss any early emission reductions achieved in Quantitative Milestone Reports.

Zero Emission Mobile Source Measures

Mobile sources are responsible for approximately 25 percent of the NH3 emissions in the South Coast; NH3 can be emitted as a byproduct during the use of control technologies designed to lower the emissions of NOx, the dominant precursor of both ozone and PM2.5 pollution. In engines fueled by Compressed Natural Gas (CNG), NH3 is formed as a byproduct of a three-way catalyst that converts NOx to nitrogen (N2). In diesel engines, Selective Catalytic Reduction controls use NH3 as a catalyst to convert NOx to N2 and water. Unreacted NH3 can be emitted as part of in this process, referred to as an ammonia slip.

CARB programs that drive mobile sources to zero-emission vehicles and engines will provide ammonia emission reduction benefits in 2030 in the South Coast, in addition to significant NOx and PM2.5

reductions; these programs include adopted regulations such as the Advanced Clean Cars, Advanced Clean Trucks, Advanced Clean Fleets, and the Transport Refrigeration Unit (Part I) Regulations, and proposed measures such as the Zero-Emissions Truck Measure, Transport Refrigeration Unit (Part II) Regulation, and Cargo Handling Equipment Amendments. CARB's adoption and implementation schedules are as expeditious as possible, but like many stationary source control measures, sufficient time is needed for both regulatory development and for development, manufacture, and purchase of control technologies prior to emissions reductions being achieved from these programs. Based on these challenges, rule implementation is not expected to be feasible prior to the implementation date listed in Table 4-8. Considering all of the factors mentioned, the majority of emission reductions resulting from the proposed control measures are projected to be achieved by 2030 rather than in the near term years.

RFP Demonstration

This analysis demonstrates generally linear RFP for NOx and direct PM2.5 emissions and stepwise RFP for ammonia emissions. Table 6-6 presents the baseline emissions of NOx, direct PM2.5, and ammonia including line item adjustments reflecting adopted regulations for the RFP milestone years. The regulations included in the line item adjustments are provided in Table 6-7. RFP is demonstrated using reductions from three categories: adopted regulations already reflected in the baseline emissions, regulations adopted since the development of the 2022 AQMP, and control measures proposed in this Plan. The second category includes South Coast AQMD's rules adopted during November 2020 to September 2023 and CARB's regulations adopted in 2022 and afterwards. The projected emissions account for all of these reductions. However, in some years, the RFP target is higher than the projected emissions. This is because the projected emissions are below the level needed to demonstrate linear progress. RFP is expected to be met for all milestone and attainment years as presented in detail for each pollutant in subsequent sections. The 2031 post-attainment year target is assumed to have same amount of reductions as the attainment scenario. However, in reality, 2031 emissions are expected to be below the RFP target levels due to continued implementation of the control strategies required to meet the 2008 and 2015 ozone NAAQS by 2031 and 2037, respectively.

TABLE 6-6
REASONABLE FURTHER PROGRESS CALCULATIONS FOR MILESTONE YEARS

	Pollutant	2018	2025	2028	2030	2031
Baseline Emissions	NOx	383.02	239.40	219.29	210.31	207.17
	PM2.5	56.04	54.01	54.11	54.05	54.06
	NH3	74.54	77.79	78.91	79.31	79.48
Line Item Adjustments	NOx	-	3.26	10.06	24.34	24.34
	PM2.5	-	0.14	0.47	0.83	0.83
	NH3	-	0.10	1.40	2.96	2.96
Control Measure Reductions	NOx	-	0	0	10.60	10.60
	PM2.5	-	0	0	0.54	0.54
	NH3	-	0	0	0.24	0.24
Projected Emissions	NOx	-	236.14	209.23	175.37	172.23
	PM2.5	-	53.87	53.64	52.68	52.69
	NH3	-	77.69	77.51	76.11	76.28
Generally Linear RFP Target	NOx	-	261.89	209.98	175.37	172.23
	PM2.5	-	54.08	53.64	52.68	52.69
Stepwise RFP Target	NH3	-	77.69	77.51	76.11	76.28

TABLE 6-7
REGULATIONS INCLUDED IN THE LINE-ITEM ADJUSTMENTS FOR RFP DEMO

Adopted Measure	Adoption Date	2025			2028			2030			2031		
		NOx	PM2.5	NH3	NOx	PM2.5	NH3	NOx	PM2.5	NH3	NOx	PM2.5	NH3
Advanced Clean Cars II	Nov. 2022	0.00	0.00	0.00	0.67	0.12	0.94	1.49	0.18	2.12	1.49	0.18	2.12
Clean Miles Standard	Mar. 2022	0.01	0.00	0.00	0.03	0.01	0.00	0.04	0.00	0.00	0.04	0.00	0.00
EPA Clean Trucks Plan	Dec. 2022	0.00	0.00	0.00	0.23	0.00	0.00	0.61	0.00	0.00	0.61	0.00	0.00
Advanced Clean Fleets	Oct. 2023	1.10	0.01	0.10	2.99	0.04	0.46	4.79	0.09	0.84	4.79	0.09	0.84
In-use Locomotive Regulation	Oct. 2023	0.69	0.01	0.00	2.78	0.06	0.00	9.90	0.24	0.00	9.90	0.24	0.00
Commercial Harbor Craft Amendments	Dec. 2022	1.06	0.06	0.00	1.58	0.08	0.00	2.06	0.09	0.00	2.06	0.09	0.00
Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation	Nov. 2022	0.31	0.02	0.00	1.53	0.10	0.00	1.91	0.12	0.00	1.91	0.12	0.00
Transport Refrigeration Unit Phase 1	Feb. 2022	0.09	0.04	0.00	0.25	0.07	0.00	0.33	0.10	0.00	0.33	0.10	0.00
Non-RECLAIM Rules adopted/amended after 2022 AQMP cut-off date	Sep. 2023	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.34	0.00	0.00
RECLAIM landing rules adjustment	Sep. 2023	0.00	0.00	0.00	0.00	0.00	0.00	2.86	0.00	0.00	2.86	0.00	0.00
Total Benefit (tpd)		3.26	0.14	0.10	10.06	0.47	1.40	24.34	0.83	2.96	24.34	0.83	2.96

Table 6-8 summarizes the total reductions needed from the 2018 baseline emissions inventory that must be achieved to reach attainment in 2030.

TABLE 6-8
TOTAL REDUCTIONS NEEDED FOR ATTAINMENT (TPD)

Pollutant	2018 Base Year Emissions	2030 Attainment Scenario Emissions	Total Reductions Needed
NOx	383.02	175.37	207.65
PM2.5	56.04	52.68	3.36
NH3	74.54	76.11	-1.57*

*Negative reductions reflect increase in emissions from 2018 to 2030

NOx

NOx emissions are expected to decrease in a generally linear fashion from the base year to the attainment scenario, as shown in Figure 6-1. The NOx emission reductions anticipated from the baseline reductions and line item adjustments are sufficient to meet or exceed the RFP targets. Therefore, NOx is determined to meet the RFP requirements.

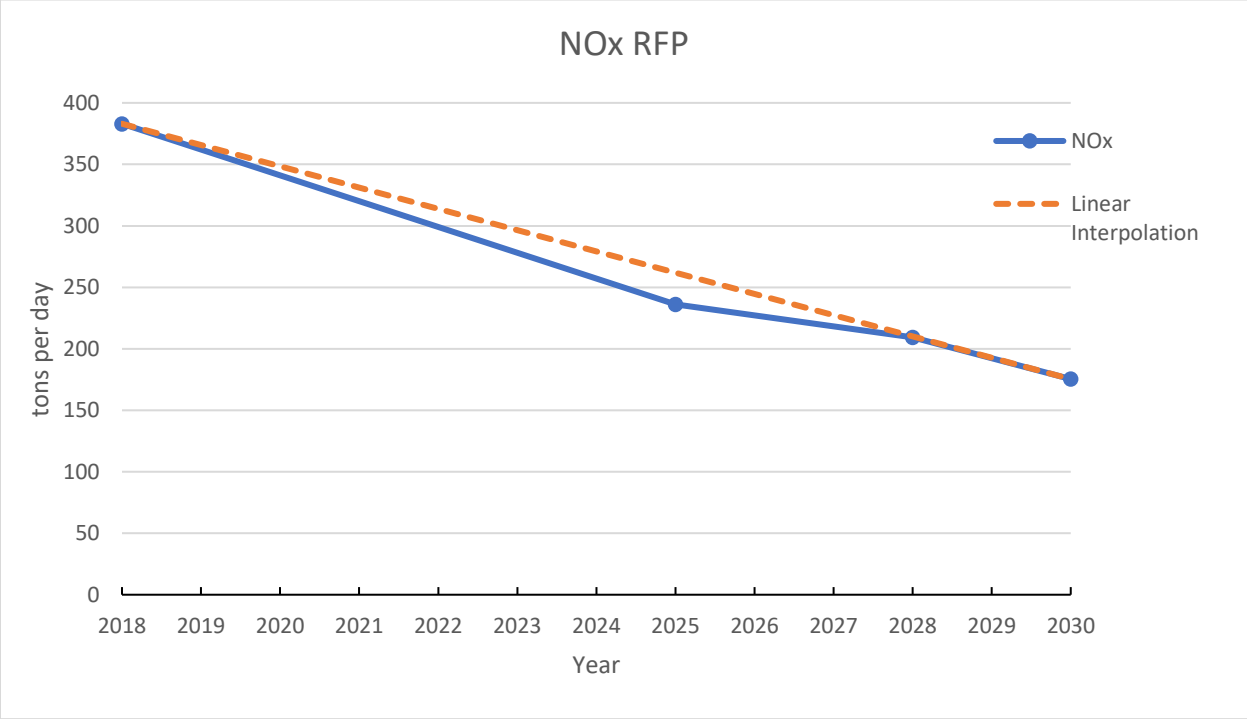


FIGURE 6-1
NOX RFP TOWARD ATTAINMENT:
ORANGE DASHED LINE PRESENTS THE LINEAR INTERPOLATION FROM BASE YEAR TO ATTAINMENT SCENARIO EMISSIONS AND BLUE SOLID LINE PRESENTS ANTICIPATED PROGRESS TOWARD ATTAINMENT

PM2.5

Direct PM2.5 emissions are expected to decrease in a generally linear fashion from the base year to the attainment scenario, as shown in Figure 6-2. The direct PM2.5 emission reductions anticipated from the baseline reductions and line item adjustments are sufficient to meet or exceed the RFP targets. Therefore, direct PM2.5 is determined to meet the RFP requirements.

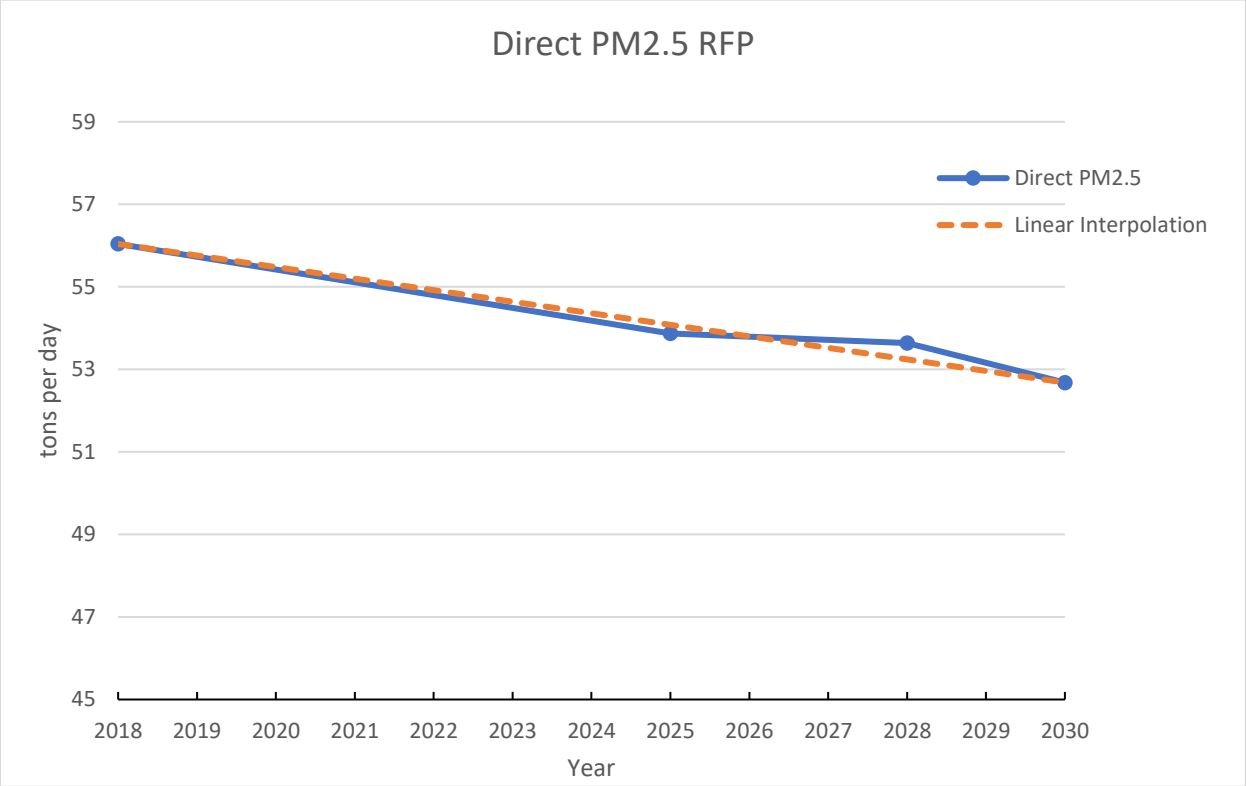


FIGURE 6-2
DIRECT PM2.5 RFP TOWARD ATTAINMENT:
ORANGE DASHED LINE PRESENTS THE LINEAR INTERPOLATION FROM BASE YEAR TO ATTAINMENT SCENARIO EMISSIONS AND BLUE SOLID LINE PRESENTS ANTICIPATED PROGRESS TOWARD ATTAINMENT

Ammonia

RFP for ammonia utilizes a stepwise approach as justified earlier in this chapter. Figure 6-3 illustrates a parabolic ammonia trend. As explained in the stepwise justification, the projected growth in ammonia emissions between 2018 and 2025 is mainly driven by increases in the human and pet population that outpace emission reductions. However, the pace of ammonia emission reductions accelerates after 2025 due to increasing penetration of zero emission technologies especially in the on-road sector. CARB regulations such as Advanced Clean Cars II and Advanced Clean Fleets contribute to these emission reductions. The control strategy also includes South Coast AQMD's ammonia measures, BCM-08 through BCM-11, and CARB's Zero Emissions Truck Measure which are expected to further reduce ammonia emissions. In 2028 and 2030, these regulations result in ammonia reductions that outpace increases due to population growth. While 2030 is projected to have higher emissions than 2018, this marginal increase will not hinder attainment of the 2012 annual PM2.5 NAAQS in 2030. In addition, the implementation of zero emission vehicles and technologies will continue beyond 2030 and lower ammonia emissions even further. Therefore, ammonia is determined to meet the RFP requirements.

