



Eastern Kern Air Pollution Control District

**2023 OZONE ATTAINMENT PLAN
FOR THE 2008 & 2015, 8-HOUR OZONE
NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)**

Adopted
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Figure 1: California Air District Map

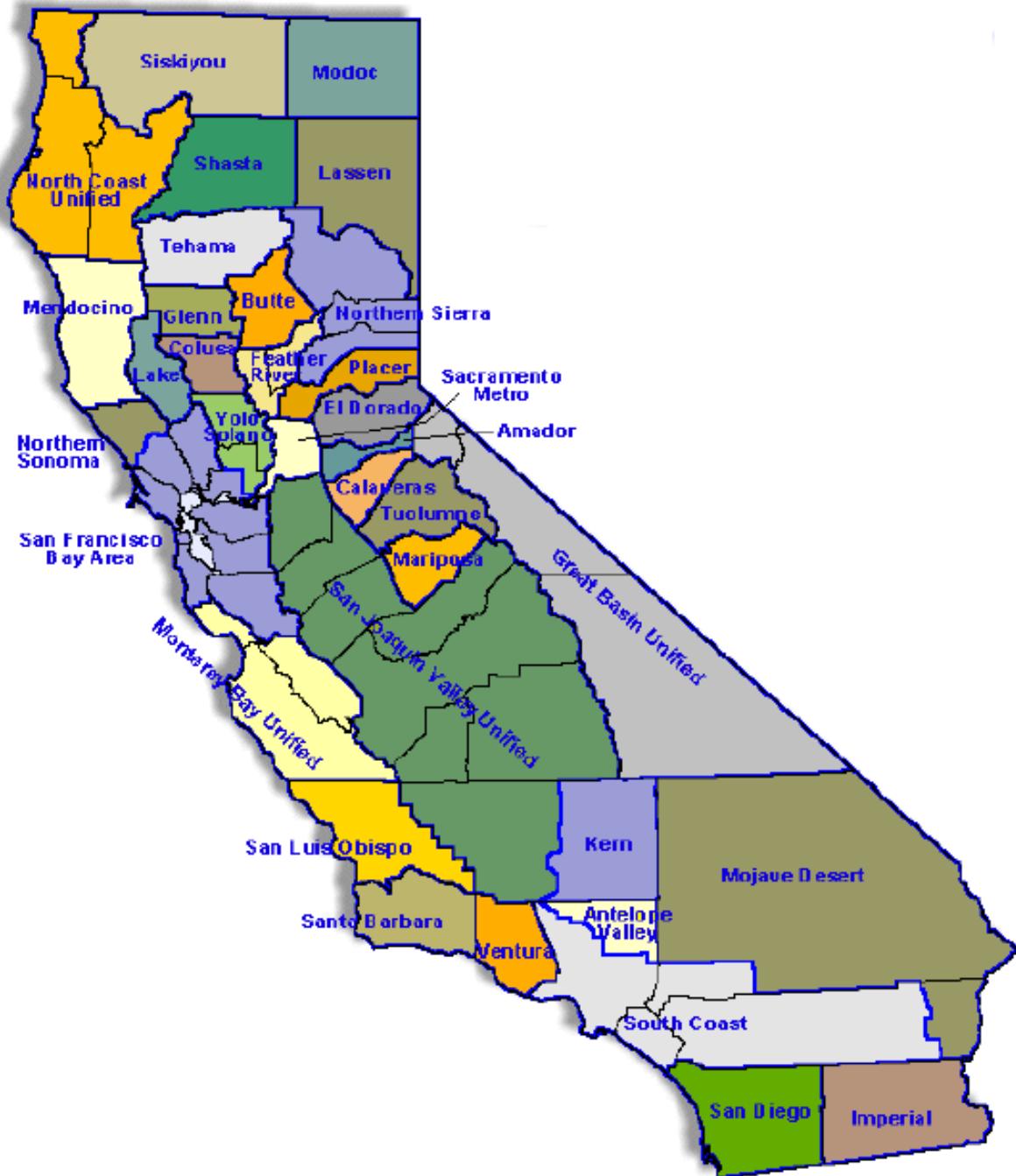
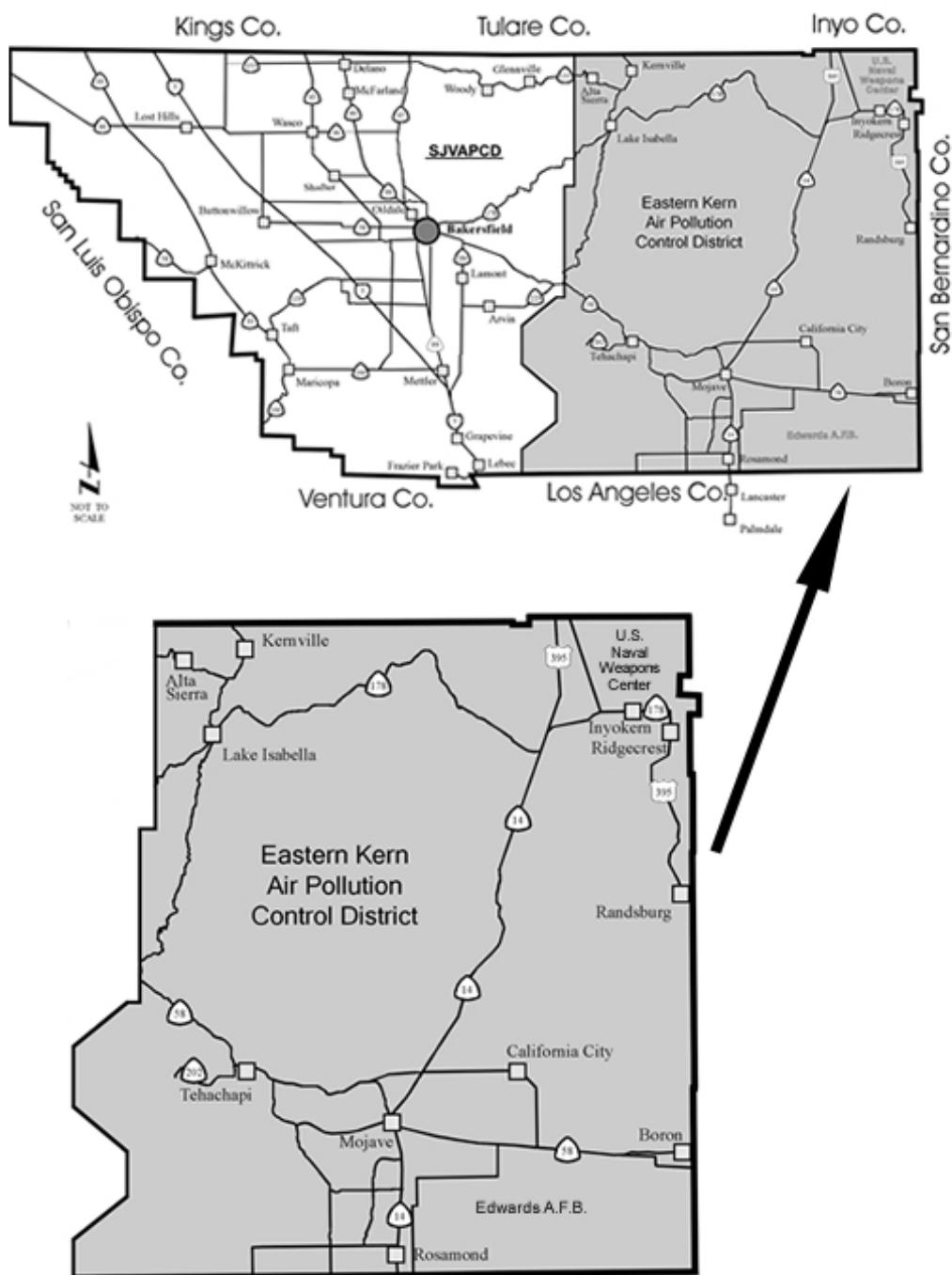


Figure 2: EKAPCD Boundary



EXECUTIVE SUMMARY

This attainment plan is intended to satisfy both the 2008, 8-hour Ozone (O_3) National Ambient Air Quality Standards (NAAQS) of 75 parts per billion (ppb) and 2015, 8-hour O_3 NAAQS (70 ppb). Each standard has a different attainment date but share many of the same elements, required emissions reductions, strategies, and plan requirements.

In 2012, a portion of Eastern Kern was classified “Marginal” nonattainment pursuant to the 2008, 8-hour O_3 NAAQS of 75 ppb. Although the Indian Wells Valley planning area met the 2008, O_3 NAAQS, the remainder of the District failed to meet the standard by the applicable attainment date and was reclassified as “Moderate” nonattainment, effective June 3, 2016. As a result, the District was required to submit a SIP revision for the nonattainment area by January 1, 2017, which showed compliance with statutory and regulatory conditions applicable to the Moderate classification.

The District, in partnership with the California Air Resources Board (CARB), conducted photochemical modeling along with supplemental analyses to determine whether the District could attain the 2008, O_3 NAAQS by the Moderate deadline. Modeling indicated the District would not meet the 75 ppb standard by the Moderate deadline but could attain it by 2020, which was the attainment date for “Serious” nonattainment areas. Pursuant to CAA §181(b)(3) “Voluntary Reclassification”, the District provided CARB with documentation to formally request that the Environmental Protection Agency (EPA) reclassify the District’s nonattainment area from “Moderate” to “Serious” pursuant to the 2008, O_3 NAAQS, and revise the attainment date to July 15, 2021. EPA approved the District’s request and reclassified the nonattainment area to Serious nonattainment. Although modeling showed attainment would be achieved, the District failed to attain the 2008, O_3 NAAQS in 2020.

In response, on May 15, 2021, the District requested CARB submit documentation to EPA to reclassify the District’s nonattainment area from Serious to Severe pursuant to the 2008, O_3 NAAQS. On June 25, 2021, EPA approved/conditionally approved, all elements of the 2017, Eastern Kern Ozone SIP, except they deferred action on the Serious area attainment and reasonably available control measures (RACM) demonstrations. On July 7, 2021, EPA reclassified the District’s nonattainment area to Severe nonattainment pursuant to the 2008, O_3 NAAQS, and now required to attain by July 2027.

Additionally, modeling indicated the District would not attain the 2015, O_3 NAAQS (70 ppb) by the Serious nonattainment date of 2027, but could attain it by 2033, (attainment date for Severe). Pursuant to CAA §181(b)(3) “Voluntary Reclassification”, the District is petitioning CARB in this attainment plan to formally submit a request to EPA asking for the voluntary reclassification from “Serious” to “Severe” pursuant to the 2015, O_3 NAAQS. This will extend the attainment deadline to August 27, 2033.

The District anticipates EPA will approve the request to be reclassified as Severe nonattainment (70 ppb), therefore this Ozone attainment plan addresses all required plan elements, emissions reductions, and control measures necessary to demonstrate attainment of the 2015, O_3 NAAQS by 2033.

I. INTRODUCTION

A. Ozone

Stratospheric ozone occurs naturally and is beneficial in the upper atmosphere, shielding the earth from harmful ultraviolet radiation from the sun. However, ground-level (tropospheric) ozone (O_3) is a colorless gas with a pungent, irritating odor and is a highly reactive harmful air pollutant that can damage living tissues and man-made materials upon contact.

O_3 is not directly emitted from sources, but formed in the air by reactions of O_3 precursor emissions—volatile organic compounds (VOC) and oxides of nitrogen (NOx)—in the presence of sunlight and heat. Accordingly, peak O_3 levels occur during the sunnier, warmer times of the year, typically April through October.

Health effects of O_3 are focused on the respiratory tract. When inhaled, O_3 can irritate and inflame the lining of the lungs, much like sunburn damage on skin. Potential health impacts include aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis. Individuals with respiratory problems are most vulnerable to O_3 , but outdoor activities on “high” O_3 days can even affect people that are normally healthy.

B. Background

The Federal Clean Air Act (CAA) of 1970 required the United States Environmental Protection Agency (EPA) to develop health-based National Ambient Air Quality Standards (NAAQS) for several categories of air pollutants, including O_3). EPA periodically reviews the NAAQS and associated scientific basis in determining appropriate revisions. Accordingly, EPA establishes new standards following advances in scientific understanding of the pollutant and its potential health effects.

Section 110 (a)(1) of the Federal Clean Air Act Amendments (FCAAA) of 1977 required EPA to divide the United States into “Planning Areas” and designate these areas “attainment”, “nonattainment”, or “unclassified” within 3 years of adopting the NAAQS.

FCAAA of 1990 gave states the primary responsibility for achieving the NAAQS. The principal mechanism for complying with the FCAAA was developing and adopting a State Implementation Plan (SIP). A SIP outlines programs, actions, and commitments a state will carry out to implement its responsibilities under the FCAAA. The EPA must approve all SIPs before they can be implemented by state and local governments. Once approved by the EPA, a SIP becomes a legally binding document under both state and federal law, and may be enforced by either government.

In 1990, EPA viewed all of Kern County as one “Planning Area” even though it was divided between two air basins. Unfortunately, there was not an O₃ monitoring station located in Eastern Kern County at that time and the only data available was from the San Joaquin Valley portion of Kern County. Consequently, all of Kern County was classified as Serious Nonattainment, with respect to the 1990 FCAA. The statutory attainment date became November of 1999.

C. Kern County Split

In 1992, Kern County was split between two air districts. The San Joaquin Valley portion of Kern County became part of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) and the Eastern Kern, high-desert portion of the County remained the Kern County Air Pollution Control District (KCAPCD)¹. Even though the District is located in the Mojave Desert air basin, EPA continued to consider it part of the San Joaquin Valley Federal Ozone Planning Area. In November 2001, upon the District’s request, EPA formally agreed to consider the District as a separate O₃ planning area.

D. 1994, Attainment Plan

The District’s 1994 O₃ Attainment Demonstration (Attainment Plan) was approved by EPA on September 25, 1996 (62 Fed. Reg. 1150, January 8, 1997). The Attainment Plan was presented in two parts: (I Transport Analysis) and (II Attainment Demonstration).

Part I showed District overwhelmingly impacted by O₃ transport from both the San Joaquin Valley Air Basin and the South Coast Air Basin. Eastern Kern air pollutant emission sources, by themselves, do not cause NAAQS or California Ambient Air Quality Standards (CAAQS) exceedances.

Part II showed District would attain O₃ NAAQS but not CAAQS by 1999. This, in fact occurred. O₃ data collected from 1999-2002 at the District’s O₃ monitor located in Mojave showed attainment.

E. 1997, Ozone NAAQS

A “new” 8-hour O₃ NAAQS of 0.08 ppm was established in 1997. The 8-hour averaging time was selected to address the impacts of exposure to longer periods of elevated O₃. The 0.08 ppm O₃ standard is attained when: Each monitor in a region shows a three-year O₃ concentration average, of the annual fourth-highest daily 8-hour average, no greater than 0.084 ppm (based on the rounding convention dictated in federal regulation)². Three years of O₃ concentrations are averaged due to the impacts of year-to-year variations in meteorology on O₃ formation.

¹ In 2010 KCAPCD appropriately changed its name to Eastern Kern Air Pollution Control District.

² Appendix I to 40 CFR 50, "Interpretation of the Eight-Hour Primary and Secondary National Ambient Air Quality Standards for Ozone."

By 2011, the Design Value (DV)³ of the District's O₃ nonattainment area dropped from 0.098 ppm (2003 level) to 0.080 ppm. On December 3, 2012, EPA announced they found that the Eastern Kern nonattainment area attained the 1997, 8-hour O₃ NAAQS.⁴ With this finding, effective January 3, 2013, the entire District was deemed to have "clean data" with respect to the 1997 standard.

F. Indian Well Valley Attainment Area

In 2004, at request of the California Air Resources Board (CARB), EPA divided the District into two O₃ planning areas: The Indian Wells Valley (IWV), which attained the 1997, 8-hour O₃ NAAQS of 0.08 ppm, and the remainder of Eastern Kern County (Nonattainment Area).

Figure 3: Indian Wells Valley Attainment Area



³The three year average of the fourth highest 8-hour ozone value for the target year and the two preceding years is the design value for that year. To determine attainment that design value is compared to the Ozone NAAQS.

⁴ 77 Federal Register 71551-71555; December 3, 2012

G. 2008, Ozone NAAQS

In 2008, EPA adopted a more stringent 8-hour O₃ NAAQS of 75 ppb⁵. Although the District showed a significant reduction in O₃ levels by attaining the 1997, O₃ NAAQS, and the IWV⁶ planning area already met the 75 ppb standard, the remainder of the District had a DV⁷ higher than 75 ppb. On May 21, 2012, EPA classified a portion of the District as “Marginal” nonattainment pursuant to the 2008, O₃ NAAQS.

CARB, in partnership with the District, conducted photochemical modeling along with supplemental analyses to determine anticipated attainment of the 2008, O₃ NAAQS. Air monitoring data and modeling revealed the District would not attain the 75 ppb standard by the Marginal (July 15, 2015) or Moderate (July 15, 2018) deadlines. However, modeling indicated the District could attain the 2008, O₃ NAAQS by the Serious deadline of July 15, 2021. Therefore, on July 27, 2017, the District adopted an attainment plan designed to address all required elements of Serious nonattainment pursuant to the 75 ppb O₃ NAAQS. The adopted O₃ plan identified emission control measures and associated emission reductions necessary to demonstrate attainment by 2021. Unfortunately, the District did not achieve attainment of the 75 ppb standard by July 15, 2021, and was reclassified to “Severe” nonattainment (now required to attain by July 2027).

H. 2015, Ozone NAAQS

On October 1, 2015, EPA revised the federal 8-Hour O₃ NAAQS, lowering it from 75 ppb to 70 ppb⁸ (2015, 8-Hour O₃ NAAQS). CARB performed analysis to determine appropriate designation recommendations throughout the State using the criteria outlined in EPA’s guidance memorandum⁹. One of the first steps of determining attainment is to compare the O₃ DV to the level of the standard. The DV reflects a three-year average of the fourth highest 8-hour average concentration at each monitoring site. If the DV is 71 ppb or greater, it violates the 2015, standard. These three-year average DVs are updated once the monitoring data from each calendar year are reviewed and certified.

Based on O₃ air quality monitoring data from years 2013-2015, nineteen areas did not meet the 70 ppb standard. Sixteen of these areas are also currently designated nonattainment for the 2008 (75 ppb) standard. CARB recommended the boundaries of these sixteen nonattainment areas remain the same for both O₃ NAAQS (70 and 75 ppb).

⁵73 FR 16436; 40 CFR 50.15, "National Primary & Secondary Ambient Air Quality Standards for Ozone."

⁶The Indian Wells Valley portion of Eastern Kern Air Pollution Control District was found attainment/unclassified for the 2008 Ozone NAAQS by EPA in 2011.

⁷Attainment is achieved when: “3-year average” of “annual 4th highest daily maximum” 8-hour average O₃ concentration, called “Design Value”, is no greater than 75 ppb at each EPA-approved O₃ air monitor in the District. The “3-year & 4th highest” are statistical values that provide stability to the standard, moderating the influence of extreme meteorological conditions (over which an area has no control).

⁸ 80 Federal Register 26594; October 26, 2015

⁹ February 25, 2016, Area Designations for the 2015 Ozone National Ambient Air Quality Standards, Memorandum from Janet G. McCabe, Acting Assistant Administrator, Office of Air and Radiation to Regional Administrators, Regions 1-10.

II. 2015, OZONE NAAQS RECLASSIFICATION

Nonattainment areas are classified as Marginal, Moderate, Serious, Severe, or Extreme, depending on the magnitude of the area's O₃ DV and EPA's guidance. On June 4, 2018, the EPA classified the District's nonattainment area as "Moderate" pursuant to the 2015, O₃ NAAQS¹⁰. However, photochemical modeling conducted by CARB indicated the District would not attain the 70 ppb standard by the Moderate deadline of August 2024. Modeling also showed the District would need more time to achieve the necessary emissions reductions in order to achieve attainment.

CAA §181(b)(3) "Voluntary Reclassification" states: "The Administrator shall grant the request of any State to reclassify a nonattainment area in that State in accordance with Table 1 of subsection (a) to a higher classification." The request for EPA to reclassify a nonattainment area to a higher classification will extend the attainment deadline. Even though more stringent requirements are imposed with each higher attainment classification, reclassification is an appropriate approach for areas that must rely on long-term strategies required for accomplishing the emission reductions needed for achieving attainment.

On May 6, 2021, the District sent a letter to CARB requesting they formally submit a request to EPA for the voluntary reclassification of the District's nonattainment area from "Moderate" to "Serious" pursuant to the 2015, O₃ NAAQS. This reclassification would modify the attainment deadline from August 3, 2024 to August 3, 2027, which was believed to allow adequate time for achieving attainment.

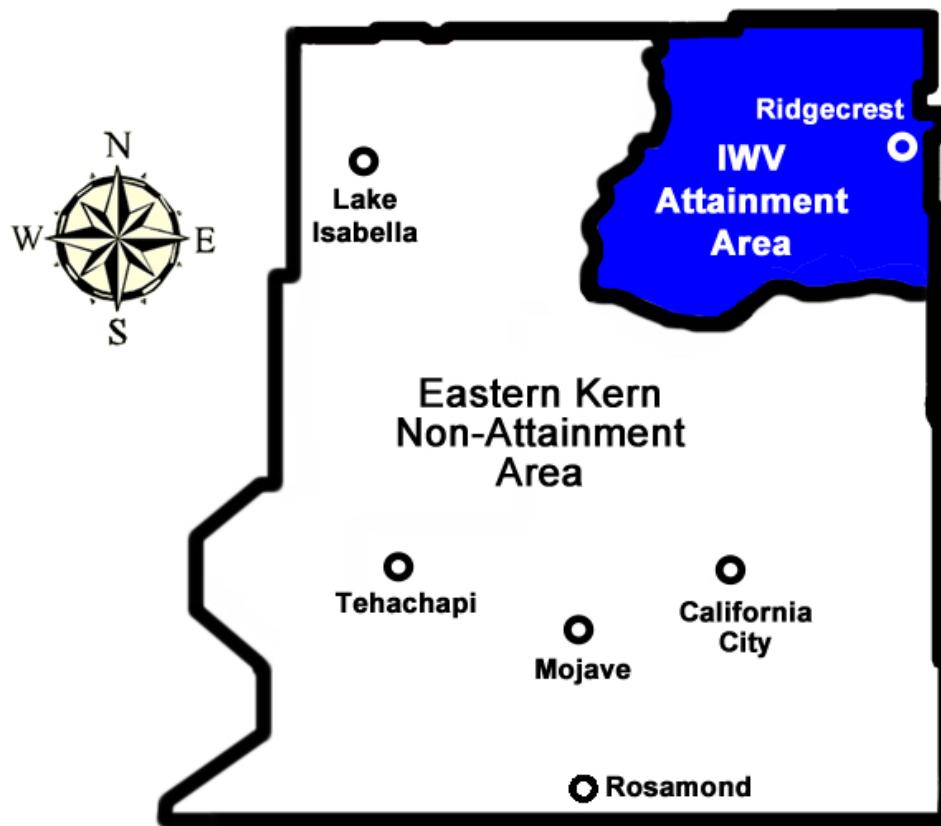
On October 28, 2021, EPA granted the District's request and reclassified the District as Serious nonattainment¹¹. Unfortunately, CARB's photochemical modeling conducted to show attainment with the 2008, O₃ NAAQS also showed that the District would not attain the 2015, O₃ NAAQS by August 3, 2027. However, the additional modeling showed that attainment could be achieved by 2033, which is the deadline for the Severe classification.

A. Voluntary Reclassification Request

The District requests that CARB formally submit a request to the EPA for the voluntary reclassification of the District's nonattainment area from Serious to Severe nonattainment pursuant to the 2015, O₃ NAAQS. This request is made in accordance with CAA §181(b)(3)(a), Table 1 "Voluntary Reclassification" of the CAA. This reclassification will revise the attainment deadline from August 3, 2027, to August 3, 2033. District Staff is aware that there will be additional planning requirements; however, staff believes this proactive approach is the best method for achieving attainment. Additionally, the Weight of Evidence included in this attainment plan provides data showing attainment will achieve by 2033.

¹⁰ 83 Federal Register 25776; June 4, 2018

¹¹ 86 Federal Register 59648-59651; October 28, 2021

Figure 4: Eastern Kern Nonattainment Area

III. REQUIREMENTS FOR OZONE NONATTAINMENT AREA

In 2015, EPA promulgated an “implementation” rule for the 2008, O₃ NAAQS (2015 Implementation Rule)¹², designed to assist states with plan development. Under the Implementation Rule, affected regions are required to address planning and emission control requirements in their implementation plan.

All nonattainment areas, including the District, are subject to the general planning and emission control requirements of Subpart 2 (Title I, Part D) of the CAA, which consist of the following:

- 1 Emission Inventory:** CAA §182(a)(1): Is a comprehensive tabulation of air pollutants organized by emission source category. This Ozone Attainment Plan includes updated inventories of O₃ precursor emissions (VOC and NOx) for the 2008 and 2015 planning years, the 2017 base year, the year from which future-year inventories are projected, and 2026 (75ppb) and 2032 (70ppb) attainment years. Additionally, all inventory years in this Attainment Plan are derived from the 2017 base year inventory.

