Staff Report

California Smog Check Performance Standard Modeling and Program Certification for the 70 Parts Per Billion (ppb) 8-Hour Ozone Standard

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Table of Contents

Executive Summary

California Air Resources Board (CARB or Board) staff prepared the California Smog Check Performance Standard Modeling (PSM) and Program Certification for the 70 parts per billion (ppb) 8-hour Ozone Standard (referred as "Smog Check Certification") to address State Implementation Plan (SIP) requirements of the federal Clean Air Act (CAA, or the Act) for ozone nonattainment areas within the State. The Smog Check Certification was due to the U.S. Environmental Protection Agency (U.S. EPA) by August 3, 2022, to meet requirements in the CAA as applicable under the 70 ppb 8-hour ozone standard. However, CARB was not able to begin analysis until U.S. EPA released guidance in October 2022. The Board is scheduled to consider the Smog Check Certification on March 23, 2023. If adopted, CARB will submit the Smog Check Certification to U.S. EPA as a revision to the California SIP.

Nonattainment areas in California are required to submit plans and related elements as revisions to the California SIP that meet the applicable requirements of the Act as described in relevant implementation rules. The Smog Check Certification is required for areas that are classified as Moderate or above and meet a prescribed population threshold, as specified in the Inspection and Maintenance (I/M, or "Smog Check") regulation (40 CFR Part 51, subpart S) and Sections 182(a)(2)(B), 182(b)(4), and 182(c)(3) of the Act and discussed in the *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements* (70 ppb Implementation Rule). For the 70 ppb 8-hour ozone standard, areas must either demonstrate and certify that their existing program meets the I/M program requirements or amend their Smog Check Program requirements.

CARB staff's PSM analysis demonstrated that California's Smog Check Program meets the federal I/M program requirements for all applicable nonattainment areas. Ten areas in California are designated as nonattainment areas for the 70 ppb 8-hour ozone standard with a Moderate or higher classification but only eight of these areas meet the population threshold prescribed in the Act as requiring implementation of an I/M program. Two nonattainment areas, the Western part of Nevada County and Mariposa County, do not meet the population threshold and are exempt from this analysis. This leaves eight areas that are subject to the I/M program requirement, which are also classified as Serious or above for the 70 ppb 8-hour ozone standard.

Specifically, this Smog Check Certification demonstrates that the following eight California 70 ppb 8-hour ozone standard nonattainment areas meet federally mandated I/M program requirements:

- South Coast Air Basin
- San Joaquin Valley
- Coachella Valley
- Western Mojave Desert
- San Diego County
- Sacramento Metro
- Eastern Kern
- Ventura County

I. Introduction and Background

The Act requires U.S. EPA to set air quality standards for criteria pollutants, including ozone, and periodically review the latest health research to ensure that standards remain protective of public health. Based on research demonstrating adverse health effects at lower exposure levels, in 2015, U.S. EPA lowered the 8-hour ozone standard from 75 ppb to 70 ppb[1] as part of the health-based National Ambient Air Quality Standards (NAAQS). Effective on August 3, 2018, U.S. EPA designated nineteen areas in California as nonattainment for this standard, with classifications ranging from Marginal to Extreme.[2] Areas are designated as nonattainment based on monitored exceedances of these standards. The Act requires Moderate and above areas not meeting the federal standards to develop comprehensive plans, known as SIPs, that describe how the area will attain the federal standards. The Act specifies the required SIP elements based on the pollutant and the severity of the air quality problem. U.S. EPA provides guidance for the states that facilitates meeting the requirements of the Act for each standard.

U.S. EPA published the 70 ppb 8-hour Implementation Rule[3] on December 6, 2018, which provides guidance and describes the implementation requirements for the 70 ppb 8-hour ozone standard. Under the federal 70 ppb 8-hour ozone standard, California must submit a SIP revision either demonstrating and certifying that the CAA requirements for the federal I/M program are met or amending their program requirements. The 70 ppb 8-hour ozone Implementation Rule also establishes due dates for the various SIP elements based on the timelines established in the Act. The I/M Program element was due to U.S. EPA by August 3, 2022, to meet requirements in the Act as applicable for the 70 ppb 8-hour ozone standard. However, CARB was not able to begin analysis until U.S. EPA released guidance in October 2022[4].

In October 2022, U.S. EPA published a final rule to reclassify certain ozone nonattainment areas from Marginal to Moderate for the 2015 Ozone NAAQS.[5] This rulemaking clarified that State and local governments are required to conduct PSM to demonstrate that their I/M programs meet the applicable performance standard, as defined within the I/M regulation (40 CFR Part 51, subpart S)[6] and sections 182(a)(2)(B), 182(b)(4), and 182(c)(3) of the Act. PSM

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[1] *National Ambient Air Quality Standards for Ozone,* 80 FR 65292, published on October 26, 2015 and effective on December 28, 2015.

[2] *Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards*, 83 FR 25776, published on June 4, 2018 and effective on August 3, 2018.

[3] *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements*, 83 FR 62998, published on December 6, 2018 and effective on February 4, 2019.

[4] U.S. EPA, *Performance Standard Modeling for New and Existing Vehicle Inspection and Maintenance (I/M) Programs Using the MOVES Mobile Source Emissions Model*, EPA-420-B-22-034, October 2022. (*https://www.epa.gov/system/files/documents/2022-10/420b22034.pdf*)

[5] *Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards*, 87 FR 60897, October 7, 2022.

[6] *https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-51/subpart-S*

requirements must be met to certify existing I/M programs for all 70 ppb 8-hour ozone standard nonattainment areas.

U.S. EPA released guidance in October 2022 and provided technical guidance for conducting PSM of I/M programs in affected ozone nonattainment areas, including direction that PSM must be developed using U.S. EPA's on-road Motor Vehicle Emission Simulator (MOVES) model.[3] The MOVES model does not include adjustments that fully encompass California's comprehensive motor vehicle emissions control programs, or fully mirror the State's implementation of the Smog Check program. As such, MOVES does not account for emission reduction benefits from certain aspects of the California Smog Check Program that are implemented at a more stringent level than federal requirements. Even so, CARB staff's PSM analysis following U.S. EPA guidance demonstrates that California's Smog Check Program meets federal I/M requirements for all applicable nonattainment areas classified as Serious or above. Because California's Smog Check Program is at least as stringent as federal requirements, CARB intends to include this relevant Smog Check Certification into the 70 ppb 8-hour ozone SIPs.