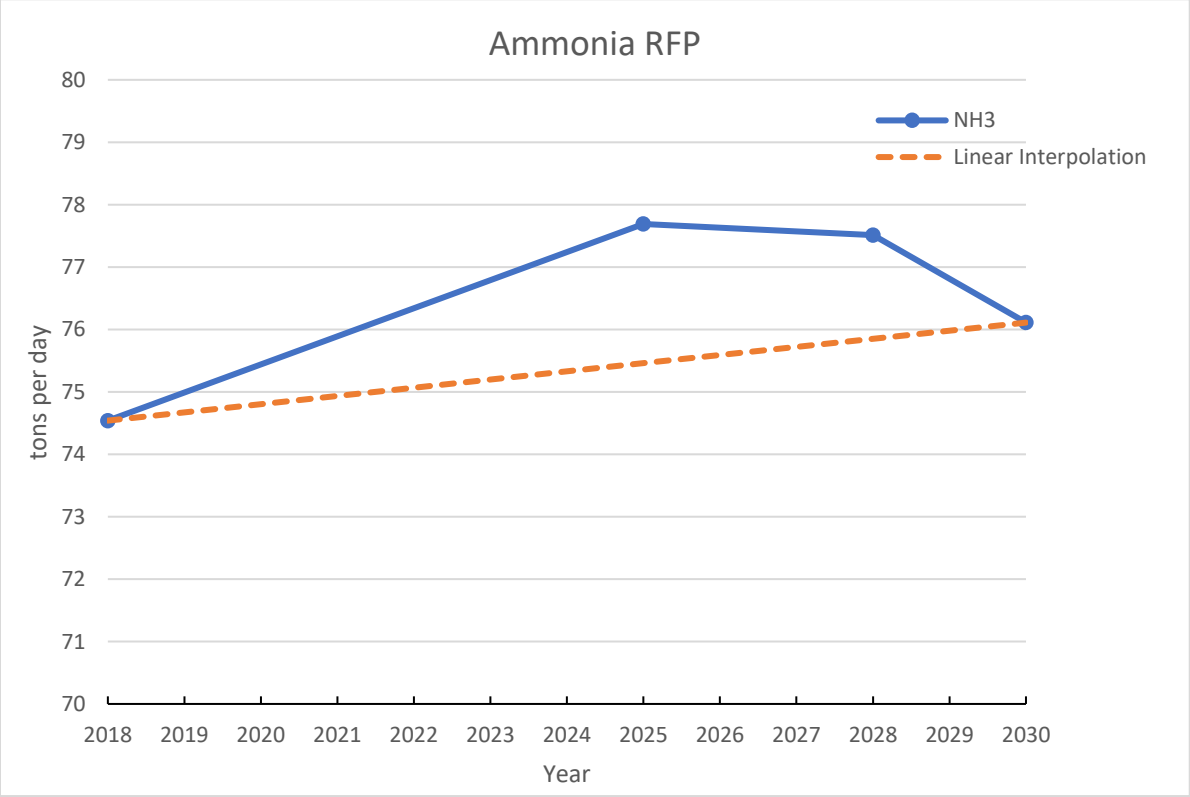


FIGURE 6-3
AMMONIA RFP TOWARD ATTAINMENT:
ORANGE DASHED LINE PRESENTS THE LINEAR INTERPOLATION FROM BASE YEAR TO ATTAINMENT SCENARIO EMISSIONS AND BLUE SOLID LINE PRESENTS ANTICIPATED PROGRESS TOWARD ATTAINMENT

Quantitative Milestones for South Coast AQMD Stationary Source Regulations

The RFP and quantitative milestone demonstrations in this Plan rely, in part, on NOx reductions from South Coast AQMD rules, the most significant of which is Rule 1109.1. South Coast AQMD will also report on the adoption and implementation of stationary source measures as specified in Chapter 4.

The applicable quantitative milestone years for the 2012 12 µg/m3 annual PM2.5 standard are 2025, 2028, and 2031.

For the 2025 milestone year, South Coast AQMD will report on the following:

- Implementation from 2022 through 2025 of Rule 1109.1, which establishes NOx and CO emission limits for combustion equipment at petroleum refineries and facilities with operations related to petroleum refineries.
- Adoption and implementation of applicable PM2.5 Plan measures according to the schedule specified in Chapter 4.

For the 2028 milestone year, South Coast AQMD will report on the following:

- Implementation from 2026 through 2028 of Rule 1109.1, which establishes NOx and CO emission limits for combustion equipment at petroleum refineries and facilities with operations related to petroleum refineries.
- Adoption and implementation of applicable PM2.5 Plan measures according to the schedule specified in Chapter 4.

For the 2031 milestone year, South Coast AQMD will report on the following:

- Implementation from 2029 through 2031 of Rule 1109.1, which establishes NOx and CO emission limits for combustion equipment at petroleum refineries and facilities with operations related to petroleum refineries.
- Adoption of applicable PM2.5 Plan measures since the 2028 milestone year.
- Demonstration of implementation of all PM2.5 Plan measures with committed adoption and implementation schedules.
- Demonstration that the aggregate emission reduction commitment was achieved for the 2030 attainment year.

Quantitative Milestones for State Mobile Source Regulations

CARB will work closely with South Coast AQMD to report on the milestones identified in this Plan for the applicable milestone years. CARB will report on milestones for implementation of mobile source measures that contribute significant emissions reductions included in the reasonable further progress demonstration through the 2031 milestone year. These regulations were originally set forth as measure commitments in the 2016 State Strategy for the State Implementation Plan (2016 State SIP Strategy) and the 2022 State Strategy for the State Implementation Plan (2022 State SIP Strategy).

For the 2025 milestone year, CARB is reporting on the following three milestones:

- Implementation from 2022 through 2025 of the Clean Truck Check Program, previously known as the Heavy-Duty Vehicle Inspection and Maintenance Program, which ensures that vehicles' emissions control systems are properly functioning when traveling on California's roadways;
- Implementation from 2022 through 2025 of the Advanced Clean Fleets Regulation which focuses on strategies to ensure that the cleanest vehicles are deployed by government, business, and other entities in California to meet their transportation needs; and
- Implementation from 2022 through 2025 of the In-Use Off-Road Diesel-Fueled Fleets Regulation which requires fleets operating in-use off-road diesel equipment to meet an annual fleet average emissions target that decreases over time.

For the 2028 milestone year, CARB is reporting on the following three milestones:

- Implementation from 2026 through 2028 of the Heavy-Duty Vehicle Inspection and Maintenance Program, also known as Clean Truck Check, which ensures that vehicles' emissions control systems are properly functioning when traveling on California's roadways;
- Implementation from 2026 through 2028 of the Advanced Clean Fleets Regulation which focuses on strategies to ensure that the cleanest vehicles are deployed by government, business, and other entities in California to meet their transportation needs; and
- Implementation from 2026 through 2028 of the In-Use Off-Road Diesel-Fueled Fleets Regulation which requires fleets operating in-use off-road diesel equipment to meet an annual fleet average emissions target that decreases over time.

For the 2031 milestone year, CARB is reporting on the following milestone:

- The status of new CARB SIP measures adopted between 2024 and 2030 per the schedule included in the adopted South Coast 12 $\mu g/m^3$ annual PM2.5 Plan that provide for attainment of the 12 $\mu g/m^3$ PM2.5 annual standard in 2030.

Transportation Conformity

CAA Section 176(c) establishes transportation conformity requirements which are intended to ensure that transportation activities do not interfere with air quality progress. The CAA requires that transportation plans, programs, and projects that obtain federal funds or approvals conform to applicable SIPs before being approved by a Metropolitan Planning Organization (MPO). Conformity to a SIP means that proposed activities must not:

(1) Cause or contribute to any new violation of any standard;
(2) Increase the frequency or severity of any existing violation of any standard in any area; or
(3) Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

A SIP that analyzes the region's total emissions inventory from all sources is necessary for purposes of demonstrating RFP and attainment. The portion of the total emissions inventory from on-road highway and transit vehicles in these analyses becomes the Motor Vehicle Emissions Budget (MVEB).[16] Budgets are set for each criteria pollutant or its applicable precursor(s), for all RFP milestone years and the attainment year. Subsequent transportation plans and programs produced by transportation planning agencies are required to conform to the SIP by demonstrating that the emissions from the proposed plan, program, or project do not exceed the MVEB.

PM2.5 Requirements for Conformity

The U.S. EPA has promulgated separate rules addressing the PM2.5 emission categories and precursors that must be considered in PM2.5 transportation conformity determinations.

PM2.5 Motor Vehicle Emission Category Requirements

Guidance on the motor vehicle emission categories that must be considered in transportation conformity determinations can be found in the July 1, 2004, Final Rule amending the Transportation Conformity Rule to implement criteria and procedures for the 8-hour ozone and PM2.5 standards:[17]

> [A]ll regional emissions analyses in PM2.5 nonattainment and maintenance areas [must] consider directly emitted PM2.5 motor vehicle emissions from the tailpipe, brake wear, and tire wear…Sections IX. and X. [of the Final Rule] provide information on when re- entrained

[16] Federal transportation conformity regulations are found in 40 CFR Part 51, subpart T – Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. of the Federal Transit Laws. Part 93, subpart A of this chapter was revised by the EPA in the August 15, 1997 Federal Register.

[17] Transportation Conformity Rule Amendments for the New 8-hour Ozone and PM2.5National Ambient Air Quality Standards and Miscellaneous Revisions for Existing Areas; Transportation Conformity Rule Amendments: Response to Court Decision and Additional Rule Changes, 69 Fed. Reg. 40004 (July 1, 2004)

road dust and construction-related dust must also be included in PM2.5 conformity analyses…[T]he analysis for direct PM2.5 must include:

- tailpipe exhaust particles,
- brake and tire wear particles,
- re-entrained road dust, if before a SIP is submitted to U.S. EPA or the state air agency has made a finding of significance or if the applicable or submitted SIP includes re-entrained road dust in the approved or adequate budget, and
- fugitive dust from transportation-related construction activities, if the SIP has identified construction emissions as a significant contributor to the PM2.5 problem.[18]

PM2.5 Motor Vehicle Emission Precursor Requirements

Following the July 1, 2004, Final Rule identifying the motor vehicle emission categories that must be considered in transportation conformity determinations, U.S. EPA issued the May 6, 2005, Final Rule[19] amending the Transportation Conformity Regulation. In this Final Rule, U.S. EPA identifies four transportation-related precursors that result in PM2.5 formation—nitrogen oxides (NOx), volatile organic compounds (VOCs), sulfur oxides (SOx),[20] and ammonia (NH3)—for consideration in the conformity process in PM2.5 nonattainment and maintenance areas.[21] Of these PM2.5 precursors, NOx must be included in the regional transportation conformity determination unless it is found to be an insignificant contributor to the formation of PM2.5 in the region, per Section 93.102(b)(2)(iv) of the Conformity Regulation. Conversely, VOCs, SOx, and NH3 are not required unless these precursors are found to be significant contributors to the formation of PM2.5 in the region or are included in the RFP demonstration.[22] In this plan, NH3 emissions are considered in the MVEB as NH3 emissions are included in the RFP demonstration.

[18] 69 FR 40331-40333. Codified in Sections 93.102(b)(1) and (3) and Section 93.122(f) of the Conformity Regulation.
[19] Transportation Conformity Rule Amendments for the New PM2.5 National Ambient Air Quality Standard: PM2.5 Precursors, 70 Fed. Reg. 24280 (June 1, 2005)
[20] U.S. EPA revised the transportation conformity rule to revise PM2.5 precursors from SOX to SO2 for consistency with the broader PM2.5 implementation strategy. (Transportation Conformity Rule Amendments To Implement Provisions Contained in the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA–LU), 73 Fed. Reg. 4435 (Jan. 24, 2008))
[21] Transportation Conformity Rule Amendments for the New PM2.5 National Ambient Air Quality Standard: PM2.5 Precursors, 70 Fed. Reg. 24282 (June 1, 2005)
[22] 40 CFR 93.102(b)(2)(v)

Conformity Budgets

Introduction

The California Air Resources Board (CARB) has prepared the motor vehicle emissions budget (MVEB)[23] for the South Coast Attainment Plan for the 2012 Annual PM2.5 National Ambient Air Quality Standard (NAAQS).[24] The MVEB is the maximum allowable emissions from motor vehicles within a nonattainment area and is used to determine whether transportation plans and projects conform to the applicable state implementation plan (SIP).

Transportation conformity is the federal regulatory procedure for linking and coordinating the transportation and air quality planning processes through the MVEB established in the SIP. Under section 176(c) of the Clean Air Act (Act), federal agencies may not approve or fund transportation plans and projects unless they are consistent with the regional SIP. In addition, conformity with the SIP requires that transportation activities do not (1) cause or contribute to new air quality violations, (2) increase the frequency or severity of any existing violation, or (3) delay the timely attainment of NAAQS. Therefore, quantifying on-road motor vehicle emissions and comparing those emissions with a budget established in the SIP determine transportation conformity between air quality and transportation planning.

The MVEBs are set for each criteria pollutant or its precursors for each milestone year and the attainment year of the SIP. Subsequent transportation plans and programs produced by transportation planning agencies must demonstrate that the emissions from the proposed plan, program, or project do not exceed the MVEBs established in the applicable SIP. The MVEBs established in this SIP apply as a "ceiling" or limit on transportation emissions for the Southern California Association of Governments (SCAG) for the years in which they are defined and for all subsequent years until another year for which a different budget is specified, or until a SIP revision modifies the budget. For the South Coast Air Quality Management District's (District) annual PM2.5 attainment plan, the milestone years, attainment year of the SIP, and post-attainment milestone years (also referred to as the plan analysis years) are 2025, 2028, 2030, and 2031.

Methodology

The MVEB for the South Coast annual PM2.5 attainment plan is established based on guidance from the U.S. EPA on the motor vehicle emission categories and precursors that must be considered in transportation conformity determinations as found in the transportation conformity regulation and final rules as described below. The MVEB must be clearly identified, precisely quantified, and consistent with

[23] Federal transportation conformity regulations are found in 40 CFR Part 51, subpart T – Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. of the Federal Transit Laws. Part 93, subpart A of this chapter was revised by the EPA in the August 15, 1997 Federal Register.

[24] National Ambient Air Quality Standards for PM, https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm#rule-summary

applicable Act requirements. Further, it should be consistent with the South Coast PM2.5 Attainment Plan's emission inventory and control measures.

The South Coast annual PM2.5 attainment plan establishes the MVEB only for primary emissions of PM2.5 from motor vehicle exhaust, tire and brake wear, and paved and unpaved road dust, as well as for the precursors of NOx and NH3. This section discusses budgets that have been set for annual average daily emissions in the analysis years 2025, 2028, 2030, and 2031. The MVEB presented below uses emission rates from California's motor vehicle emission model, EMFAC2021 (V.1.0.2),[25] with South Coast activity data (Vehicle Miles Traveled, i.e., VMT, and speed distributions), along with California Emissions Projection Analysis Model (CEPAM) 2022v1.01. The activity data are from the region's 2020 Regional Transportation Plan (RTP).[26] Thus, they are consistent with the attainment demonstration for the SIP.