¹² Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule. 80 Fed. Reg. 44. Pp. 12264-12319. (March 6, 2015), (to be codified at 40 CFR Parts 50, 51, 52, et al.) <https://www.gpo.gov/fdsys/pkg/FR-2015-03-06/pdf/2015-04012.pdf>

- 2 Major Source Emission Statements:** CAA §182(a)(3)(B): States whether the District's existing emission statement reporting rule (Rule 108.2) is sufficient and remained adequate for the purposes of the 2008, 8-hour O₃ NAAQS for major sources.
- 3 New Source Review (NSR):** CAA §182(a)(2): Requires the District to address emissions from new sources and major modifications to existing sources.

A. Emissions Inventory

An emissions inventory is one of the fundamental building blocks in the development of a SIP. In simple terms, an emissions inventory is a systematic listing of the sources of air pollution along with the amount of pollution emitted from each source or category over a given time period. An emissions inventory is required by the CAA and *Ozone SIP Requirements Rule*, also called the *Ozone Implementation Rule*¹³.

Specifically, emissions inventories are required for areas that exceed the NAAQS. These areas are designated as nonattainment based on monitored exceedances of these standards. These nonattainment areas must develop an emissions inventory as the basis of a SIP that demonstrates how they will attain the standards by specified dates. The following sections of this attainment plan describes the emissions inventory included in the District's 2015, O₃ SIP (70 ppb). Showing attainment of the 70 ppb standard will also demonstrate attainment of the 75 ppb standard as the 70 ppb standard is the more restrictive of the two.

B. Emissions Inventory Overview

Emissions inventories are estimates of the amount and type of pollutants emitted into the atmosphere by facilities, mobile sources, and area-wide sources. They are fundamental components of an air quality plan and serve critical functions such as:

- 1). The primary input to air quality modeling used in attainment demonstrations;
- 2). The emissions data used for developing control strategies; and
- 3). A means to track progress in meeting the emission reduction commitments.

CARB and the District have developed a comprehensive current emissions inventory consistent with the requirements set forth in CAA §182(a)-(f)¹⁴. CARB and District staff conducted a thorough review of the inventory to ensure that the emission estimates reflect accurate emissions reports for point sources and that estimates for mobile and area wide sources are based on the most recent approved models and methodologies.

¹³ Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; (40 CFR part 51 Subpart AA; see also <https://www.epa.gov/ground-level-ozone-pollution/implementation-2008-national-ambient-air-quality-standards-naaqs-ozone>)

¹⁴ §182(a)-(f) of the Act. <https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart2-sec7511a.htm>

CARB also reviewed the growth profiles for point and area wide source categories and updated them as necessary to ensure that the emission projections are based on data that reflect historical trends, current conditions, and recent economic and demographic forecasts.

EPA regulations require that the emissions inventory for an O₃ SIP contain emissions data for the two precursors to O₃ formation: NOx and VOC¹⁵. The inventory included in this plan substitutes VOC with reactive organic gases (ROG), which, in general, represent a slightly broader group of compounds than those in EPA's list of VOCs.

C. Inventory Base Year

40 CFR 51.1315(a) requires that the inventory year be selected consistent with the baseline year for the reasonable further progress (RFP) plan as required by 40 CFR 51.1310(b)¹⁶, which states that the base year emissions inventory shall be the emissions inventory for the most recent calendar year of which a complete triennial inventory is required to be submitted to EPA under the provisions of subpart A of 40 CFR part 51, Air Emissions Reporting Requirements, 40 CFR 51.1– 50. States may also use an alternative baseline emissions inventory provided that the year selected corresponds with the year of the effective date of designation as nonattainment for that NAAQS¹⁷.

CARB selected the base year 2017 because it is the most recent triennial inventory year conducted for the National Emissions Inventory (NEI) pursuant to the Air Emissions Reporting Requirements (AERR) rule.

D. Forecasted Inventories

In addition to base year emissions, emissions projections are needed for a variety of reasons, including re-designation maintenance plans, the attainment projected inventory for a nonattainment area (NAA), and air quality modeling for attainment plans¹⁸.

For stationary and area sources, forecasted inventories are a projection of the base year inventory that reflects expected growth trends for each source category and emissions reductions due to adopted control measures. CARB develops emission forecasts by applying growth and control profiles to the base year inventory. The stationary and area source emissions inventory for the Eastern Kern 70 ppb O₃ SIP is modeled by the California Emission Projection Analysis Model (CEPAM), 2019 Emission Projections, Version 1.04 (CEPAM2019v1.04).

¹⁵ §182(a)(1) of the Act. <https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart2-sec7511a.htm>

¹⁶ 40 CFR 51.1315(a). <https://www.govinfo.gov/content/pkg/CFR-2021-title40-vol2/pdf/CFR-2021-title40-vol2-sec51-1315.pdf>

¹⁷ 40 CFR 51.1310(b). <https://www.govinfo.gov/content/pkg/CFR-2020-title40-vol2/pdf/CFR-2020-title40-vol2-sec51-1310.pdf>

¹⁸ 40 CFR 51.114. <https://www.govinfo.gov/content/pkg/CFR-2000-title40-vol2/pdf/CFR-2000-title40-vol2-sec51-114.pdf>

Growth profiles for point and area-wide sources are derived from surrogates, such as economic activity, fuel usage, population, and housing units that best reflect the expected growth trends for each specific source category. Growth projections were obtained primarily from government entities with expertise in developing forecasts for specific sectors, or, in some cases, from econometric models. Control profiles, which account for emission reductions resulting from adopted rules and regulations, are derived from data provided by the regulatory agencies responsible for the affected emission categories.

Projections for on-road mobile source emissions are generated by CARB's EMFAC2017 model, which predicts activity rates and vehicle fleet turnover by vehicle model year, along with activity inputs from the metropolitan planning organization (MPO). Off-road mobile sources are forecasted with category-specific model or, where not available, CARB's OFFROAD2007.

CEPAM integrates the emission projections derived from these mobile source models to develop a comprehensive forecasted emission inventory. As with stationary sources, the mobile source models include control algorithms that account for adopted regulatory actions.

E. Temporal Resolution

40 CFR 51.1315(c) requires emissions values included in the base year inventory to be actual O₃ season day emissions as defined by 40 CFR 51.1300(q)¹⁹. Since O₃ concentrations tend to be highest during the summer months, the emissions inventory used in the SIP is based on the summer season (May through October).

F. Geographic Resolution

The inventory presented in this plan includes emissions for the District NAA, which consists of the Eastern Kern County, excluding the IWV. Since the NAA is split into a region not defined by county, air basin, or district boundaries, the District identified the facilities that fall in the portion of NAA, on-road emissions were estimated by EMFAC2017, and the area and off-road source emissions in the NAA were estimated using category-specific factors based on the spatial distribution of population and other activity parameters within the nonattainment region. These fractions were developed by CARB and the District. The special split allocation method of each subcategory is shown in Table 1.

¹⁹ 40 CFR 51.1315(c). <https://www.govinfo.gov/content/pkg/CFR-2021-title40-vol2/pdf/CFR-2021-title40-vol2-sec51-1315.pdf>.

Table 1: Subcategory Allocation Method for NAA

Subcategory	Allocation Method
MANUFACTURING AND INDUSTRIAL	HUMAN POPULATION
FOOD AND AGRICULTURAL PROCESSING	HUMAN POPULATION
SERVICE AND COMMERCIAL	HUMAN POPULATION
SEWAGE TREATMENT	HUMAN POPULATION
LANDFILLS	HUMAN POPULATION
LAUNDERING	HUMAN POPULATION
DEGREASING	HUMAN POPULATION
COATINGS AND RELATED PROCESS SOLVENTS	HUMAN POPULATION
ADHESIVES AND SEALANTS	HUMAN POPULATION
PETROLEUM MARKETING	HUMAN POPULATION
MINERAL PROCESSES	HUMAN POPULATION
METAL PROCESSES	HUMAN POPULATION
CONSUMER PRODUCTS	HUMAN POPULATION
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	HUMAN POPULATION
PESTICIDES/FERTILIZERS	LAND AREA
ASPHALT PAVING / ROOFING	HUMAN POPULATION
RESIDENTIAL FUEL COMBUSTION	HUMAN POPULATION
FARMING OPERATIONS	LAND AREA
FIRES	HUMAN POPULATION
MANAGED BURNING AND DISPOSAL	LAND AREA
COOKING	HUMAN POPULATION
LIGHT DUTY PASSENGER (LDA)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
LIGHT DUTY TRUCKS - 1 (LDT1)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
LIGHT DUTY TRUCKS - 2 (LDT2)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
MEDIUM DUTY TRUCKS (MDV)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
MOTORCYCLES (MCY)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
SCHOOL BUSES - DIESEL (SBD)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
OTHER BUSES - GAS (OBG)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
ALL OTHER BUSES - DIESEL (OBD)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
MOTOR HOMES (MH)	EMFAC2017 run for Kern--MD air basin (excludes IWV)
AIRCRAFT	DISTRICT FRACTION ESTIMATE
TRAINS	DISTRICT FRACTION ESTIMATE
RECREATIONAL BOATS	HUMAN POPULATION
OFF-ROAD RECREATIONAL VEHICLES	HUMAN POPULATION
OFF-ROAD EQUIPMENT	HUMAN POPULATION
FARM EQUIPMENT	LAND AREA
FUEL STORAGE AND HANDLING	HUMAN POPULATION

G. Quality Assurance and Quality Control

CARB has established a quality assurance and quality control (QA/QC) process to ensure the integrity and accuracy of the emission inventories used in the development of air quality plans. QA/QC occurs at the various stages of SIP emission inventory development. Base year emissions are assembled and maintained in the California Emission Inventory Development and Reporting System (CEIDARS). CARB inventory staff works with air districts, which are responsible for developing and reporting point source emission estimates, to verify these data are accurate. The locations of point sources, including stacks, are checked to ensure they are valid.

Area-wide source emissions estimates are developed by both CARB and District staff, and the methodologies are reviewed by both agencies before their inclusion in the emissions inventory. Mobile categories are verified with CARB mobile source staff for consistency with the on-road and off-road emission models. Additionally, CEIDARS is designed with automatic system checks to prevent errors, such as double counting of emission sources. At the final stage, CEPAM is thoroughly reviewed to validate the accuracy of growth and control application, and the output emissions are compared against prior approved versions of CEPAM to identify data anomalies.

H. Emission Inventory Components

A summary of the components that make up the District's 70 ppb O₃ SIP emissions inventory is presented in the following sections. These include mobile (on- and off-road) sources, stationary point sources, and area-wide sources. Natural sources are not included.

I. Mobile Source Emissions

CARB develops the emission inventory for the mobile sources using various modeling methods. These models account for the effects of various adopted regulations, technology types, fleet turnover, and seasonal conditions on emissions. Mobile sources in the emission inventory are composed of both on-road and off-road sources, described in the sections below.

J. On-Road Mobile Source Emissions

Emissions from on-road mobile sources, which include passenger vehicles, buses, and trucks, were estimated using outputs from CARB's EMFAC2017 model. The on-road emissions were calculated by applying EMFAC2017 emission factors to the transportation activity data provided by the local MPO.

EMFAC2017 includes data on California's car and truck fleets and travel activity. Light-duty motor vehicle fleet age, vehicle type, and vehicle population were updated based on 2016 DMV data. The model also reflects the emissions benefits of CARB's recent rulemakings such as the Pavley Standards and Advanced Clean Cars Program and

includes the emissions benefits of CARB’s Truck and Bus Rule and previously adopted rules for other on-road diesel fleets.

EMFAC2017 utilizes a socio-econometric regression modeling approach to forecast new vehicle sales and to estimate future fleet mix. Light-duty passenger vehicle population includes 2016 DMV registration data along with updates to mileage accrual using Smog Check data. Updates to heavy-duty trucks include model year specific emission factors based on new test data, and population estimates using DMV data for in-state trucks and International Registration Plan (IRP) data for out-of-state trucks.

Additional information and documentation on the EMFAC2017 model is available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation>

1. EMFAC2017 SAFE Vehicles Rules Off-Model Adjustment Removal

On September 27, 2019, EPA and National Highway Traffic Safety Administration (NHTSA) published the “Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program” (SAFE-1)²⁰. SAFE-1 revoked California’s authority to set its own greenhouse gas emissions standards and set zero-emission vehicle mandates in California. On April 28, 2021, EPA reconsidered the 2019 SAFE-1 by finding that the actions taken as a part of SAFE-1 were decided in error and are now entirely rescinded²¹. Therefore, any previously applied off-model adjustments as a result of SAFE-1 were removed in this inventory, resulting in a minor reduction in emissions.

2. EMFAC2017 ACT Off-Model Adjustment

The Advanced Clean Trucks (ACT) regulation was approved on June 25, 2020 and has two main components, a manufacturers zero-emission vehicle (ZEV) sales requirement and a one-time reporting requirement for large entities and fleets. The first component requires manufacturers to sell ZEVs as a percentage of annual truck and bus sales in California for vehicle model years 2024 and newer.

The ACT regulation impacts some of the underlying assumptions in CARB’s EMFAC2017 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors in order to reflect the regulation. Adjustment factors were based on calculations in EMFAC2021, which models a percentage of California-certified ZEV sales for each EMFAC category and model year. More information on inventory modelling methods can be found in the ACT Initial Statement of Reasons (ISOR) Appendix B.

²⁰ 84 FR 51310. <https://www.govinfo.gov/content/pkg/FR-2019-09-27/pdf/2019-20672.pdf>.

²¹ 87 FR 14332. <https://www.govinfo.gov/content/pkg/FR-2022-03-14/pdf/2022-05227.pdf>.

These adjustment factors were calculated based on emission estimates using EMFAC2021 under two scenarios:

- 1). Controlled scenario -estimated emissions with adopted regulations (EMFAC2021 default) and
- 2). Uncontrolled scenario - estimated emissions without accounting for the benefits of adopted regulations, including ACT and other regulations Heavy-Duty Omnibus, Opacity, and ICT (described below).

These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of the ACT regulation. The ACT off-model adjustment factors were only applied to the medium-and heavy-duty truck sectors.

Additional information on ACT is available at: <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks>

Additional information on EMFAC2021 technical details is available at:
https://ww2.arb.ca.gov/sites/default/files/202108/emfac2021_technical_documentation_april2021.pdf

3. EMFAC2017 Heavy-Duty Omnibus Off-Model Adjustment

On August 27, 2020, CARB adopted the Heavy-Duty (HD) Omnibus regulation, which would establish NOx engine emission standards 90 percent lower than today's technology. The Omnibus Regulation will dramatically reduce NOx emissions by comprehensively overhauling exhaust emission standards, test procedures, and other emissions-related requirements for California-certified heavy-duty engines with engine model years 2024 and newer. The HD Omnibus regulation impacts some of the underlying assumptions in CARB's EMFAC2017 model, which was used to assess emissions from on-road mobile sources.

Therefore, CARB developed off-model adjustment factors based on EMFAC2021 (described above) in order to reflect the regulation. These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of the HD Omnibus regulation. The adjustment factors reflect the impact of all components of the HD Omnibus regulation on in-use (i.e. real-world) NOx emissions and deterioration-related emissions. More details on the inventory analysis for this regulation can be found in Appendix E of the HD Omnibus staff report. The HD Omnibus off-model adjustment factors were only applied to on-road heavy-duty vehicles.

Additional information on the HD Omnibus regulation is available at:
<https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox>

4. EMFAC2017 Innovative Clean Transit Off-Model Adjustment

The Innovative Clean Transit (ICT) regulation was adopted by CARB in 2019 and targets reductions in transit fleets by requiring transit agencies to gradually transition their buses to zero-emission technologies. ICT has helped to advance heavy-duty ZEV deployment, with buses acting as a beachhead in the heavy-duty sector. Based on the size of the transit agencies, they are categorized as small and large agencies. Starting calendar year 2023, large agencies follow the phase-in schedule to have a certain percentage of their new purchases as zero emission buses (ZEB). For the small agencies, the start calendar year will be 2025. By 2030, all the agencies need to have 100% of their new purchases as ZEB.

The ICT regulation impacts some of the underlying assumptions in CARB's EMFAC2017 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors based on EMFAC2021 (described above) in order to reflect the regulation. These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of ICT. More details on the inventory analysis for this regulation can be found in Appendix L of the ICT staff report. The ICT off-model adjustment factors were only applied to the urban buses (UBUS) category.

Additional information on the ICT regulation is available at:

<https://ww2.arb.ca.gov/our-work/programs/innovative-clean-transit/ict-regulation>

5. EMFAC2017 Heavy-Duty Inspection and Maintenance Off-Model Adjustment

The Innovative Clean Transit (ICT) regulation was adopted by CARB in 2019 and targets reductions in transit fleets by requiring transit agencies to gradually transition their buses to zero-emission technologies. ICT has helped to advance heavy-duty ZEV deployment, with buses acting as a beachhead in the heavy-duty sector. Based on the size of the transit agencies, they are categorized as small and large agencies. Starting calendar year 2023, large agencies follow the phase-in schedule to have a certain percentage of their new purchases as zero emission buses (ZEB). For the small agencies, the start calendar year will be 2025. By 2030, all the agencies need to have 100% of their new purchases as ZEB.

The ICT regulation impacts some of the underlying assumptions in CARB's EMFAC2017 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors based on EMFAC2021 (described above) in order to reflect the regulation. These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of ICT.

More details on the inventory analysis for this regulation can be found in Appendix M of the ICT staff report. The ICT off-model adjustment factors were only applied to the urban buses (UBUS) category.

Additional information on the ICT regulation is available at:
<https://ww2.arb.ca.gov/our-work/programs/innovative-clean-transit/ict-regulation>

6. EMFAC2017 Heavy-Duty Inspection and Maintenance Off-Model Adjustment

Dec. 9th, 2021, CARB adopted Heavy-Duty Inspection and Maintenance (HD I/M) program, which controls emissions effectively from non-gasoline on-road heavy-duty vehicles with a gross vehicle weight rating (GVWR) greater than 14,000 pounds. Starting from calendar year 2023, the program drastically reduces NOx and PM 2.5 emissions by enforcing periodic testing and inspections for heavy-duty trucks operating in California.

The Heavy-Duty Inspection and Maintenance (HD I/M) regulation impacts some of the underlying assumptions in CARB's EMFAC2017 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors based on off-model analysis with EMFAC2021 in order to reflect the regulation. More information on this analysis is provided in Appendix E of the HD I/M staff report. Since this regulation was adopted after the release of EMFAC2021, these adjustment factors were calculated based on emission estimates under two scenarios:

- 1). EMFAC2021 with HD I/M analysis incorporated and
- 2). EMFAC2021 default, which does not include HD I/M.

These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of HD I/M. These off-model adjustment factors were applied to all diesel heavy-duty diesel categories.

K. Off-Road Mobile Source Emissions

Emissions from off-road sources are estimated using a suite of category-specific models or, where a new model was not available, the OFFROAD2007 model. Many of the newer models are developed to support recent regulations, including in-use off-road equipment, ocean-going vessels, and others. The sections below summarize the updates made by CARB to specific off-road categories.

1. Recreational Marine Vessels

Pleasure craft or recreational marine vessel (RMV) is a broad category of marine vessel that includes gasoline-powered spark-ignition marine watercraft (SIMW) and diesel-powered marine watercraft. It includes outboards, sterndrives, personal watercraft, jet boats, and sailboats with auxiliary engines. This emissions inventory was last updated in 2014 to support the evaporative control measures. The population, activity, and emission factors were revised using new surveys, DMV registration information, and emissions testing.

Staff used economic data from a 2014 UCLA Economic Forecast to estimate the near-term annual sales of RMV(2014 to 2019). To forecast long-term annual sales (2020 and later), staff used an estimate of California's annual population growth as a surrogate.

Additional information is available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad>

2. Recreational Vehicles

Off-highway recreational vehicles include off-highway motorcycles (OHMC), all-terrain vehicles (ATV), off-road sport vehicles, off-road utility vehicles, sand cars, golf carts, and snowmobiles. A new model was developed in 2018 to update emissions from recreational vehicles. Input factors such as population, activity, and emission factors were re-assessed using new surveys, DMV registration information, and emissions testing. OHMC population growth is determined from two factors: incoming population as estimated by future annual sales and the scrapped vehicle population as estimated by the survival rate.

Additional information is available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad>

3. Fuel Storage and Handling

Emissions from portable fuel containers (gas cans) were estimated based on past surveys and CARB in-house testing. This inventory uses a composite growth rate that depends on occupied household (or business units), percent of households (or businesses) with gas cans, and average number of gas cans per household (or business) units.

Additional information is available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad>

4. Small Off-Road Engines (SORE)

Small off-road engines (SORE) are spark-ignition engines rated at or below 19 kilowatts (i.e., 25 horsepower). Typical engines in this category are used in lawn and garden equipment as well as other outdoor power equipment and cover a broad range of equipment. The majority of this equipment belongs to the Lawn & Garden (e.g., lawnmower, leaf blower, trimmer) and Light Commercial (e.g., compressor, pressure washer, generator) categories of CARB's SORE emissions inventory model.

The newly developed, stand-alone SORE2020 Model reflects the recovering California economy from the 2008 economic recession and incorporates emission results from CARB's recent in-house testing as well as CARB's most recent Certification Database. CARB also has conducted an extensive survey of SORE operating within California through the Social Science Research Center (SSRC) at the California State University, Fullerton (CSUF). Data collected through this survey provides the most up-to-date information regarding the population and activity of SORE equipment in California. The final SORE emissions included the adopted SORE rule in December 2021 as well as the 15-day changes after the Board hearing which allowed the pressure washers (greater than 5 hp) extra time for meeting the regulation. The SORE annual sales were forecasted using historic growth of the number of California households (DOF household forecasts, 2000 – 2008 and 2009 - 2018).

Additional information on SORE baseline emissions (without the adopted rule and 15-day changes) is available at: https://ww2.arb.ca.gov/sites/default/files/2020-09/SORE2020_Technical_Documentation_2020_09_09_Final_Cleaned ADA.pdf

5. Locomotives

All locomotive inventories were updated in 2020 and include line haul (large national companies), switchers (used in railyards), passenger, and Class 3 locomotives (smaller regional companies). Data for each sector was supplied by rail operations, including Union Pacific and Burlington Northern Santa Fe Railway (BNSF) for line haul and switcher operations. Data for other categories was supplied by the locomotive owners. Emission factors for all categories were based on EPA emission factors for locomotives. The inventory reflects the 2005 memorandum of understanding (MOU) with Union Pacific and BNSF. Growth rates were primarily developed from the FAF.

More information is available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

6. Military and Industry Locomotives

This new category includes military and Industrial (M&I) locomotive emission inventory and relies on the annual fuel consumption and engine information collected from 2011 to 2018. The M&I locomotive data was supplied by 39 private companies, 4 military rail groups, with a total of 85 locomotives. The subject locomotives typically consist of smaller, older switchers and medium horsepower (MHP, 2,301 to 3,999 hp) locomotives operating within the boundaries of a granary, plant, or industrial facility.

The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

7. Diesel Agricultural Equipment

The agricultural equipment inventory covers all off-road vehicles used on farms or first processing facilities (of all fuel types). It was updated in 2021 using a 2019 survey of California farmers and rental facilities, and the 2017 U.S. Department of Agriculture (USDA) agricultural census. Emission factors are based on the 2017 off-road diesel emission factor update. The inventory reflects incentive programs for agricultural equipment that were implemented earlier than August 2019. Agricultural growth rates were developed using historical data from the County Agricultural Commissioners' reports.

Additional information is available at: https://ww2.arb.ca.gov/sites/default/files/2021-08/AG2021_Technical_Documentation_0.pdf

8. In-Use Off-Road Equipment

This category covers off-road diesel vehicles over 25 horsepower in construction, mining, industrial, and oiling drilling categories. The inventory was updated in 2022 based on the DOORS registration program. Activity was updated based on a 2021 survey of registered equipment owners, and emission factors were based on the 2017 off-road diesel emission factor update. The inventory reflects the In-Use Off-Road Equipment Regulations, as amended in 2011.

The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

9. Transportation Refrigeration Units - Diesel

The Transportation Refrigeration Units (TRU) inventory was updated in 2020 based on the TRU reporting program at CARB. The activity was developed based on 2010 surveys of facilities served by TRUs and 2017 to 2019 telematics data purchased from TRU manufacturers. Emission factors were developed specifically for TRUs based on TRU engine certification data reported to EPA as of 2018. The inventory reflects the TRU ATCM and 2021 amendments. Forecasting was based on IBISWorld reports forecast for related industries, and turnover forecasting was based on the past 20 years equipment population trends.

Additional information is available at:

<https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/apph.pdf>

10. Portable Equipment

Portable equipment inventory includes non-mobile diesel, such as generators, pumps, air compressors, chippers, and other miscellaneous equipment over 50 horsepower. This inventory was developed in 2017 based on CARB's registration program, 2017 survey of registered owners for activity and fuel, and the 2017 off-road diesel emission factor update. The inventory also reflects the Portable ATCM and 2017 amendments.