A. Overview of Vehicle Inspection and Maintenance (I/M) Requirements

I/M is the periodic inspection and repair of the emissions control systems of motor vehicles. The goal of I/M programs is to improve air quality in areas that are not attaining the NAAQS by identifying and repairing vehicles with emissions at levels higher than they were initially certified. U.S. EPA and CARB set new vehicle emission standards to protect public health, but those regulations do not guarantee proper operation and maintenance of the vehicle's emission controls over its lifetime.

The CAA requires I/M programs to meet certain criteria based on factors such as air quality status, population, and/or geographic location. The CAA established two performance levels for I/M programs:

1. Basic I/M for ozone nonattainment areas classified as Moderate per CAA section 182; and,
2. Enhanced I/M pursuant to CAA sections 182, 184 and 187. Enhanced I/M programs are mandated in the following areas:

    - All Serious or higher ozone nonattainment areas that had a 1980 urban population of 200,000 or more;
    - Metropolitan statistical areas with a 1990 population of 100,000 or more in the Ozone Transport Region (OTR), regardless of their air quality classification; and,
    - All Moderate or higher carbon monoxide (CO) nonattainment areas with a design value greater than 12.7 parts per million at the time of classification that had a 1980 urban population of 200,000 or more.

For the 2015 ozone NAAQS, states with urbanized ozone nonattainment areas classified as Moderate or higher are required to implement Basic or Enhanced I/M programs and include these programs in their I/M SIPs. States like California, for which there is already an approved I/M SIP, are required to either revise their I/M programs or certify that the existing programs meet all applicable requirements and operate at or above the applicable performance

standard level for the corresponding ozone NAAQS. A SIP revision that includes a PSM analysis and Program Certification is required for submission to U.S. EPA.

B. I/M Performance Standards and Modeling

An I/M performance standard is a collection of program design elements which defines a benchmark program to which a state's proposed program is compared in terms of its potential to reduce emissions of relevant pollutants and precursors (e.g., in ozone areas, namely volatile organic compounds (VOC) and oxides of nitrogen (NOx)) by certain comparison dates. I/M program design elements include test frequency (annual or biennial), waiver/compliance rate, vehicle type coverage, model year coverage, network type (centralized or decentralized), and test type (e.g., idle, on-board diagnostic (OBD)).

U.S. EPA first promulgated performance standards for Basic and Enhanced I/M programs in November 1992 as part of the I/M regulations (40 CFR Part 51, subpart S).[6] The I/M performance standards are defined in the I/M regulations at 40 CFR 51.352[7] for Basic I/M programs and at 40 CFR 51.351[8] for Enhanced I/M programs. One of the main distinctions between Basic and Enhanced I/M performance standards is that the Basic performance standard includes the testing of passenger cars while the Enhanced performance standard includes the testing of passenger cars and light-duty trucks rated up to 8,500 lbs. gross vehicle weight rating (GVWR). The I/M performance standards have been revised several times to provide states greater flexibility to design I/M programs that meet local needs. I/M performance standards were last revised in April 2006 to address I/M programs required under an 8-hour ozone NAAQS.[9]

PSM is one of the required elements of an I/M SIP, as listed in 40 CFR 51.372.[10] Per 40 CFR 51.372(a)(2), the required PSM analysis element is "an analysis of emission level targets for the program using the most current U.S. EPA mobile source emission model or an alternative approved by the Administrator showing that the program meets the performance standards described in §51.351 or §51.352 of this subpart, as applicable". The purpose of a PSM analysis is to evaluate whether a proposed or existing I/M program meets the applicable performance standard. The performance standards establish the level of emission reductions that mandatory I/M programs must achieve. To conduct a PSM analysis, it is necessary to model two scenarios:

1. Proposed or Existing Program Scenario – this scenario represents the I/M program that is covered by the new or revised SIP, which includes all the local area parameters and control measures as well as inputs required to define the proposed or existing I/M program; and,

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[7] *https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-51/subpart-S/section-51.352*
[8] *https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-51/subpart-S/section-51.351*
[9] *Amendments to Vehicle Inspection Maintenance Program Requirements to Address the 8-Hour National Ambient Air Quality Standard for Ozone*, 71 FR 17705, April 7, 2006.
[10] *https://www.govinfo.gov/content/pkg/CFR-2021-title40-vol2/pdf/CFR-2021-title40-vol2-sec51-372.pdf*

2. Performance Standard Benchmark Scenario – this scenario represents the applicable U.S. EPA defined benchmark program, which includes all the local area parameters and control measures and an I/M program with the elements of the required federal I/M performance standard.

The results of these scenario runs are compared to determine whether the Proposed or Existing Program Scenario emissions rates are the same or lower than the Performance Standard Benchmark Scenario.

U.S. EPA clarified in its October 2022 rulemaking that, consistent with the I/M regulations, states with existing I/M programs would need to conduct and submit a PSM analysis as part of their SIP submissions to ensure that I/M programs are operating at or above the I/M performance standard level for the 2015 ozone NAAQS.[5] States may determine through the PSM analysis that the existing SIP-approved program would meet the performance standards requirements for purposes of the 2015 ozone NAAQS without modification. In this case, the state could submit a SIP revision with the associated PSM and a written statement certifying their determination in lieu of submitting new revised regulations.[11]

C. California's Motor Vehicle Inspection and Maintenance (Smog Check) Program

California's Health and Safety Code (HSC) Chapter 5, §44000, et seq., establish California's I/M Program, referred to as the Smog Check Program, which has been in place since 1984.[12] In response to amendments of the Federal CAA, Assembly Bill 2018 was passed by the legislature and signed into law in 1994. This legislation required loaded mode emissions testing for vehicles registered in areas of the state that have not achieved federal air quality standards ("Enhanced Areas"). The State's less polluted areas (Basic and Change of Ownership Areas) continued to use a two-speed idle emissions test mode. In 2010, Assembly Bill 2289 modernized the program by requiring an OBD focused inspection for 2000 model-year and newer vehicles, which was implemented in March 2015.