On November 15, 2022, the U.S. EPA approved EMFAC2021 for use in SIPs and demonstrating transportation conformity.[27] The EMFAC model estimates emissions from two combustion processes (running and start exhaust) and four evaporative processes (hot soak, running losses, diurnal, and resting losses). Further, the estimated emissions were adjusted for the Heavy-Duty Inspection and Maintenance (HD I/M) Program,[28] the Advanced Clean Fleets (ACF) program,[29] the Advanced Clean Cars II (ACCII) program,[30] and the Clean Trucks Plan.[31]

The MVEB for the South Coast annual PM2.5 attainment plan was developed to be consistent with the on-road emissions inventory[32] and attainment demonstration using the following method:

(1) Used the EMFAC2021 model to produce the on-road motor vehicle emissions totals (average annual day) for the appropriate pollutants (NOx, NH3, and PM2.5)33 using the 2020 RTP activity data.
(2) Applied the off-model adjustments (HD I/M, ACF, ACCII, and Clean Trucks Plan) to account for recently adopted regulations.
(3) Used CEPAM2022 model to estimate on-road construction dust, paved road dust, and unpaved road dust for PM2.5.
(4) Rounded the totals for NOx, NH3, and PM2.5 to the nearest ton.

[25] More information on data sources can be found in the EMFAC technical support documentation at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation
[26] SCAG 2020 RTP, https://scag.ca.gov/read-plan-adopted-final-connect-socal-2020
[27] U.S. EPA approval of EMFAC2021 can be found at 87 FR 68483: federalregister.gov
[28] Heavy-Duty Engine and Vehicle Omnibus Regulations, https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox
[29] Advanced Clean Fleet, https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets
[30] Advanced Clean Cars II, https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii
[31] Clean Trucks Plan, https://www.epa.gov/system/files/documents/2021-08/420f21057.pdf
[32] More information about the on-road motor vehicle emission budgets can be found in Chapter 3 of the plan
[33] More information about the significance of these pollutants can be found in Appendix VI of the plan

Motor Vehicle Emissions Budget

The MVEB in Table 1 was established according to the methodology outlined above and in consultation with SCAG, the District, U.S. EPA, Federal Highway Administration (FHWA), and Federal Transit Administration (FTA). The MVEB is consistent with the emission inventories and control measures in the PM2.5 attainment plan. This budget will be effective once U.S. EPA determines it is adequate or approved.

Table 6-9 contains the Summary MVEB for the South Coast Air Basin. It includes pollutants of NOx, NH3, and PM2.5 emissions for milestone and attainment years using the EMFAC2021 model and 2020 RTP activity data.

TABLE 6-9
SUMMARY MVEB FOR THE SOUTH COAST PM2.5 ATTAINMENT PLAN (TONS PER DAY)

	2025			2028			2030			2031		
	NOx	NH3	PM2.5	NOx	NH3	PM2.5	NOx	NH3	PM2.5	NOx	NH3	PM2.5
Vehicular Exhaust (including brake/tire wear for PM10)	86.7	20.2	4.0	74.8	21.0	3.9	68.5	21.2	3.9	65.9	21.2	3.8
Construction Road Dust	-	-	0.3	-	-	0.3	-	-	0.3	-	-	0.3
Paved Road Dust	-	-	8.9	-	-	9.1	-	-	9.1	-	-	9.1
Unpaved Road Dust	-	-	1.7	-	-	1.7	-	-	1.7	-	-	1.7
Reductions from HD I/M[a]	14.2	0.0	0.1	17.5	0.0	0.2	18.5	0.0	0.2	18.8	0.0	0.2
Reductions from Advanced Clean Fleets	1.1	0.1	0.0	3.0	0.5	0.0	4.8	0.8	0.1	4.8	0.8	0.1
Reductions from ACCII	-	-	-	0.7	0.9	0.1	1.5	2.1	0.2	1.5	2.1	0.2
Reductions from Clean Trucks Plan	-	-	-	0.2	0.0	0.0	0.6	0.0	0.0	0.6	0.0	0.0
Total[b]	71.36	20.14	14.73	53.36	19.58	14.69	43.10	18.25	14.46	40.24	18.29	14.44
Motor Vehicle Emission Budget	72	21	15	54	20	15	44	19	15	41	19	15

[a] Values may not add up due to rounding.
[b] Motor Vehicle Emission Budgets calculated are rounded up to the nearest ton.
Source: EMFAC2021 v1.02 and CEPAM2022 v1.01

Fulfillment of New Source Review Requirements

CAA Section 172(c) requires permits for the construction and operation of new or modified major stationary sources. New Source Review (NSR) for major and in some cases minor sources of PM2.5 and its precursors is presently addressed through South Coast AQMD's NSR and RECLAIM programs (Regulations XIII and XX, respectively). Both programs are applicable to sources located in the South Coast AQMD jurisdiction, including the South Coast Air Basin and the Coachella Valley. Regulation XIII establishes the federal and State mandated pre-construction review program for new, modified, or relocated sources. The NSR program is a critical component of South Coast AQMD's attainment strategy and ensures that all new and modified sources install BACT and their emission increases are fully offset with creditable emission reductions.

The components of South Coast AQMD's NSR program are contained within Regulation XIII. Rule 1325 was adopted June 3, 2011 to incorporate the U.S. EPA's requirements for PM2.5 and its precursors into Regulation XIII. The rule mirrors federal requirements which include the definition of major source, significant emissions rate, offset ratios, and the applicability requirements of Lowest Achievable Emission Rate (LAER), facility compliance, offsets, and control of PM2.5 precursors. In 2021, U.S. EPA approved Rule 1325 as meeting all applicable NSR requirements.[34]

RECLAIM facilities are currently not subject to emission offsets for NOx and SOx under Regulation XIII, however, these facilities are instead subject to NOx and SOx emission offsets under Regulation XX. Under existing NSR in Regulation XIII and RECLAIM programs in Regulation XX, major stationary sources of NOx and SOx are already subject to emission offsets. The 2016 AQMP included a control measure, CMB-05 - Further NOx Reductions from RECLAIM Assessment, to achieve an additional five tons per day of NOx emissions as soon as practicable, but no later than 2025, and to transition RECLAIM to a command-and-control regulatory structure. The transition will include requiring former RECLAIM sources to be subject to Regulation XIII for NOx and SOx as applicable. Regulation XIII will be updated to reconcile the program with U.S. EPA's 2002 NSR Reform.[35]

VOC and ammonia emissions are also subject to BACT under existing NSR. VOC emissions are required to be offset when a new or modified source has the potential to emit 4 tons per year or more of VOC. Ammonia emission sources have not historically been subject to NSR offset requirements. However, for permitted ammonia sources, Rule 1303 (NSR Requirements) requires denial of "the Permit to Construct for any relocation, or for any new or modified source which results in an emission increase of any nonattainment air contaminant, any ozone depleting compound, or ammonia, unless BACT is employed for the new or relocated source or for the actual modification to an existing source." BACT shall be at least as stringent as LAER as defined in CAA Section 171(3); therefore, South Coast AQMD's current regulations requiring BACT

[34] Air Plan Approval; California; South Coast Air Quality Management District; Stationary Source Permits, 86 Fed. Reg. 58592 (Oct. 22, 2021)

[35] Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Baseline Emissions Determination, Actual-to-Future-Actual Methodology, Plantwide Applicability Limitations, Clean Units, Pollution Control Projects, 67 Fed. Reg. 80186 (Dec. 31, 2002)

comply with the federal LAER requirements.

Major Source Threshold

The NSR permitting program relies on emissions thresholds to determine when certain requirements apply to new stationary sources and to modifications of existing stationary sources. If a new or modified facility will emit PM2.5 or PM2.5 precursor emissions greater than the major source threshold, the facility is considered a major source. Under a "serious" nonattainment classification, the major source threshold is defined as a potential to emit 70 or more tons per year of PM2.5 or PM2.5 precursors. To comply with federal requirements for "serious" nonattainment areas, Rule 1325 was amended on November 4, 2016 to update the Major Polluting Facility definition to align the associated major source emission threshold at 70 tons per year for PM2.5 and PM2.5 precursors. VOC and ammonia were added to the Rule 1325 definition of "precursors" and a VOC and ammonia threshold at 40 tons per year was added as part the definition of "significant" which is used in the determination of a "major modification." The SOx major polluting facility threshold defined in Rule 1302 was also lowered from 100 to 70 tons per year. While the 2016 amendment expanded the definition of "precursors," it did not expand the definition of "regulated NSR pollutant" to explicitly reference VOC and NH3 as PM2.5 precursor. For this reason, U.S. EPA conditionally approved Rule 1325 based on a commitment to amend Rule 1325 to expand the definition of "regulated NSR pollutant."[36] South Coast AQMD subsequently amended Rule 1325 on January 4, 2019 to correct this deficiency and U.S. EPA approved the amendment into the SIP.[37]

PM Precursor Requirement in Nonattainment NSR

CAA Section 189(e) states that control requirements applicable to plans in effect for major stationary PM sources shall also apply to major stationary sources of PM precursors, except where such sources do not contribute significantly to PM levels which exceed the standard in the area. A state is required to conduct a Nonattainment NSR (NNSR) precursor demonstration, which evaluates the sensitivity of PM2.5 levels to an increase in emissions of a precursor, to exempt the precursor from NSR requirements.[38] This differs from a comprehensive precursor demonstration, which evaluates the sensitivity of PM2.5 levels to a decrease in emissions of a precursor. South Coast AQMD has not conducted an NNSR precursor demonstration and is not seeking to exempt precursors from NSR requirements. Therefore, Rule 1325 satisfies CAA Section 189(e) by addressing all precursors of PM2.5 including NOx, VOC, ammonia, and SOx.

[36] Revisions to California State Implementation Plan; South Coast Air Quality Management District; Stationary Source Permits, 83 Fed. Reg. 61551 (Nov. 30, 2018)
[37] Air Plan Approval; California; South Coast Air Quality Management District; Stationary Source Permits, 86 Fed. Reg. 58592 (Oct. 22, 2021)
[38] Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements, 81 Fed. Reg. 58010 (Aug. 24, 2016)

Contingency Measures

Clean Air Act Section 172(c)(9) requires a SIP to provide for the implementation of specific measures to be undertaken if the nonattainment area fails to make RFP, or to attain the NAAQS by the applicable attainment date. Such contingency measures need to take effect within 60 days in any such case without further action by South Coast AQMD. Furthermore, contingency measures must achieve their full emission reductions within 2 years of being triggered. The U.S. EPA provides further details in its Draft Contingency Measures Guidance.[39]

Rule 445 (Wood-Burning Devices)

To comply with PM2.5 contingency requirements, South Coast AQMD amended Rule 445 (Wood-Burning Devices) on June 5, 2020 to include multiple triggers for contingency measures. Rule 445 was subsequently approved by U.S. EPA, excluding paragraph (g) (Ozone Contingency Measures) and paragraph (k) (Penalties), as fulfilling PM2.5 contingency measure requirements.[40] Rule 445 contains four PM2.5 contingency measures, each of which impose lower curtailment thresholds upon any of U.S. EPA's findings of failure to comply or attain as specified in 40 CFR §51.1014(a). The first Rule 445 contingency measure was triggered upon U.S. EPA's finding of failure to attain the 2006 24-hour PM2.5 standard.[41] As a result, Rule 445 wood burning curtailment applies to the entire Basin when PM2.5 is forecast to be higher than 29 µg/m3 on any day during the wood-burning season.

Each subsequent finding by the U.S. EPA will trigger increasingly stringent requirements by lowering the curtailment threshold in the rule. The PM2.5 reductions for imposing the remaining thresholds of 28, 27, and 26 µg/m3 are expected to be 20.9, 13.9 and 19.1 tpy, respectively. If future amendments to Rule 445 modify the curtailment threshold, South Coast AQMD commits to consider retaining the existing structure for contingency measures.

One Year's Worth of Emission Reductions

The reductions from contingency measures are required to satisfy U.S. EPA's definition of one year's worth (OYW) of reductions, which is given by the following equation:

$$\frac{(base\ year\ EI - attainment\ year\ EI)}{(attainment\ year - base\ year)} \div base\ year\ EI \times attainment\ year\ EI$$

Thus, OYW of reductions represents the average emission reductions expected per year over the planning

[39] U.S. EPA DRAFT: Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter, https://www.epa.gov/system/files/documents/2023-03/CMTF%202022%20guidance%203-17-23.pdf

[40] Air Plan Approval; California; Los Angeles — South Coast Air Basin, 87 Fed. Reg. 12866 (March 8, 2022)

[41] Finding of Failure To Attain the 2006 24-Hour Fine Particulate Matter Standards; California; Los Angeles- South Coast Air Basin, 85 Fed. Reg. 57733 (Sept. 16, 2020)

timeline, expressed as a percentage of the base year emission inventory (EI), applied to the attainment year EI. Table 6-10 provides the calculated OYW of reductions for PM2.5 and NOx. Ammonia is omitted from Table 6-10 as its emissions increase between 2018 and 2030 and it would be unreasonable to propose a contingency measure that results in an emissions increase.

TABLE 6-10
OYW OF PM2.5 AND APPLICABLE PRECURSOR REDUCTIONS BASED ON 2018 BASE YEAR AND 2030 ATTAINMENT YEAR EI (TPD)

	NOx	PM2.5
2018 Base Year EI	383.02	56.04
2030 Attainment Year EI	175.37	52.68
OYW of Reductions	7.92	0.26

Reductions from the remaining contingency triggers in Rule 445 are compared to OYW's of reductions in Table 6-11. The difference between the cumulative reductions of all contingency triggers and OYW of reductions is also displayed for comparison.

TABLE 6-11
RULE 445 CONTINGENCY MEASURE REDUCTIONS (TPY)

Pollutant	Rule 445 Curtailment Threshold			Cumulative Reductions	Difference [OYW Reductions – Cumulative Reductions]
	28 µg/m^3	27 µg/m^3	26 µg/m^3		
PM2.5	20.9	13.9	19.1	53.9	42.2
NOx	0	0	0	0	2,890.8

While Rule 445 satisfies the triggering mechanism requirement and results in PM2.5 reductions, it does not achieve OYW of reductions as required by U.S. EPA. Concurrent reductions of other pollutants are expected to be small and were not quantified. If contingency measures are unable to provide OYW of reductions, U.S. EPA requires that agencies provide a reasoned justification for achieving a lesser amount of reductions. While the Draft Contingency Measures Guidance outlines a process for developing such a justification, the guidance has not yet been finalized and is therefore subject to revision. Nevertheless, based on the Draft Contingency Measures Guidance and currently available information, staff developed a justification for achieving less than OYW of reductions and included it in Appendix V.