Because registration in PERP is voluntary, the PERP registration data was used as the basis for equipment population, with an adjustment factor used to represent the remaining portable equipment in the state. Estimates of future emissions beyond the base year were made by adjusting base year estimates for population growth, activity growth, and the purchases of new equipment (i.e. natural and accelerated turnover).

Additional information is available at:

<https://ww3.arb.ca.gov/msei/ordiesel/perp2017report.pdf>

11. Large Spark Ignition/Forklifts

The large spark ignition (LSI) inventory includes gasoline and propane forklifts, sweeper/scrubbers, and tow tractors. The inventory was updated in 2020 based on the LSI/forklift registration in the DOORS reporting system at CARB, and the sales data was provided by the Industrial Truck Association (ITA). Activity was based on a survey of equipment owners in the DOORS system, and emission factors were based on EPA's latest guidance for gasoline and propane engines. The inventory reflects the LSI regulation requirements and 2016 amendments.

The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

12. Forestry Equipment

The new 2021 forestry diesel equipment emissions inventory was developed to replace the previous emissions inventory for diesel forestry equipment based on OFFROAD2007. This inventory includes equipment used in forestry and in milling. This includes foresting operations, such as feller/bunchers and dragline operations, equipment used to build roads to reach forested areas, and forklifts or loaders used in milling operations. The inventory was based on a 2019 survey of forestry operations and mills (for calendar year 2017), as well as the 2019 California Department of Tax and Fee Administration data on the annual timber harvest, with emission factors from the 2017 off-road diesel emission factor update. This sector does not include any emission reduction measures or strategies. The model projects forestry equipment population and emissions in future years by predicting the retirement and purchasing habits of forestry equipment. The model attempts to predict a business as usual (BAU) behavior based on the 2017 survey data.

Additional information is available at:

https://ww2.arb.ca.gov/sites/default/files/2021-10/2021_Forestry_Inventory_Technical_Document_FINAL_09302021.pdf

L. Stationary Point Sources

The stationary source inventory is composed of point sources and area-wide sources. The data elements in the inventory are consistent with the data elements required by the AERR. The inventory reflects actual emissions from industrial point sources reported to the District by the facility operators through calendar year 2017.

Stationary point sources also include smaller point sources, such as gasoline dispensing facilities and laundering, that are not inventoried individually, but are estimated as a group and reported as a single source category. Emissions from these sources are estimated using various models and methodologies. Estimation methods include source testing, direct measurement by continuous emissions monitoring systems, or engineering calculations. Emissions for these categories are estimated by both CARB and the District.

Estimates for the categories below were developed by CARB and has been reviewed by CARB staff to reflect the most up-to-date information.

1. Stationary Nonagricultural Diesel Engines

This category includes emissions from backup and prime generators and pumps, air compressors, and other miscellaneous stationary diesel engines that are widely used throughout the industrial, service, institutional, and commercial sectors. The emission estimates, including emission forecasts, are based on a 2003 CARB methodology derived from the OFFROAD2007 model.

Additional information on this methodology is available at:
<https://ww3.arb.ca.gov/ei/areasrc/arbfuelcombother.htm>

2. Agricultural Diesel Irrigation Pumps

This category includes emissions from the operation of diesel-fueled stationary and mobile agricultural irrigation pumps. Emission estimates are based on a 2003 CARB methodology using statewide population and include replacements due to the Carl Moyer Program. Emissions are grown based on projected acreage for irrigated farmland from the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), 2008.

Additional information on this category is available at:
<https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full1-1.pdf>

3. Laundering

This category includes emissions from perchloroethylene (perc) dry cleaning establishments. Emission estimates are based on a 2002 CARB methodology that used nationwide perc consumption rates allocated to the county level based on population and an emission factor of 10.125 pounds per gallon used. Emissions were grown based on the California Department of Finance (DOF) population forecasts, 2020.

Additional information on this methodology is available at:
<https://ww3.arb.ca.gov/ei/areasrc/arbcleanlaund.htm>

4. Degreasing

This category includes emissions from solvents in degreasing operations in the manufacturing and maintenance industries. Emissions estimates are based on a 2000 CARB methodology using survey and industry data, activity factors, emission factors and a user's fraction. Emissions were grown based on CARB's Real Disposable Personal Income (REMI) industry-specific economic output, version 2.4.5.

Additional information on this methodology is available at:
<https://ww3.arb.ca.gov/ei/areasrc/arbcleandegreas.htm>

5. Coatings and Thinners

This category includes emissions from coatings and related process solvents. Auto refinishing emissions estimates are based on a CARB methodology using production data and a composite emission factor derived from a 2002 survey. These estimates were grown based on CARB's on-road mobile sources model (EMFAC2017). Estimates for industrial coatings emissions are based on a 1990 CARB methodology using production and survey data, and emission factors derived from surveys.

Estimates for thinning and cleaning solvents are based on a 1991 CARB methodology, census data and a default emission factor developed by CARB. These estimates were grown based on REMI county economic forecasts, version 2.4.5.

Additional information on these methodologies is available at:
<https://ww3.arb.ca.gov/ei/areasrc/arbcleancoatreproc.htm>

6. Adhesives and Sealants

This category includes emissions from solvent-based and water-based solvents contained in adhesives and sealants. Emissions are estimated based on a 1990 CARB methodology using production data and default emission factors. Estimates were grown based on REMI county economic forecasts, version 2.4.5.

Additional information on this methodology is available at:
<https://ww2.arb.ca.gov/carb-cleaning-and-surface-coating-methodologies-adhesives-and-sealants>

7. Gasoline Dispensing Facilities

This category uses a 2015 CARB methodology to estimate emissions from fuel transfer and storage operations at gasoline dispensing facilities (GDFs). The methodology addresses emissions from underground storage tanks, vapor displacement during vehicle refueling, customer spillage, and hose permeation. The updated methodology uses emission factors developed by CARB staff that reflect more current in-use test data and also accounts for the emission reduction benefits of onboard refueling vapor recovery (ORVR) systems. The emission estimates are based on 2012 statewide gasoline sales data from the California Board of Equalization that were apportioned to the county level using fuel consumption estimates from EMFAC 2014. Emissions were grown based on EMFAC2017.

Additional information on this category is available at:
<https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing>

8. Gasoline Cargo Tank

This category uses a 2002 CARB methodology to estimate emissions from gasoline cargo tanks. These emissions do not include the emissions from loading and unloading of gasoline cargo tank product; they are included in the gasoline terminal inventory and gasoline service station inventory. Pressure-related fugitive emissions are volatile organic vapors leaking from three points: fittings, valves, and other connecting points in the vapor collection system on a cargo tank. 1997 total gasoline sales were obtained from the California Department of Transportation.

The emission factors are derived from the data in the report, "Emissions from Gasoline Cargo Tanks, First Edition," published by the Air and Waste Management Association in 2002.

The initial emission estimates for 1997, were grown to 2012 using a growth parameter developed by Pechan based on gasoline and oil expenditures data. Emissions were grown according to fuel consumption from CARB's EMFAC 2017 mobile sources emission factors model.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing>

9. Oil and Gas Production

The oil and natural gas production inventory is estimated by a 2015 CARB methodology. This category is related to fugitive emissions from production-related fuel consumption, fugitive losses (sumps, pits, pumps, compressors, well heads, separators, valves and fittings), vapor recovery and flares, tank and truck working and breathing losses, wastewater treatment, tertiary production, and wet and dry gas stripping. Emissions were calculated using EPA's Oil and Natural Gas Tool v1.4 with default emissions factors from ENVIRON Int'l Corp's 2012 report, "2011 Oil and Gas Emission Inventory Enhancement Project for CenSARA States," and activity data taken from California's Division of Oil, Gas, and Geothermal Resources (DOGGR) (which was renamed to Geologic Energy Management Division (CalGEM) in 2020).

CARB also incorporated data from the 2007 Oil and Gas Industry Survey (e.g., typical component counts) and feedback from individual air districts (e.g., minimum controls required to operate in a certain district, with associated control factors) to improve these parameters and further adjust the tool's output. Emissions were grown to 2017 based on CalGEM historical statewide production. Growth in future years an assumed 2.9% annual decline, which reflects the statewide CalGEM trend from 2000 through 2016.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/resources/documents/oil-and-gas-industry-survey>
<https://ww3.arb.ca.gov/ei/areasrc/oilandgaseifinalreport.pdf>

M. Area-Wide Sources

Area-wide sources include categories where emissions take place over a wide geographic area, such as consumer products. Emissions from these sources are estimated using various models and methodologies. Estimation methods include source testing, direct measurement by continuous emissions monitoring systems, or engineering calculations. Emissions for these categories are estimated by both CARB and the District.

Estimates for the categories below were developed by CARB and has been reviewed by CARB staff to reflect the most up-to-date information:

1. Consumer Products and Aerosol Coatings

The Consumer Product emission estimates utilized sales and formulation data from the CARB's mandatory survey of all consumer products sold in California for calendar years 2013 through 2015 (2015 Consumer Product Survey). The aerosol coatings estimates utilized sales and formulation data from a survey conducted by CARB in 2010. Based on the survey data, CARB staff determined the total product sales and total VOC emissions for the various product categories. Growth for personal care products are based on real disposable personal income projections per REMI version 2.4.5. No growth is assumed for aerosol coatings. Growth for all other consumer products are based on DOF population projections, 2020.

Additional information on CARB's consumer products surveys is available at:
<https://ww2.arb.ca.gov/our-work/programs/consumer-products-program/consumer-commercial-product-surveys>

2. Architectural Coatings

Architectural coatings are coatings applied to stationary structures and their accessories. They include house paints, stains, industrial maintenance coatings, traffic coatings, and many other products. Industrial maintenance coatings are high performance architectural coatings formulated for application to substrates, including floors, exposed to extreme environmental conditions (e.g., immersion in water, chronic exposure to corrosive agents, frequent exposure to temperatures above 121°C, repeated heavy abrasion). The architectural coatings category reflects emission estimates based on a 2014 comprehensive CARB survey for the 2013 calendar year. The emission estimates include benefits of the 2007 CARB Suggested Control Measures. These emissions are grown based on DOF households forecast, 2020.

Additional information about CARB's architectural coatings program is available at:
<https://ww2.arb.ca.gov/carb-solvent-evaporation-methodologies-architectural-coatings-and-cleaningthinning-solvents>

3. Pesticides

The California Department of Pesticide Regulation (DPR) develops month-specific emission estimates for agricultural and structural pesticides. Each calendar year, DPR updates the inventory based on the Pesticides Use Report, which provides updated information from 1990 through the 2018 calendar year. Agricultural pesticide emission forecasts for years 2019 and beyond are based on the average of the most recent five years. Growth for agricultural pesticides is based on CARB projections of farmland acres per FMMP, 2016. Growth for structural pesticides is based on DOF households growth projections, 2020.

Additional information about CARB's pesticides program is available at:
<https://ww2.arb.ca.gov/carb-solvent-evaporation-methodologies-agricultural-and-non-agricultural-pesticides>

4. Residential Wood Combustion

Residential Wood Combustion estimates are based off a 2011 CARB methodology. It reflects survey data on types of wood burning devices and wood consumption rates, updates to the 2002 EPA National Emission Inventory (NEI) emission factors, and improved calculation approaches.

CARB assumes no growth for this category based on the relatively stagnant residential wood fuel use over the past decade (according to the American Community Survey and US Energy Information Administration).

Additional information on this methodology is available at:
<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion>

5. Residential Natural Gas Combustion

CARB staff updated the methodology to reflect 2017 fuel use from the California Energy Consumption Database. The emissions estimates reflect the most recent emissions factors from EPA's AP-42 for residential natural gas combustion. Growth is based on California Energy Commission (CEC) projections for natural gas consumption, 2019.

Additional information on this methodology is available at:
<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion>

6. Residential Distillate Oil and Liquefied Petroleum Gas

The residential distillate oil/liquefied petroleum gas (LPG) category includes emissions occurring in the residential sector. Distillate oil for heating is generally used in older homes and remote areas where natural gas lines are not available.

Activity is based on the number of housing units, population, and LPG and distillate oil capacities. The 1991 Fuels Report Working Paper published by the CEC was used to determine energy demand by fuel type in terms of the number of houses heated by a specific fuel in a particular area. Heating degree days (HDD) are used to estimate how many heating days are likely to occur in a particular area.

This category uses emission factors from EPA's AP-42. The emissions were initially calculated in 1993 then grown to 2012 using housing unit data from the DOF, 2013. Emissions were grown from 2012 to 2017 using a 'no growth' profile developed by Pechan (2012). Emissions post-2017 were grown based on EIA – SEDS, and no growth was assumed.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion>

7. Farming Operations

CARB staff updated the non-cattle Livestock Husbandry methodology to reflect livestock population data based on the USDA's 2017 Census of Agriculture. Cattle emissions are primarily based on the 2012 Census of Agriculture. A seasonal adjustment was added to account for the suppression of dust emissions in months in which rainfall occurs. Growth profiles are based on CARB's projections of Census of Agriculture's historical livestock population trends, 2012. No growth is assumed for dairy and feedlots.

Additional information on CARB's methodology is available at:

<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-farming-operations>

8. Fires

Emissions from structural and automobile fires were estimated based on a 1999 CARB methodology using the number of fires and the associated emission factors. Estimates for structural fires are calculated using the amount of the structure that is burned, the amount and content of the material burned, and emission factors derived from test data. Estimates for automobile fires are calculated using the weight of the car and components and composite emission factors derived from AP-42 emission factors. Structural fire growth is based on DOF households forecasts, 2020, and automobile fire growth is based on DOF population forecasts, 2020.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-fires>

9. Managed Burning & Disposal – Agricultural Burning

The Agricultural Burning Managed Burning and Disposal category includes the open burning of weed abatement (such as ditch and canal bank burning). CARB updated the emissions inventory to reflect burn data reported by air district staff for 2017. Emissions are calculated using crop specific emission factors and fuel loadings. Temporal profiles reflect monthly burn activity. No growth is assumed for burning associated with weed abatement.

Additional information on this methodology is available at:
<https://ww2.arb.ca.gov/district-miscellaneous-process-methodologies-managed-burning-and-disposal>

N. Point and Area-wide Source Emissions Forecasting

Emission forecasts (2018 and subsequent years) are based on growth profiles that in many cases incorporate historical trends up to the base year or beyond. The growth surrogates used to forecast the emissions from these categories are presented in Table 2. The emissions inventory also reflects emission reductions from point and area-wide sources subject to District rules and CARB regulations. Table 3 lists the rules and regulations included in the inventory.

Table 2: Growth Surrogates for Point and Area-wide Sources

Source Category	Subcategory	Growth Surrogate
Electric Utilities	Other Fuels	Energy Information Administration (EIA) Annual Energy Outlook, 2019
Cogeneration	All	CEC forecast, 2019
Oil and Gas Production (Combustion)	All	DOGGR statewide total oil production. Assumed 2.9% annual decline reflecting CalGEM historical trend, 2000 through 2016
Petroleum Refining (Combustion)	All	No growth assumption
Manufacturing and Industrial	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA forecast, 2018
Food and Agricultural Processing	Ag Irrigation I. C. Engines	FMMP irrigated farmland acreage, 2008
Service and Commercial	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA forecast, 2018
Other (Fuel Combustion)	Diesel	Modeled estimate, 2003
	Other Fuels	EIA forecast, 2018
Waste Disposal	All	DOF population forecast, 2020
Laundering	Dry Cleaning	DOF population forecast, 2020
Degreasing	All	CARB/REMI economic forecast, version 2.4.5
Coatings & Thinners	Auto Refinishing	Vehicles from CARB EMFAC2017 model
	Others	REMI economic forecast, version 2.4.5
Adhesives & Sealants	All	REMI economic forecast, version 2.4.5
Oil and Gas Production	All	Assumed 2.9% annual decline reflecting CalGEM historical trend, 2000 through 2016
Petroleum Refining	All	No growth assumption

Table 2: Continued

Source Category	Subcategory	Growth Surrogate
Petroleum Marketing	Natural Gas Transmission	CEC forecast, 2019
	Gas Dispensing Facilities and Cargo Tanks	Fuel use from CARB EMFAC2017 model
	Other Point Sources	REMI economic forecast, version 2.4.5
Chemical	All	REMI economic forecast, version 2.4.5
Mineral Processes	All	REMI version 2.4.5; EIA forecast, 2018
Metal Processes	All	REMI economic forecast, version 2.4.5
Other Industrial Processes	All	REMI economic forecast, version 2.4.5
Consumer Products	Personal Care Products	Real Disposable Personal Income per REMI, version 2.4.5
	Other Consumer Products	DOF population forecast, 2020
	Aerosol Coatings	No growth
Architectural Coatings & Related Process Solvents	All	DOF households forecast, 2020
Pesticides & Fertilizers	Agricultural Pesticides	CARB projection of farmland acres per FMMP, 2016
	Structural Pesticides	DOF households forecast, 2020
Asphalt Paving & Roofing	All	DOF construction jobs forecast, 2020; CARB projection
Residential Fuel Combustion	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA – SEDS – No growth
Farming Operations	Dairy / Feedlots	No growth
	Other Livestock	CARB projection of livestock population per Census of Agriculture, 2012
Fires	Structural	DOF households forecast, 2020
	Automobile	DOF population forecast, 2020
Managed Burning and Disposal	Agricultural Burning, Weed Abatement	FMMP farmland acreage projection, 2016
Cooking	All	DOF population forecast, 2020

Table 3: District and CARB Control Rules and Regulations Included in the Inventory

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
CARB	ARCH_SCM	Architectural Coatings 2000 SCM	Architectural coatings
CARB	AC_SCM2007	Architectural Coatings 2007 SCM	Architectural coatings
CARB	ARB_R003 & ARB_R003_A	Consumer Product Regulations & Amendments	Consumer products
CARB	ARB_R007	Aerosol Coating Regulations	Aerosol coatings
CARB	GDF_HOSREG	Gasoline Dispensing Facility Hose Emission Regulation	Petroleum marketing
CARB	ORVR	Fueling Emissions from ORVR Vehicles	Petroleum marketing
CARB	AG_IC_ENG	Agricultural IC Engine Emission Scalers	Agricultural irrigation internal combustion engines
CARB	NONAGICENG	Non-Agricultural IC Engine Emission Scalers	Non-agricultural internal combustion reciprocating engines

O. External Adjustments

External adjustments were made in CEPAM to account for military growth and other unaccounted regulatory factors. The external adjustments reflected in the CEPAM2019v1.04 Eastern Kern SIP inventory are listed below in Table 4.

Table 4: External Adjustment IDs and Descriptions

Adjustment ID	Adjustment Description
HD_I/M	HD I/M Regulation adopted by CARB Dec 2021
NonAg_ICE	Update non-ag internal comb. engines to reflect 2003 ATCM and 2010 rule amend
TRUCK_REGS	Advanced clean trucks Omnibus Low NOx_Opacity ICT_UBUS adjustments

IV. CHALLENGES

A. Meteorology

High temperatures and low relative humidity play a big role in O₃ formation. Meteorological data from several ambient air monitoring stations²² and airports²³ located in Kern, Los Angeles, and San Bernardino Counties along with data obtained from CARB were analyzed during the summer months (peak O₃ season). Temperatures in the District can be in excess of 95° Fahrenheit for sixty to seventy days per year between June and September with almost no precipitation. Relative humidity is also very low with average humidity below 10 percent in the hottest part of the day.

²² Ambient air monitoring data was collected at air monitoring stations in Mojave (Eastern Kern APCD), Bakersfield, Edison, Oildale, and Arvin (SJVAPCD); Lancaster (SCAQMD), and Barstow and Trona (MDAQMD)

²³ Meteorological data was obtained from the following airports: Mojave Airport, Edwards Air Force Base, Meadows Field, Naval Air Weapons Station, Lancaster, Ontario, San Bernardino, and Daggett.

The combination of a hot dry climate, mixed with little to no cloud cover, produces an intense solar radiation that contributes to photochemical O₃ formation. June through September is considered peak O₃ season, with O₃ concentrations gradually rising from the beginning of the year toward the summer where levels peak by August when temperatures are usually the hottest, then gradually declining during the fall and winter.

B. Geography

The District is located on the western edge of the Mojave Desert and comprised of unique geography, topography, and meteorology, which create a challenging environment for attaining the O₃ NAAQS. The District is separated from populated valleys and coastal areas to the west and south by several mountain ranges. O₃ and its precursor emissions (NOx and VOC) are transported from these valleys and coastal areas are the major factor affecting O₃ exceedances in the District.

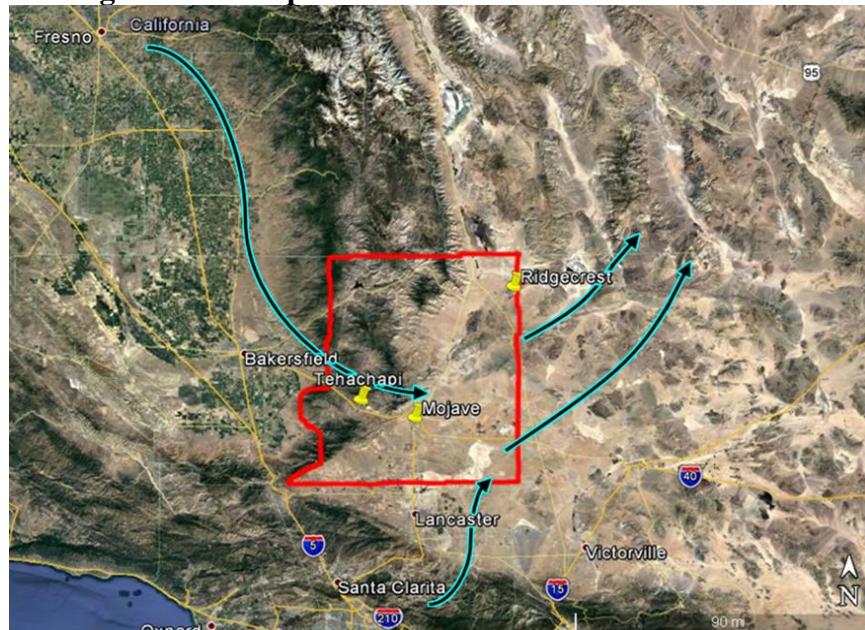
The surrounding mountain ranges contain a limited number of passes that serve as transport corridors. Passes include: Tehachapi Pass, connecting the western Mojave Desert to the southern San Joaquin Valley, and Soledad Pass and Cajon Pass connecting to the South Coast Air Basin. The District is primarily influenced by transport through the Tehachapi Pass corridor with some potential influence through Soledad Pass. Soledad Pass and Cajon Pass mainly influence air quality in the eastern portion of the Mojave Desert due to prevailing wind directions.

C. Pollutant Transport

It is common for air pollutants to transport between air basins. The District's air quality is overwhelmingly impacted from O₃ and its precursor emissions being transported from SJVAPCD and SCAQMD (both designated Extreme Nonattainment). Transport can take place from the surface up to several thousand feet elevation. Transport occurs when winds are of sufficient in magnitude, direction, and duration. Atmospheric chemistry also determines how transported pollutants may affect downwind O₃ concentrations.

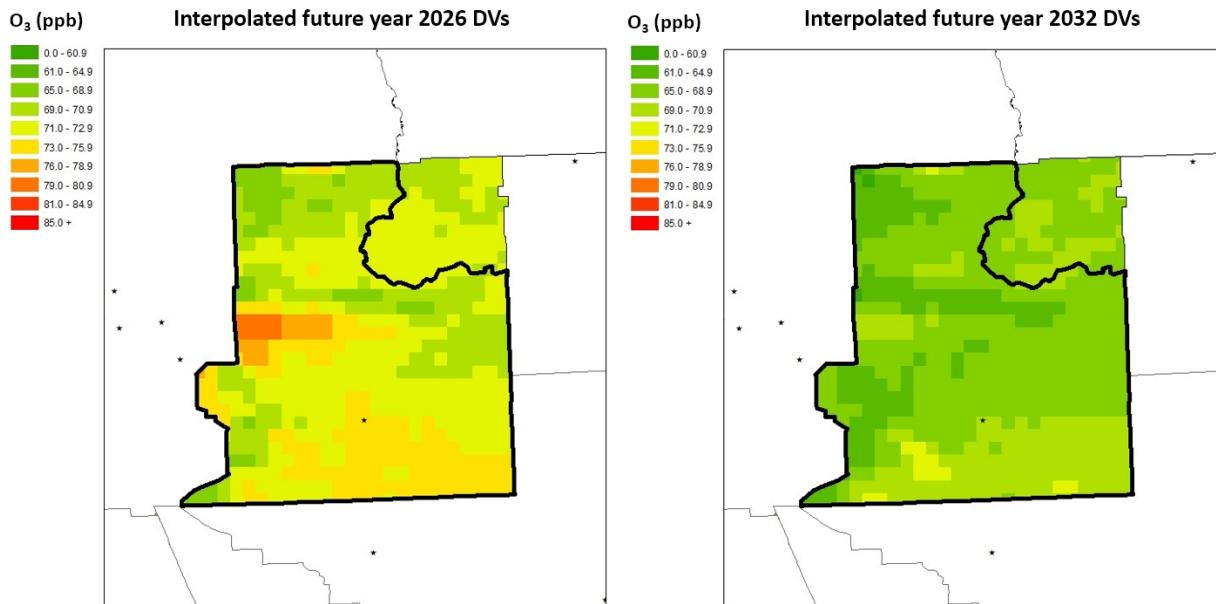
Analysis of Eastern Kern's wind data shows O₃ and its precursors transport to the District when: Prevailing wind originates from consistently high O₃ concentration areas, and wind is persistent with high enough velocity to move emissions from upwind areas. Data also demonstrated elevated O₃ concentrations in the District coinciding with high upwind O₃ levels being transported. Figure 5 illustrates District transport corridors and wind flow patterns²⁴ from surrounding air basins.