The Smog Check Program divides California into three program areas determined by the air quality and population in the designated area.[13] Some counties are solely in one program area while other counties may have portions in two or three program areas. While the OBD focused inspection is required statewide for most 2000 model-year and newer vehicles, 1976-1999 model-year vehicles may be required to receive a different inspection, depending on program area:

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[11] *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications and State Implementation Plan Requirements*, 83 FR 63001-63002, published on December 6, 2018 and effective on February 4, 2019.

[12] CA Health & Safety Code § 44000. (*https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=HSC&division=26.&title=&part=5.&chapter=5.&article=1*.)

[13] *Smog Check Reference Guide 2019*, California Department of Consumer Affairs Bureau of Automotive Repair, 10/23/2019. (*https://www.bar.ca.gov/pdf/smog-check-reference-guide.pdf*)

- **Enhanced Areas**: These areas do not meet federal or state air quality standards for ozone or CO and exceed population thresholds. Biennial inspections are required in these areas, in addition to inspections upon change of ownership and initial registration. In order to measure NOx emissions, most Enhanced Area 1976-1999 model-year vehicles are subject to a dynamometer loaded mode emissions test focused inspection such as Acceleration Simulation Mode dynamometer test (ASM)25/25 or ASM50/15.
- **Basic Areas**: Basic areas are less polluted or less populated than Enhanced Areas; however, due to their marginal air quality, biennial inspections are required. Basic Area 1976-1999 model-year vehicles are subject to a two-speed idle (TSI) test focused inspection. Loaded mode tests are not required in Basic Areas.
- **Change of Ownership Areas**: These more rural areas of the State require Smog Checks only when an affected vehicle changes ownership (with the exception of gasoline vehicles four or less model-years old) or is initially registered in California. Change of Ownership Area 1976-1999 model-year vehicles are subject to a TSI emissions test at the time of inspection.

Affected vehicles include 1976 model-year and newer vehicles powered solely in gasoline (include hybrid vehicles) or in combination with alternative fuels such as propane, natural gas, or methanol/ethanol; and 1998 model-year and newer vehicles with a GVWR of 14,000 lbs. and less powered solely with diesel or in combination with alternative fuels. Gasoline vehicles eight or less model-years old are exempt from biennial inspection beginning in calendar year 2019. Before the year of 2019, the new vehicle exemption was six model-years old for non-diesel vehicles.

D. California Nonattainment Areas

Effective on August 3, 2018, U.S. EPA designated nineteen areas in California as nonattainment for the 70 ppb 8-hour Ozone Standard, with classifications ranging from Marginal to Extreme. The CAA requires Moderate and above areas not meeting the federal standards to develop comprehensive SIPs that describe how each area will attain the federal standards. Ten areas in California are designated as nonattainment for the 70 ppb 8-hour ozone standard with a Moderate or higher classification but only eight of these areas meet the population threshold prescribed in the Act to require implementation of an I/M program. The two nonattainment areas that do not meet the population threshold are Mariposa County and Western Nevada County. This leaves eight areas that are subject to the I/M Program requirement, which are also classified as Serious or above for the 70 ppb 8-hour ozone standard.

The nonattainment areas include the South Coast Air Basin, San Joaquin Valley, Coachella Valley, West Mojave Desert, San Diego County, Sacramento Metropolitan Area, East Kern, and Ventura County. Table 1 shows the California nonattainment areas, classifications, and attainment years for 70 ppb 8-hour ozone standard. Furthermore, San Diego County and Eastern Kern both have SIPs addressing the 75 ppb and 70 ppb ozone standard, and therefore have two attainment years in 2026 and 2032. All the listed nonattainment areas

that exceed the population threshold are classified as Serious or above and subjected to the Enhanced I/M performance standards.

Table 1. Ozone Nonattainment Areas for 70 ppb 8-Hour Ozone Standard

Nonattainment Area	Classification	Attainment Year	PSM Requirement
South Coast Air Basin	Extreme	2037	Yes
San Joaquin Valley	Extreme	2037	Yes
Coachella Valley	Extreme	2037	Yes
Western Mojave Desert	Severe	2032	Yes
San Diego County	Severe	2026, 2032	Yes
Sacramento Metro	Severe	2032	Yes
Eastern Kern	Severe	2026, 2032	Yes
Ventura County	Serious	2026	Yes
Western Nevada	Serious	2026	No
Mariposa County	Moderate	2023	No

II. Performance Standard Modeling Analysis Methodology

This section describes the methodology and input selections for the PSM analysis of the California Smog Check Program. Generally, California uses the EMission FACtor (EMFAC)[14] emission model for on-road mobile emissions modeling. However, U.S. EPA's guidance[4] required that PSM must be demonstrated using the most current version of MOVES model. CARB staff used inputs and assumptions consistent with the State's vehicle regulations and I/M program. Following the general modeling requirements for Enhanced I/M programs at 40 CFR 51.351(d), modeling was performed using the most recent version of the MOVES emissions model, version 3.0, which was available at the time of analysis. MOVES3 is U.S. EPA's latest motor vehicle emissions model for state and local agencies to estimate NOx, VOC, and other pollutants from cars, trucks, buses, and motorcycles. When planning a PSM analysis, other than selecting the appropriate model, there are some other important factors

[14] *https://arb.ca.gov/emfac/*, the latest version EMFAC2021 was approved by U.S. EPA in 87 FR 68483, November 15, 2022.

to consider, such as identifying the performance standard, determining analysis years, identifying geographic coverage, selecting representative counties, and characterizing the existing program, which will be discussed in the following sections.

A. Performance Standard

Ozone nonattainment areas within California that are designated as Serious or higher for the 8-hour ozone NAAQS and exceed the population threshold, must use the Enhanced performance standard for PSM per 40 CFR 51.351(i)[8]. U.S. EPA has developed a performance standard template for use in MOVES that captures the required program elements from the Enhanced I/M regulations for Performance Standard Benchmark Scenarios.[15] For the Proposed or Existing Program Scenario in California, the latest planning assumptions available are reflected in the modeling, including the California I/M coverage, fleet mix, local fleet age distributions, vehicle miles traveled (VMT), and vehicle population. For California's Enhanced I/M program areas, the applicable Enhanced performance standard for an ozone NAAQS is met if the existing program obtains the same or lower emissions levels for VOC and NOx (ozone precursors) as the Performance Standard Benchmark Program to within 0.02 grams/mile (g/mile).