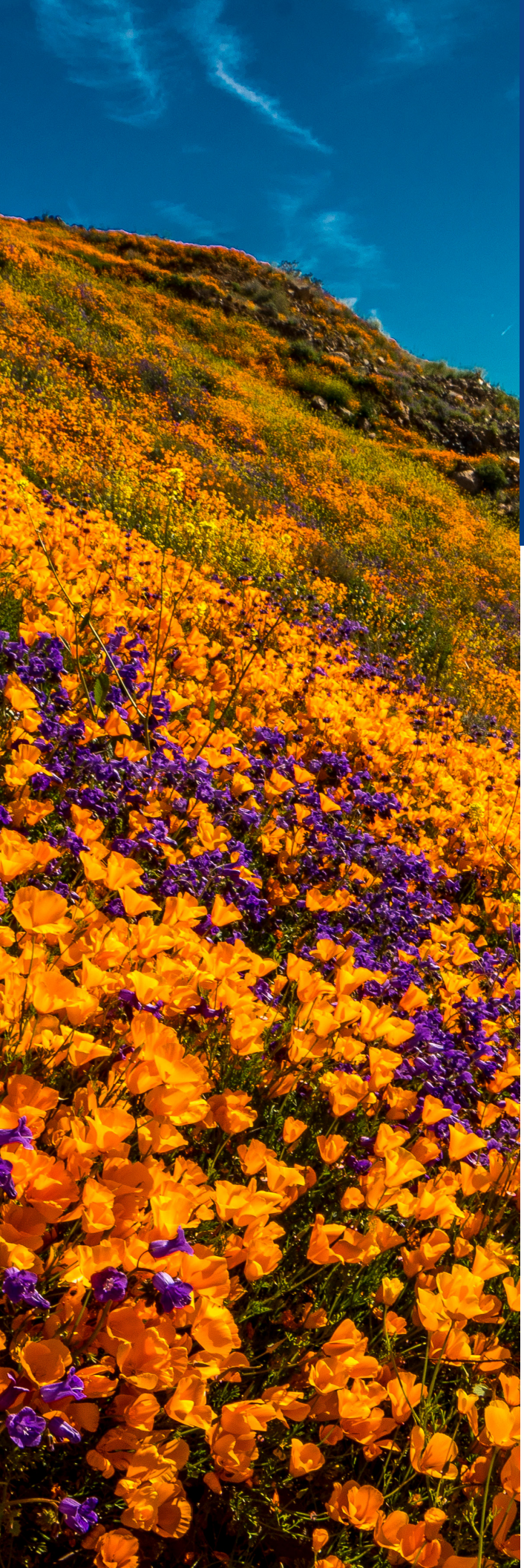
South Coast AQMD's Opportunities for Contingency Measures

The South Coast Air Basin faces some of the most difficult air quality challenges in the nation and, accordingly, South Coast AQMD has one of the most stringent stationary source control programs in the country. South Coast AQMD recently expanded its regulatory activities to mobile sources using innovative approaches such

as indirect source rules, voluntary Memoranda of Understanding, and incentive measures. Due to the stringency of those existing requirements, further opportunities for a triggered contingency measure that can be implemented by South Coast AQMD and result in OYW of emission reductions within two years of triggering are non-existent. Even if there were measures capable of achieving this level of emission reductions, they would not be withheld for contingency purposes. Instead, they would be adopted to improve air quality in furtherance of the obligation to meet the NAAQS as soon as feasible. As demonstrated in Appendix V, staff did not identify any other feasible measures that satisfy contingency measure criteria.

Conclusion

The PM2.5 Plan complies with all federal CAA requirements. The most significant CAA requirements, including the emissions inventory, control strategy, and attainment demonstration, are discussed in Chapters 3 through 5. This chapter demonstrates compliance with other CAA requirements. Further details showing compliance with control strategy and contingency measure requirements are provided in Appendices III, IV and V.



CHAPTER 7

Environmental Justice

- **The impacts of air pollution are not distributed equitably throughout the South Coast Air Basin, with some communities bearing much higher air pollution burdens.**

- **The Draft PM2.5 Plan includes control measures to reduce the levels of PM2.5, a regional pollutant in the entire Basin to meet the annual PM2.5 NAAQS. South Coast AQMD, however, addresses disproportionate impacts of local air pollution in disadvantaged communities through the AB 617 program.**

- **Environmental Justice (EJ) communities typically experience higher PM2.5 levels and higher cancer risks from toxic air pollutants than other regions in the Basin.**

- **Measures associated with the Draft PM2.5 Plan will help reduce air pollution in disproportionately impacted areas.**

- **In the implementation of both existing and future incentive programs, South Coast AQMD will continue to prioritize EJ areas to address the issues of the most disadvantaged communities.**

Introduction

Environmental Justice (EJ) communities are disproportionately impacted by various types of pollution and experience health, social, and economic inequities. These inequities can also make residents of EJ communities more vulnerable to the effects of environmental pollution. These communities are often located near multiple air pollution sources including both mobile sources and commercial and industrial facilities. For example, communities adjacent to ports, rail yards and warehouses are exposed to higher levels of emissions from the associated ships, trains, and trucks, including diesel particulate matter, a carcinogen. Communities near refineries and other industries can also suffer from higher levels of air pollution.

The California Office of Environmental Health Hazard Assessment (OEHHA) developed the California Communities Environmental Health Screening Tool (CalEnviroScreen) to identify disadvantaged communities across California based on pollution exposure and population characteristics. This information can be used to advise and assist South Coast AQMD in protecting and improving public health in the most impacted communities through the reduction and prevention of air pollution. While there is no universal definition for what constitutes an EJ community, one that is commonly used is the Senate Bill (SB) 535 definition of disadvantaged communities (DACs)[1]. These are defined as:

1. Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0 (1,984 tracts).
2. Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores (19 tracts).
3. Census tracts identified in the 2017 DAC designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0 (307 tracts).
4. Lands under the control of federally recognized Tribes.

All calculations and maps in this section that refer to EJ communities are consistent with this definition. The map of EJ communities alongside major roads within the Basin are presented in Figure 7-1.

[1] Monserrat, Laurie. “SB 535 Disadvantaged Communities.” OEHHA, 20 Nov. 2015, https://oehha.ca.gov/calenviroscreen/sb535.

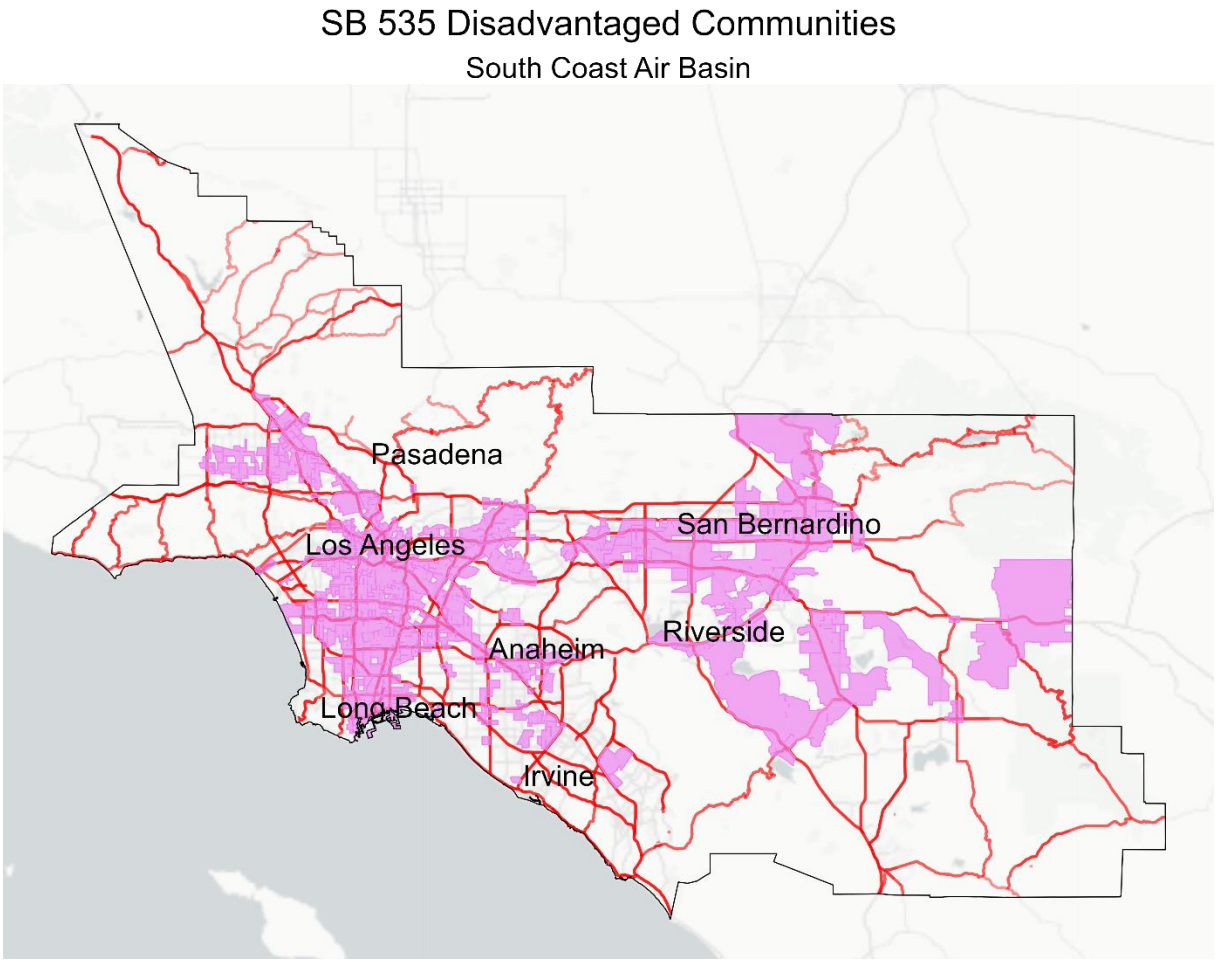


FIGURE 7-1
MAP OF ENVIRONMENTAL JUSTICE COMMUNITIES (VIOLET) WITHIN THE SOUTH COAST AIR BASIN. PRIMARY AND SECONDARY ROADS ARE IN RED

The PM2.5 Plan focuses on steps needed to attain the 2012 annual PM2.5 standard. As further described in this chapter, environmental justice communities typically experience worse levels of PM2.5 than other areas in the Basin. The control strategy proposed in this Plan, which includes transitioning to zero emission technologies where feasible and the cleanest available technologies where zero emission technologies are not feasible, will substantially reduce PM2.5 emissions. This includes diesel particulate matter, a powerful cancer-causing pollutant, and other mobile source pollutants that go on to form PM2.5, such as nitrogen oxides. As shown in Figure 7-2 below, the highest levels of air toxics risk are around our ports, rail yards, and major transportation corridors, where many of our EJ communities are located. About 88 percent of those risks are from pollutants associated with mobile sources, with diesel particulate matter alone accounting for about half of those risks. Cleaning up emissions from truck, ship, locomotive, and aircraft fleets will therefore substantially reduce health risks from air pollution in impacted communities, while also putting the region on a path to meet federal air quality standards.

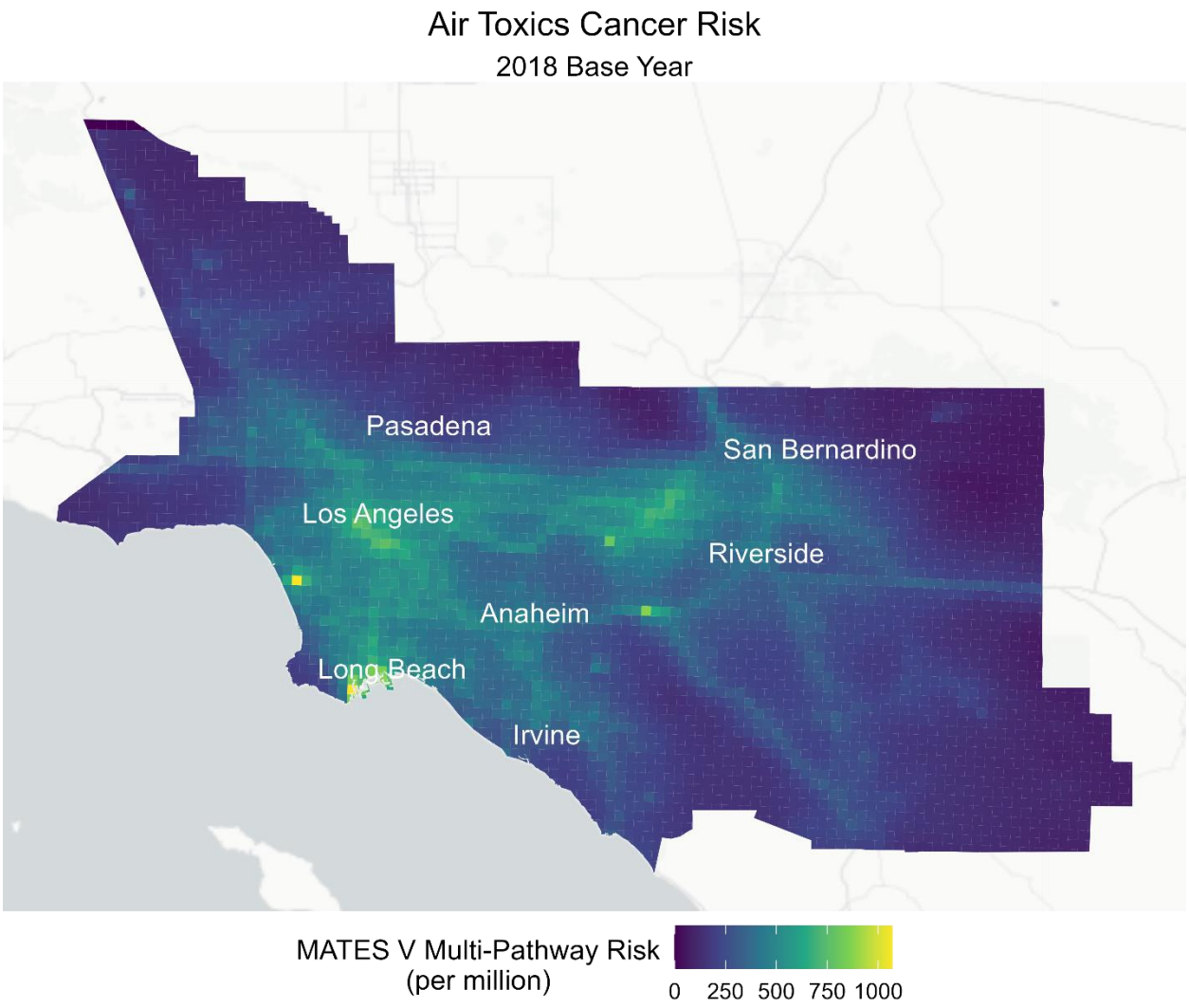


FIGURE 7-2
MODELED MULTI-PATHWAY AIR TOXICS CANCER RISK FROM MATES V IN THE SOUTH COAST AIR BASIN[2]

[2] South Coast AQMD. Multiple Air Toxics Exposure Study in South Coast AQMD. South Coast Air Quality Management District, Aug. 2021, https://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf?sfvrsn=6.

The purpose of this chapter is to describe air quality impacts experienced in EJ communities and projected future air quality and attainment of the 2012 annual PM2.5 standard. While the work described in this chapter will help reduce localized impacts, South Coast AQMD understands that work is ongoing, and much more will need to be done to address historic environmental injustice. South Coast AQMD is committed to continuing work with impacted communities, listening to their concerns, and to the greatest extent possible, addressing their concerns. Environmental justice principles center the importance of public participation in decision-making. To that end, as highlighted in chapter 8, public participation and outreach are critical to the development of the PM2.5 Plan. Relevant stakeholders in the development of the PM2.5 Plan include environmental justice organizations, environmental advocacy groups, and members of the public. Outreach occurs in-person and remote participation at Advisory Group Meetings, South Coast AQMD Governing Board Meetings, and Regional Public Hearings. For these programs, South Coast AQMD releases Spanish-language versions of meeting notices, agendas, and presentations alongside live Spanish translation.