²⁴ Reference from California Surface Wind Climatology published by Aerometric Projects and Laboratory Branch (Meteorology Section) from ARB from June to September.
<https://www.arb.ca.gov/research/apr/reports/l013.pdf>

Figure 5: Transport Corridors & Wind Flow Patterns

D. Ozone Trends

Although SJVAPCD and SCAQMD have been improving their local air quality and reducing O₃ and its precursor emissions, neither district have attained the 2008, or 2015 O₃ NAAQS. Concurrently, the District has been steadily improving its air quality since of attaining the 1997, 8-Hour O₃ NAAQS (80 ppb). Figure 6 compares the District's interpolated DVs for future years 2026 and 2032, along with the areas of the District being impacted by O₃ transport emissions. Appendix M, Section G contains CARB's unmonitored area analysis of the District's nonattainment area.

Figure 6: O₃ Transport and Future DVs for 2026 and 2032

V. DEVELOPMENT OF OZONE EMISSION INVENTORIES

Emission inputs for air quality modeling (commonly and interchangeably referred to as “modeling inventories” or “gridded inventories”) have been developed by CARB and staff from multiple air districts. These inventories support multiple SIPs across California to address nonattainment of the federal O₃ standards. CARB maintains an electronic database of emissions and other useful information to generate aggregate emission estimates at the county, air basin, and district level, Criteria Pollutant Emission Inventory Data in CEIDARS. CEIDARS provides a foundation for the development of a more refined (hourly, grid cell-specific) set of emission inputs that are required by air quality models. The CEIDARS base year inventory is a primary input to the state’s CEPAM emission forecasting system. CEPAM produces the projected emissions that are then processed to serve as the emission input for air quality models. Appendix B of this Attainment Plan describes the methods used to prepare the base and future year emissions inventory estimates. Please see Appendix B for complete details.

VI. TRANSPORTATION CONFORMITY BUDGETS

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

SIP analyzes of a region’s total emissions inventory (all applicable sources) is necessary to demonstrate RFP, attainment, or maintenance of the NAAQS. The emissions inventory for on-road and transit vehicles in the RFP, becomes the “motor vehicle emissions budget²⁵”. The motor vehicle emissions budget is the mechanism for ensuring transportation planning activities conform to the SIP. Budgets are set for each criteria pollutant or precursor for each RFP milestone year including the attainment year.

²⁵ Federal transportation conformity regulations are found in 40 CFR Parts 51 and 93 – Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved under Titles 23 or 49 of the United States Code.

A. Requirements for Demonstrating Conformity

Kern COG²⁶ prepares a long-range regional transportation plan (RTP) at least every four years and a short-range funding program, or regional transportation improvement program (RTIP) every two years²⁷. Before adopting the RTP/RTIP, Kern COG prepares a regional emissions analysis using the proposed plan and program as specified in the federal conformity regulation and compares those emissions to the emission budgets in the SIP. The MPO may determine the RTP/RTIP conforms if the emissions from the proposed actions are less than the emissions budgets in the SIP. The conformity determination also signifies that the MPO has met other transportation conformity requirements such as interagency consultation and financial constraint.

B. Motor Vehicle Emissions Budget (MVEB)

CARB has prepared the motor vehicle emissions budget (MVEB)²⁸ for the 75 ppb 8-hr O₃ NAAQS and the 70 ppb 8-hr O₃ NAAQS. The MVEB is the maximum allowable emissions from motor vehicles within an air basin and is used for determining whether transportation plans and projects conform to the applicable SIP.

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 Kern COG 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 75 ppb 8-hr O₃ NAAQS, the milestone year and the attainment year of the SIP (also referred to as the plan analysis years) are 2023 and 2026. For the 70 ppb 8-hr O₃ NAAQS, the milestone years and the attainment year of the SIP are 2023, 2026, 2029, and 2032.

C. Methodology

The MVEB for the 75 ppb and 70 ppb O₃ standards are established based on guidance from 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.

²⁶ The MPO in Kern County

²⁷ Content of the RTP and RTIP are specified in federal transportation law found at Titles 23 and 49 of the federal code of regulations and applicable sections of state transportation planning law.

²⁸ 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.

The MVEB must be clearly identified and precisely quantified, and consistent with applicable CAA requirements for reasonable further progress and attainment toward meeting NAAQS. Further, it should be consistent with the emission inventory and control measures in the SIP.

The District's O₃ SIP establishes the MVEB for the O₃ precursor emissions ROG and NOx using emission rates from California's motor vehicle emission model, EMFAC2017 (V.1.0.3)²⁹, using activity data (vehicle miles traveled [VMT] and speed distributions) from Kern COG's 2019 Federal State Transportation Improvement Program (FSTIP) amendment³⁰. Appendix C contains the complete VMT Emissions Offset Demonstration.

On August 15, 2019, EPA approved EMFAC2017 for use in SIPs, and to demonstrate transportation conformity³¹. The EMFAC model estimates emissions from two combustion processes (start and running) and four evaporative processes (hot soak, running loss, diurnal, and resting loss). In addition, the emissions output from the EMFAC2017 model was adjusted to account for the impacts of recently adopted regulations and regulations currently under development that are not reflected in the EMFAC2017 model using off-model adjustments³². The regulations incorporated in this way are the Heavy-Duty Warranty Phase 1, Innovative Clean Transit (ICT), Amendments to the Heavy-Duty Vehicle Inspection Program (HDVIP), Periodic Smoke Inspection Program (PSIP), Advanced Clean Trucks (ACT), Heavy-Duty (HD) Omnibus, Advanced Clean Cars II (ACC II), and Advanced Clean Fleets (ACF).

The MVEBs for this SIP were developed to be consistent with the on-road emissions inventory and attainment demonstration using the following method:

- 1) Used the EMFAC2017 model to produce an initial/preliminary calculation of the on-road motor vehicle emissions totals (average summer day) for the appropriate pollutants (ROG and NOx) using 2019 FSTIP activity data.
- 2) Applied the off-model adjustments to account for recently adopted regulations.
- 3) Subtracted expected emission reductions from ACC II and ACF to be consistent with the on-road control measures in the California State Implementation Plan Strategy for 70 ppb 8-hr O₃ standard³³.
- 4) Rounded the totals for both ROG and NOx to the nearest tenth ton.

²⁹ 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>

³⁰ 2019 Federal Statewide Transportation Improvement Program (FSTIP) (ca.gov)

³¹ EPA approval of EMFAC2017 can be found at 84 FR 41717 <https://www.federalregister.gov/d/2019-17476>

³² Off-Model Adjustment Factors to Account for Recently Adopted Regulations in EMFAC2017 Model <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory>

³³ 2022 State Strategy for the State Implementation Plan <https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy>

The MVEB in Table 5 was established according to the methodology outlined above and in consultation with the Kern COG, CARB, EPA, Federal Highway Administration (FHWA), and Federal Transit Administration (FTA). The MVEB is consistent with the emission inventories and control measures in the O₃ SIP. These budgets will be effective once EPA determines it is adequate.

The emissions budgets presented in Table 5 represent the on-road motor vehicle emission levels projected for 2023, 2026, 2029, and 2032, as determined using the CARB, EMFAC2017 model, recently adopted regulations, and regulations currently under development using off-model adjustments for both ROG and NOx emissions. Years 2023 and 2026 are used for the 2008, O₃ NAAQS, while all four years are used for the 2015, O₃ NAAQS. The final MVEB is rounded upwards to the nearest tenth.

Table 5: Motor Vehicle Emissions Budgets for 2023, 2026, 2029, 2032

Eastern Kern Totals (Tons/Day)	2023		2026		2029		2032	
	ROG	NOx	ROG	NOx	ROG	NOx	ROG	NOx
Vehicular Exhaust	0.78	2.38	0.69	2.28	0.62	2.23	0.56	2.22
Reductions from recently adopted regulations using off-model adjustments ^a	0.0000	0.0553	0.0005	0.9081	0.0019	1.1033	0.0041	1.2244
Reductions from developing regulations using off-model adjustments ^b	-	-	-	-	-	-	0.0280	0.1650
Total^c	0.78	2.33	0.69	1.37	0.62	1.12	0.53	0.83
Motor Vehicle Emission Budget^d	0.8	2.4	0.7	1.4	0.7	1.2	0.6	0.9

a This reflects the adjustment factor for Heavy-Duty Vehicle Warranty Phase 1, ICT, HDVIP/PSIP, ACT, and HD Omnibus regulations.

b This reflects the on-road commitments for ACCII and ACF from the draft 2022 State SIP Strategy.

c Values from EMFAC2017 v1.03 may not add up due to rounding.

d Motor vehicle emission budgets calculated are rounded up to the nearest tenth of a tpd. Source::EMFAC2017v1.03

VII. MOBILE SOURCE REGULATIONS & EMISSION REDUCTION PROGRAMS

Given the severity of California's air quality challenges and the need for ongoing emission reductions, CARB has implemented the most stringent mobile source emissions control program in the nation. CARB's comprehensive program relies on four fundamental approaches:

- 1). Stringent emissions standards that minimize emissions from new vehicles and equipment;
- 2). In-use programs that target the existing fleet and require the use of the cleanest vehicles and emissions control technologies;
- 3). Cleaner fuels that minimize emissions during combustion; and,
- 4). Incentive programs that remove older, dirtier vehicles and equipment and pay for early adoption of the cleanest available technologies.

This multi-faceted approach has spurred the development of increasingly cleaner technologies and fuels and achieved significant emission reductions across all mobile source sectors that go far beyond national programs or programs in other states. These efforts extend back to the first mobile source regulations adopted in the 1960s, and pre date the CAA Amendments of 1970, which established the basic national framework for controlling air pollution.

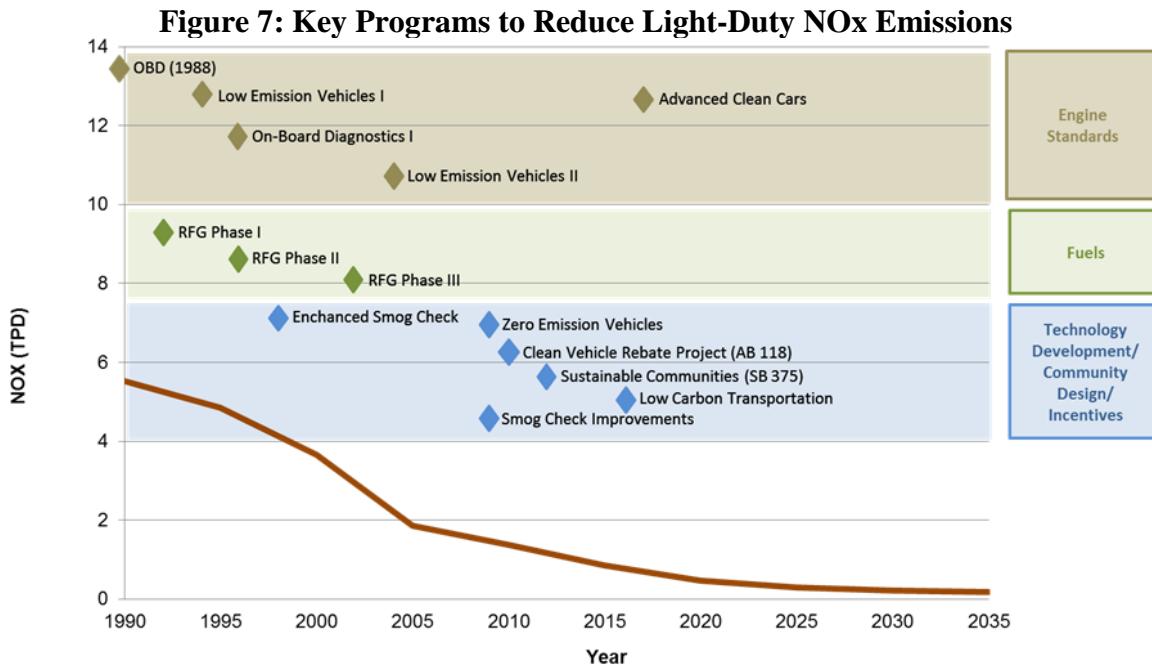
In recognition of the pioneering nature of CARB's efforts, the CAA provides California unique authority to regulate mobile sources more stringently than the federal government by providing a waiver of preemption for its new vehicle emission standards under Section 209(b). This waiver provision preserves a pivotal role for California in the control of emissions from new motor vehicles, recognizing that California serves as a laboratory for setting motor vehicle emission standards. Since then, the CARB has consistently sought and obtained waivers and authorizations for its new motor vehicle regulations. CARB's history of progressively strengthening standards as technology advances, coupled with the waiver process requirements, ensures that California's regulations remain the most stringent in the nation.

In 1998, CARB identified diesel particulate matter as a toxic air contaminant. Since then, CARB adopted numerous regulations aimed at reducing exposure to diesel particulate matter while concurrently providing reductions in oxides of nitrogen (NOx) from freight transport sources like heavy-duty diesel trucks, transportation sources like passenger cars and buses, and off-road sources like large construction equipment. Phased implementation of these regulations will continue to produce emission reduction benefits through 2032 and beyond, as the regulated fleets are retrofitted, and as older and dirtier portions of the fleets are replaced with newer and cleaner models at an accelerated pace.

Further, CARB and District staff work closely on identifying and distributing incentive funds to accelerate cleanup of engines. Key incentive programs include the Carl Moyer Program; the Goods Movement Program; the Lower-Emission School Bus Program; and the Air Quality Improvement Program (AQIP). These incentive-based programs work in tandem with regulations to accelerate deployment of cleaner technology.

A. Light-Duty Vehicles, Emissions Standards, and Clean Fuels

Since setting the nation's first motor vehicle exhaust emission standards in 1966 that led to the first pollution controls, California has dramatically tightened emission standards for light-duty vehicles. Figure 7 illustrates the trend in NOx emissions from light-duty vehicles and key programs contributing to those reductions. As a result of these efforts, light-duty vehicle emissions in the District's O₃ nonattainment area have been reduced significantly since 1990 and will continue to decrease due to the benefits of CARB's longstanding light-duty mobile source programs. Key light-duty programs include Advanced Clean Cars, On-Board Diagnostics, Reformulated Gasoline, Incentive Programs, and the Smog Check Program.

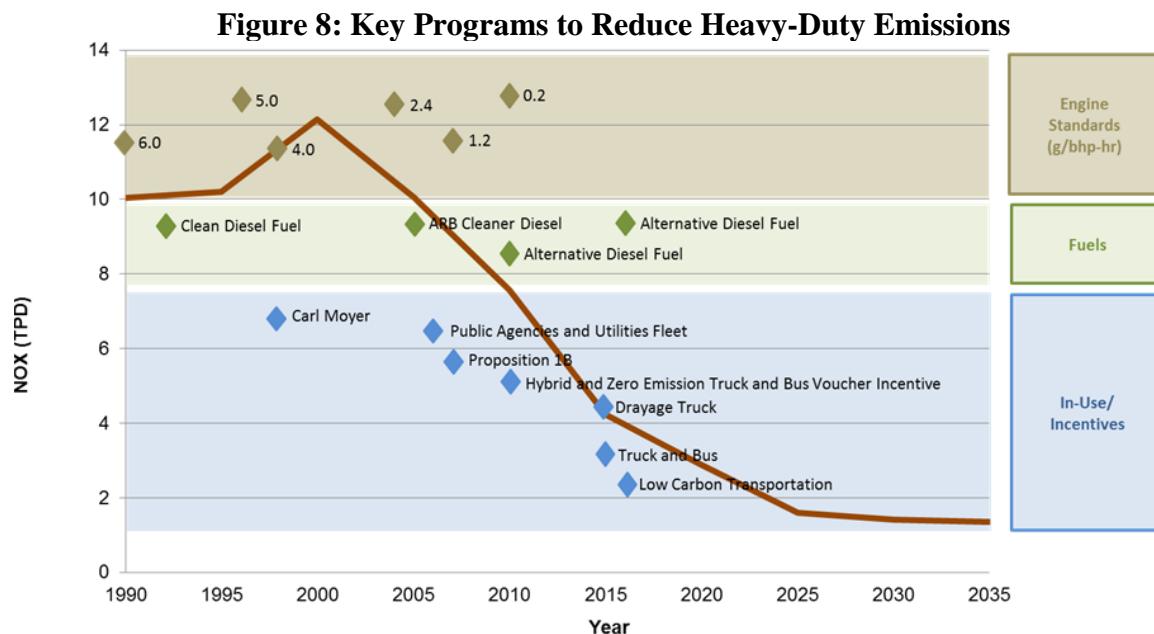


B. Heavy-Duty Trucks, Emissions Standards, and Clean Fuels

Since 1990, heavy-duty engine NOx emission standards have become dramatically more stringent, dropping from 6 grams per brake horsepower hour (g/bhp-hr) in 1990 down to the current 0.2 g/bhp-hr standard, which took effect in 2010. In addition to mandatory NOx standards, there have been several generations of optional lower NOx standards put in place over the past 15 years. Most recently in 2015, engine manufacturers can certify to three optional NOx emission standards of 0.1 g/bhp hr, 0.05 g/bhp-hr, and 0.02 g/bhp-hr (i.e., 50 percent, 75 percent, and 90 percent lower than the current mandatory standard of 0.2 g/bhp-hr). The optional standards allow local air districts and CARB to preferentially provide incentive funding to buyers of cleaner trucks, to encourage the development of cleaner engines.

Figure 8 illustrates the trend in NOx emissions from heavy-duty vehicles and key programs contributing to those reductions. As a result of these efforts, heavy-duty vehicle emissions in the District's O₃ nonattainment area have been reduced significantly since 1990 and will continue to decrease due to the benefits of CARB's longstanding heavy-duty mobile source programs. Key programs include Heavy-Duty Engine Standards, Clean Diesel Fuel, Truck and Bus Regulation and Incentive Programs.

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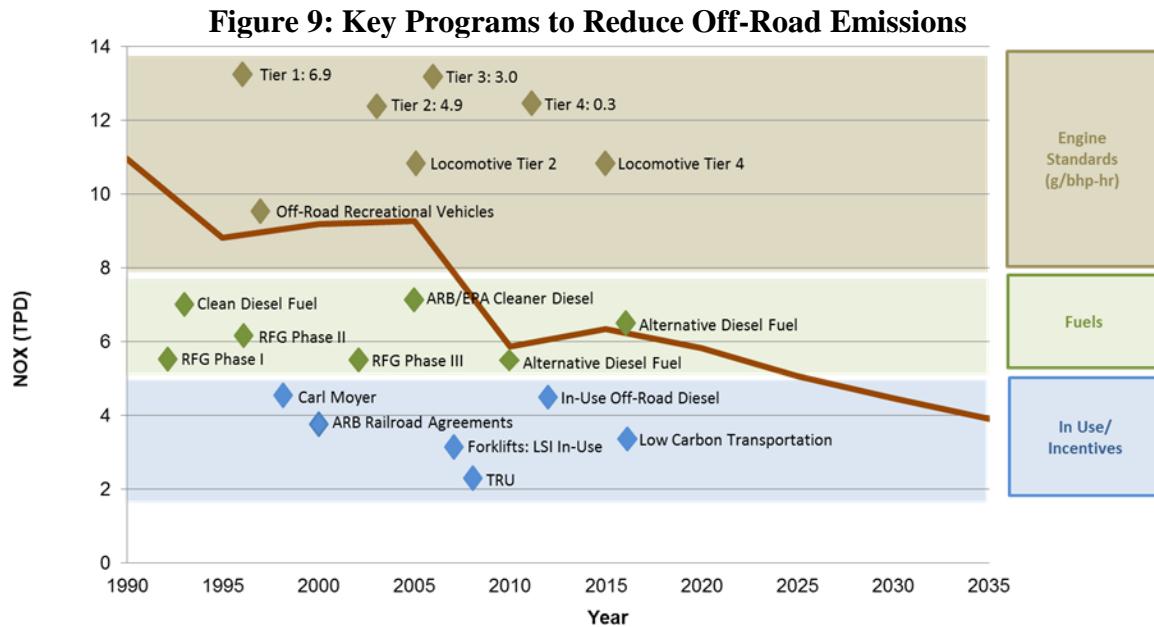


C. Off-Road Sources, Emissions Standards, and Clean Fuels

Off-road sources encompass equipment powered by an engine that does not operate on the road. Sources vary from ships to lawn and garden equipment and for example, include sources like locomotives, aircraft, tractors, harbor craft, off-road recreational vehicles, construction equipment, forklifts, and cargo handling equipment.

Figure 9 illustrates the trend in NOx emissions from off-road equipment and key programs contributing to those reductions. As a result of these efforts, off-road emissions in the District O₃ nonattainment area have been reduced since 1990 and will continue to decrease due to the benefits of CARB's and EPA's longstanding programs. Key programs include Off-Road Engine Standards, Locomotive Engine Standards, Clean Diesel Fuel, Cleaner In-Use Off-Road Regulation and In-Use LSI Fleet Regulation.

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Appendix H of this Attainment Plan includes an extensive and detailed list of CARB's mobile source programs designed to reduce vehicle related emissions.

VIII. CARB COMMITMENTS FOR EASTERN KERN

A. CARB Commitments

SIPs may contain enforceable commitments to achieve the level of emissions necessary to meet NAAQS, as defined in the attainment demonstration. The 2022 State SIP Strategy lists new SIP measures and quantifies potential emissions reduction SIP commitments for the District based on the measures identified and quantified to date. CARB's Board adoption of the 2022 State SIP Strategy and control measure schedule formed the basis of the commitments for emission reductions by the attainment deadlines for each region that will be proposed for CARB's Board consideration, alongside the respective nonattainment area's SIP. The commitments consist of two key components:

- 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 EPA's approval. While the 2022 State SIP Strategy discusses a range of measures and actions, those measures and actions would still be subject to CARB's formal approval process and would not be final until the CARB Board takes action.

Commitment to Act on Measures

On September 22, 2022, the CARB Board adopted the 2022 State SIP Strategy list of measures and corresponding schedule. For each SIP measure from the 2022 State SIP Strategy shown in Table 6, CARB commits to address each measure as described in this document. 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 commits to bring a publicly noticed item before the CARB Board that is either a proposed rule or a recommendation that the CARB Board direct staff not to pursue a rule covering that subject matter at that time. That 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, ongoing technology review, and assessments of costs and environmental impacts.

The measures, as proposed by staff to the CARB Board or adopted by the 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 6: CARB 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			
On-Road Motorcycle New Emissions Standards	CARB	2022	2025
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
Cargo Handling Equipment Amendments	CARB	2025	2026
Off-Road Zero-Emission Targeted Manufacturer Rule	CARB	2027	2031
Clean Off-Road Fleet Recognition Program	CARB	2025	2027
Spark-Ignition Marine Engine Standards	CARB	2029	2031
Other			
Consumer Products Standards	CARB	2027	2028
Zero-Emission Standard for Space and Water Heaters	CARB	2025	2030
Enhanced Regional Emission Analysis in State Implementation Plans	CARB	2025	2023
Federally & Internationally Regulated Sources – CARB Measures			
In-Use Locomotive Regulation	CARB	2023	2024
Future Measures for Aviation Emission Reductions	CARB	2027	2029

Commitment to Achieve Emission Reductions

The following section describes the estimated emission reductions and commitment from the SIP measures identified and quantified to date for the District. 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 Eastern Kern County 8-hour 70 ppb O₃ SIP when it is brought to the CARB Board. While the 2022 State SIP Strategy includes estimates of the emission reductions 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 and the 2022 State SIP Strategy, CARB will submit an updated emissions inventory to EPA as part of a SIP revision. The SIP revision would outline the changes that have occurred, and provide 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.

Air quality modeling indicates that NOx emissions reductions are needed in areas upwind and within the District by 2032, in order to achieve attainment. A significant fraction of the needed reductions will come from the existing control program. In addition, although most of the 2016 State SIP Strategy measure commitments have been adopted, there is one (Zero Emission Forklift) that the CARB Board will be acting upon over the next year, and two that were recently adopted but are not yet accounted for in the baseline emissions inventory (Advanced Clean Cars II, Transport Refrigeration Unit Part 1), as outlined in Table 7. Action will be taken on the remaining measure in the coming year (2023).

Table 7: Reductions from Remaining 2016 State SIP Strategy Measures

Measure	Action	Implementation Begins	2032 NOx (tpd)	2032 ROG (tpd)
Advanced Clean Cars II	2022	2026	<0.1	<0.1
Transport Refrigeration Unit Part I	2022	2023-2024	<0.1	<0.1
Zero-Emission Forklift	2023	2026	<0.1	<0.1
Total			<0.1	<0.1

*Numbers may not add up due to rounding.