B. Analysis Years

Selection of the analysis years is a critical element of PSM and it depends on the area's ozone classification. Based on 40 CFR 51.135(i)(13), for Serious and higher nonattainment areas that also require Enhanced Performance Standards, the analysis year(s) are 6 years after the effective date of designation and classification, and the attainment year. Effective on July 20, 2012, U.S. EPA designated Coachella Valley, Sacramento Metropolitan Area, San Joaquin Valley, South Coast Air Basin, Ventura County, and West Mojave Desert in California as nonattainment areas with Serious or above classification for the 75 ppb ozone standard.[16] In addition, effective June 3, 2016, U.S. EPA classified Eastern Kern and San Diego County as Moderate for 75 ppb 8-hour ozone standard.[17] Effective on August 3, 2018, U.S. EPA designated each of these areas as a nonattainment area with a Moderate or above classification for the 70 ppb ozone standard.[2] Table 2 shows CARB staff's selection of analysis years for California I/M PSM, which were discussed and confirmed prior to release of this report with staff at U.S. EPA Region 9. Calendar years 2017 or 2018 were selected as the base modeling year for the SIP, and the other analysis years are the specific attainment years of each nonattainment area. The modeling results of the Existing Program Scenario and Performance Standard Benchmark Scenario are compared for each analysis year in each Enhanced area.

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[15] The template is available as fillable Excel spreadsheets on the EPA *Vehicle Emissions Inspection and Maintenance (I/M)" Policy and Technical Guidance* website at: *https://www.epa.gov/system/files/documents/2022-10/moves3-enhanced-im-perf-stand-template-2022-09.xlsx*

[16] 77 FR 30088, published May 21, 2012 and effective July 20, 2012, *Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards*.

[17] 81 Federal Register 26697; May 4, 2016.

C. Representative Counties

PSM analysis should be performed for each county in which an I/M program is required to operate to capture the programmatic and operational differences within those counties. However, U.S. EPA's October 2022 Guidance allows the selection of a single county or area as a representative county for the PSM analysis, depending on factors such as:

- The similarity of the I/M program implementation such as subject vehicle coverage, types of tests administered, inspection frequency, and performance;
- The similarity of road type distribution, meteorology, and fuels used in the representative county compared to the whole nonattainment areas; and,
- The similarity of the local vehicle fleets to that of the overall I/M program geographic coverage.

Therefore, CARB staff selected representative counties or areas for PSM analysis from the highest-populated county within each nonattainment area. Please note that all regions within California nonattainment areas, except for some ZIP codes that do not meet the Federal Census definition of an urbanized area[18] or under the Safe At Home program[19], are subject to Enhanced I/M programs per federal CAA requirements. If an Enhanced area does not include the entire county (such as in the situation where a county boundary extends further than the air basin boundary that has a nonattainment designation), then the partial county was selected by using geographic area index (GAI) boundaries as defined and used in EMFAC2021[20]. This approach and the final selection of representative counties were confirmed by U.S. EPA Region 9 staff prior to developing this staff report. Table 2 lists the selection of representative counties or areas, where parentheses indicate the air basin portion of partial county selections.

Table 2. California I/M PSM Analysis Years and Representative County

Nonattainment Area	Analysis Years	Representative County/Area
South Coast Air Basin	2018, 2037	Los Angeles (South Coast)
San Joaquin Valley	2018, 2037	Fresno
Coachella Valley	2018, 2037	Riverside (Salton Sea)
Western Mojave Desert	2018, 2032	San Bernardino (Mojave Desert)
San Diego County	2017, 2026, 2032	San Diego
Sacramento Metro	2018, 2032	Sacramento
Eastern Kern	2018, 2026, 2032	Kern (Mojave Desert)
Ventura County	2018, 2026	Ventura

[18] 87 FR 16707, March 24, 2022. (*https://www.govinfo.gov/content/pkg/FR-2022-03-24/pdf/2022-06180.pdf*)
[19] *https://www.sos.ca.gov/registries/safe-home*
[20] *https://arb.ca.gov/emfac/emissions-inventory*

D. California Existing I/M Coverage

A critical input for a PSM analysis is the I/M coverage table that characterizes the existing California Smog Check Program in terms of vehicle coverage by source type, fuel type, the beginning and ending model years, inspection frequency, and types of tests performed. MOVES calculates I/M program benefits only for gasoline-fueled vehicles, and the federal Enhanced I/M performance standard covers only light-duty vehicles up to 8500 lbs. GVWR. MOVES uses the compliance factor (CF) to account for I/M program compliance rates (CR), waiver rates (WR), failure rates (FR), and adjustments needed to account for the fraction of vehicles within a source type that are covered by the I/M program (referred to as "regulatory class coverage adjustment" or RCCA).[21] The compliance factor (CF) in MOVES is calculated as:

$$CF = CR \times (1 - WR \times FR) \times RCCA$$

where:

CF = Compliance factor, the percentage of vehicles within a source type that receive the benefits of the I/M program.

CR = Compliance rate, the percentage of vehicles in the fleet covered by the I/M program that completes the I/M program and receives either a certificate of compliance (i.e., vehicles that pass inspections) or a waiver.

WR = Waiver rate, the fraction of vehicles that fail an initial I/M test and do not pass a retest, but still receive a certificate.

FR = Failure rate, the fraction of all tested vehicles that fail an initial I/M test (regardless of the vehicle's final outcome).

RCCA = Regulatory class coverage adjustment, the population fraction of regulatory weight class within a source type, such as the fraction of regulatory weight class "light duty trucks (< 8,500 lbs. GVWR)" in source type "passenger truck" or "light commercial truck".