Environmental Justice Communities

Environmental Justice, or "EJ" has been defined by South Coast AQMD as "equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution." While there are many approaches for identifying EJ communities, throughout this Draft PM Plan, we consider EJ communities as the disadvantaged communities defined under SB 535.[3] By that definition, approximately 42 percent of South Coast Air Basin residents are in EJ communities. Race and ethnicity are not included in the CalEnviroScreen population indicators, but as discussed in the OEHHA Analysis of Race/Ethnicity and CalEnviroScreen results,[4] people of color disproportionately reside in highly impacted communities in California. These disparities are also clear in the South Coast Air Basin, reflecting the impact of institutional and structural racism that has created unequal pollution burdens and health impacts for different groups (Figure 7-3). Mental and physical disabilities are not considered in this analysis since they are not accounted for in the CalEnviroScreen.

[3] Refer the 2nd paragraph of this chapter for the definition of EJ community

[4]OEHHA. Analysis of Race/Ethnicity and CalEnviroScreen 4.0 Scores. California Office of Environmental Health Hazards Assessment, Oct. 2021.

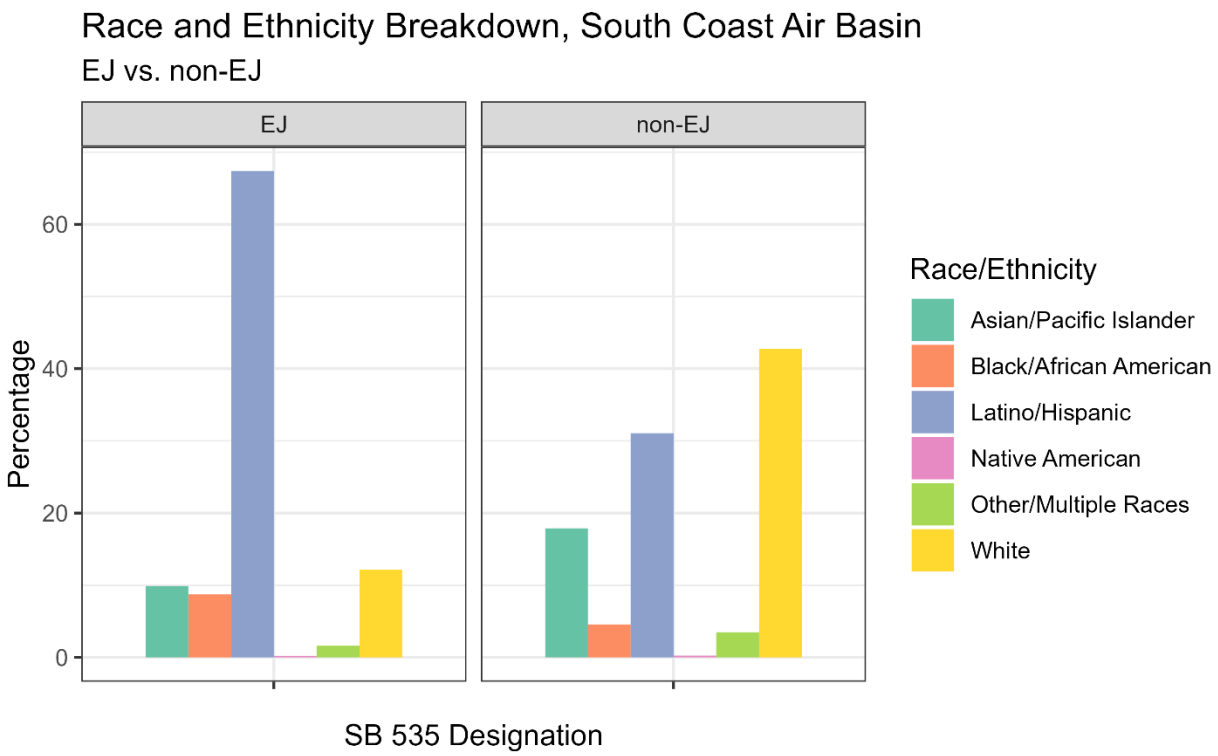


FIGURE 7-3
RACIAL AND ETHNIC MAKEUP OF EJ AND NON-EJ COMMUNITIES IN SOUTH COAST AIR BASIN (2021)

Assembly Bill 617

The PM2.5 Plan is designed to address regional air pollution, however, South Coast AQMD recognizes there is still much work to be done to reduce local exposures within EJ communities. Statewide and South Coast AQMD environmental justice efforts, such as the Assembly Bill 617 (AB 617)[5] program, seek to collaboratively address environmental challenges in communities that are disproportionately impacted by pollution and more vulnerable to the health effects of pollution.

[5] California Health and Safety Code § 44391.2

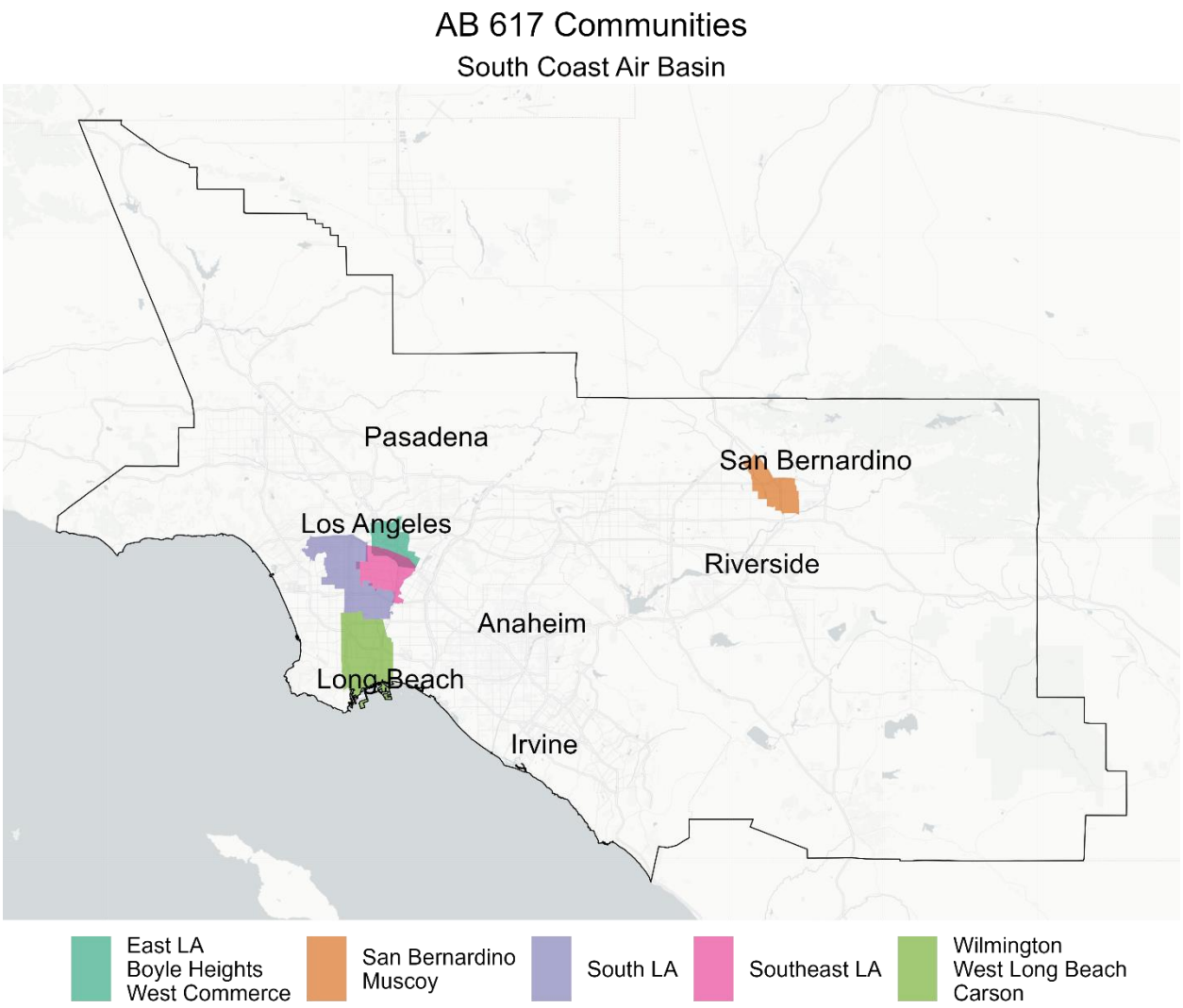


FIGURE 7-4
MAP OF AB 617 COMMUNITIES WITHIN THE SOUTH COAST AIR BASIN

AB 617 was signed into California law on July 26, 2017, and focused on addressing disproportionate impacts of local air pollution in EJ communities. The AB 617 program requires local air districts and California Air Resources Board (CARB) to reduce air pollution in disproportionately burdened communities, improve accountability and transparency, and promote collaborative partnerships with community stakeholders. AB 617 communities are designated by CARB, and they specify the plan(s) for the community as either an emission reduction program, air monitoring program, or both.

To meet the emission reduction program requirements, South Coast AQMD works with the communities to develop and implement Community Emission Reduction Plans (CERPs). CERPs are specific to each AB 617 community and are intended to address air quality related impacts in those communities. Similarly, for the air monitoring program requirements, South Coast AQMD works with the communities to develop and deploy Community Air Monitoring Plans (CAMPs). Both the measures associated with the PM2.5 Plan and the elements of AB 617 CERPs will help reduce air pollution in disproportionately impacted areas. More detail on the AB 617 program can be found on South Coast AQMD's AB 617 Community Air Initiatives webpage.[6]

To date, there are six designated AB 617 communities in the South Coast AQMD jurisdiction. These communities are the East Los Angeles/Boyle Heights/West Commerce (ELABHWC) community, San Bernardino/Muscoy community (SBM) and Wilmington/Carson/West Long Beach community (WCWLB) designated in 2018; the Southeast Los Angeles community (SELA) and Eastern Coachella Valley (ECV) designated in 2019; and the South Los Angeles community (SLA) designated in 2020. All of these communities, with the exception of ECV are located within the South Coast Air Basin and shown in Figure 7-4.

Air Quality in Environmental Justice Communities

The impacts of air pollution are not distributed equitably throughout South Coast AQMD jurisdiction, with some communities bearing much higher air pollution burdens. In this section, results from the recently released CalEnviroScreen 4.0 are used to show the distribution of air pollution across the South Coast Air Basin.

Figure 7-5 shows levels of PM2.5 concentrations in AB 617 communities, in EJ and non-EJ areas in the South Coast Air Basin, and the overall basin-wide levels. As described in the CalEnviroScreen 4.0 report, average annual PM2.5 concentrations in each census tract were calculated using 2015-2017 ambient air monitoring data combined with satellite observations in a land-use regression model. For AB 617 communities, estimates were generated using the census tracts in each community. Boxes indicate the interquartile range (25th to 75th percentile), and the bold line indicates the median concentration (50th percentile). The two ends of the whiskers represent 1.5 multiplied by the interquartile range added and

[6] South Coast AQMD. "AB 617 Community Air Monitoring." South Coast AQMD, https://www.aqmd.gov/nav/about/initiatives/environmental-justice/ab617-134/ab-617-community-air-monitoring. Accessed 2 Jan. 2024.

subtracted to the median. The dashed line represents the 12 µg/m^3 standard. The dotted line represents the basin median (11.9 µg/m^3) concentration. Colors of the bars for each AB617 community correspond to map locations illustrated in Figure 7-4. While estimated annual average PM2.5 concentrations span a wide range of concentrations in EJ and non-EJ areas, PM2.5 concentrations are generally higher in EJ areas and some AB 617 communities in the South Coast Air Basin. The observed disparities within the basin are likely driven by local sources of directly emitted PM2.5 such as freeways and industrial facilities, that tend to be concentrated in disadvantaged communities. These sources also contribute to higher levels of diesel particulate matter, a powerful air toxic, in EJ communities.

Importantly, PM2.5 is one of the many air pollution challenges that these communities face. All five communities contain census tracts that rank in the CalEnviroScreen 4.0 top 25 percent most impacted tracts across California. Estimated PM2.5 concentrations for three EJ communities in the Basin are above the median concentration of 11.9 µg/m^3 of all Basin tracts, as estimated by CalEnviroScreen.

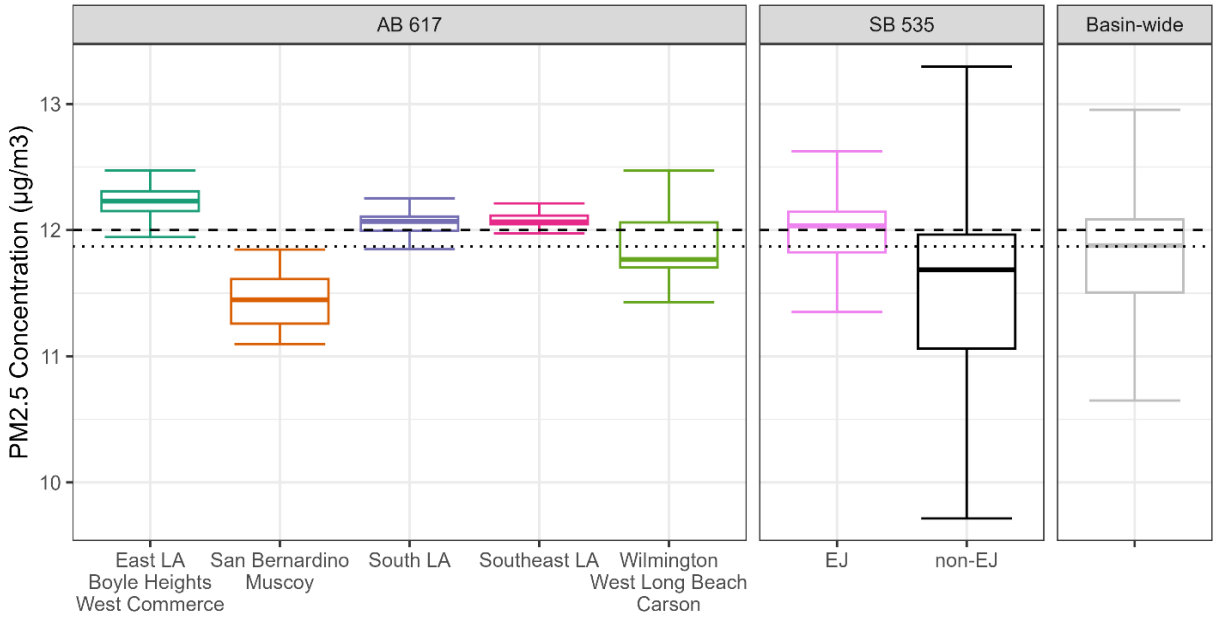


FIGURE 7-5
ESTIMATED PM2.5 CONCENTRATIONS IN AB 617 COMMUNITIES (LEFT) AND SB 535-DEFINED EJ COMMUNITIES (MIDDLE) AND OVERALL PM2.5 CONCENTRATIONS (2021) IN THE SOUTH COAST AIR BASIN (RIGHT)

Exposure to air toxics is also an important driver of health risks in AB 617 communities. The Multiple Air Toxics Exposure Study V (MATES V)[7] found a substantial decrease in estimated cancer risk in each of the AB 617 communities from 2012 to 2018[8]. Figure 7-6 shows the air toxic risk in the AB617 communities, and in EJ and non-EJ communities. Boxes indicate the interquartile range (25th to 75th percentile), and the bold line indicates the median concentration (50th percentile). The two ends of the whiskers represent 1.5 multiplied by the interquartile range added and subtracted to the median. Colors of the bars for the AB617 communities correspond to map locations illustrated in Figure 7-4.