Table 8 shows that, collectively, emissions reductions from CARB's current control program, reductions from the 2016 State SIP Strategy measures still to be adopted, and reductions estimated from the measures in the 2022 State SIP Strategy provide the emissions reductions needed from State sources to support attainment of the 70 ppb 8-hour O₃ NAAQS. The measures listed in Table 9 reflect CARB commitments for State actions and the estimated emissions reductions for the District.

Table 8: NOx Emission Reductions from CARB Programs

CARB Programs in Eastern Kern County	2032 NOx Emission Reductions (tpd)
Current Mobile Source Control Program ³⁴ .	3.1
Potential CARB Emissions Reductions Commitments	1.8
2016 State SIP Strategy Measures (Not yet in baseline inventory)	<0.1
2022 State SIP Strategy Measures	1.8
Total Reductions	4.9

*Numbers may not add up due to rounding.

Table 9: Expected Emissions Reductions from the 2022 State SIP Strategy Measures

Measure	2032 NOx (tpd)	2032 ROG (tpd)
On-Road Heavy-Duty		
Advanced Clean Fleets Regulation	0.1	<0.1
Zero-Emissions Trucks Measure	NYQ ³⁵	NYQ
Total On-Road Heavy-Duty Reductions	0.1	<0.1
Road Light-Duty		
On-Road Motorcycle New Emissions Standards	<0.1	<0.1
Clean Miles Standard	<0.1	<0.1
Total On-Road Light-Duty Reductions	<0.1	<0.1
Off-Road Equipment		
Tier 5 Off-Road Vehicles and Equipment	<0.1	NYQ
Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation	<0.1	<0.1
Transport Refrigeration Unit Regulation Part 2	0.1	<0.1
Cargo Handling Equipment Amendments	<0.1	<0.1
Off-Road Zero-Emission Targeted Manufacturer Rule	NYQ	NYQ
Clean Off-Road Fleet Recognition Program	NYQ	NYQ
Spark-Ignition Marine Engine Standards	<0.1	<0.1
Total Off-Road Equipment Reductions	0.2	<0.1
Other		
Consumer Products Standards	-	NYQ
Zero-Emission Standard for Space and Water Heaters	NYQ	NYQ
Enhanced Regional Emission Analysis in State Implementation Plans	NYQ	NYQ
Total Other	NYQ	NYQ
Primarily-Federally and Internationally Regulated Sources – CARB Measures		
In-Use Locomotive Regulation	1.5	<0.1
Future Measures for Aviation Emission Reductions	NYQ	NYQ
Total Primarily-Federally and Internationally Regulated Sources – CARB Measures Reductions	1.5	<0.1
Aggregate Emissions Reductions	1.8	0.1

*Numbers may not add up due to rounding.

³⁴Source: CARB 2019 CEPAM v1.04; represents the current baseline emissions out to 100 nautical miles

³⁵ Not yet quantified

As a part of the aggregate emission reduction commitment for the District, CARB staff will propose to commit to emissions reductions specifically from on-road mobile sources that will be used for transportation conformity. CARB continues to have an aggregate emission reduction commitment, which is a sum of emissions reductions from on- and off-road mobile sources, consumer products, and other State regulated sources as outlined above. The on-road mobile source commitment will provide the enforceability needed to support the use of motor vehicle emissions budgets that factor in reductions from the on-road mobile source measures in the 2022 State SIP Strategy. The proposed on-road mobile source commitment in Table 10 is a subset of emissions reductions from the aggregate emission reduction commitment and is not additive to the aggregate emission reduction commitment.

Table 10: Emissions Reductions from On-Road Mobile Source Measures

On-Road Mobile Source Reductions	2032 NOx (tpd)	2032 ROG (tpd)
Eastern Kern County	0.2	0.03

B. CARB Measures

Advanced Clean Fleets Regulation

This measure accelerates zero-emission vehicle adoption in the medium- and heavy-duty sectors by setting zero-emission requirements for fleets and 100 percent ZEV sales requirement in California for manufacturers of Class 2b through 8 vehicles. The Advanced Clean Fleets Regulation will focus on strategies to ensure that the cleanest vehicles are deployed by government, business, and other entities in California to meet their transportation needs. The requirements would be phased-in on varying schedules for different fleets including public, drayage trucks, and high priority private and federal fleets. Public fleets would be required to phase-in purchase requirement starting at 50 percent of new purchases in 2024 and 100 percent starting in 2027. All drayage trucks operating at seaports and intermodal railyards would be required to be zero-emission by 2035. Drayage trucks will also have new registration and reporting requirements, starting in 2023. High priority private and federal fleets would be required to phase-in zero-emission vehicles as a percentage of the total fleet. The fleet requirements are based on zero-emission suitability and are phased-in by vehicle body type. The Advanced Clean Fleets Regulation would also include a requirement that 100 percent of Class 2b and above vehicle manufacturer sales in California are zero emissions starting in 2040.

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 proposed Advanced Clean Fleets measure. 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.

C. On-Road Light-Duty

On-Road Motorcycles New Emissions Standards

This measure would reduce emissions from new, on-road motorcycles by adopting more stringent exhaust and evaporative emissions standards along with limited on board diagnostics requirements and zero-emissions sales thresholds with an associated credit program to help accelerate the development of zero emissions motorcycles. The new exhaust emissions standards include substantial harmonization with the more stringent European motorcycle emissions standards already in place. The new evaporative emissions standards are based on more aggressive CARB off highway recreational vehicle emissions standards that exist today. This measure also proposes significant zero-emission motorcycle sales thresholds beginning in 2028 and increasing gradually through 2035.

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 CO₂ emissions per passenger mile traveled and 90 percent electric VMT by 2030.

D. Off-Road Equipment

Tier 5 Off-Road Vehicles and Equipment

This measure would reduce NO_x and 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 EPA and European Stage V non-road regulations and would require the use of best available control technologies.

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

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

Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation were approved by CARB on November 17, 2022. This measure will further reduce emissions from the in-use off-road diesel equipment sector by adopting more stringent requirements to the In-Use Off-Road Diesel-Fueled Fleets Regulation. These amendments create additional requirements to the currently regulated fleets by targeting the oldest and dirtiest equipment that is allowed to operate indefinitely under the current regulation's structure.

The amendments include an operational backstop to the current In-Use Off Road Diesel-Fueled Fleets Regulation for most Tier 0, 1, and 2 engines between 2024 and 2032. This will allow a 12-year phase out of these oldest engines. Along with the operational backstop, adding vehicle provisions in the current regulation will be extended to phase in a limitation on the adding of Tier 3 and Tier 4i vehicles to fleets. The amendments also include proposed new requirements for most fleets to use renewable diesel, proposed requirements for prime contractors and public works awarding bodies to increase the enforceability of the regulation, and optional flexibility provisions for fleet adoption of zero-emission vehicles.

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, TRU generator sets, and direct-drive refrigeration units).

Cargo Handling Equipment Amendments

This measure would start transitioning Cargo Handling Equipment (CHE) to full zero emission in 2026, 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. Other technologies are in early production or demonstration phases.

Off-Road Zero-Emission Targeted Manufacturer Rule

The Off-Road Zero-Emission Targeted Manufacturer Rule would accelerate the development and production of zero-emission off-road equipment and powertrains. Existing zero-emission regulations and regulations currently under development target a variety of sectors (e.g., forklifts, cargo-handling equipment, off road fleets, Small Off Road Engines (SORE), etc.). However, as technology advancements occur, more sectors including wheel loaders, excavators, and bulldozers could be accelerated. Fully addressing control of emissions from new farm and construction equipment under 175 horsepower that are preempted, will require partnership on needed Federal zero emission standards for off-road equipment.

This measure would require manufacturers of off-road equipment and/or engines to produce for sale zero-emission equipment and/or powertrains as a percentage of their annual statewide sales volume. Sales/production mandate levels would be developed based on the projected feasibility of zero-emission technology to enter and grow in the various off-road equipment types currently operating in California. This measure is expected to increase the availability of zero-emission options in the off-road sector and support other potential measures that promote and/or require the purchase and use of such options. A targeted manufacturer regulation will need to take into account parameters such as the number of equipment and engine manufacturers producing off-road equipment for sale in California, along with sales volumes, to ensure that such an effort is cost effective and technologically feasible.

Clean Off-Road Fleet Recognition Program

This measure would create a non-monetary incentive to encourage off-road fleets to go beyond existing regulatory fleet rule compliance and adopt advanced technology equipment with a strong emphasis on zero-emission technology. The Clean Off-Road Fleet Recognition Program would provide a standardized methodology for contracting entities, policymakers, state and local government, and other interested parties to establish contracting criteria or require participation in the program to achieve their individual policy goals.

The Clean Off-Road Fleet Recognition Program framework would encourage entities with fleets to incorporate advanced technology and zero-emission vehicles into their fleets, prior to or beyond regulatory mandates based on fleet size. The program would provide standardized criteria or a rating system for participation at various levels to reflect the penetration of advanced technology and zero-emission vehicles into a fleet. Levels could be scaled over time as zero-emission equipment becomes more readily available. CARB anticipates the next several years of technology advancements and demonstrations to drive the stringency of the rating system. Participation in the program would be voluntary for entities with fleets, however, designed in a manner that provides them motivation to go beyond business as usual. The program would offer value for entities with fleets to participate by potentially providing them increased access to jobs/contracts, public awareness, and marketing opportunities.

Spark-Ignition Marine Engine Standards

For this measure, CARB will develop and propose catalyst-based standards for outboard and personal watercraft engines less than or equal to 40 kW in power that will gradually reduce emission standards to approximately 70 percent below current levels. For outboard and personal watercraft engines under 40 kW, more stringent exhaust standards will be developed and proposed based on the incorporation of electronic fuel injection that will gradually reduce emission standards 40 percent below current levels. This measure would require a 5.0 g/kW-hr HC+NOx standard for outboard engines and personal watercraft engines at or above 40 kW in power and a 10.0 g/kW-hr HC+NOx standard for engines less than 40 kW.

In addition to requiring more stringent exhaust standards, CARB is considering actions consistent with Executive Order N-79-20 that would require a percentage of outboard and personal watercraft vessels to be propelled by zero-emission technologies for certain applications. Outboard engines less than 19 kW, which are typically not operated aggressively or for extended periods, could potentially be phased-out and gradually replaced with zero-emission technologies. Some personal watercraft applications could also potentially be replaced with zero-emission technologies.

E. Other Categories

Consumer Products Standards

This measure will further reduce VOC and equivalent VOC emissions from consumer products to expedite attainment of the O₃ NAAQS. As with previous rulemakings, emission reductions will be achieved by setting regulatory standards applicable to the content of consumer products. To meet emission reduction targets for the measure, CARB staff will evaluate categories with relatively high contributions to O₃ formation, whether currently regulated or unregulated. Staff will consider the merits of proposing VOC content standards as well as reactivity limits. Staff developing proposed amendments to the Consumer Products Regulation will also consider investigating concepts for expanding manufacturer compliance options, market-based approaches, and reviewing existing exemptions. Staff will work with stakeholders to explore mechanisms that would encourage the development, distribution, and sale of cleaner, very low, or zero-emitting products. In undertaking these efforts, staff will prioritize strategies that achieve the maximum feasible reductions in O₃ forming, toxic air contaminant, and GHG emissions. This measure complements a parallel measure in CARB's Climate Change Scoping Plan Update, approved by the CARB Board in December 2022, to phase down use of HFC 152a and other GHGs in consumer products.

Zero-Emission Standard for Space and Water Heaters

For this measure, CARB would develop and propose zero GHG emission standards for 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 new 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 homes.

Enhanced Regional Emissions Analysis in SIPs

The primary goal of this measure is to reduce criteria pollutant and GHG emissions that come from on-road mobile sources through reductions in VMT. In addition, lowering VMT will help alleviate traffic congestion, improve public health, reduce consumption of fossil fuels, and reduce infrastructure costs. CARB is exploring three options to reduce ROG and NOx emissions through reductions in VMT. First, CARB will consider whether and how to change the process for developing MVEB by evaluating the existing MVEB development process to meet NAAQS. In addition, CARB will assess and improve the RACM analysis in the SIP by providing a comprehensive list of Transportation Control Measures (TCMs) and emission quantification methodology. Finally, CARB will consider updating the guidelines for the California Motor Vehicle Registration Fee (MV Fees) Program and the Congestion Mitigation and Air Quality Improvement (CMAQ) Program to fund a broader range of transportation and air quality projects that advance new approaches and technologies in reducing air pollution.

F. CARB Measures for Federally & Internationally Regulated Sources

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 petition federal agencies for action and 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 CAA, as described below.

In-Use Locomotive Regulation

This measure would use 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 would apply 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 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 would be established for each locomotive operator. Funds in the account would only 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. Locomotive operators would also be required to report locomotive engine emissions levels and activity on an annual basis.

Future Measures for Aviation Emissions Reductions

Future measures for aviation would reduce emissions from airport and aircraft related activities. The identified emission sources for the aviation sector are main aircraft engines, auxiliary power units (APU), and airport ground transportation. Emission reductions can be achieved by pursuing incentive and regulatory measures.

CARB would evaluate federal, state, and local authority in setting operational efficiency practices to achieve emission reductions. Operational practices include landing, takeoff, taxi, and running the APU, and contribute to on-ground and near-ground emissions. Near ground emissions are emissions between ground level up to 3,000 feet. Operational practices such as de-rated take-off and reduced power taxiing have the potential to achieve emission reductions.

CARB would similarly work with EPA, Air Districts, airports, and industry stakeholders in a collaborative effort to develop regulations, voluntary measures, and incentive programs. CARB would evaluate the incentive amounts that would be required to encourage aircrafts to voluntarily use cleaner engines and fuels. Incentives to encourage the use of cleaner engines and fuels for aircraft in California would involve identification of funding sources and implementation mechanisms such as development of new programs.

IX. STATE SIP STRATEGY

The 2022, State Strategy for the State Implementation Plan (2022, State SIP Strategy) is a Statewide planning document that identifies the strategies and controls under State authority that are needed to reduce emissions to reduce ground-level O₃. These measures are needed across the State of California for areas to meet the federal 70 ppb 8-hour O₃ NAAQS. More specifically, the document describes the State's proposed commitments to develop control measures and reduce emissions from State-regulated sources as needed to support attainment by the required attainment dates; these State measures and commitments will be incorporated into regional SIPs for the 70 ppb O₃ standard for each nonattainment area. CARB's 2022, State SIP Strategy is located in Appendix J of this attainment plan.

X. BANKED EMISSION REDUCTION CREDITS

CAA §182(d)(2) requires that, for purposes of satisfying the offset requirements pursuant to this part, the ratio of total emission reductions of VOCs to total increased emissions of such air pollutant shall be at least 1.3 to 1, except that if the State plan requires all existing major sources in the nonattainment area to use Best Available Control Technology (BACT) (as defined in section 7479(3) of this title) for the control of VOCs, the ratio shall be at least 1.2 to 1.

The District's federally mandated New Source Review (NSR) rules 210.1, New and Modified Stationary Source Review (NSR) and 210.1A, Major New and Modified Stationary Source Review (MNSR) require new and modified major stationary sources that increase emissions in amounts exceeding specified thresholds to provide emission reduction offsets to mitigate their emissions growth. Offsets represent either on-site emission reductions, or the use of banked emission reduction credits (ERCs), which are voluntary, surplus emission reductions previously achieved and registered with the District for future use as offsets.

There should be no net effect on emissions inventories from future construction or modifications at major stationary sources due to offset requirements. For example, a new emissions unit at a major source producing "new" emissions are canceled out by reductions of other emissions units already in the inventory.

To ensure construction or modification of major sources has no net effect on emission inventories used for demonstrating attainment, banked ERCs, which otherwise would not be included as emissions in the baseline and subsequent inventories, must be added back into the inventories, pursuant to federal requirements³⁶. Accordingly, Table 11 presents currently (as of 2022) banked ERCs in the District's credit bank that have been added to the emissions inventory.

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³⁶ 70 Federal Register 71676; November 29, 2005.

Table 11: Banked ERC Summary

Company Name	Certificate Number	NOx	VOC	Cumulative Totals	
		(TPY)	(TPY)	NOx	VOC
Edwards Air Force Base	0126002/501		3.44		3.44
Edwards Air Force Base	0127029/501		1.74		5.18
Edwards Air Force Base	0134004/401	0.23		0.23	5.18
Edwards Air Force Base	0134023/401	0.38		0.61	5.18
Edwards Air Force Base	0134023/501		0.01	0.61	5.19
Edwards Air Force Base	0134062/401	0.07		0.68	5.19
Edwards Air Force Base	0146004/501		0.09	0.68	5.28
Edwards Air Force Base	0147012/401	0.02		0.70	5.28
MSS Properties	2052001/401	3.57		4.27	5.28
MSS Properties	2052001/501		1.84	4.27	7.12
National Cement Company	1128003/401	9.41		13.68	7.12
National Cement Company	1128001/501		1.98	13.68	9.10
Naval Air Weapons Station	9001005/501		5.59	13.68	14.69
Naval Air Weapons Station	9001016/401	5.62		19.30	14.69
Naval Air Weapons Station	9001349/401	0.19		19.49	14.69
U.S. Borax, Inc.	1004005/401	1.76		21.25	14.69
U.S. Borax, Inc.	1004077/401	21.25		42.50	14.69
TOTALS (tons per year):				42.50	14.69
TOTALS (tons per day):				0.12	0.04

The amount of NOx and VOCs emission in the Banked ERC Summary table was not incorporated in the O₃ modeling emission inventory or the attainment demonstration. The amount of the ERCS banked is relatively small (0.12 tpd NOx and 0.04 tpd VOCs). The sensitivity analysis in the attainment demonstration concluded that an extra tpd of NOx emission would lead to an increase of 0.0426 ppb of O₃ design value for the attainment years, while the impact from extra VOC emission is negligible (Appendix M, Table 16). Thus, the banked ERCS would lead to an increase of 0.005 ppb in attainment year O₃ design values and would not affect the attainment status.

XI. EMISSION STATEMENT CERTIFICATION

Pursuant to CAA §182(a)(3)(B)³⁷ subsection (i), states must have an Emissions Statement program (i.e., rule) in place by 1993, that requires stationary sources to annually report and certify accuracy of their NOx and VOC emissions. Subsection (ii) has waiver provisions for stationary sources emitting less than 25 tpy of NOx or VOC. District Rule 108.2 (Emission Statement Requirements), was adopted July 13, 1992, last amended August 4, 2022, addresses Emissions Statement requirements. The District is currently awaiting EPA's approval of the 8/4/2022, revision and inclusion into the SIP. EPA promulgated the previous (5/2/1996), revision of Rule 108.2 into the SIP May 26, 2004³⁸.

³⁷ 70 Federal Register 71676; November 29, 2005.

³⁸ CAA §182(a)(3)(B) details Emissions Statement requirements for O₃ nonattainment areas classified as marginal and above.

District staff reviewed Rule 108.2 for adequacy, pursuant to CAA requirements and subsequent EPA guidance. Staff amended Rule 108.2 August 4, 2022, to meet CAA §182(a)(3)(B) requirements set forth in the implementation rule as shown in Table 12. The District certifies Rule 108.2 is adequate for the purposes of implementing the 2008 and 2015, 8-hour O₃ NAAQS.

Table 12: CAA §182(a)(3)(B) Requirements and Provisions of District Rule 108.2

CAA §182(a)(3)(B)	District Rule 108.2
<i>CAA §182(a)(3)(B)(i)</i>	
<i>Within 2 years after November 15, 1990, the State must submit revision to SIP to require that the owner or operator of each stationary source of NOx or VOC to provide the State with a statement, in such form as the Administrator may prescribe (or accept an equivalent alternative developed by the State), for classes or categories of sources, showing the actual emissions of NOx or VOC from that source.</i>	Rule 108.2 was adopted in July 1992 and amended in May 1996. EPA promulgated Rule 108.2 into the SIP on May 26, 2004. Amended August 4, 2022, awaiting EPA approval.
<i>Requires the owner/operator of stationary sources of NOx or VOC to provide the State with statements showing the actual NOx and VOC emissions.</i>	The owner or operator of any source operation emitting or with the potential to emit NOx or VOC shall provide the District with a written statement, in such form as prescribed, showing actual emissions of NOx and VOC from such source.
<i>Submittal of the first statement was required to be submitted within three years after November 15, 1990. Submittal of subsequent statements is required at least every year thereafter.</i>	The first statement shall cover 1992 emissions and shall be submitted to the district by June 1993. Statements shall be submitted annually thereafter.
<i>Statements shall contain a certification that the information contained in the statement is accurate to the best knowledge of the individual certifying the statement.</i>	The statement shall also contain a certification by a responsible official of the company that information contained in the statement is accurate to the best knowledge of the individual certifying the statement.
<i>CAA §182(a)(3)(B)(ii)</i>	
<i>The State may elect to waive the application of clause (i) to any class or category of stationary sources which emit less than 25 tons per year of VOC or NOx if the State provides an inventory of emissions from such class or category of source, based on the use of the emission factors established by the Administrator or other methods acceptable to the Administrator.</i>	The Control Officer may waive this requirement to any class or category of stationary sources emitting less than 25 tons per year of oxides of nitrogen or reactive organic gases if the district provides CARB with an emission inventory of sources emitting greater than 10 tons per year of nitrogen oxides or reactive organic gases based on the use of emission factors acceptable to the CARB.

XII. NEW SOURCE REVIEW

Pursuant to CAA §182(c)(10), the District is required to have an New Source Review (NSR) rule designed to address emissions from new and modified major stationary sources of NOx or VOC. District Rule 210.1, New and Modified Stationary Source Review (NMSR), last amended May 4, 2000, was initially adopted in 1974 when the District's jurisdiction included the San Joaquin portion of Kern County and was classified as Serious nonattainment. Therefore, the applicability thresholds for NOx and VOCs in Rule 210.1 is 50 tpy with an offset ratio of 1.2-to-1 (as mandated in the CAA for areas classified as "Serious" nonattainment). Although this satisfies the requirements of the District's 2015, O₃ NAAQS, it does not meet the requirements of District's 2008, O₃ NAAQS classification of Severe nonattainment; which has NOx and VOCs applicability thresholds of 25 tpy with an offset ratio of 1.3-to-1. In an effort to meet the requirements of Severe nonattainment, the District adopted Rule 210.1A, Major New and Modified Stationary Source Review (MNSR) on August 8, 2022. Rule 210.1A has a NOx and VOC threshold of 25 tpy and an offset ratio of 1.3-to-1.

The District certifies the currently adopted version of Rule 210.1 (NSR), and 210.1A (MNSR) are sufficient for the purposes of the 2008, and 2015, O₃ NAAQS, and fulfills the requirements of a Severe nonattainment area (which would also include Serious). Although the key regulatory components of Rule 210.1 currently satisfy the NOx and VOC applicability threshold and offset ratio for Serious nonattainment, the District plans to amend Rule 210.1 in the near future to include components for Severe and Extreme nonattainment along with any new or revised definitions, and any new EPA requirement.

XIII. ATTAINMENT PLAN REQUIREMENTS

EPA's Implementation Rule for the O₃ NAAQS requires additional planning and emission control demonstrations necessary for Severe nonattainment areas (which includes Serious) in order to comply with the CAA. These conditions go beyond the general requirements listed in Section III of this plan and include the following:

- 1). Reasonably Available Control Measures (RACM):** CAA §172(c) requires the District to verify that all RACM including stationary, transportation, and mobile) are being implemented as expeditiously as practicable.
- 2). Reasonable Further Progress (RFP):** CAA §182(b)(1) requires the District to provide RFP to show steady progress in emission reduction between the baseline planning (2008), base year (2018), and attainment year (2026, 75 ppb and 2032, 70 ppb).
- 3). Attainment Demonstration:** CAA §182(c)(2)(A) requires the District to develop photochemical air quality simulation modeling that demonstrates attainment of 2008 8-hour O₃ NAAQS as expeditiously as practicable.

4). Contingency Measures: CAA §179(c)(9) requires the District to implement contingency measures in the event of failure to achieve RFP milestones or to attain 8-hour O₃ NAAQS by the attainment deadline.

XIV. REASONABLE AVAILABLE CONTROL MEASURES DEMONSTRATION

To fulfill the CAA control measure requirements for O₃ nonattainment areas, an assessment of control measures in the SIP must be performed. For O₃ nonattainment areas, the control measures must be shown to be RACM. CARB is responsible for measures to reduce emissions from mobile sources needed to attain the national ambient air quality standards (standards). This chapter will discuss how California's mobile source measures meet RACM.

Given the severity of California's air quality challenges, CARB has implemented the most stringent mobile source emissions control program in the nation. CARB's comprehensive strategy to reduce emissions from mobile sources includes stringent emissions standards for new vehicles, in-use programs to reduce emissions from existing vehicle and equipment fleets, cleaner fuels that minimize emissions, and incentive programs to accelerate the penetration of the cleanest vehicles beyond that achieved by regulations alone. Taken together, California's mobile program meets RACM requirements in the context of O₃ nonattainment.