CARB, in consultation with the California Bureau of Automotive Repair (BAR) submits an annual report of statistics on the California Smog Check Program to U.S. EPA every July as required by 40 CFR 51.366[22], which includes statewide data for CR, WR and FR by vehicle type and test performed. For this PSM analysis, CARB staff used the program summary statistics from the California 2022 Annual Report[23] to U.S. EPA. Table A-1 of the MOVES Technical Guidance[21] lists the MOVES gasoline regulatory class distribution by source type (RCCA). Using the information from the California 2022 Annual Report, Table A-1 of the MOVES Technical Guidance and the above equation, CARB staff calculated the compliance factors used for the MOVES I/M coverage table representing California Smog Check Program. Table 3 presents the California Smog Check Program (I/M) coverage used for this

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[21] *https://www.epa.gov/sites/default/files/2020-11/documents/420b20052.pdf*

[22] *https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-51/subpart-S/section-51.366*

[23] *2022 USEPA Annual Report (I/M Rule Section 51.366)*, California Department of Consumer Affairs Bureau of Automotive Repair, 7/31/2022.

PSM analysis. ASM and OBD tests have test specific waiver rates and failure rates. For Evaporative Gas Cap tests, CARB staff applied statewide waiver rates and failure rates computed from all Smog Check tests (ASM+OBD+TSI).

Table 3. California Smog Check Program (I/M) Coverage Tables for MOVES3

(1) Compliance Rate, Waiver Rate, Failure Rate and Regulatory Class Coverage Adjustment Values

MOVES Source Type	Compliance Rate* (%)	Waiver Rate (%)			Failure Rate (%)			Regulatory Class Coverage Adjustment
		ASM	OBD	All Tests	ASM	OBD	All Tests	
Passenger Car	98.20	0.04	0.04	0.04	21.29	8.35	9.52	1.0000
Passenger Truck		0.03	0.05	0.04	21.67	7.59	9.88	0.9612**
Light Commercial Truck		0.03	0.05	0.04	21.67	7.59	9.88	0.7526**

* Based on data from "Vehicle with no known outcome following May 2020 U.S. EPA Guidance[24]"

** For light-duty vehicles ≤ 8500 lbs. GVWR

(2) Compliance Factor (%) by Test Standard in MOVES3

Test Standard	Passenger Car	Passenger Truck	Light Commercial Truck
ASM	98.19	94.38	73.90
Evaporative OBD	98.20	94.39	73.90
Evaporative Gas Cap	98.20	94.39	73.90
Exhaust OBD	98.20	94.39	73.90

E. Input Database

CARB staff developed a unique input database for the MOVES run for the Existing Program Scenario and a separate unique input database for the Performance Standard Benchmark Scenario. For a given analysis year and county, the input databases for these two runs are identical except for the I/M coverage tables. CARB staff used Run Specification (RunSpec) selections in MOVES3 as per the Section 3.1 of the EPA October 2022 Guidance[4]. RunSpec selections include a variety of parameters of how the model is run, such as setting the geographic boundary, scope of emissions processes, analyses years, and other information. CARB staff selected July to represent activity that coincides with the highest likely number of

[24] "Guidance on Vehicle Inspection and Maintenance (I/M) Test Data Statistics as Part of Annual I/M Reporting Requirements," U.S. EPA, EPA-420-B-20-033, May 2020. This approach tracks vehicles for up to 120 days following their registration due date and therefore only considers biennial inspections. Failing vehicles not receiving a certification within 120 days after their registration due date are considered to have no known outcome.

ozone exceedance days per month. CARB staff selected all fuel types for passenger cars, passenger trucks, and light commercial trucks. All emission processes for VOC and NOx were modeled with "24-Hour Day" time output aggregation.

For each modeled nonattainment area with an Enhanced I/M program, CARB staff used area-specific local fleet age distribution, VMT and vehicle population by vehicle source type from the EMFAC2021 v.1.0.2 default outputs[20], either at the county or GAI level. Moreover, because EMFAC does not specify road type by rural/urban and by restricted/unrestricted access and such local data is not readily available, CARB staff decided to use the national default distribution of VMT to source type for each road type.[25] Average speed distribution, fuel information, and meteorology profiles were based on MOVES3 default data for each county.

The MOVES RunSpec, input files including annual VMT, vehicle population, and age distribution that are used from EMFAC2021 v1.0.2 default outputs for each run are presented in Section VII, Appendices.

III. California Smog Check Program Performance Standard Modeling Results

Evaluating whether an existing program meets the Enhanced performance standard requires showing that the Existing Program Scenario area-wide emission rates for NOx and VOC are not more than 0.02 g/mile higher than the area-wide emission rates of the Performance Standard Benchmark Scenario.[8]

As shown in the following Tables 4 through 11, MOVES3 modeling results indicate that the California Enhanced I/M program from each of the nonattainment areas either meets or exceeds the federal Enhanced performance standard benchmark program with the 0.02 g/mile buffer. **Therefore, California meets the PSM requirements for all ozone nonattainment areas.**

Note that this PSM analysis only compares emissions from light-duty gasoline vehicles between the California Existing Program Scenario and federal Enhanced Performance Standard Benchmark Scenario. However, there are additional requirements of the California Smog Check Program that are not federal I/M program requirements and are not reflected in the scenarios run in this analysis. Some examples of additional stringencies of the California Smog Check Program include:

- Inclusion of diesel-fueled vehicles less than 14,000 lbs. GVWR;
- Inclusion of Class 2b and Class 3 trucks between 8,500 and 14,000 lbs. GVWR;
- Requirements for smog checks upon Change of Ownership except for gasoline vehicles four years and newer;

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[25] *Population and Activity of Onroad Vehicles in MOVES3*, EPA-420-R-20-023, U.S. EPA, Ann Arbor, MI, November 2020. (Table 7-2, *https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1011TF8.pdf*)

- Low-pressure fuel evaporative system tests for identifying fuel system leaks and visible fuel leak inspections;
- Requirements for vehicles more likely to fail an inspection to be tested at stations that must adhere to higher inspection-based standards (i.e. certified STAR stations);
- Advanced OBD testing parameters that are more stringent than federal recommended OBD inspection criteria including fraud prevention, tampered vehicle detection, and stringent readiness monitor standards.

U.S. EPA directed the states to use the MOVES model, but the MOVES model does not include adjustments that fully encompass California's comprehensive motor vehicle emissions control programs. Therefore, the results likely underestimate the emission reduction benefits from certain aspects of the California Smog Check Program that are implemented at a more stringent level than federal requirements.