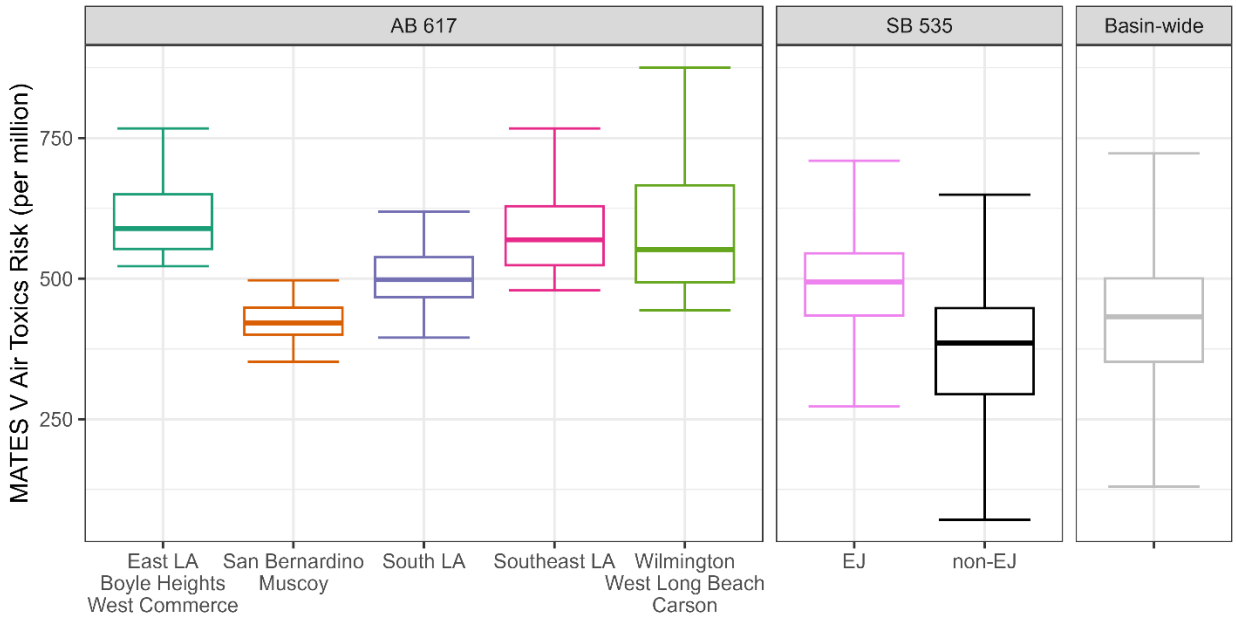


FIGURE 7-6
MATES AIR TOXIC RISK IN AB 617 COMMUNITIES (LEFT) AND SB 535-DEFINED EJ COMMUNITIES (CENTER) AND OVERALL AIR TOXIC RISK IN THE SOUTH COAST AIR BASIN, PER MATES V (2021) (RIGHT)

[7] South Coast AQMD. Multiple Air Toxics Exposure Study in South Coast AQMD. South Coast Air Quality Management District, Aug. 2021, https://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf?sfvrsn=6.

[8] South Coast AQMD. Multiple Air Toxics Exposure Study in South Coast AQMD. South Coast Air Quality Management District, Aug. 2021, https://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf?sfvrsn=6.

As shown in Figure 7-6, non-EJ areas have the lowest toxics air risk as modeled in MATES V. In comparison, the median air toxic risk among AB 617 communities and EJ areas is higher than the median risk for non-EJ areas. This is likely due to these communities' proximity to air toxics sources. As shown on Figure 7-4, there is a significant toxics risk hotspot near the ports of Los Angeles and Long Beach. This is due to the activity associated with shipping, handling and transporting cargo in the region. The related activity extends up the 710 freeway, where many of the AB 617 communities are located. In addition to freeways and shipping activity, some AB 617 communities, such as Wilmington/West Long Beach/Carson, East Los Angeles/Boyle Heights/West Commerce, and Southeast LA are homes to heavy industry that contribute to higher air toxic risk. Consequently, AB 617 communities suffer the highest concentrations of cancer-causing pollutants, such as diesel particulates, due to the proximity of AB617 communities to sources of these pollutants. South Coast AQMD plans to conduct MATES VI in near future to assess the progress in air quality improvement in recent years.

Annual PM2.5 Attainment in AB 617 and Environmental Justice Communities

Air quality simulations to demonstrate future attainment of the PM2.5 standard are an integral part of the planning process to achieve clean air. These simulations evaluate the changes in PM2.5 concentrations over time and in response to various emissions and development scenarios. Figure 7-7 summarizes the results of the PM2.5 simulations in each of South Coast AQMD's AB 617 communities for the 2018, 2030 baseline, and 2030 attainment scenarios. In this analysis, model simulations were run across the entire South Coast Air Basin domain. Model results were then cropped to the boundaries illustrated in Figure 7-1 (DACs) and Figure 7-4 (AB 617 communities). Within each community, we calculated a distribution of PM2.5 levels in the future that would result after the implementation of the Plan. We compared these summary statistics to the 2012 annual PM2.5 standard of 12 $\mu g/m^3$, which is marked in Figure 7-7 by the dotted line.

As shown in Figure 7-7, all AB617 communities and EJ areas have higher mean PM2.5 concentrations than the basin-wide average, and the maximum annual PM2.5 concentrations occur in EJ communities. While parts of the Basin that include portions of AB617 and EJ communities were not in attainment in 2018 and are not expected to be in attainment under the 2030 baseline conditions, all the AB 617 communities and EJ areas will attain the standard when the Plan is fully implemented.

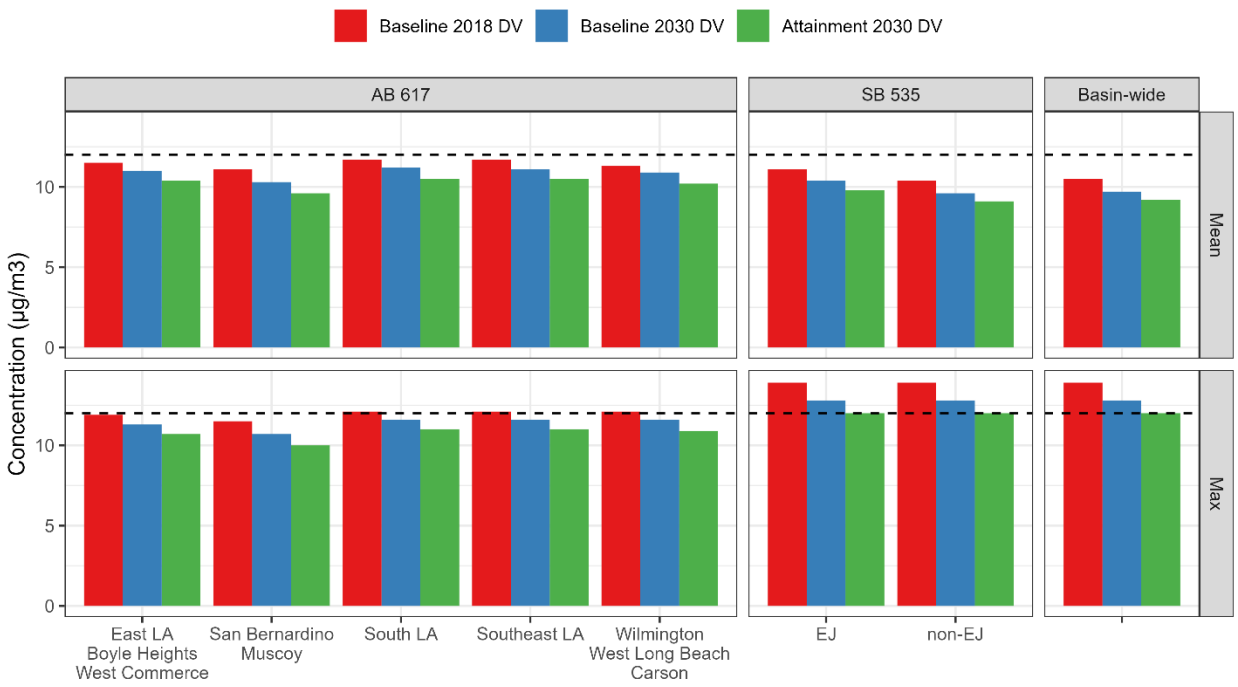


FIGURE 7-7
MODEL-PREDICTED MEAN (TOP) AND MAXIMUM (BOTTOM) ANNUAL DESIGN VALUES IN SOUTH COAST AQMD'S AB 617 (LEFT) AND SB 535-DESIGNATED EJ AND NON-EJ COMMUNITIES (CENTER), AND BASIN-WIDE (RIGHT)

Design values are calculated under three scenarios: 2018 baseline (red), 2030 baseline (blue), and 2030 attainment (green). The dashed line represents the 12 µg/m^3 standard.

Incentives and Funding in Environmental Justice Communities

Incentives and funding will continue to be a critical component in implementing the control strategies in the PM2.5 Plan. Among the 2022 AQMP control measures required to attain the 2015 8-hour ozone standard by 2037, this PM2.5 Plan included selected measures that can be implemented and achieve emission reductions prior to 2030. The 2022 AQMP commits both traditional regulatory and incentive funding-based approaches to achieve emission reductions needed to meet the federal ozone standard. Incentives and funding for EJ communities will be pursued to implement both the 2022 AQMP and this PM Plan commitments.

Incentive funding can be used to subsidize low-emitting or zero emission equipment purchases and help promote deployment of clean technologies for both stationary and mobile sources. For mobile sources, incentive funds can facilitate the replacement of older, high-emitting vehicles and equipment with the cleanest vehicles and equipment commercially available. South Coast AQMD has been implementing a

number of incentive programs to accelerate the deployment of clean technologies with a particular emphasis on benefits to EJ communities. For example, under the Lower-Emission School Bus Program, the Carl Moyer Program and other diesel mitigation programs, not less than 50 percent of the funds appropriated are expended in a manner that directly reduces air contaminants and/or associated public health risks in disadvantaged and low-income communities. Notably, programs may employ different definitions of disadvantaged in their implementation. The Lower-Emission School Bus Program allows individual agencies to develop their own individual criteria in consultation with CARB, but by default recommends uses the percentage of students in a public school district participating in the free and reduced-lunch meal program.[9] South Coast AQMD frequently uses SB 535 to define disadvantaged communities. In their implementation of the Lower-Emission School Bus Program, they include an additional low-income criterion.[10] The Carl Moyer program uses a combination of racial and ethnic composition alongside income in their definition of disadvantaged.[11] In implementing existing incentive programs and for the development of future programs, South Coast AQMD will continue to prioritize incentive funding in EJ areas and seek opportunities to expand funding to benefit the most disadvantaged communities, which is frequently defined using the DACs under SB535.

For stationary sources, incentives can help promote the transformation to zero emission technologies for small commercial and residential combustion sources such as water heaters and furnaces. Incentive programs will be of particular importance for measures regarding zero emission buildings. Programs to change out gas appliances, heaters and boilers may be cost-effective, but not necessarily affordable. First, there is the cost of replacing the appliances themselves – which would not be insignificant for many smaller businesses or residential households. Second, many buildings will likely need additional electrical panel upgrades and other infrastructure to support the increased electrical load needed to power the replacement appliances. These infrastructure upgrades can be far more costly than the cost of replacing gas appliances. These issues are further magnified in economically disadvantaged communities, where switching from gas to electrical appliances may be cost-prohibitive unless a substantial portion of those costs are covered by other programs.

Existing rebate programs, such as South Coast AQMD's Clear Air Furnace program, funded by Rule 1111 mitigation fees, provides rebates to those installing a residential electric heat pump to replace a natural gas furnace. In addition, a specific percentage of the funding was dedicated to those applying from a disadvantaged community. This program can be further funded to enhance the existing rebate program or expanded to include other building appliances such as water heaters. In addition, partnerships with other organizations, such as Technology and Equipment for Clean Heating (TECH) Clean California or

[9] CARB. 2008 Lower-Emission School Bus Program Guidelines. California Air Resources Board, 15 Apr. 2008, https://ww2.arb.ca.gov/sites/default/files/2022-02/2008_LESBP_Guidelines-with-Advisories.pdf.
[10] South Coast AQMD. Issue Program Announcement for Lower School Bus Emissions Program, Oct 2020. https://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2020/2020-oct2-006.pdf?sfvrsn=2
[11] Legislature, Cal. Cal. Health & Safety Code § 43023.5. https://california.public.law/codes/ca_health_and_safety_code_section_43023.5. Accessed 2 Jan. 2024.

Southern California Edison, with similar programs and directives could assist in providing more rebate money to further incentivize early deployment of cleaner technologies. Therefore, evaluating funding needs and sourcing funding to support control measures associated with zero emission building measures will be critical. But a much larger issue will be structuring incentive/rebate programs in a way that is equitable and does not leave economically disadvantaged communities behind. Stationary source control measures (BCM-01, BCM-02, BCM-03, BCM-04, ECC-02 and ECC-03, see Table 7-1) target emission reductions from residential buildings and include incentive components as part of the proposed control approach.

TABLE 7-1
SELECTED SOUTH COAST AQMD PROPOSED STATIONARY SOURCE MEASURES

Number	Title [Pollutant]
BCM-01	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Water Heating [PM2.5, NOx]
BCM-02	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Space Heating [PM2.5, NOx]
BCM-03	Emission Reductions from Residential Cooking Devices [PM2.5, NOx]
BCM-04	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances – Residential Other Combustion Sources [PM2.5, NOx]
ECC-02	Co-benefits from Existing and Future Residential and Commercial Building Energy Efficiency Measures [All Pollutants]
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [All Pollutants]

In addition, mitigation fees will be considered where appropriate under BCM-04. The mitigation fee collected would be utilized as incentives to accelerate the adoption of zero emission units or utilized to assist in panel upgrades or infrastructure at residences in disadvantaged communities. In developing these incentive programs, South Coast AQMD will seek community input and evaluate ways to prioritize distribution of funding to benefit the most disadvantaged communities. South Coast AQMD will ensure that environmental justice areas are able to access advanced technologies while benefiting from the transition to zero emission technologies.

Summary

PM2.5 air pollution and air toxics risk impact residents in the South Coast Air Basin disproportionately. EJ communities often contend with higher PM2.5 concentrations, elevated cancer risks from toxic air pollutants, and exposure to multiple pollution sources than the average levels in the Basin. The Draft PM2.5 Plan incorporates control measures aimed at reducing PM2.5 levels in the entire South Coast Air Basin and meeting the federal 2012 annual PM2.5 standard. These measures will help reduce air pollution in disproportionately impacted areas as well.