A. RACM Requirements

EPA has interpreted RACM to be those emission control measures that are technologically and economically feasible and when considered in aggregate, would advance the attainment date by at least one year. Section 172(c)(1) of the Act requires SIPs to provide for the implementation of RACM as expeditiously as practicable. Given the severity of California's air quality challenges, CARB has implemented the most stringent mobile source emissions control program in the nation. CARB's comprehensive strategy to reduce emissions from mobile sources includes stringent emissions standards for new vehicles, in-use programs to reduce emissions from existing vehicle and equipment fleets, cleaner fuels that minimize emissions, and incentive programs to accelerate the penetration of the cleanest vehicles beyond that achieved by regulations alone. Taken together, California's mobile source program meets RACM requirements in the context of O₃ nonattainment.

To ensure the State continues to meet RACM requirements and achieve its emissions reductions goals in the future, California continues to develop new programs and regulations to strengthen its overall mobile source program and to achieve new emissions reductions from mobile sources.

B. RACM for Mobile Sources

1. Waiver and Authorizations

While section 209 of the Act preempts other states from adopting emission standards and other emission-related requirements for new motor vehicles and engines that differ from the federal standards set by EPA, the Act provides California with the ability to seek a waiver or authorization from the federal preemption clause in order to enact emission standards and other emission-related requirements for new motor vehicles and engines, as well as new and in-use off-road vehicles and engines³⁹ – provided California standards are at least as protective as applicable federal standards.

Over the years, California has received waivers and authorizations for over 100 regulations. The most recent California standards and regulations that have received waivers and authorizations are: the Advanced Clean Cars (ACC) regulations for light duty vehicles including ZEV and the Low-Emission Vehicle III (LEV III) regulations; the On-Board Diagnostics (OBD) regulation; the Heavy-Duty Idling, Malfunction and Diagnostics System Regulation; the In-Use Off-Road Diesel Fleets Regulation; the Large Spark Ignition (LSI) Fleet Regulation; and the Mobile Cargo Handling Equipment (CHE) regulation. Further, CARB has recently submitted waiver requests for: *Advanced Clean Transit (ACT) regulation; the Zero-Emission Airport Shuttle Buses Regulation; the Zero Emission Powertrain Certification Regulation, and the Heavy-Duty Omnibus Regulation*. Other authorizations include the Off Highway Recreational Vehicles and PERP.

Additionally, CARB obtained an authorization from EPA to enforce adopted emission standards for off-road engines used in yard trucks and two-engine sweepers. CARB adopted the off-road emission standards as part of its “Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In Use Heavy-Duty Diesel-Fueled Vehicles,” (Truck and Bus Regulation). The bulk of the regulation applies to in use heavy-duty diesel on-road motor vehicles with a gross vehicle weight rating in excess of 14,000 pounds, which are not subject to preemption under section 209(a) of the Act and do not require a waiver under section 209(b).

The waiver and authorizations California has received are integral to the success and stringent emission requirements that characterize CARB’s mobile source program. Due to California’s unique waiver authority under the Act, no other state or nonattainment area has the authority to promulgate mobile source emission standards at levels that are more stringent than the federal standards. Other states can elect to match either the federal standards or the more stringent California standards. As such, no state or nonattainment area has a more stringent suite of mobile source emission control programs than California, implying a de-facto level of control that at least meets, if not exceeds, RACM.

³⁹ Locomotives and engines less than 175 horsepower (hp) used in farm and construction equipment are exempt from California’s waiver authority.

2. CARB's Mobile Source Controls

CARB's current mobile source control program, along with efforts at the local and federal level, have been tremendously successful in reducing emissions of air pollutants, resulting in significantly cleaner vehicles and equipment in operation.

CARB developed its 2022 State Strategy for the SIP (2022 State SIP Strategy) through a multi-step measure development process, including extensive public consultation, to develop and evaluate potential strategies for mobile source categories under CARB's regulatory authority that could contribute to expeditious attainment of the 70 ppb 8-hour O₃ NAAQS, as well as supporting attainment for other national and State air quality standards. This effort builds on the measures and commitments already made in the 2016 State SIP Strategy, and expands on the scenarios and concepts included in the 2020 Mobile Source Strategy, CARB's multi pollutant planning effort that identifies the pathways forward to achieve the State's many air quality, climate, and community risk reduction goals. The Board adopted the 2022 State SIP Strategy in September 2022.

With the 2022 State SIP Strategy, CARB is exploring and proposing an unprecedented variety of new measures to reduce emissions from the sources under our authority using all mechanisms available. The measures included in the 2022 State SIP Strategy encompass actions to establish requirements for cleaner technologies (both zero-emissions and near zero-emissions), deploy these technologies into the fleet, and to accelerate the deployment of cleaner technologies through incentives.

3. Light- and Medium-Duty Vehicles

Since setting the nation's first motor vehicle exhaust emission standards in 1966 that led to the first pollution controls California has dramatically tightened emission standards for light duty vehicles. Through CARB regulations, today's new cars pollute 99 percent less than their predecessors did thirty years ago. In 1970, CARB required auto manufacturers to meet the first standards to control NOx emissions along with hydrocarbon emissions, which together form smog. The simultaneous control of emissions from motor vehicles and fuels led to the use of cleaner-burning gasoline that has removed the emissions equivalent of 3.5 million vehicles from California's roads.

Light- and medium-duty vehicles are currently regulated under California's ACC program, which includes the LEV III and ZEV programs. The ACC program combines the control of smog, soot-causing pollutants, and greenhouse gas emissions into a single coordinated package of requirements for model years 2015 through 2025. Since first adopted in 1990, CARB's LEV I and LEV II, and the ZEV Programs have resulted in the production and sales of hundreds of thousands of ZEVs in California. Advanced Clean Cars II (ACC II), a measure in the 2016 State SIP Strategy, is a significant effort critical to meeting air quality standards and will be finalized this year. ACC II, which was recently adopted by the CARB Board in

August 2022, has the goal of cutting emissions from new combustion vehicles while taking all new vehicle sales to 100 percent zero-emission no later than 2035.

For passenger vehicles, the 2022 State SIP Strategy includes actions to increase the penetration of ZEVs by targeting ride-hailing services offered by transportation network companies through the Clean Miles Standard regulation in order to reduce GHG and criteria pollutant emissions, and promote electrification of the fleet. For motorcycles, the 2022 State SIP Strategy proposes more stringent exhaust and evaporative emissions standards along with zero-emissions sales thresholds. The primary goal of the On-Road Motorcycle New Emissions Standard measure is to reduce emissions from new, on-road motorcycles by adopting more stringent exhaust and evaporative emissions standards along with zero emissions sales thresholds.

CARB is also active in implementing in-use programs for owners of older dirtier vehicles to retire them early. The “car scrap” programs, like Clean Cars 4 All and Clean Vehicle Rebate Project provide monetary incentives to replace old vehicles with zero emission vehicles. Other California programs and goals such as the 2012 Governor’s Executive Order to put 1.5 million zero emission vehicles on the road by 2025 and will produce substantial and cost effective emission reductions from the light-duty vehicle sector.

Taken together, California’s emission standards, fuel specifications, and incentive programs for on-road light- and medium-duty vehicles represent all measures that are technologically and economically feasible within California. There are no additional measures that, when considered in aggregate, would advance the attainment date by at least one year.

4. Heavy-Duty Vehicles

California’s heavy-duty vehicle emissions control program includes requirements for increasingly stringent new engine emission standards and addresses vehicle idling, certification procedures, on-board diagnostics, emissions control device verification, and in use measures to ensure that emissions from the existing vehicle fleet remain adequately controlled. Taken together, the on-road heavy-duty vehicle program is designed to achieve an on-road heavy-duty diesel fleet with 2010 engines emitting 98 percent less NOx and PM2.5 than trucks sold in 1986.

Other significant in-use control measures CARB has in place include: the On-Road Heavy Duty Diesel Vehicle (In Use) Regulation; the Drayage (Port or Rail Yard) Regulation; the Public Agency and Utilities Regulation; the Solid Waste Collection Vehicle Regulation; the Heavy-Duty (Tractor-Trailer) Greenhouse Gas (GHG) Regulation, the Airborne Toxic Control Measures (ATCM) to Limit Diesel Fueled Commercial Motor Vehicle Idling; the Heavy-Duty Diesel Vehicle Inspection Program; the Periodic Smoke Inspection Program (PSIP); the Fleet Rule for Transit Agencies; the Lower-Emission School Bus Program; and Heavy-Duty Truck Idling Requirements.

In 2013, California recognized the heavy-duty engines could be cleaner and established optional low-NOx standards for heavy-duty diesel engines (Optional Reduced Emissions Standards for Heavy-Duty Engines regulation), with the most aggressive standard being 0.02 g/bhp-hr, 90 percent below the 2010 federal standard. Further, in 2021, CARB adopted the Heavy-Duty Engine and Vehicle Omnibus Regulation (Omnibus Regulation) which made the 0.02 g/bhp-hr a mandatory standard, and comprehensively overhauled how NOx emissions from new heavy-duty engines are regulated in California. The Omnibus Regulation also includes in-use standards that significantly reduce tailpipe NOx emissions during most vehicle operating modes, and revisions to the emissions warranty, useful life, emissions warranty and reporting information and corrective action procedures, and durability demonstration procedures.

To further control emissions from the in-use fleet, CARB adopted in 2021 the Heavy Duty Inspection and Maintenance Regulation, which requires periodic demonstration that vehicles' emissions control systems are properly functioning in order to legally operate within the State. This regulation is designed to achieve criteria emissions reductions by ensuring that malfunctioning emissions control systems are timely repaired.

In June 2020, CARB adopted the ACT regulation, a first of its kind regulation requiring medium- and heavy-duty manufacturers to produce ZEVs as an increasing portion of their sales beginning in 2024. This regulation is expected to result in roughly 100,000 ZEVs by 2030 and nearly 300,000 ZEVs by 2035. Most recently in the ongoing efforts to go beyond federal standards and achieve further reductions, the 2022 State SIP Strategy includes the complementary Advanced Clean Fleets measure. Through this program, CARB is developing a medium and heavy-duty zero-emission fleet regulation with the goal of achieving a zero-emission truck and bus California fleet by 2045 everywhere feasible, and significantly earlier for certain market segments such as last mile delivery and drayage applications.

The 2022 State SIP Strategy also includes the Zero-Emissions Trucks Measure, which would accelerate the number of zero-emission heavy-duty vehicles beyond existing measures and the Advanced Clean Fleets measure. The Zero-Emissions Trucks Measure was developed in response to comments from the public related to turning over heavy-duty trucks at the end of their useful life. The Zero-Emissions Trucks Measure targets the replacement of older trucks in order to increase the number of heavy-duty ZEVs as soon as possible and reduces emissions from fleets not affected by the Advanced Clean Fleets measure. CARB is exploring new methods to replace older trucks, including market signal tools that would burden low-income truckers, provide flexibility and target reductions in the areas that need it most.

In addition, CARB's significant investment in incentive programs provides an additional mechanism to achieve maximum emission reductions from this source sector. California has a variety of programs to incentivize clean heavy-duty vehicles that include the Carl Moyer Air Quality Standards Attainment Program, the Hybrid

and Zero-Emission Truck and Bus Voucher Incentive Project, the Truck Loan Program, and AB 617 Community Air Protection Funds.

Taken together, California's emission standards, fuel specifications, and incentive programs for on-road heavy-duty vehicles represent all measures that are technologically and economically feasible within California. There are no additional measures that, when considered in aggregate, would advance the attainment date by at least one year.

5. Off-Road Vehicles and Engines

California regulations for off-road equipment include not only increasingly stringent emission standards for new off road diesel engines, but also in-use requirements and idling restrictions. CARB has programs in place to control emissions from various new off-road vehicles and equipment. CARB also has in-use programs for off-road vehicles and equipment, including the In-Use Off-Road Diesel Fueled Fleets Regulation (Off-Road Regulation) and Large Spark-Ignition Engine Fleet Requirements Regulation, as well as incentive programs including the Clean Off-Road Equipment (CORE) Voucher Incentive Project. CARB adopted amendments to the small off-road engine regulations in December 2021, the Transport Refrigeration Unit Part 1 regulatory action in February 2022, and will be proposing the Zero Emission Off-Road Forklift regulation in the next year.

The Off-Road Regulation, adopted in 2010, is an extensive program designed to accelerate the penetration of the cleanest equipment into California's fleets, and impose idling limits on off-road diesel vehicles. The program goes beyond emission standards for new engines through comprehensive in-use requirements for legacy fleets. CARB is also including in the 2022 State SIP Strategy a measure for amendments to the existing Off-Road Regulation. These amendments would create additional requirements to the currently regulated fleets by targeting the oldest and dirtiest equipment that is allowed to operate indefinitely under the current regulation's structure, potentially through an operational ban on the oldest and dirtiest equipment and limitations on vehicles added to a fleet.

The LSI Engine Fleet Requirements Regulation applies to operators of forklifts, sweeper/scrubbers, industrial tow tractors, and airport ground support equipment (GSE). The 2006 LSI rulemaking and 2010 amendments required operators of in-use fleets to achieve specific hydrocarbon + NOx fleet average emission level standards that became more stringent over time. CARB adopted amendments to the small off-road engine (SORE) regulations in December 2021 that will accelerate the transition of SORE equipment to Zero Emission Equipment (ZEE). Deployment of ZEE is key to meeting the expected emission reductions in the 2016 State SIP Strategy.

As discussed in the 2016 State SIP Strategy, CARB is also developing new requirements to transition diesel-powered transport refrigeration units (TRUs) to zero-emission technology in two phases. CARB adopted the Part 1 amendments to the existing TRU ATCM in February 2022, which requires the transition of diesel-

powered truck TRUs to zero-emission. As discussed in the 2022 State SIP Strategy, CARB plans to develop a subsequent Part 2 regulation to require zero-emission trailer TRUs, domestic shipping container TRUs, railcar TRUs, and TRU generator sets, for future Board consideration.

Additionally, the 2022 State SIP Strategy includes the Tier 5 Off-Road New Compression-Ignition Engine Standards measure to reduce NOx and PM emissions from new, off-road compression-ignition engines by adopting more stringent exhaust standards for all power categories. Compression-ignition engines are used in a wide range of off-road equipment including tractors, excavators, bulldozers, graders, and backhoes. The standards considered for this measure would be more stringent than required by current EPA and European Stage V non-road regulations and would require the use of BACT for both PM and NOx.

CARB is also developing a measure, as described in the 2022 State SIP Strategy, to accelerate the development and production of zero-emission off-road equipment and powertrains through the Off-Road Zero-Emission Targeted Manufacturer Rule. Existing zero-emission regulations and regulations currently under development target a variety of sectors (e.g., forklifts, cargo handling equipment, off-road fleets, small off road engines, etc.) however, as technology advancements occur, more sectors, including wheel loaders, excavators, and bulldozers could be accelerated through this measure.

Further, CARB implements a number of incentive programs and projects to advance the turnover of off-road equipment to cleaner technologies. The Moyer Program has provided funding towards on- and off-road equipment for decades. The CORE is a newer project that is intended to accelerate deployment of advanced technology in the off-road sector and targets commercial-ready products that have not yet achieved a significant market foothold. For engines and equipment used in agricultural processes, CARB has the Funding Agricultural Replacement Measures for Emission Reductions (FARMER) program to support fleet turnover to cleaner engines.

Taken together, California's comprehensive suite of emission standards, fuel specifications, and incentive programs for off-road vehicles and engines represent all measures that are technologically and economically feasible within California. There are no additional measures, that, when considered in aggregate, would advance the attainment date by at least one year.

6. Fuels

As mentioned earlier, cleaner burning fuels also play an important role in reducing emissions from motor vehicles and engines in these source categories. CARB has adopted standards to ensure that the fuels sold in California are the cleanest in the nation. These programs include the California Reformulated Gasoline program (CaRFG), which controls emissions from gasoline, and the Ultra-Low Sulfur Diesel requirements (2006), which provide the nation's cleanest diesel fuel specifications and help to ensure that diesel fuels burn as cleanly as possible and work

synergistically with cleaner-operating heavy-duty trucks equipped with advanced emission control systems that debuted in 2007, and the Low Carbon Fuel Standard. These fuel standards, in combination with engine technology requirements, ensure that California's transportation system achieves the most effective emission reductions possible.

Taken together, California's emission standards, fuel specifications, and incentive programs for other mobile sources and fuels represent all measures that are technologically and economically feasible within California. There are no additional measures that, when considered in aggregate, would advance the attainment date by at least one year.

7. Mobile Source Summary

California's long history of comprehensive and innovative emissions control has resulted in the most stringent mobile source control program in the nation. EPA has previously acknowledged the strength of the program through the waiver process, and in their approvals of CARB's regulations and District plans.

While EPA deferred action on the RACM elements included in the 2017 Eastern Kern O₃ SIP plan for the 75 ppb 8-hour O₃ NAAQS⁴⁰, it did find that the State's current control program and measure commitments from the 2016 State SIP Strategy met RACM requirements in its 2019 approval of the San Joaquin Valley's 2016 O₃ Plan for the same O₃ standard:

"There are no additional reasonably available control measures that would advance attainment of the 2008 ozone standards in the San Joaquin Valley... therefore, the 2016 Ozone Plan provides for the implementation of all RACM as required by [the] CAA.⁴¹"

In addition to declarations that the mobile source control program meets RACM requirements, EPA has also provided past determinations that CARB's mobile source control programs meet the more rigorous BACM requirements. As BACM requirements are considered a more stringent threshold to meet than RACM, EPA has stated that a determination that the control program has meet BACM requirements also constitutes a conclusion that it meets RACM requirements⁴².

⁴⁰ 86 FR 33528 <https://www.federalregister.gov/documents/2021/06/25/2021-13608/approval-of-air-quality-implementation-plans-california-eastern-kern-8-hour-ozone-nonattainment-area>

⁴¹ 84 FR 3302 <https://www.federalregister.gov/documents/2019/02/12/2019-01686/clean-air-plans-2008-8-hour-ozone-nonattainment-area-requirements-san-joaquin-valley-california>

⁴² "We interpret the BACM requirement as generally subsuming the RACM requirement (i.e., if we determine that the measures are indeed the "best available," we have necessarily concluded that they are "reasonably

EPA has acknowledged CARB's mobile source control program as meeting BACM in and in their 2019 approval of the South Coast's PM2.5 Serious Area Plan⁴³. In their 2018 proposal for that approval, EPA noted that,

"With respect to mobile sources, we recognize that CARB's current program addresses the full range of mobile sources in the South Coast through regulatory programs for both new and in-use vehicles... Overall, we believe that the program developed and administered by CARB and SCAG provide for the implementation of BACM for PM2.5 and PM2.5 precursors in the South Coast nonattainment area.⁴⁴"

In their 2020 approval of the San Joaquin Valley's PM2.5 Serious Area 2018 Plan⁴⁵, EPA further found that CARB's mobile source control program met the more stringent level of Most Stringent Measures (MSM). In their 2020 proposal for that plan, EPA found that,

"CARB's programs constitute the most stringent emission control programs currently available for the mobile source and fuels categories, taking into account economic and technological feasibility.⁴⁶"

CARB has continued to substantially enhance and accelerate reductions from our mobile source control programs through the implementation of more stringent engine emissions standards, in-use requirements, incentive funding, and other policies and initiatives as described in the preceding sections. The CARB process for developing CARB's control measures includes an extensive public process and is consistent with EPA's RACM guidance. Through this process, CARB found that with the current mobile source control program and new measures included in the 2022 State SIP Strategy, there are no additional reasonable available control measures that would advance attainment of the 70 ppb 8-hour O₃ NAAQS in the nonattainment area. There are no reasonable regulatory control measures excluded from use in this plan; therefore, there are no emissions reductions associated with unused regulatory control measures. As a result, California's mobile source control programs fully meet the requirements for RACM.

C. RACM for Stationary Sources

Sections 182(b)(2) and 182(f) of the FCAA (42 U.S.C. §7511(a)) require O₃ nonattainment areas to implement Reasonably Available Control Technology (RACT) emission standards for "major sources" of VOCs and NOx (O₃ precursors). RACT is also required for sources of air pollution that are subject to Control Techniques

⁴³ 84 FR 3305 <https://www.federalregister.gov/documents/2019/02/12/2019-01922/approval-and-promulgation-of-implementation-plans-california-south-coast-serious-area-plan-for-the>

⁴⁴ 83 FR 49872 <https://www.federalregister.gov/documents/2018/10/03/2018-21560/approval-and-promulgation-of-implementation-plans-california-south-coast-serious-area-plan-for-the>

⁴⁵ 85 FR 44192 <https://www.federalregister.gov/documents/2020/07/22/2020-14471/clean-air-plans-2006-fine-particulate-matter-nonattainment-area-requirements-san-joaquin-valley>

⁴⁶ 85 FR 17382 <https://www.federalregister.gov/documents/2020/03/27/2020-05914/clean-air-plans-2006-fine-particulate-matter-nonattainment-area-requirements-san-joaquin-valley>

Guidelines (CTGs) issued by EPA⁴⁷. RACT is defined as the lowest emissions limitation that a particular source is capable of meeting by the application of air pollution control technology that is reasonably available considering technological and economic feasibility (44 FR 53762; September 17, 1979)⁴⁷.

RACT requirements are included in the CAA to assure that significant source categories of O₃ precursor emissions are controlled to a “reasonable” extent, but not necessarily to the more stringent Best Available Control Technology (BACT) or Maximum Achievable Control Technology (MACT) levels expected for new or modified major stationary sources.

Pursuant to the 75 ppb 8-hour O₃ NAAQS, the District’s stationary source NOx and VOC prohibitory rules were fully addressed in the District’s 2017 Reasonable Available Control Technology State Implementation Plan (RACT SIP). The RACT SIP evaluated District O₃ precursor control measures to determine compliance with federal RACT requirements for stationary sources covered by Control Technique Guidelines (CTGs). The RACT SIP revealed deficiencies in the following three District rules designed to regulate NOx at major stationary sources:

- 425 (Cogeneration Gas Turbine Engines);
- 425.2 (Boilers, Steam Generators, and Process Heaters); and
- 425.3 (Portland Cement Kilns).

The District committed to amending the three deficient rules in the 2017 O₃ Attainment Plan.⁴⁸ The District amended all three Rules in 2018 to adequately correct their deficiencies and fulfill RACT requirements. The Board adoption dates are as follows Rule 425 amended January 11, 2018, Rules 425.2 and 425.3 amended March 8, 2018.

Pursuant to the 70 ppb 8-hour O₃ NAAQS, the District’s stationary source NOx and VOC prohibitory rules were fully addressed in the District’s 2020 RACT SIP. The RACT SIP evaluated District O₃ precursor control measures to determine compliance with federal RACT requirements for stationary sources covered by CTGs. All rules applicable to CTG source categories were determined to meet or exceed CTG requirements. The District’s 2017 RACT SIP is located in Appendix N and the 2020 RACT SIP is located in Appendix O of this attainment plan.

D. RACM for Consumer Products

Consumer products are defined as chemically formulated products used by household and institutional consumers. For thirty years, CARB has taken actions pertaining to the regulation of consumer products. Three regulations have set VOC limits for 129 consumer product categories. These regulations, referred to as the Consumer Product

⁴⁷ RACT requirements are included in the Clean Air Act to ensure that significant source categories at major sources of ozone precursor emissions are controlled to a “reasonable” extent, but not necessarily to the more stringent best available control technology (BACT) or maximum achievable control technology (MACT) levels expected for new or modified major stationary sources.

⁴⁸ 2017 Ozone Attainment Plan For 2008 Federal 75 ppb 8-Hour Ozone Standard Adopted – July 27, 2017

Program, have been amended frequently, and progressively stringent VOC limits and reactivity limits have been established. These are Regulation for Reducing VOC Emissions from Antiperspirants and Deodorants; Regulation for Reducing Emissions from Consumer Products; and Regulation for Reducing the Ozone Formed from Aerosol Coating Product Emissions, and the Tables of Maximum Incremental Reactivity Values. Additionally, a voluntary regulation, the Alternative Control Plan has been adopted to provide compliance flexibility to companies. The program's most recent rulemaking occurred in 2021 with amendments to Consumer Products Regulation and Method 310.

EPA also regulates consumer products. EPA's consumer products regulation was promulgated in 1998 however; federal consumer products VOC limits have not been revised since their adoption. EPA also promulgated reactivity limits for aerosol coatings. As with the general consumer products, California's requirements for aerosol coatings are more stringent than the EPA's requirements. Other jurisdictions, such as the Ozone Transport Commission states, have established VOC limits for consumer products that are modeled after the California program. However, the VOC limits typically lag those applicable in California.

In summary, California's Consumer Products Program, with the most stringent VOC requirements applicable to consumer products, meets RACM. There are no additional reasonable available control measures that, when considered in aggregate, would advance attainment of the 70 ppb 8-hour O₃ NAAQS in the nonattainment area. There are no reasonable regulatory control measures excluded from use in this plan; therefore, there are no emissions reductions associated with unused regulatory control measures. As a result, California's consumer product control program fully meets the requirements for RACM.

XV. REASONABLE FURTHER PROGRESS (RFP)

CAA §172(c)(2) and §182(c)(2) require nonattainment areas to provide for Reasonable Further Progress (RFP). RFP is defined in CAA §171(1) as “ such annual incremental reductions in emissions of the relevant air pollutant as are required...for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date.” This requirement to demonstrate steady progress in emission reductions between the baseline year and attainment date ensures that areas will begin lowering air pollution in a timely manner and not delay implementation of control programs until immediately before the attainment deadline.