Table 4. Summary of July Weekday Emission Rates (in g/mile) for South Coast Air Basin

Calendar Year 2018 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.2472	0.2163
Enhanced Performance Standard Benchmark	0.2675	0.2219
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.2875	0.2419
Calendar Year 2037 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0261	0.0857
Enhanced Performance Standard Benchmark	0.0254	0.0815
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.0454	0.1015

Table 5. Summary of July Weekday Emission Rates (in g/mile) for San Joaquin Valley

Calendar Year 2018 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.3368	0.2796
Enhanced Performance Standard Benchmark	0.3640	0.2877
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.3840	0.3077
Calendar Year 2037 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0291	0.1019
Enhanced Performance Standard Benchmark	0.0283	0.0964
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.0483	0.1164

Table 6. Summary of July Weekday Emission Rates (in g/mile) for Coachella Valley

Calendar Year 2018 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.2612	0.2302
Enhanced Performance Standard Benchmark	0.2800	0.2346
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.3000	0.2546
Calendar Year 2037 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0295	0.0962
Enhanced Performance Standard Benchmark	0.0287	0.0907
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.0487	0.1107

Table 7. Summary of July Weekday Emission Rates (in g/mile) for Western Mojave Desert

Calendar Year 2018 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.3234	0.2613
Enhanced Performance Standard Benchmark	0.3509	0.2693
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.3709	0.2893
Calendar Year 2032 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0439	0.1064
Enhanced Performance Standard Benchmark	0.0431	0.1018
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.0631	0.1218

Table 8. Summary of July Weekday Emission Rates (in g/mile) for San Diego County

Calendar Year 2017 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.2604	0.2292
Enhanced Performance Standard Benchmark	0.2831	0.2357
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.3031	0.2557
Calendar Year 2026 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0863	0.1284
Enhanced Performance Standard Benchmark	0.0902	0.1255
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.1102	0.1455
Calendar Year 2032 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0374	0.0960
Enhanced Performance Standard Benchmark	0.0367	0.0921
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.0567	0.1121

Table 9. Summary of July Weekday Emission Rates (in g/mile) for Sacramento Metro

Calendar Year 2018 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.3007	0.2631
Enhanced Performance Standard Benchmark	0.3254	0.2701
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.3454	0.2901
Calendar Year 2032 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0461	0.1186
Enhanced Performance Standard Benchmark	0.0453	0.1136
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.0653	0.1336

Table 10. Summary of July Weekday Emission Rates (in g/mile) for Eastern Kern

Calendar Year 2018 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.3746	0.2959
Enhanced Performance Standard Benchmark	0.4071	0.3076
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.4271	0.3276
Calendar Year 2026 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.1218	0.1557
Enhanced Performance Standard Benchmark	0.1294	0.1529
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.1494	0.1729
Calendar Year 2032 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0460	0.1069
Enhanced Performance Standard Benchmark	0.0453	0.1025
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.0653	0.1225

Table 11. Summary of July Weekday Emission Rates (in g/mile) for Ventura County

Calendar Year 2018 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.1804	0.1647
Enhanced Performance Standard Benchmark	0.1901	0.1652
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.2101	0.1852
Calendar Year 2026 July Weekday Emission Rates (in g/mile)		
Scenario	NOx	VOC
CA Existing Program	0.0620	0.0972
Enhanced Performance Standard Benchmark	0.0629	0.0938
Enhanced Performance Standard Benchmark with 0.02 g/mile Buffer	0.0829	0.1138

IV. California Smog Check Program Certification

This chapter contains the Smog Check Certification for the California I/M (Smog Check) Program requirements to be submitted into the California SIP. Ten areas in California are designated as nonattainment for the 70 ppb 8-hour ozone standard with a Moderate or higher classification but only eight of these areas meet the population threshold prescribed in the Act to require implementation of an I/M program. The two nonattainment areas that do not meet the population threshold are Mariposa County and Western Nevada County. This leaves eight areas that are subject to the I/M Program requirement, which are also classified as Serious or above for the 70 ppb 8-hour ozone standard. Based on PSM results, this action proposes a certification to address the I/M program requirement for the eight applicable California nonattainment areas.

Specifically, the Smog Check Program Certification establishes that the California Smog Check Program continues to meet I/M program requirements as applicable under the 70 ppb 8-hour ozone standard for the following eight California ozone nonattainment areas:

- South Coast Air Basin
- San Joaquin Valley
- Coachella Valley
- Western Mojave Desert
- San Diego County

- Sacramento Metro
- Eastern Kern
- Ventura County

V. Environmental Impacts

A. Introduction

This chapter provides the basis for CARB's determination that the Smog Check Certification is exempt from the requirements of the California Environmental Quality Act (CEQA). A brief explanation of this determination is provided below. CARB's regulatory program, which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality, has been certified by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of CEQA (14 CCR 15251(d)). Public agencies with certified regulatory programs are exempt from certain CEQA requirements, including but not limited to, preparing environmental impact reports, negative declarations, and initial studies. CARB, as a lead agency, prepares a substitute environmental document (referred to as an "Environmental Analysis" or "EA") as part of the Report prepared for a proposed action to comply with CEQA (17 CCR 60000-60008). If the Smog Check Certification is finalized, a Notice of Exemption will be filed with the Office of the Secretary for the Natural Resources Agency and the State Clearinghouse for public inspection.

B. Analysis

CARB has determined that the proposed Smog Check Certification is exempt from CEQA under the general rule or "common sense" exemption (14 CCR 15061(b)(3)). CEQA Guidelines states "[t]he activity is covered by the common sense exemption that CEQA applies only to projects, which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA". The proposal is also categorically exempt from CEQA under the "Class 8" exemption (14 CCR 15308) because it is an action taken by a regulatory agency for the protection of the environment. As described in this staff report, the proposed Smog Check Certification is a SIP requirement for ozone nonattainment areas that are classified as Moderate or above and that meet minimum population requirements. Based on CARB's review it can be seen with certainty that there is no possibility that the proposed Smog Check Certification may result in a significant adverse impact on the environment. Further, the proposed action is designed to protect the environment and CARB found no substantial evidence indicating the proposal could adversely affect air quality or any other environmental resource area, or that any of the exceptions to the exemption applies (14 CCR 15300.2). Therefore, this activity is exempt from CEQA.