Efforts to address environmental injustices extend beyond the Draft PM2.5 Plan, with initiatives like the AB 617 program which focuses on reducing local air pollution exposure, promoting transparency, accountability, and community engagement. Collaborative partnerships, emission reduction programs, and air monitoring initiatives are integral components of AB 617, aiming to reduce air pollution and improve public health outcomes in disproportionately impacted areas.

Incentives and funding mechanisms are pivotal in facilitating the implementation of control measures, ensuring accessibility to clean technologies, and promoting the transition to zero emission solutions. South Coast AQMD is committed to prioritizing EJ areas in existing and future incentive programs, striving for equitable distribution of resources and fostering community engagement. Ongoing collaboration with impacted communities, coupled with community input and evaluation, will guide the development of inclusive incentive programs, ensuring that economically disadvantaged communities are not left behind. Moving forward, South Coast AQMD remains dedicated to addressing historic environmental injustices, improving public health, and creating a more equitable and sustainable future for all residents.

CHAPTER 8

Public Process

- **PM2.5 Plan development has been a multi-agency effort including the California Air Resources Board, Southern California Association of Governments and U.S. Environmental Protection Agency.**

- **The PM2.5 Plan was developed through a robust and transparent process. Specific outreach efforts included:**

  - **Convening the AQMP Advisory Group and the Scientific, Technical, and Modeling Peer Review Advisory Group;**

  - **Holding regional public hearings;**

  - **Briefing the South Coast AQMD Mobile Source Committee and Governing Board on PM2.5 Plan development;**

  - **Providing meeting materials in Spanish and conducting public meetings in both English and Spanish languages; and**

  - **Conducting public meetings in both in-person and virtual formats, scheduled during both regular business hours and evening hours.**

Introduction

Development of the PM2.5 Plan has been a regional multi-agency effort including South Coast Air Quality Management District (South Coast AQMD), California Air Resource Board (CARB), Southern California Association of Governments (SCAG), U.S. EPA and other entities. Staff conducted robust public outreach efforts to engage the public and interested stakeholders, solicit feedback, and ensure transparency in the development of the Plan. The following describes specific outreach activities conducted by staff regarding the PM2.5 Plan.

Outreach Program

As a public agency, South Coast AQMD is committed to transparency and public participation during the development of State Implementation Plan (SIP) revisions. Outreach for the PM2.5 Plan aimed to achieve multiple goals including ensuring greater transparency in the process, reaching a broader and more diverse audience, and facilitating participation and engagement. The outreach program has been designed to inform the policy discussion by helping to ensure that all stakeholders have access to a common set of facts. Public awareness of federal requirements for PM2.5 SIPs and having appropriate background information are vital to engaging in a meaningful dialogue on the PM2.5 Plan.

Clean air goals cannot be achieved solely by the decisions and actions of South Coast AQMD. Stakeholder engagement is critical to the development of a successful plan. Stakeholders include community groups, businesses, environmental organizations, academia, and local, regional, state, and federal government entities. Table 8-1 lists specific stakeholder groups participating in PM2.5 Plan development.

TABLE 8-1
STAKEHOLDERS PARTICIPATING IN PM2.5 PLAN DEVELOPMENT

Stakeholder Category	Agency/Stakeholder Group
Public Agencies	• CARB • U.S. EPA
Local/Regional Government	• SCAG • Councils of government/associated governments • Transportation commissions
Special Districts	• Sanitation districts • Water/power districts
Community/Health/Environmental Groups	• Public health departments/associations • Environmental justice organizations • Environmental advocacy groups
Academia/Research	• Universities

Stakeholder Category	Agency/Stakeholder Group
	• National laboratories
General Public	• Residents • Interested parties
Business	• Energy industry (electricity, petroleum production and refining, natural gas, biofuels, renewables, etc.) • Goods movement and logistics (warehousing, trucking, railroads, ports/shipping/freight) • Printing/coating industry • Airport/airline operations • Chambers of commerce/business councils • Trade associations • Labor organizations • Small businesses

Advisory Group Meetings

Staff convened the AQMP and Scientific, Technical, and Modeling Peer Review (STMPR) Advisory Groups to provide feedback and recommendations on the development of the PM2.5 Plan. Advisory Group meetings were conducted in a hybrid format with in-person participation required for Advisory Group members, while members of the public were allowed to provide comment in-person or remotely. Special accommodations were offered to those with disabilities or those requiring translation. Both Advisory Groups met periodically throughout PM2.5 Plan development as shown in Table 8-2.

The AQMP Advisory Group represents a diverse cross-section of stakeholders, such as large and small businesses, labor associations, government agencies, environmental and community groups, and academia. Together, the Advisory Groups reviewed the overall aspects of the PM2.5 Plan and made recommendations concerning emissions inventories, modeling, control measures, and socioeconomic impacts, including:

- Reviewing and providing comments on: (a) studies relevant to advancing scientific and technical knowledge in support of AQMP preparation; (b) emissions inventory development and modeling approaches; (c) the development of new and revised control measures; and (d) socioeconomic data and evaluations;

- Fostering coordinated approaches toward overall attainment strategies; and

- Assisting in resolving key technical issues.

The STMPR Advisory Group consists of experts in the field of socioeconomic modeling, air quality modeling, and atmospheric science. The duties of this advisory group included reviewing and providing

feedback on air quality modeling, socioeconomic modeling techniques and making recommendations for and comments on proposed modeling approaches for attainment demonstration, precursor analysis, near-road attainment approach and emissions inventory.

TABLE 8-2
ADVISORY GROUP MEETINGS FOR THE PM2.5 PLAN

Date	Meeting
5/25/2023	AQMP Advisory Group Meeting
7/13/2023	AQMP Advisory Group Meeting
8/3/2023	STMPR Advisory Group Meeting
10/11/2023	STMPR Advisory Group Meeting
11/8/2023	AQMP Advisory Group Meeting

South Coast AQMD Governing Board Meetings

Before South Coast AQMD makes decisions that affect local residents and businesses, ideas and comments from the public must be considered. The opportunity to comment begins weeks prior to public workshops and ends with a public hearing by the South Coast AQMD Governing Board, where the Governing Board may vote to adopt a plan as proposed or with changes. Anyone may testify or present written comments. Holding public workshops, recording oral and written comments, responding to those comments, publishing draft plans, holding public hearings and voting publicly are all based on set procedures. Documenting the process is necessary to ensure public participation, fairness, and an accurate account to which interested parties can refer to in the future. The Governing Board meets at South Coast AQMD's Diamond Bar headquarters on the first Friday of each month. In addition, select members from the South Coast AQMD Governing Board are also members of the Mobile Source Committee, which periodically reviewed PM2.5 Plan development. South Coast AQMD released the Draft PM2.5 Plan on March 22, 2024. Table 8-3 lists the South Coast AQMD Governing Board and Mobile Source Committee meetings in which PM2.5 Plan development was or will be discussed.

TABLE 8-3
SOUTH COAST AQMD GOVERNING BOARD ACTIVITIES FOR THE PM2.5 PLAN

Date	Meeting
3/17/2023	South Coast AQMD Mobile Source Committee
10/20/2023	South Coast AQMD Mobile Source Committee
3/15/2024	South Coast AQMD Mobile Source Committee
4/5/2024	South Coast AQMD Governing Board Meeting
6/7/2024	South Coast AQMD Governing Board Meeting

Regional Public Hearings

Regional public hearings are held prior to taking a proposed plan or other significant action to the South Coast AQMD Governing Board to allow public input before Governing Board members vote on plans. Regional public hearings for the PM2.5 Plan will be held in April – May 2024 as shown in Table 8-4. Meeting materials for the regional public hearings will be translated to Spanish and there will be one meeting that features live Spanish translation.

TABLE 8-4
SOUTH COAST AQMD REGIONAL PUBLIC HEARINGS SCHEDULE FOR THE PM2.5 PLAN

Date	Meeting
4/23/2024	PM2.5 Plan Regional Public Hearing – San Bernardino County
4/24/2024	PM2.5 Plan Regional Public Hearing – Riverside County
4/25/2024	PM2.5 Plan Regional Public Hearing – Orange County
5/1/2024	PM2.5 Plan Regional Public Hearing – Los Angeles County

Language Accommodations

According to the U.S. Census Bureau, almost 51% of the population in the counties under South Coast AQMD jurisdiction speaks a language other than English.[1] The Spanish language is the second most common language spoken after English, where about 35% of the population in the counties under South Coast AQMD jurisdiction speaks Spanish.[2] To facilitate greater participation and engagement of the public, including Spanish-speaking community members, South Coast AQMD staff posts a Spanish version

[1] 2022 American Community Survey: https://data.census.gov/table?q=language&g=050XX00US06037,06059,06065,06071
[2] Ibid.

of meeting notices, agendas, and presentations for key public meetings on the South Coast AQMD meeting webpages. Key public meetings include Regional Public Hearings and Governing Board meetings. Live Spanish translation will be provided at these meetings. Translation services are offered upon request for all other public meetings. In addition, most meetings are conducted via videoconferencing and closed captioning is available for deaf audiences.

Glossary

AAQS (Ambient Air Quality Standards): Health and welfare based standards for clean outdoor air that identify the maximum acceptable average concentrations of air pollutants during a specified period of time. (See NAAQS.)

Acute Health Effect: An adverse health effect that occurs over a relatively short period of time (e.g., minutes or hours).

Aerosol: Particles of solid or liquid matter that can remain suspended in air for long periods of time because of their small size and light weight.

Air Pollutants: Amounts of foreign and/or natural substances occurring in the atmosphere that may result in adverse effects on humans, animals, vegetation, and/or materials.

Air Quality Simulation Model: A computer program that simulates the transport, dispersion, and transformation of compounds emitted into the air and can project the relationship between emissions and air quality.

Air Toxics: A generic term referring to a harmful chemical or group of chemicals in the air. Typically, substances that are especially harmful to health, such as those considered under U.S. EPA's hazardous air pollutant program or California's AB 1807 toxic air contaminant program, are considered to be air toxics. Technically, any compound that is in the air and has the potential to produce adverse health effects is an air toxic.

Alternative Fuels: Fuels such as methanol, ethanol, hydrogen, natural gas, and liquid propane gas that are cleaner burning and help to meet mobile and stationary emission standards.

Ambient Air: The air occurring at a particular time and place outside of structures. Often used interchangeably with "outdoor" air.

ATCM (Airborne Toxic Control Measure): A type of control measure, adopted by the CARB (Health and Safety Code Section 39666 et seq.), which reduces emissions of toxic air contaminants from nonvehicular sources.

APCD (Air Pollution Control District): A county agency with authority to regulate stationary, indirect, and area sources of air pollution (e.g., power plants, highway construction, and housing developments) within a given county, and governed by a district air pollution control board composed of the elected county supervisors and in most cases, representatives of cities within the district.

AQMD (Air Quality Management District): A group or portions of counties, or an individual county specified in law with authority to regulate stationary, indirect, and area sources of air pollution within the region and governed by a regional air pollution control board comprised mostly of elected officials from within the region.

AQMP (Air Quality Management Plan): A Plan prepared by an APCD/AQMD, for a county or region designated as a nonattainment area, for the purpose of bringing the area into compliance with the requirements of the national and/or California Ambient Air Quality Standards. AQMPs designed to attain national ambient air quality standards are incorporated into the SIP.

Area-wide Sources (also known as "area" sources): Smaller sources of pollution, including permitted sources smaller than the district's emission reporting threshold and those that do not receive permits (e.g., water heaters, gas furnace, fireplaces, woodstoves, architectural coatings) that often are typically associated with homes and non-industrial sources. The California Clean Air Act requires districts to include area sources in the development and implementation of the AQMPs.

Atmosphere: The gaseous mass or envelope surrounding the earth.

Attainment Area: A geographic area which is in compliance with the National and/or California Ambient Air Quality Standards (NAAQS or CAAQS).

Attainment Plan: In general, a plan that details the emission reducing control measures and their implementation schedule necessary to attain air quality standards. In particular, the federal Clean Air Act requires attainment plans for nonattainment areas; these plans must meet several requirements, including requirements related to enforceability and adoption deadlines.

AVAPCD (Antelope Valley APCD): The Antelope Valley Air Pollution Control District.

BAAQMD (Bay Area AQMD): The San Francisco Bay Area Air Quality Management District.

BACM (Best Available Control Measure): The maximum degree of emission reduction achievable from a source or source category which is determined on a case-by-case basis, considering energy, economic and environmental impacts and other costs, which includes Best Available Control Technology. (see BACT.)

BACT (Best Available Control Technology): The most up-to-date methods, systems, techniques, and production processes available to achieve the greatest feasible emission reductions for given regulated air pollutants and processes. BACT is a requirement of NSR (New Source Review) and PSD (Prevention of Significant Deterioration). BACT as used in federal law under PSD applies to permits for sources of attainment pollutants and other regulated pollutants is defined as an emission limitation based on the maximum degree of emissions reductions allowable taking into account energy, environmental & economic impacts and other costs. [(CAA Section 169(3)]. The term BACT as used in state law means an emission limitation that will achieve the lowest achievable emission rates, which means the most stringent of either the most stringent emission limits contained in the SIP for the class or category of source, (unless it is demonstrated that the limitation is not achievable) or the most stringent emission limit achieved in practice by that class in category of source. "BACT" under state law is more stringent than federal BACT and is equivalent to federal LAER (Lowest Achievable Emissions Rate) which applies to nonattainment NSR permit actions.

BAR (Bureau of Automotive Repair): An agency of the California Department of Consumer Affairs that manages the implementation of the motor vehicle Inspection and Maintenance Program.

BARCT (Best Available Retrofit Control Technologies): an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.

Basin (South Coast Air Basin): Area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties.

Carrying Capacity: Amount of allowable regional emissions that would still meet health-based air quality standards.

CAA (Clean Air Act): A federal law passed in 1970 and amended in 1977 and 1990 which forms the basis for the national air pollution control effort. Basic elements of the Act include national ambient air quality standards for major air pollutants, air toxics standards, acid rain control measures, and enforcement provisions.

CAAQS (California Ambient Air Quality Standards): Standards set by the State of California for the maximum levels of air pollutants which can exist in the outdoor air without unacceptable effects on human health or the public welfare, which are often more stringent than NAAQS.

CARB (California Air Resources Board): The State's lead air quality agency, consisting of a nine-member Governor-appointed board. It is responsible for attainment and maintenance of the State and federal air quality standards, and is primarily responsible for motor vehicle pollution control. It oversees county and regional air pollution management programs.

CCAA (California Clean Air Act): A California law passed in 1988 which provides the basis for air quality planning and regulation independent of federal regulations. A major element of the Act is the requirement that local APCDs/AQMDs in violation of state ambient air quality standards must prepare attainment plans which identify air quality problems, causes, trends, and actions to be taken to attain and maintain California's air quality standards by the earliest practicable date.

CEQA (California Environmental Quality Act): A California law which sets forth a process for public agencies to make informed decisions on discretionary project approvals. The process aids decision makers to determine whether any environmental impacts are associated with a proposed project. It requires significant environmental impacts associated with a proposed project to be identified, disclosed, and mitigated to the maximum extent feasible.