There are two separate RFP requirements for O₃ nonattainment areas depending upon their classification. For O₃ nonattainment areas classified as Moderate or above, there is a one-time requirement for a 15% reduction in ROG emissions over the first six years of the planning period (§182(b)(1)). For O₃ nonattainment areas classified as Serious or higher, §182(c)(2)(B) of the Act has an additional requirement to demonstrate 3% per year cumulative reduction of O₃ precursors averaged over each consecutive three-year period until attainment.

In 1997, EPA approved a 15% ROG-only rate of progress demonstration for the District's O₃ nonattainment area for the 1-hour O₃ standard covering the entire nonattainment area for the 75 ppb 8-hour O₃ standard⁴⁹. As such, the requirement under section 182(b)(1) of the Act in the first 6 years of the attainment planning period has been met for the O₃ nonattainment area.

For the §182(c)(2)(B) RFP requirement for Serious and higher areas, EPA guidance allows for NOx substitution to demonstrate the annual 3% reductions of O₃ precursors if it can be demonstrated that substitution of NOx emission reductions (for ROG reductions) yields equivalent O₃ reductions⁵⁰. Additional EPA guidance states that certain conditions are needed to use NOx substitution in an RFP demonstration⁵¹. First, an equivalency demonstration must show that cumulative RFP emission reductions are consistent with the NOx and ROG emission reductions determined in the O₃ attainment demonstration. Second, the reductions in NOx and ROG emissions should be consistent with the continuous RFP emission reduction requirement. The guidance states "Any combination of VOC (ROG) and NOx emission reductions which totals 3% per year and meet other SIP consistency requirements described in this document are allowed."

Photochemical modeling included in the attainment demonstration shows that NOx reductions are critical for the District to reach attainment and yields more O₃ reductions compared to the same percentage of ROG reductions. See Appendix B for more information.

The current SIP submittal address two 8-hour O₃ standards (75 ppb and the 70 ppb). For the 75 ppb 8-hour standard, the District is required to demonstrate RFP from the base-year of 2011, to the remaining future milestone year of 2023, and the attainment year of 2026. For the 70 ppb 8-hour O₃ standard, the District must demonstrate RFP in all milestone years until attainment, which are 2023, 2026, 2029, and the attainment year of 2032. The base-year for the 70 ppb RFP demonstration is 2017.

The District's 8-hour O₃ RFP demonstrations were developed using CARB's CEPAM2019v1.04 Emission Projections (see Appendix M). In order to demonstrate consistency between the RFP demonstration and the motor vehicle emissions budgets (MVEB), a line item adjustment is made in the RFP demonstration to account for the differences in the on-road mobile source emissions projections in the CEPAM inventory and the MVEB which is rounded up to the nearest tenth of a ton, see Section VI.B.

Another line item adjustment to the RFP demonstration is made to account for banked ERCs. ERCs are voluntary, surplus, emission reductions that are registered and banked with air districts. ERCs are generated from equipment shutdown or voluntary controls and can be used as offsets for new or modified projects. EPA policy requires that ERCs are treated as emissions in the air and therefore included in each future year in the RFP demonstration. More information regarding banked ERCs can be found in Section X.

⁴⁹ 62 FR 1150 <https://www.gpo.gov/fdsys/pkg/FR-1997-01-08/pdf/97-144.pdf>

⁵⁰ [P1001E8Z.PDF \(epa.gov\)](#)

⁵¹ www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/19931201_oaqps_nox_substitution_guidance.pdf

Table 13 demonstrates that the cumulative ROG and NOx emission reductions meet the 75 ppb standard RFP targets in the 2023, milestone year and the attainment year of 2026. In accordance with EPA guidance for implementation of the 75 ppb 8-hour O₃ NAAQS attainment plans, *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements*, the emissions reductions in the RFP demonstration occur inside the nonattainment area, and are achieved through existing control regulations starting from the baseline year of 2011⁵². The District meets RFP requirements for the 75 ppb 8-hour O₃ NAAQS.

Table 13: RFP Demonstration for the 75 ppb Ozone SIP

Year	2017	2023	2026
ROG emissions	8.81	7.13	6.97
Emission Reduction Credits		0.04	0.04
MVEB Rounding Margin		0.02	0.01
ROG Emissions + ERCs + MVEB Rounding Margin		7.18	7.03
Required % Change Since 2017		36%	45%
Target ROG Level		5.64	4.84
Shortfall (-)/ Surplus (+) in ROG		-1.55	-2.18
Shortfall (-)/ Surplus (+) in ROG, %		-18%	-25%
Year	2011	2023	2026
NOx emissions	26.29	18.74	17.75
Emission Reduction Credits		0.12	0.12
MVEB Rounding Margin		0.07	0.01
NOx Emissions + ERCs + MVEB Rounding Margin		18.94	17.89
Change in NOx since 2017		7.35	8.40
Change in NOx since 2017, %		28%	32%
NOx reductions since 2017 used for ROG substitution in this milestone year, %		18%	25%
NOx reductions since 2017 surplus after meeting ROG substitution needs in this milestone year, %		10%	7%
RFP shortfall (-), if any		0%	0%
RFP Met:		YES	YES

Note: Numbers may not add up due to rounding

Table 14 demonstrates that the cumulative ROG and NOx emission reductions only meets the 70 ppb standard RFP targets in the milestone years of 2023, and 2026, but not the out year of 2029, or the attainment year of 2032. In accordance with EPA guidance for implementation of the 70 ppb 8-hour O₃ standard attainment plans, *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements*, the emissions reductions in the RFP demonstration

⁵² 80 FR 12264 <http://www.gpo.gov/fdsys/pkg/FR-2015-03-06/pdf/2015-04012.pdf>

occur inside the nonattainment area, are achieved through existing control regulations, and start from the baseline year of 2017⁵³.

However, the CAA provides an alternative for meeting RFP requirements if the area cannot demonstrate reductions of 3 percent per year. CAA §182(c)(2)(B)(ii) allows nonattainment areas to demonstrate RFP if they include in their SIP “all measures that can feasibly be implemented in the area, in light of technological achievability” and “measures that are achieved in practice by sources in the same source category in nonattainment areas of the next higher classification.”

An analysis of the sources and measures in the District and in the two Extreme nonattainment areas is provided in Section XV.B, demonstrating the nonattainment area meets RFP requirements for the 70 ppb 8-hour O₃ NAAQS.

Table 14: RFP Demonstration for the 70 ppb Ozone SIP

Year	2017	2023	2026	2029	2032
ROG emissions	7.86	7.13	6.97	6.83	6.76
Emission Reduction Credits		0.04	0.04	0.04	0.04
MVEB Rounding Margin		0.02	0.01	0.08	0.07
ROG Emissions + ERCs + MVEB Rounding Margin		7.18	7.03	6.96	6.85
Required % change since 2017		18%	27%	36%	45%
Target ROG Level		6.45	5.74	5.03	4.32
Shortfall (-)/ Surplus (+) in ROG		-0.74	-1.29	-1.92	-2.52
Shortfall (-)/ Surplus (+) in ROG, %		-9%	-16%	-24%	-32%
Year	2017	2023	2026	2029	2032
NOx emissions	21.56	18.74	17.75	17.50	17.48
Emission Reduction Credits		0.12	0.12	0.12	0.12
MVEB Rounding Margin		0.07	0.01	0.06	0.00
NOx Emissions + ERCs + MVEB Rounding Margin		18.94	17.89	17.68	17.60
Change in NOx since 2017		2.62	3.67	3.88	3.96
Change in NOx since 2017, %		12%	17%	18%	18%
NOx reductions since 2017 used for ROG substitution in this milestone year, %		9%	16%	18%	18%
NOx reductions since 2017 surplus after meeting ROG substitution needs in this milestone year, %		3%	1%	0%	0%
RFP shortfall (-), if any		0%	0%	-6%	-14%
RFP Met:		YES	YES	NO	NO

Note: Numbers may not add up due to rounding

In order to be most conservative, 0.00 values are used when the corresponding MVEB was lower than comparable emissions in CEPAM due to updated adjustment factors used in the MVEB at the direction of EPA

⁵³ 83 FR 629988 <https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf>

Additionally, the CAA provides an alternative for meeting RFP requirements if the nonattainment area cannot demonstrate reductions of 3% per year. CAA §182(c)(2)(B)(ii) of the CAA allows the nonattainment area to demonstrate RFP if the SIP includes “all measures that can feasibly be implemented in the area, in light of technological achievability” and “measures that are achieved in practice by sources in the same source category in nonattainment areas of the next higher classification.”

An analysis of the source categories and District control measures compared to the two Extreme nonattainment areas that demonstrates the nonattainment area meets RFP requirements for the 70 ppb 8-hour O₃ NAAQS is provided in Section XIII.B.

A. Amended NOx & VOC Rules

As shown in Table 14, the District’s existing NOx and VOC rules were not going to achieve the required 3% annual reductions needed to meet RFP for the 70 ppb standard. Therefore, the District evaluated current rules to determine where any additional reductions could be achieved. The District identified the following three VOC rules that could be made more stringent: 410 (Organic Solvents), 410.8 (Aerospace Coating Operations), and 432 (Polyester Resin Operations).

Rules 410, 410.8, and 432, were originally listed in a CARB approved commitment letter as VOC rules to be included in the contingency provisions of the attainment plan. However, due to the projected RFP shortfall, the District amended all three VOC rules in 2022. The combined VOC emissions reductions from amending these three rules are estimated to be 0.2 tpd. Reductions are as follows: 410 (0.183 tpd), 410.8 (0.014 tpd), and 432 (0.003 tpd). Although these reductions are a step toward achieving attainment, they do not provide enough emissions reductions needed to meet RFP.

B. Pathway to Meeting RFP

CAA §182 (c)(2)(B)(ii) includes a provision that allows O₃ nonattainment areas that cannot meet the 3% annual emission reduction requirement of the RFP a pathway to an approvable RFP demonstration. The state must demonstrate that the SIP includes measures that are achieved in practice, by sources in the same source category in the nonattainment area, meet requirements of the next higher classification (Extreme).

In order for EPA to approve an RFP that does not meet the minimum 3% annual reduction requirement, the District must document and demonstrate that its NOx and VOC rules are at least as stringent as the two Extreme California air districts. The following sections detail CARB’s required analysis to show RFP for three source types: (1) Major Stationary Source, (2) Non-major Point Source and Area Source, and (3) Other Sources.

1. Major Stationary Source

The main goal of this section is (1) to create an analysis that includes all the major stationary sources and (2) to make the case that the emission reduction measures adopted by these sources match those being achieved in practice in NAAs of the next higher classification. For severe areas, this requires comparison to the two extreme nonattainment areas, South Coast (SCAQMD) and San Joaquin Valley (SJVAPCD). The District may follow the steps below to draft the analysis.

- a. Identify the major stationary sources with an emission threshold consistent with that of the next higher classification
 - i. Produce a new list of major stationary sources based on the major source threshold of the next higher classification (10 tpy for Extreme) for both ROG and NOx.
 - ii. Group the sources according to their source categories
 - iii. Determine if these sources are operating in the extreme areas using CARB's CEIDARS facility search tool or other sources.
- b. Assess the stringency of the District controls compared to the extreme controls for each source identified.
 - i. For each source category document that the adopted and projected rules and measures are no less stringent than those in practice in the extreme areas.
 - ii. Each rule involved in this part of the analysis should be listed with key specifications for clear comparison.
 - iii. If some rules in South Coast and San Joaquin Valley are found more stringent and the controls are in practice, the District will need to commit to amending the applicable rules.
- c. Ensure District rules are still RACT since the RACT SIP submittal
 - i. Reassess source category in other areas regardless of classification and demonstrate that more stringent controls do not exist in practice anywhere.
 - ii. Document consent decrees that will require controls.

2. Non-major Point Sources and Area Sources

The District should also document controls on non-major point sources and area sources of NOx or ROG emissions that are regulated by the District.

- a. Investigate current and future rules that apply to these sources and compare to those in NAAs of the next higher classification.
- b. Identify the largest contributing source categories.
- c. Compare the rules in place to those adopted in NAAs of the next higher classification.
- d. For those categories with less stringent rules or no rules, consider adopting similar rules in the NAAs of the next higher classification.
- e. List all the rules that are relevant to this section's analysis.

3. Other sources

The District should identify sources that are not regulated by the district, evaluate, and document.

C. Sources Over 10 tpy

The District evaluated all permitted stationary sources (that are not currently over the major source threshold) to determine if any would exceed the major source threshold of the next higher classification (10 tpy for Extreme) for both VOC and NOx. The District determined that Innovative Coatings Technology Corporations located in Mojave is the only source currently above 10 tpy of VOCs.

D. NOx & VOC Rule Comparison to Extreme Nonattainment Area

In order to satisfy CAA §182 (c)(2)(B)(ii), the District compared all currently adopted NOx and VOC rules to the NOx and VOC rules of the two Extreme nonattainment air districts, SCAQMD and SJVAPCD. Table 15 demonstrates that the SIP includes control measures applicable to all NOx and VOC emissions sources located within the District's nonattainment area, and that the measures meet or exceed the requirements of the next higher classification (Extreme). Table 15 shows that the District is achieving all that could be expected in practice. Additionally, the Model Attainment Demonstration in Section XVII, shows that attainment will be achieved by 2023 even without meeting the 3% reductions for 2029 or 2032. The District believes that it has shown that all NOx and VOC emission reductions strategies have been employed and that the RFP requirement should be satisfied.

Table 15: NOx & VOC Rule Comparison to Extreme Districts

Category	EKAPCD Rule	SJVAPCD Rule	SCAQMD Rule	Difference
Organic Solvents	410	4661	442	EK More Stringent
Amended	9/1/22	9/20/07	12/15/00	
Architectural Coatings	410.1A	4601	1113	SJV & SC Have a few lower limits
Amended	1/1/11	4/16/20	2/5/16	
Organic Solvent Degreasing Operations	410.3	4662	1122	Equivalent
Amended	5/7/98	9/20/07	5/1/09	
Metal, Plastic, and Pleasure Craft Parts and Products Coating Operations	410.4	4603	1107	Equivalent
Amended	3/13/14	9/17/09	2/7/20	
Motor Vehicle and Mobile Equipment Refinishing Operations	410.4A	4612	1151	Equivalent
Amended	3/13/14	10/21/10	9/5/14	
Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations	410.5	4641	1108 & 1108.1	Equivalent
Amended	3/7/96	12/17/92	2/1/85 11/4/83	
Graphic Arts	410.7	4607	1130	SJV & SC Have a few lower limits
Amended	3/7/96	12/18/08	5/2/14	
Aerospace Assembly and Coating Operations	410.8	4605	1124	EK More Stringent
Amended	11/3/22	6/16/11	9/21/01	
Wood Products Surface Coating Operations	410.9	4606	1136	Equivalent to SJV More Stringent than SC
Amended	3/13/14	10/16/08	6/14/96	
Storage of Organic Liquids	411	4623	463	Equivalent
Amended	3/7/96	5/19/05	11/4/11	
Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants	412	4621	461	Equivalent
Amended	1/13/22	12/19/13	1/7/22	

Table 15: Continued

Category	EKAPCD Rule	SJVAPCD Rule	SCAQMD Rule	Difference
Transfer of Gasoline to Vehicle Fuel Tanks	412.1	4622	461	Equivalent
Amended	1/13/22	12/19/13	1/7/22	
Organic Liquid Loading	413	4624	462	Equivalent
Amended	3/7/96	12/20/07	5/14/99	
Wastewater Separators	414	4625	464	Equivalent
Amended	3/7/96	12/15/11	12/7/90	
Valves, Pressure Relief Valves, Flanges, Threaded Connections and Process Drains at Petroleum Refineries and Chemical Plants	414.1	4409	466.1 & 467	Equivalent
Amended	3/7/96	4/20/05	3/16/84 3/5/82	
Soil Decontamination (VOCs) -	414.2	4651	1166	Equivalent
Amended	5/6/99	9/20/07	5/11/01	
Pump and Compressor Seals at Petroleum Refineries and Chemical Plants	414.5	4455	466	Equivalent
Amended	3/7/96	4/20/05	10/7/83	
Residential Water Heaters (NOx)	424	4902	1121	SJV & SC Have a few lower limits
Amended	4/19/93	3/19/09	9/3/04	
Stationary Gas Turbines (NOx)	425	4703	1134	Equivalent To SJV SC Has lower limits
Amended	1/11/18	9/20/07	2/4/22	
Hot Mix Asphalt Paving Plants (NOx)	425.1	N/A	471 Rescinded	No Rules to Compare
Amended	10/13/94		9/7/79	
Boilers, Steam Generators, and Process Heaters (NOx)	425.2	4305	1146	Equivalent To SJV SC Has a few lower limits
Amended	3/8/18	8/21/03	12/4/20	
Portland Cement Kilns (NOx)	425.3	N/A	1112	EK More Stringent
Amended	3/8/18		6/6/86	
Stationary Piston Engines (NOx)	427	4701	1110.1 Rescinded	ATCM Supersedes
Amended	11/1/01	8/21/03	6/3/05	
Polyester Resin Operations	432	4684	1162	EK More Stringent
Amended	9/1/22	8/18/11	7/8/05	

Table 15 shows that almost all of the District's NOx and VOC rules are equivalent to, or more stringent than the NOx and VOC rules of the two Extreme nonattainment air districts. Two source category rules were identified (Graphic Arts and Residential Hot Water Heaters) in the Extreme districts that have slightly more restrictive VOC limits. However, amending these two rules would still not achieve RFP because the emissions reductions would be negligible. Furthermore, amending these two rules to include more stringent controls or purchasing new equipment would not achieve an annual 3 percent reduction and the associated costs would not outweigh the insignificant reductions.

XVI. WEIGHT OF EVIDENCE

Photochemical modeling is a required element of the SIP to ensure that existing and proposed control strategies provide the reductions needed to meet the federal standards by the relevant attainment deadlines. To address the uncertainties inherent to photochemical modeling assessments, EPA guidance, *Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze*, recommends that supplemental analyses accompany all modeled attainment demonstrations.

To complement regional photochemical modeling analyses included in the District's O₃ SIP, Appendix L contains the Weight of Evidence (WOE) demonstration, which includes detailed analyses of ambient O₃ data and trends, transport impacts, precursor emission trends and reductions, population exposure trends, and a discussion of conditions that contribute to exceedances of the federal standards. All analysis methods have inherent strengths and weaknesses; therefore, examining an air quality problem in a variety of ways helps offset the limitations and uncertainties associated with any one approach.

The impact of emissions generated in the upwind South Coast and San Joaquin Valley Air Basins, which are both classified as Extreme O₃ nonattainment areas, have a significant impact on air quality in the District. O₃ air quality data, along with photochemical modeling results show that while the District has made progress, the magnitude of emission reductions in the upwind area that are necessary to provide for attainment for the 2015, 8-hour O₃ NAAQS will not occur by the 2026. However, data shows that the District should achieve attainment by 2032 (the Severe nonattainment date).

As shown in Table 16, the most recent DV for the site is 10 percent above the level of the 2015 standard (70 ppb) and 2.7 percent above the level of the 2008 standard (75 ppb). The WOE provides the documentation to support the District's reclassification to Severe nonattainment pursuant to the 2015, 8-hour O₃ NAAQS, with an attainment deadline of 2032.

Table 16: O₃ Design Values at the Western Mojave Monitoring Site

Site Name	AQS ID	2019 Design Value (ppb)*	2020 Design Value (ppb)*	% Above Standard in 2020
Mojave-923 Poole Street	060290011	78	77	10%**
Mojave-923 Poole Street	060290011	78	77	2.7%***

* with 2018 and 2020 wildfire days (as identified in the wildfire section of this document) removed.

** above 070 ppb standard.

*** above 75 ppb standard.

XVII. MODEL ATTAINMENT DEMONSTRATION

Photochemical modeling plays a crucial role in the SIP process to demonstrate attainment of air quality standards based on estimated future emissions and for the development of emissions targets necessary for attainment. As previously stated, the District's nonattainment area is classified as Severe nonattainment pursuant to the 2008, O₃ NAAQS (75 ppb) and will be reclassified to Severe for the 2015 O₃ NAAQS (70 ppb), which means it must demonstrate attainment of the 2008 standard by 2026, and the 2015 standard by 2032. Consistent with EPA's guidance for model attainment demonstrations (EPA, 2018), photochemical modeling was used to estimate the 2026, and 2032, DVs at the Mojave-923 Poole Street monitoring site located within the District's nonattainment area, to show attainment of the 75 ppb and 70 ppb O₃ NAAQS.

The findings of District's model attainment demonstration are summarized below. Additional information and a detailed description of the procedures employed in this modeling are available in Appendix B.

EPA's modeling guidance⁵⁴ outlines the approach for utilizing regional chemical transport models (CTMs) to predict future attainment of the 2008 (75 ppb) and 2015 (70 ppb) 8-hour O₃ NAAQS. The model attainment demonstration requires that CTMs be used in a relative sense, where the relative change in O₃ to a given set of emission reductions (i.e., predicted change in future anthropogenic emissions) is modeled, and then used to predict how current/present-day O₃ levels would change under the future emissions scenario.

The starting point for the attainment demonstration is the observational based DV, which is used to determine compliance with the O₃ standards. The DV for a specific monitor and year represents the three-year average of the annual 4th highest 8-hour O₃ mixing ratio observed at the monitor. The EPA recommends using an average of three DVs to better account for the year-to-year variability in O₃ levels due to meteorology. This average DV is called a weighted DV (in the context of this SIP document, the weighted DV will also be referred to as the reference year DV or DV_R).

⁵⁴ EPA. 2018. Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze. 11 29. <https://www.epa.gov/scram/sip-modeling-guidance-documents>.

Since 2018, represents the reference year for projecting DVs to the future, site-specific DVs should be calculated for the three-year periods ending in 2018, 2019, and 2020, and then these three DVs are averaged. However, 2020, was an atypical year with large societal changes in response to the COVID19 pandemic and is not suitable for use in the DV_R calculation. To remove the impact from 2020, observations, an alternative methodology was used for calculating the average DVs by excluding year 2020. In this method, the 8-hour O₃ DV for 2020, was replaced by the two-year average of the 4th highest 8-hour O₃ concentrations from 2018, and 2019.

These reference DVs serve as the anchor point for estimating future year projected DVs. The years 2026, and 2032, are the future years modeled in this attainment demonstration because those are the years that must demonstrate attainment.

Projecting the reference DVs to the future requires the following three photochemical model simulations:

1. Base Year Simulation

The base year simulation for 2018, is used to assess model performance (i.e., to ensure that the model is reasonably able to reproduce the observed O₃ mixing ratios). Since this simulation will be used to assess model performance, it is essential to include as much day-specific detail as possible in the emissions inventory, including, but not limited to hourly adjustments to the motor vehicle and biogenic inventories based on local meteorological conditions, known wildfire and agricultural burning events, and any exceptional events such as refinery fires.

2. Reference Year Simulation

The reference year simulation was identical to the base year simulation, except that certain emissions events which are either random and/or cannot be projected to the future are removed from the emissions inventory. For 2018, the only difference between the base and reference year simulations was that wildfires were excluded from the reference year simulation.

3. Future Year Simulation

The future year simulation (2026 or 2032) was identical to the reference year simulation, except that the projected future year anthropogenic emission levels were used rather than the reference year emission levels. All other model inputs (e.g., meteorology, chemical boundary conditions, biogenic emissions, and calendar for day-of-week specifications in the inventory) are the same as those used in the reference year simulation.

Table 17 summarizes the District's 2018, 2026, and 2032, anthropogenic emissions. Overall, anthropogenic NOx emissions in CEPAM2019v1.04 were projected to decrease by ~13.6% (from 20.5 tpd to 17.8 tpd) and 15% (20.5 tpd to 17.5 tpd) respectively in 2026 and 2032 when compared to 2018, levels with bulk of the reductions coming from on-road mobile sources. In contrast, anthropogenic ROG was projected to decrease by ~9.5% (from 7.7 tpd to 7.0 tpd) and 12% (from 7.7 tpd to 6.8 tpd) respectively in 2026 ,and 2032, when compared to the 2018, levels with the bulk of those reductions coming

from all mobile sources including on-road and other mobile sources. CEPAM2019v1.04 emissions for 2026, and 2032, reflect emission reductions from CARB's Heavy-Duty Vehicle Inspection and Maintenance (HD I/M) Program.

The right two columns in Table 17 show the 2032, emissions after further incorporating CARB commitments from the State SIP Strategy, which are estimated at ~1.8 and 0.3 tpd additional reductions to the 2032, NO_x and ROG emission levels, respectively. Details on these rules/adjustments can be found in Appendix B.