VI. Staff Recommendations

CARB staff recommends that the Board:

1. Adopt the California Smog Check Certification for the 70 ppb 8-hour ozone standard for the South Coast Air Basin, San Joaquin Valley, Coachella Valley, Western Mojave Desert, San Diego County, Sacramento Metro, Eastern Kern, and Ventura County nonattainment areas as a revision to the California SIP.
2. Adopt the California Smog Check Certification for the 75 ppb 8-hour ozone standard for the San Diego County and Eastern Kern nonattainment areas as a revision to the California SIP.
3. Direct the Executive Officer to submit the California Smog Check Certification for the 70 ppb 8-hour ozone standard to U.S. EPA as a revision to the California SIP.

VII. Appendices

Appendix A Enhanced I/M Performance Modeling RunSpecs

Take Ventura County in year 2026 as an example.

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Appendix B Enhanced I/M Performance Modeling Inputs

1. Annual Vehicle Miles Traveled (VMT) and Vehicle Population

South Coast Air Basin

(Representative County: Los Angeles County in South Coast part)

Source Type ID	Year ID	VMT (miles)	Vehicle Population
21 (Passenger Car)	2018	55,345,173,644	4,253,289
31 (Passenger Truck)	2018	26,143,665,036	2,085,983
32 (Light Commercial Truck)	2018	3,061,117,114	244,244
21 (Passenger Car)	2037	48,539,819,803	3,643,432
31 (Passenger Truck)	2037	36,826,813,937	2,828,904
32 (Light Commercial Truck)	2037	4,311,988,784	331,232

San Joaquin Valley

(Representative County: Fresno County)

Source Type ID	Year ID	VMT (miles)	Vehicle Population
21 (Passenger Car)	2018	4,519,110,043	356,641
31 (Passenger Truck)	2018	2,918,716,305	239,309
32 (Light Commercial Truck)	2018	341,747,510	28,020
21 (Passenger Car)	2037	5,479,636,585	418,241
31 (Passenger Truck)	2037	3,610,564,225	290,418
32 (Light Commercial Truck)	2037	422,754,802	34,005

Coachella Valley

(Representative County: Riverside County in Salton Sea part)

Source Type ID	Year ID	VMT (miles)	Vehicle Population
21 (Passenger Car)	2018	1,812,291,024	153,745
31 (Passenger Truck)	2018	1,150,945,096	87,889
32 (Light Commercial Truck)	2018	134,762,197	10,291
21 (Passenger Car)	2037	1,872,773,611	164,694
31 (Passenger Truck)	2037	1,704,983,144	137,545
32 (Light Commercial Truck)	2037	199,633,566	16,105

Western Mojave Desert

(Representative County: San Bernardino County in Mojave Desert part)

Source Type ID	Year ID	VMT (miles)	Vehicle Population
21 (Passenger Car)	2018	4,945,060,975	373,616
31 (Passenger Truck)	2018	2,702,567,154	216,106
32 (Light Commercial Truck)	2018	316,438,975	25,303
21 (Passenger Car)	2032	5,396,680,647	366,169
31 (Passenger Truck)	2032	3,447,499,114	243,157
32 (Light Commercial Truck)	2032	403,661,787	28,471

San Diego County

Source Type ID	Year ID	VMT (miles)	Vehicle Population
21 (Passenger Car)	2017	18,794,733,714	1,498,913
31 (Passenger Truck)	2017	9,990,786,554	808,696
32 (Light Commercial Truck)	2017	1,169,804,144	94,689
21 (Passenger Car)	2026	19,595,575,788	1,396,921
31 (Passenger Truck)	2026	11,494,824,817	819,572
32 (Light Commercial Truck)	2026	1,345,909,417	95,962
21 (Passenger Car)	2032	19,996,674,631	1,385,699
31 (Passenger Truck)	2032	11,961,910,931	839,027
32 (Light Commercial Truck)	2032	1,400,599,728	98,240

Sacramento Metro

(Representative County: Sacramento County)

Source Type ID	Year ID	VMT (miles)	Vehicle Population
21 (Passenger Car)	2018	6,987,627,186	583,698
31 (Passenger Truck)	2018	3,851,026,745	326,444
32 (Light Commercial Truck)	2018	450,910,148	38,223
21 (Passenger Car)	2032	7,745,720,140	602,789
31 (Passenger Truck)	2032	4,918,256,495	392,853
32 (Light Commercial Truck)	2032	575,870,258	45,998

Eastern Kern

(Representative County: Kern County in Mojave Desert part)

Source Type ID	Year ID	VMT (miles)	Vehicle Population
21 (Passenger Car)	2018	901,538,378	67,439
31 (Passenger Truck)	2018	563,147,612	46,179
32 (Light Commercial Truck)	2018	65,937,993	5,407
21 (Passenger Car)	2026	963,106,594	63,450
31 (Passenger Truck)	2026	662,581,932	46,208
32 (Light Commercial Truck)	2026	77,580,587	5,410
21 (Passenger Car)	2032	1,008,449,521	62,865
31 (Passenger Truck)	2032	726,278,343	48,918
32 (Light Commercial Truck)	2032	85,038,691	5,728

Ventura County

Source Type ID	Year ID	VMT (miles)	Vehicle Population
21 (Passenger Car)	2018	3,678,954,643	297,911
31 (Passenger Truck)	2018	2,140,598,820	178,434
32 (Light Commercial Truck)	2018	250,639,062	20,893
21 (Passenger Car)	2026	3,953,041,513	280,190
31 (Passenger Truck)	2026	2,353,562,615	170,054
32 (Light Commercial Truck)	2026	275,574,629	19,911

2. Vehicle Age Distribution

South Coast Air Basin

(Representative County: Los Angeles County in South Coast part)

Age ID	2018		2037	
	Age Fraction		Age Fraction	
	Passenger Car	Passenger Truck/ Light Commercial Truck	Passenger Car	Passenger Truck/ Light Commercial Truck
0	0.0703	0.0793	0.0755	0.0647
1	0.0893	0.0927	0.0745	0.0684
2	0.0892	0.0677	0.0668	0.0650
3	0.0787	0.0546	0.0608	0.0615
4	0.0593	0.0457	0.0578	0.0596