Chronic Health Effect: An adverse health effect which occurs over a relatively long period of time (e.g., months or years).

CMAQ (Community Multiscale Air Quality Model): A computer modeling system designed to address air quality as a whole by including state-of-the-science capabilities for modeling multiple air quality issues, including tropospheric ozone, fine particles, toxics, acid deposition, and visibility degradation.

Conformity: Conformity is a process mandated in the federal Clean Air Act to insure that federal actions do not impede attainment of the federal health standards. General conformity sets out a process that requires federal agencies to demonstrate that their actions are air quality neutral or beneficial. Transportation conformity sets out a process that requires transportation projects that receive federal funding, approvals or permits to demonstrate that their actions are air quality neutral or beneficial and meet specified emissions budgets in the SIP.

Congestion Management Program: A state mandated program (Government Code Section 65089a) that requires each county to prepare a plan to relieve congestion and reduce air pollution.

Consumer Products: Products for consumer or industrial use such as detergents, cleaning compounds, polishes, lawn and garden products, personal care products, and automotive specialty products which

are part of our everyday lives and, through consumer use, may produce air emissions which contribute to air pollution.

Contingency Measure: Contingency measures are statute-required back-up control measures to be implemented in the event of specific conditions. These conditions can include failure to meet interim milestone emission reduction targets or failure to attain the standard by the statutory attainment date. Both State and federal Clean Air Acts require that District plans include contingency measures.

CTG (Control Techniques Guidelines): Documents issued by U.S. EPA to provide recommendations for state and local air agencies on how to control the emissions of VOCs from certain types of sources in areas with smog problems. CTGs are not regulations, but they help states and areas meet the RACT requirements under the CAA. CTGs provide information on the available control technologies and their respective cost-effectiveness for reducing VOC emissions from these sources. States and areas can use the CTGs as guidance to develop their own RACT rules or standards that are appropriate for their specific circumstances.

Electric Vehicle: A motor vehicle which uses a battery-powered electric motor as the basis of its operation. Such vehicles emit virtually no air pollutants. Hybrid electric motor vehicles may operate using both electric and gasoline powered motors. Emissions from hybrid electric motor vehicles are also substantially lower than conventionally powered motor vehicles.

EMFAC: The EMission FACtor model used by CARB to calculate on-road mobile vehicle emissions. The Coachella Valley Contingency Measure SIP Revision is based on the version of EMFAC2017.

Emission Inventory: An estimate of the amount of pollutants emitted from mobile and stationary sources into the atmosphere over a specific period such as a day or a year.

Emission Offset (also known as an emission trade-off): A regulatory requirement whereby approval of a new or modified stationary source of air pollution is conditional on the reduction of emissions from other existing stationary sources of air pollution or banked reductions. These reductions are required in addition to reductions required by BACT.

Emission Standard: The maximum amount of a pollutant that is allowed to be discharged from a polluting source such as an automobile or smoke stack.

FIP (Federal Implementation Plan): In the absence of an approved State Implementation Plan (SIP), a plan prepared by the U.S. EPA which provides measures that nonattainment areas must take to meet the requirements of the Federal Clean Air Act.

Fugitive Dust: Dust particles which are introduced into the air through certain activities such as soil cultivation, off-road vehicles, or any vehicles operating on open fields or dirt roadways.

Goods Movement: An event that causes movement of commercial materials or stock typically at ports, airports, railways, highways, including dedicated truck lanes and logistics centers.

GHGs (Greenhouse Gases): A gas in an atmosphere that absorbs long-wave radiant energy reflected by the earth, which warms the atmosphere. GHGs also radiate long-wave radiation both upward to space and back down toward the surface of the earth. The downward part of this long-wave radiation absorbed by the atmosphere is known as the “greenhouse effect.”

HEV (Hybrid Electric Vehicles): Hybrids commercially available today combine an internal combustion engine with a battery and electric motor.

Hydrocarbon: Any of a large number of compounds containing various combinations of hydrogen and carbon atoms. They may be emitted into the air as a result of fossil fuel combustion, fuel volatilization, and solvent use, and are a major contributor to smog. (Also see VOCs.)

HFCV (Hydrogen Fuel Cell Vehicles): Vehicles that produce zero tailpipe emissions and run on compressed hydrogen fed into a fuel cell "stack" that produces electricity to power the vehicle.

ICAPCD (Imperial County APCD): The County of Imperial Air Pollution Control District.

Incentives: Tax credits, financial rebates/discounts, or non-monetary conveniences offered to encourage further use of advanced technology and alternative fuels for stationary and mobile sources.

Indirect Source: Any facility, building, structure, or installation, or combination thereof, which generates or attracts mobile source activity that results in emissions of any pollutant (or precursor). Examples of indirect sources include employment sites, shopping centers, sports facilities, housing developments, airports, commercial and industrial development, and parking lots and garages.

Indirect Source Control Program: Rules, regulations, local ordinances and land use controls, and other regulatory strategies of air pollution control districts or local governments used to control or reduce emissions associated with new and existing indirect sources.

Inspection and Maintenance Program: A motor vehicle inspection program implemented by the BAR. It is designed to identify vehicles in need of maintenance and to assure the effectiveness of their emission control systems on a biennial basis. Enacted in 1979 and strengthened in 1990. (Also known as the "Smog Check" program.)

LAER (Lowest Achievable Emission Rate): The more stringent rate of emissions for any source based on the following: the most stringent emissions limitation in which is contained in the implementation plan of any State for such class or category of sources, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable; or the most stringent emissions limitation which is achieved in practice by such class or category of stationary sources. This limitation, when applied to a modification, means the lowest achievable emissions rate for the new or modified emissions units whin or stationary source. In no event shall the application of this term permit a proposed new or modified source to emit any pollutant in excess of the amount allowable under applicable new source standards of performance.

LEV (Low Emission Vehicle): A vehicle which is certified to meet the CARB 1994 emission standards for low emission vehicles.

Low NOx Technologies: Refers to NOx emissions approaching zero and will be delineated for individual source categories through the process of developing the Air Quality Management Plan/State Implementation Plan and subsequent control measures.

Maintenance Plan: In general, a plan that details the actions necessary to maintain air quality standards. In particular, the federal Clean Air Act requires maintenance plans for areas that have been redesignated as attainment areas.

MCAQD (Maricopa County Air Quality Department): The Maricopa County Air Quality Department in Arizona.

MDAQMD (Mojave Desert AQMD): The Mojave Desert Air Quality Management District.

Mobile Sources: Moving sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats and airplanes.

Model Year: Model year refers to the actual annual production period (year) as determined by the manufacturer.

MSM (Most Stringent Measures): The maximum degree of emission reduction that has been required or achieved from a source or source category in any other attainment plans or in practice in any other states and that can feasibly be implemented in the area seeking the extension. "Serious" nonattainment areas can request an extension of the attainment date under CAA Section 188(e) and are required to demonstrate that the attainment plan includes the MSM. In some cases it may be possible for the MSM requirement to result in no more controls and no more emissions reductions in an area than result from the implementation of BACM and BACT.

MVEB (Motor Vehicle Emissions Budget): The portion of the total allowable emissions allocated to highway and transit vehicles and is defined in the SIP for the purpose of demonstrating Reasonable Further Progress (RFP) for interim milestone years and attainment of the NAAQS.

NAAQS (National Ambient Air Quality Standards): Standards set by the federal U.S. EPA for the maximum levels of air pollutants which can exist in the outdoor air without unacceptable effects on human health or the public welfare.

NOx (Nitrogen Oxides, Oxides of Nitrogen): A general term pertaining to compounds of nitric acid (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant, and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility.

Nonattainment Area: A geographic area identified by the U.S. EPA and/or CARB as not meeting either NAAQS or CAAQS for a given pollutant.

NSR (New Source Review): A program used in development of permits for new or modified industrial facilities which are in a nonattainment area, and which emit nonattainment criteria air pollutants. The two major requirements of NSR are Best Available Control Technology and Emission Offsets.

Ozone: A strong smelling reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the upper atmosphere ozone layer as well as at the earth's surface. Ozone at the earth's surface causes numerous adverse health effects and is a criteria air pollutant. It is a major component of smog.

Ozone Precursors: Chemicals such as hydrocarbons and oxides of nitrogen, occurring either naturally or as a result of human activities, which contribute to the formation of ozone, a major component of smog.

PCAPCD (Placer County APCD): The County of Placer Air Pollution Control District.

Permit: Written authorization from a government agency (e.g., an air quality management district) that allows for the construction and/or operation of an emissions generating facility or its equipment within certain specified limits.

PEV (Plug-in Electric Vehicle): Vehicles that can be recharged from any external source of electricity and the electricity is stored in a rechargeable battery pack to drive or contribute to drive the wheels.

PHEV (Plug-in Hybrid Electric Vehicle): Vehicles similar to traditional hybrids but are also equipped with a larger, more advanced battery that allows the vehicle to be plugged in and recharged in addition to refueling with gasoline. This larger battery allows the car to drive on battery alone, gasoline alone, or a combination of electric and gasoline fuels.

PM (Particulate Matter): Solid or liquid particles of soot, dust, smoke, fumes, and aerosols.

PM Precursors: Chemicals such as volatile organic compounds, oxides of nitrogen, and ammonia, occurring either naturally or as a result of human activities, which contribute to the formation of particulate matter.

PM10 (Particulate Matter less than 10 microns): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the air sacs in the lungs where they may be deposited, resulting in adverse health effects. PM10 also causes visibility reduction and is a criteria air pollutant.

PM2.5 (Particulate Matter less than 2.5 microns): A major air pollutant consisting of tiny solid or liquid particles, generally soot and aerosols. The size of the particles (2.5 microns or smaller, about 0.0001 inches or less) allows them to easily enter the air sacs deep in the lungs where they may cause adverse health effects, as noted in several recent studies. PM2.5 also causes visibility reduction and is a criteria air pollutant.

PSD (Prevention of Significant Deterioration): A program used in development of permits for new or modified industrial facilities in an area that is already in attainment. The intent is to prevent an attainment area from becoming a nonattainment area. This program, like require BACT as defined in the Clean Air Act and, if an AAQS is projected to be exceeded, Emission Offsets.

Public Consultation: A consultation held by a public agency for the purpose of informing the public and obtaining its input on the development of a regulatory action or control measure by that agency.

Public Workshop: A workshop held by a public agency for the purpose of informing the public and obtaining its input on the development of a regulatory action or control measure by that agency.

PZEV (Partial Zero Emission Vehicle): A vehicle emissions rating within California's exhaust emission standards. Cars that are certified as PZEVs meets the Super Ultra Low Emission Vehicle exhaust emission standard and has zero evaporative emissions from its fuel system.

RACM (Reasonably Available Control Measures): An area-specific analysis focusing on area, mobile and non-major point sources. It considers measures that are readily implemented, are economically and technologically feasible, and contribute to the advancement of attainment in a manner that is "as expeditious as practicable.

RACT (Reasonably Available Control Technology): The lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

RFP (Reasonable Further Progress): Annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date, as defined in CAA Section 171(1). The goal of the RFP requirements is for areas to achieve generally linear progress toward attainment. To determine RFP for the attainment date, EPA guidance states that the plan should rely only on emission reductions achieved from sources within the nonattainment area.

RTP (Regional Transportation Plan): The long-range transportation plan developed by the Southern California Association of Governments that provides a vision for transportation investments throughout the South Coast region. The RTP considers the role of transportation in the broader context of economic, mobility, environmental, and quality-of-life goals for the future, identifying regional transportation strategies to address regional mobility needs.

SBCAPCD (Santa Barbara County APCD): The County of Santa Barbara Air Pollution Control District.

SCM (Suggested Control Measure): A model rule developed by CARB that local air districts can adopt for their architectural coatings rule. The SCM was last updated in 2020.

SCS (Sustainable Communities Strategy): Planning element in the RTP that integrates land use and transportation strategies that will achieve CARB's GHG emissions reduction targets.

SDAPCD (San Diego County APCD): The County of San Diego Air Pollution Control District.

SIP (State Implementation Plan): A document prepared by each state describing existing air quality conditions and measures which will be taken to attain and maintain national ambient air quality standards. (see AQMP.)

SJVAPCD (San Joaquin Valley APCD): The San Joaquin Valley Air Pollution Control District.

SMAQMD (Sacramento Metro AQMD): The Sacramento Metropolitan Air Quality Management District.

Smog: A combination of smoke, ozone, hydrocarbons, nitrogen oxides, and other chemically reactive compounds which, under certain conditions of weather and sunlight, may result in a murky brown haze that causes adverse health effects. The primary source of smog in California is motor vehicles. (See Inspection and Maintenance Program.)

Smoke: A form of air pollution consisting primarily of particulate matter (i.e., particles). Other components of smoke include gaseous air pollutants such as hydrocarbons, oxides of nitrogen, and carbon monoxide. Sources of smoke may include fossil fuel combustion, agricultural burning, and other combustion processes.

SO_2 (Sulfur Dioxide): A strong smelling, colorless gas that is formed by the combustion of fossil fuels. Ocean-going vessels, which may use oil high in sulfur content, can be major sources of SO2. SO2 and other sulfur oxides contribute to ambient PM2.5. SO2 is also a criteria pollutant.

SSAB (Salton Sea Air Basin): Area comprised of a central portion of Riverside County (the Coachella Valley) and Imperial County. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley.

Stationary Sources: Non-mobile sources such as power plants, refineries, and manufacturing facilities which emit air pollutants; can include area sources depending on context.

SULEV (Super Ultra Low Emission Vehicle): A vehicle emissions rating within California's LEV 1 and LEV 2 exhaust emission standards.

TAC (Toxic Air Contaminant): An air pollutant, identified in regulation by the CARB, which may cause or contribute to an increase in deaths or in serious illness, or which may pose a present or potential hazard to human health. TACs are considered under a different regulatory process (California Health and Safety Code Section 39650 et seq.) than pollutants subject to CAAQS. Health effects due to TACs may occur at extremely low levels, and it is typically difficult to identify levels of exposure which do not produce adverse health effects.

TCM (Transportation Control Measure): Under Health & Safety Code Section 40717, any control measure to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. TCMs can include encouraging the use of carpools and mass transit. Under federal law, includes, but is not limted to those measures listed in CAA Section 108(f).

UFP (Ultrafine Particles): Particles with a diameter less than 0.1 mm (or 100 nm).

ULEV (Ultra Low Emission Vehicle): Vehicles with low emission ratings within California's LEV 1 or LEV 2 exhaust emission standards. The LEV 1 emission standards typically apply to cars from 1994–2003. The LEV 2 emission standards were adopted in 1998 and typically apply to cars from 2004–2010.

U.S. EPA (United States Environmental Protection Agency): The federal agency charged with setting policy and guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

VCAPCD (Ventura County APCD): The Ventura County Air Pollution Control District.

VMT (Vehicle Miles Traveled): Total vehicle miles traveled by all or a subset of mobile sources.

VOCs (Volatile Organic Compounds): Hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

Zero Emission Technologies: Advanced technology or control equipment that generates zero end-use emissions from stationary or mobile source applications.

ZEV (Zero Emission Vehicle): A vehicle that produces no emissions from the on-board source of power.