Table 17. Summer Planning Emissions for 2018, 2026 and 2037 (tons/day)

	CEPAM2019v1.04						With CARB Commitments	
Source Category	2018 NOx (tpd)	2018 ROG (tpd)	2026 NOx (tpd)	2026 ROG (tpd)	2032 NOx (tpd)	2032 ROG (tpd)	2032 NOx (tpd)	2032 ROG (tpd)
Stationary	12.8	1.4	12.3	1.5	12.4	1.6	12.4	1.6
Area	0.1	1.2	0.1	1.2	0.1	1.3	0.1	1.3
On-road Mobile	3.7	1.2	1.4	0.7	1.0	0.6	0.8	0.5
Other Mobile	4.0	3.9	3.9	3.6	3.9	3.4	2.3	3.2
Total	20.5	7.7	17.8	7.0	17.5	6.8	15.7	6.5

Emission Inventory of O₃ Precursors in the District (2008-2021) are located in Appendix A

* Note: Rounding errors may result in emissions totals that do not exactly match the sum of the individual categories.

As part of the model attainment demonstration, the fractional changes in O₃ mixing ratios between the model reference year and model future years were calculated at the Mojave-923 Poole Street monitor following EPA modeling guidance and procedures outlined in Appendix B. These ratios, called "relative response factors" or RRFs, are calculated based on the ratio of modeled future year O₃ to the corresponding modeled reference year O₃.

$$\text{RRF} = \frac{\frac{1}{N} \sum_{d=1}^N (\text{MDA8 } O_3)_{\text{future}}^d}{\frac{1}{N} \sum_{d=1}^N (\text{MDA8 } O_3)_{\text{reference}}^d}$$

The RRFs and the 2026, and 2032, future O₃ DVs for the Mojave-923 Poole Street site are summarized in Table 18 and Table 19. The projected O₃ DV (at the site) in 2026, is 74 ppb and in 2032, is 69 ppb. Therefore, the attainment demonstration modeling predicts that the District will attain the 2008, 75 ppb 8-hour O₃ NAAQS by 2026, and the 2015, 70 ppb 8- O₃ NAAQS by 2032, with the commitments outlined in the SIP.

Table 18. Key parameters related to the future year 2026, O₃ DV calculation

Site	RRF	2018 Average DV (ppb)	2026 DV (ppb)	2026 Truncated DV (ppb)
Mojave-923 Poole St.	0.8979	82.7	74.3	74

Table 19. Key parameters related to the future year 2032, O₃ DV calculation

Site	RRF	2018 Average DV (ppb)	2032 DV (ppb)	2032 Truncated DV (ppb)
Mojave-923 Poole St.	0.8400	82.7	69.5	69

XVIII. CONTINGENCY MEASURES

Contingency measures are required by the CAA to be implemented should an area fail to make reasonable further progress or attain the NAAQS by the required date. Over the last few years, multiple court decisions in the 9th circuit and nation-wide have effectively disallowed the SIP-approved approach which CARB and the districts have historically used to meet contingency measure requirements. CARB and the District continue to strive to meet the requirements, but EPA has not yet released comprehensive and updated guidance encompassing the full scope of contingency measure requirements, in light of the results of the varying court decisions. Guidance is needed for CARB, the District, and other air agencies across California and the U.S., to ensure that any resources devoted to creating, adopting, and implementing a measure will result in one that meets the requirements and be approved into the SIP.

Additionally, California faces the most difficult air quality challenges in the nation and, accordingly, leads the country with the most stringent air pollution control programs. Historically, EPA guidance required contingency measures to achieve approximately one year's worth of emission reductions. CARB and District control programs are advanced, and primarily-federally regulated sources contribute over half of the emissions. Thus, opportunities for a triggered contingency measure that can be implemented by the State and result in one year's worth of emission reductions in the required time frame are not readily available. Further, if any measure that could achieve this level of emission reductions existed, it would be adopted to improve air quality and support attainment of NAAQS, and would not be withheld for contingency purposes. Even with recent court decisions, EPA has the opportunity to justify a revised approach for contingency measures recognizing the maturity of control programs or allow states to provide a reasoned justification for achieving less than the required amount. California continues to work towards meeting contingency measure requirements, but EPA must issue guidance to provide clarity and direction for states to move forward and pursue contingency measures that will meet the requirements.

CAA §172(c)(9) requires nonattainment areas to implement contingency measures if they fail to make RFP or fail to attain air quality standards by the required attainment date. The CAA is silent though on the specific level of emission reductions that must flow

from contingency measures. In the absence of specific requirements for the amount of emission reductions required, in 1992, EPA conveyed that the contingency measures should, at a minimum, ensure that an appropriate level of emissions reduction progress continues to be made if attainment of RFP is not achieved and additional planning by the State is needed⁵⁵. Further, EPA O₃ guidance states that “contingency measures should represent one year’s worth of progress amounting to reductions of 3 percent of the baseline emissions inventory for the nonattainment area”. EPA, though, has accepted contingency measures that equal less than a year’s worth of progress when the circumstances fit under “EPA’s long-standing recommendation that states should consider ‘the potential nature and extent of any attainment shortfall for the area’ and that contingency measures ‘should represent a portion of the actual emissions reductions necessary to bring about attainment in the area⁵⁶.’”

Historically, EPA allowed contingency measure requirements to be met via excess emission reductions from ongoing implementation of adopted emission reduction programs, a method that CARB has used for a contingency measure and EPA has approved in the past. In 2016, in *Bahr v. U.S. Environmental Protection Agency*⁵⁷ (*Bahr*), the 9th Circuit Court of Appeals determined EPA erred in approving a contingency measure that relied on an already-implemented measure for a nonattainment area in Arizona, thereby rejecting EPA’s longstanding interpretation of section 172(c)(9). EPA staff interpreted this decision to mean that contingency measures must include a future action triggered by a failure to attain or failure to make RFP. This decision was applicable to the states covered by the 9th Circuit Court. In the rest of the country, EPA was still approving contingency measures using their pre-Bahr stance. In January 2021, in *Sierra Club v. Environmental Protection Agency*⁵⁸, the United States Court of Appeals for the D.C. Circuit, ruled that already implemented measures do not qualify as contingency measures for the rest of the country (*Sierra Club*).

Additionally, CAA §182(c)(9) requires that the plan provide for the implementation of specific measures to be undertaken if the nonattainment area fails to meet any applicable milestone. Such measures shall be included in the plan revision as contingency measures to take effect without further action by the State or the Administrator upon a failure by the State to meet the applicable milestone.

A. CARB’s Opportunities for Contingency Measures

Much has changed since EPA’s 1992 guidance on contingency measures. Control programs across the country have matured as have the health-based standards. O₃ standards have strengthened in 2008 and 2015 with attainment dates out to 2037. California has the only two extreme areas in the country. Control measures identified for these areas must be implemented for meeting the standard and not held in reserve.

⁵⁵ 57 Federal Register 13510, 13512 (April 16, 1992)

⁵⁶ 78 Fed.Reg. 37741, 37750 (Jun. 24, 2013), approval finalized with 78 Fed.Reg. 64402 (Oct. 29, 2013).

⁵⁷ *Bahr v. U.S. Environmental Protection Agency*, (9th Cir. 2016) 836 F.3d 1218.

⁵⁸ *Sierra Club v. Environmental Protection Agency*, (D.C. Cir. 2021) 985 F.3d 1055.

To address contingency measure requirements given the courts' decisions and current EPA guidance, CARB and local air districts would need to develop a measure or measures that, when triggered by a failure to attain or failure to meet RFP, will achieve one year's worth of emissions reductions for the given nonattainment area, or approximately 3 percent of total baseline emissions.

Given CARB's wide array of mobile source control programs, the relatively limited portion of emissions primarily regulated by the local air district, and the fact that primarily-federally regulated sources are expected to account for approximately 49 percent of statewide NOx emissions by 2026⁵⁹ and 54 percent of statewide NOx emissions by 2032⁶⁰, finding a single triggered measure that will achieve the required reductions would be nearly impossible. That said, even discounting the amount to reflect the proportion that is primarily-federally regulated, approximately 1.3 percent of total baseline emissions would still be needed. Even targeting a lower percentage, additional control measures that can be identified by CARB are scarce or nonexistent that would achieve the required emissions reductions needed for a contingency measure.

Adding to the difficulty of identifying available control measures, not only does the suite of contingency measures need to achieve a large amount of reductions, but they will also need to achieve these reductions in the year following the year in which the failure to attain or meet RFP has been identified. Control measures achieving the level of reductions required may take years to implement and will likely not result in immediate reductions. In the 2022 State SIP Strategy, CARB's three largest NOx reduction measures, In-Use Locomotive Regulation, Zero -Emission Standards for Space and Water Heaters and Advanced Clean Fleets, rely on accelerated turnover of older engines/trucks. Buildup of infrastructure and equipment options limits the availability to have significant emission reductions in a short amount of time. Unless EPA changes its historic stance or finds a reasoned justification for requiring less than the stated amount, adopting a single triggered measure that can be implemented and achieve the necessary reductions in the time frame required is scarce in California and may not be possible.

CARB has over 50 years of experience reducing emissions from mobile and other sources of pollution under State authority. The RACM for State Sources analysis illustrates the reach of CARB's current programs and regulations, many of which set the standard nationally for other states to follow. Few sources CARB has primary regulatory authority over remain without a control measure, and all control measures that are in place support the attainment of the NAAQS. This causes a lack of additional control measures available that could achieve the reductions necessary for a contingency measure.

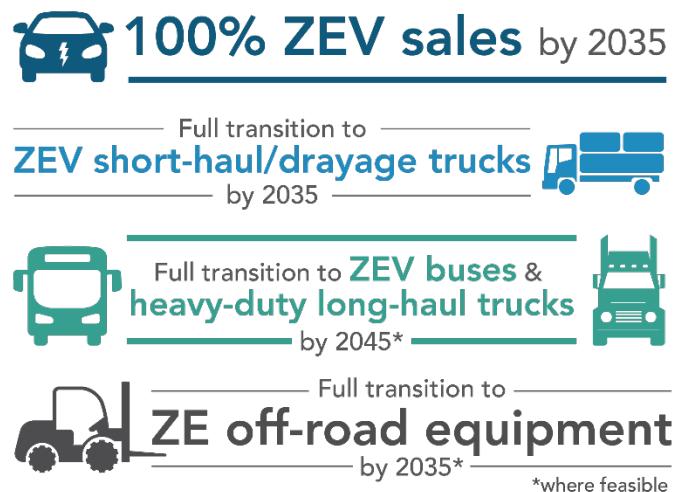
⁵⁹ Source: CARB 2019 CEPAM v1.03; based on 2026 emissions totals.

⁶⁰ Source: CARB 2019 CEPAM v1.03; based on 2026 emissions totals.

Due to the unique air quality challenges California faces, should such additional measures exist, CARB would pursue those measures to support expeditious attainment of the NAAQS and would not reserve such measures for contingency purposes. Nonetheless, CARB continues to explore options for potential statewide contingency measures utilizing its authorities in anticipation of EPA's written guidance. CARB anticipates that EPA's guidance will allow an assessment of viability of such a statewide measure.

A central issue in considering a statewide contingency measure under CARB's authority is that CARB is already fully committed to the "drive to zero" effort. In 2020, Governor Newsom signed Executive Order N-79-20 (Figure 10) that established a first-in-the-nation goal for 100 percent of California sales of new passenger cars and trucks to be zero emission by 2035. The Governor's order set a goal to transition 100 percent of the drayage truck fleet to zero-emission by 2035, all off-road equipment where feasible to zero-emission by 2035 and the remainder of the medium and heavy-duty vehicles to zero-emission where feasible by 2045.

Figure 10: Governor Newson Executive Order N-79-20



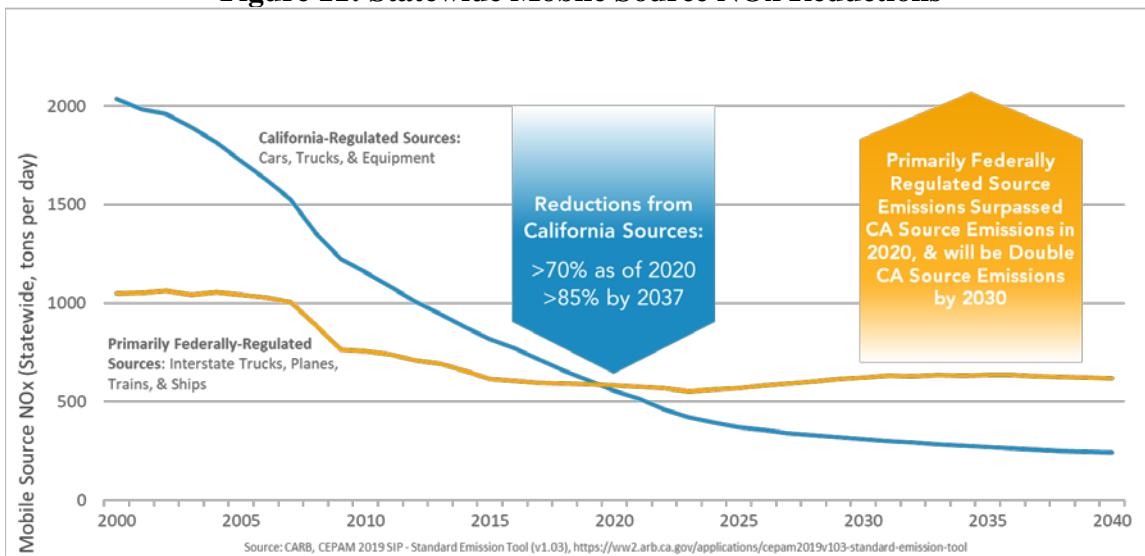
CARB has committed to achieving these goals. Thus, CARB's programs not only go beyond emissions standards and programs set at the federal level, but many include zero-emissions requirements or otherwise, through incentives and voluntary programs, drive mobile sources to zero-emissions, as listed in Table 20. CARB is also exploring and developing a variety of new measures to drive more source categories to zero-emissions and reduce emissions even further, as detailed in the 2022 State Strategy for the State Implementation Plan. With most source categories being driven to zero-emissions, opportunities for which a triggered measure that could reduce emissions by the amount required for contingency measures are scarce.

Table 20. CARB Programs with a Zero-Emissions Component

Emission Source	Regulatory Programs
Light-Duty Passenger Vehicles and Light-Duty Trucks	<ul style="list-style-type: none"> Advanced Clean Cars Program (I and II*), including the Zero Emission Vehicle Regulation Clean Miles Standard *
Motorcycles	<ul style="list-style-type: none"> On-Road Motorcycle Regulation*
Medium Duty-Trucks	<ul style="list-style-type: none"> Advanced Clean Cars Program (I and II*), including the Zero Emission Vehicle Regulation Zero-Emission Powertrain Certification Regulation Advanced Clean Trucks Regulation Advanced Clean Fleets Regulation*
Heavy-Duty Trucks	<ul style="list-style-type: none"> Zero-Emission Powertrain Certification Regulation Advanced Clean Trucks Regulation Advanced Clean Fleets Regulation*
Heavy-Duty Urban Buses	<ul style="list-style-type: none"> Innovative Clean Transit Advanced Clean Fleets Regulation*
Other Buses, Other Buses – Motor Coach	<ul style="list-style-type: none"> Zero-Emission Airport Shuttle Regulation Advanced Clean Fleets Regulation*
Commercial Harbor Craft	<ul style="list-style-type: none"> Commercial Harbor Craft Regulation
Recreational Boats	<ul style="list-style-type: none"> Spark-Ignition Marine Engine Standards*
Transport Refrigeration Units	<ul style="list-style-type: none"> Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (Parts I and II*)
Industrial Equipment	<ul style="list-style-type: none"> Zero-Emission Forklifts* Off-Road Zero-Emission Targeted Manufacturer Rule*
Construction and Mining	<ul style="list-style-type: none"> Off-Road Zero-Emission Targeted Manufacturer Rule*
Airport Ground Support Equipment	<ul style="list-style-type: none"> Zero-Emission Forklifts*
Port Operations and Rail Operations	<ul style="list-style-type: none"> Cargo Handling Equipment Regulation Off-Road Zero-Emission Targeted Manufacturer Rule*
Lawn and Garden	<ul style="list-style-type: none"> Small Off-Road Engine Regulation Off-Road Zero-Emission Targeted Manufacturer Rule*
Ocean-Going Vessels	<ul style="list-style-type: none"> At Berth Regulation
Locomotives	<ul style="list-style-type: none"> In-Use Locomotive Regulation*

*Indicates program or regulation is in development

There are few sources remaining without a control measure implemented by CARB, and those that do remain are primarily-federally regulated sources. This includes interstate trucks, ships, locomotives, aircraft, and certain categories of off-road equipment, constituting a large source of potential emissions reductions. Since these are primarily regulated at the federal and, in some cases, international level, options to implement a contingency measure with reductions approximately equivalent to one year's worth of emission reductions are limited.

Figure 11: Statewide Mobile Source NOx Reductions

CARB includes a zero-emission component in most of their regulations, both those already adopted and those that are in development, and the vast majority of the regulations are statewide. Beyond the wide array of sources CARB has been regulating over the last few decades, and especially considering those they are driving to zero-emission, there are few sources of emissions left for CARB to implement additional controls upon under its authorities. The few source categories that do not have control measures are primarily regulated federally and internationally.

CARB and local air districts will need to implement contingency measures that, when triggered, would achieve one year's worth of emissions reductions, or at least the relevant portion equivalent to the contribution of sources primarily regulated at the State and local level, unless a reasoned rationale for achieving less emission reductions can be provided. Considering the air quality challenges California and local air districts face, CARB would need to implement the measure to support expeditious attainment of the NAAQS as the CAA requires rather than withhold it for contingency measure purposes. Should there be a measure achieving the required emission reductions, the measure would likely take more than one year to reduce the necessary emissions.

CARB fully intends to meet the contingency requirement as required by the CAA, but written EPA guidance that addresses the dilemma California faces is needed to provide direction and clarity for CARB and local air districts to develop and adopt approvable contingency measures. CARB continues to explore potential contingency measures while awaiting EPA's written guidance. Further, since it has been about 30 years, since EPA developed the guidance, this may be the time for EPA to update the guidance by formally changing its historic stance on the amount of reductions required to meet the contingency measure requirement and allowing states with mature control programs to demonstrate that contingency measure opportunities are scarce.

B. District's Opportunities for Contingency Measures

Over the past decades, the District has drafted, adopted, and implemented generations of emissions control measures for stationary and area sources under its jurisdiction. These control measures, coupled with stringent regulations on mobile sources from CARB, represent some of the nation's toughest air pollution emissions controls. The District's current rules and regulations reflect technologies and methods that are far beyond any minimum required control levels.

District Rules 410 (Organic Solvents), 410.8 (Aerospace Coating Operations), and 432 (Polyester Resin Operations) were identified as the only three rules that could be made more stringent if the District failed to attain the NAAQS. All three rules were listed in a CARB approved commitment letter⁶¹ as rules to be included in the contingency provisions of the attainment plan. However, due to the projected RFP shortfall, the District amended all three rules in 2022 and therefore left without rules that contained contingency triggers and provisions. Additionally, if the District identified any rule, or combination of rules that could be amended to produce O₃ reductions significant enough to achieve RFP, the amendment would have already occurred in order to meet RFP. If this were the case, the District would still be without a contingency rule.

Although the District is challenged in providing contingency provisions within its SIP rules, this should not interfere with the approvability of the attainment plan. As shown in Table 13, the District will make RFP for all applicable dates of the 75 ppb 8-hour O₃ NAAQS. Additionally, RFP will be achieved in 2023 and 2026 pursuant to the 70 ppb 8-hour O₃ NAAQS (shown in Table 14) however, there is a mitigated shortfall in 2029 and 2032. As described in Section XV.B. CAA §182 (c)(2)(B)(ii) includes a provision that allows O₃ nonattainment areas that cannot achieve RFP a pathway to an approvable RFP demonstration by meet requirements of the next higher classification (Extreme). Table 15 shows that the District has NOx and VOC rules applicable to all applicable source categories, and that those rules are equivalent to, or more stringent than the NOx and VOC rules of the two Extreme nonattainment air districts, with exception to only two minor source categories (Graphic Arts and Residential Hot Water Heaters), that if amended would only provide negligible reductions. Amending these two rules would not achieve an annual 3 percent reduction and the associated costs would not outweigh such minor reductions.

Although RFP for the 70 ppb 8-hour O₃ NAAQS is not being achieved in 2029 and 2032, modeling and the attainment demonstration show that, the District will attain the 70 ppb standard by 2032. As detailed throughout this attainment plan, attainment will be achieved through a combination of mobile source regulations, the State SIP Strategy, reductions in transport emissions, and CARB's commitments for Eastern Kern.

⁶¹ Eastern Kern Air Pollution Control District Commitment to Adopt Rule Amendments as Contingency Measures for the 2008 8-Hour Ozone Standard (March 13, 2020).

In an effort to satisfy CAA §182(c)(9) and provide a contingency measure in this attainment plan, the District will commit to removing the small container exemption from Section IV.B. of District Rule 410.1A, Architectural Coating Controls. Removing this exemption from the rule will provide unquantifiable VOC reductions but will satisfy the CAA requirement of providing a contingency measure in the plan.

C. CAA 185 Fees

CAA §185 requires that: Each implementation plan revision required under section 7511a(d) and (e) of this title (relating to the attainment plan for Severe and Extreme O₃ nonattainment areas) shall provide that, if the area to which such plan revision applies has failed to attain the O₃ NAAQS by the applicable attainment date, each major stationary source of VOCs located in the area shall, except as otherwise provided under subsection (c) of this section, pay a fee to the State as a penalty for such failure, computed in accordance with subsection (b) of this section, for each calendar year beginning after the attainment date, until the area is re-designated as an attainment area for O₃.

CAA §185(e) allows the following exemptions for certain small areas: For areas with a total population under 200,000 which fail to attain the standard by the applicable attainment date, no sanction under this section or under any other provision of this chapter shall apply if the area can demonstrate, consistent with guidance issued by the Administrator, that attainment in the area is prevented because of O₃ or O₃ precursors transported from other areas. The prohibition applies only in cases in which the area has met all requirements and implemented all measures applicable to the area under this chapter.

D. CAA 185 Fee Rule

In the event the District fails to attain the 75 ppb or 70 ppb 8-hour O₃ NAAQS by each standard's milestone attainment date for Severe nonattainment, the District will evaluate the applicability of adopting a 185 Fee Rule. As stated within this attainment plan, O₃ and O₃ precursor emissions transported from other areas is a major contributing factor to the District not attaining the NAAQS. Additionally, the population in the District's nonattainment area is currently well below 200,000 and anticipated to continue growing at a very slow rate.

If attainment is not achieved by either 8-hour O₃ NAAQS milestone date, and the District can demonstrate that attainment was prevented by O₃ or O₃ precursor emissions transported from other areas, and the nonattainment area has a population under 200,000, then District will be exempt from adopting and implementing a 185 fee rule. However, If the District fails to attain either 8-hour O₃ NAAQS by the milestone date, and it cannot be demonstrated that attainment was prevented by O₃ or O₃ precursor emissions transported from other areas, and the nonattainment area has a population over 200,000, then the District will adopt and implement a 185 fee rule pursuant to the requirements of CAA §185 and consistent with guidance issued by the EPA.

XIX. CONCLUSION

Pursuant to CAA requirements and EPA guidance, CARB and the District conducted extensive analyses to determine whether timely attainment of the 75 ppb and 70 ppb 8-hour O₃ NAAQS as a “Severe” nonattainment area is likely. The results of the modeling provide strong evidence that the District will continue to achieve the O₃ reductions needed to meet both 8-hour O₃ NAAQS by each milestone date (2026, and 2032). Attainment will be achieved through a combination of the District’s emission control measures, CARB’s Commitments for Eastern Kern, along with implementation of CARB’s Mobile Source Regulations, Emission Reduction Programs, and the State SIP Commitment, which are all detailed within this Attainment Plan.

CARB provides substantial emissions reduction planning methods and strategies in their 2022 State Strategy for the State Implementation Plan (2022 State SIP Strategy). The State SIP Strategy is a Statewide planning document that identifies the strategies and controls under State authority that are needed to reduce emissions to reduce ground-level O₃ (smog).

Control programs already adopted by CARB and upcoming measures that were included in the 2016 State SIP Strategy, as well as District and EPA programs, provided a significant down payment on reducing the NOx emissions needed to meet the 70 ppb O₃ standard and improve air quality throughout the State. These measures will achieve almost a 36 percent reduction in total NOx emissions by 2037, as relative to 2018, with especially significant reductions in emissions from light-, medium-, and heavy-duty on-road vehicles.

Although the 2016 State SIP Strategy has achieved significant reductions, additional measures are needed across the State of California for areas to meet the 70 ppb 8-hour O₃ NAAQS. More specifically, the 2022 State SIP Strategy describes the State’s proposed commitments to develop additional control measures and greater emissions reductions from State-regulated sources, as needed to support attainment by 2032. The State measures and commitments detailed within the document will be incorporated into regional SIPs for the 70 parts ppb 8-hour O₃ NAAQS for the nonattainment area.

The 2022 State SIP Strategy also identifies all of the proposed measures, associated emissions reductions, and other elements needed to support attainment of the 70 ppb O₃ standard. Additionally, the State SIP Strategy allows CARB to explore and propose an unprecedented variety of new measures to reduce emissions from the sources under their authority, which will use all mechanisms available. This level of action is needed to ensure federal air quality standards are attained and to deliver on CARB’s commitments to protect public health, particularly in light of the growing body of evidence on the adverse impacts of air pollution. The State SIP Strategy is located in Appendix J of this attainment plan.