5	0.0595	0.0411	0.0557	0.0579
6	0.0483	0.0334	0.0531	0.0557
7	0.0347	0.0359	0.0513	0.0540
8	0.0355	0.0280	0.0487	0.0522
9	0.0327	0.0184	0.0466	0.0504
10	0.0398	0.0363	0.0437	0.0474
11	0.0438	0.0477	0.0411	0.0446
12	0.0386	0.0488	0.0380	0.0413
13	0.0361	0.0526	0.0350	0.0384
14	0.0305	0.0553	0.0318	0.0352
15	0.0308	0.0493	0.0290	0.0323
16	0.0271	0.0429	0.0225	0.0252
17	0.0249	0.0371	0.0167	0.0188
18	0.0228	0.0331	0.0186	0.0210
19	0.0179	0.0246	0.0211	0.0192
20	0.0156	0.0167	0.0193	0.0157
21	0.0122	0.0137	0.0168	0.0097
22	0.0088	0.0082	0.0148	0.0073
23	0.0085	0.0079	0.0087	0.0060
24	0.0065	0.0058	0.0080	0.0044
25	0.0051	0.0041	0.0055	0.0033

26	0.0043	0.0029	0.0032	0.0032
27	0.0046	0.0028	0.0028	0.0024
28	0.0038	0.0023	0.0028	0.0014
29	0.0034	0.0020	0.0031	0.0026
30	0.0173	0.0092	0.0267	0.0313

San Joaquin Valley

(Representative County: Fresno County)

Age ID	2018		2037	
	Age Fraction		Age Fraction	
	Passenger Car	Passenger Truck/ Light Commercial Truck	Passenger Car	Passenger Truck/ Light Commercial Truck
0	0.0419	0.0472	0.0435	0.0417
1	0.0631	0.0631	0.0548	0.0516
2	0.0721	0.0568	0.0599	0.0528
3	0.0774	0.0565	0.0616	0.0534
4	0.0654	0.0515	0.0618	0.0539
5	0.0649	0.0443	0.0610	0.0538
6	0.0539	0.0377	0.0594	0.0532
7	0.0363	0.0394	0.0579	0.0523
8	0.0365	0.0287	0.0555	0.0510
9	0.0335	0.0206	0.0528	0.0495
10	0.0426	0.0388	0.0502	0.0476
11	0.0491	0.0574	0.0473	0.0455
12	0.0443	0.0538	0.0437	0.0429
13	0.0401	0.0588	0.0404	0.0403
14	0.0330	0.0571	0.0366	0.0374

15	0.0344	0.0511	0.0331	0.0347
16	0.0318	0.0452	0.0255	0.0273
17	0.0290	0.0411	0.0188	0.0207
18	0.0268	0.0347	0.0183	0.0265
19	0.0210	0.0258	0.0188	0.0262
20	0.0190	0.0181	0.0169	0.0230
21	0.0154	0.0158	0.0159	0.0169
22	0.0112	0.0096	0.0140	0.0143
23	0.0100	0.0094	0.0084	0.0115
24	0.0079	0.0074	0.0073	0.0081
25	0.0059	0.0053	0.0050	0.0062
26	0.0050	0.0041	0.0026	0.0055
27	0.0050	0.0038	0.0023	0.0038
28	0.0036	0.0032	0.0022	0.0023
29	0.0030	0.0026	0.0026	0.0040
30	0.0169	0.0110	0.0219	0.0421

Coachella Valley

(Representative County: Riverside County in Salton Sea part)

Age ID	2018		2037	
	Age Fraction		Age Fraction	
	Passenger Car	Passenger Truck/ Light Commercial Truck	Passenger Car	Passenger Truck/ Light Commercial Truck
0	0.0640	0.0737	0.0682	0.0543
1	0.0859	0.0913	0.0778	0.0655
2	0.0873	0.0695	0.0752	0.0646
3	0.0822	0.0626	0.0687	0.0627
4	0.0676	0.0549	0.0642	0.0609
5	0.0655	0.0461	0.0606	0.0590
6	0.0520	0.0367	0.0565	0.0569
7	0.0359	0.0371	0.0536	0.0548
8	0.0340	0.0280	0.0501	0.0521
9	0.0301	0.0168	0.0473	0.0494
10	0.0382	0.0366	0.0436	0.0468
11	0.0458	0.0499	0.0405	0.0440
12	0.0398	0.0515	0.0371	0.0407
13	0.0366	0.0541	0.0339	0.0379
14	0.0311	0.0542	0.0303	0.0348

15	0.0319	0.0471	0.0271	0.0320
16	0.0279	0.0412	0.0208	0.0250
17	0.0248	0.0362	0.0154	0.0188
18	0.0226	0.0293	0.0165	0.0221
19	0.0179	0.0208	0.0165	0.0209
20	0.0151	0.0144	0.0145	0.0176
21	0.0118	0.0122	0.0134	0.0108
22	0.0079	0.0070	0.0124	0.0089
23	0.0078	0.0067	0.0080	0.0076
24	0.0056	0.0046	0.0071	0.0053
25	0.0045	0.0033	0.0050	0.0039
26	0.0035	0.0023	0.0029	0.0036
27	0.0035	0.0019	0.0024	0.0026
28	0.0032	0.0019	0.0024	0.0014
29	0.0026	0.0016	0.0028	0.0029
30	0.0131	0.0065	0.0251	0.0320

Western Mojave Desert

(Representative County: San Bernardino County in Mojave Desert part)

Age ID	2018		2032	
	Age Fraction		Age Fraction	
	Passenger Car	Passenger Truck/ Light Commercial Truck	Passenger Car	Passenger Truck/ Light Commercial Truck
0	0.0512	0.0560	0.0542	0.0543
1	0.0689	0.0740	0.0625	0.0629
2	0.0757	0.0598	0.0634	0.0616
3	0.0797	0.0551	0.0622	0.0599
4	0.0651	0.0493	0.0603	0.0586
5	0.0638	0.0424	0.0580	0.0571
6	0.0520	0.0358	0.0551	0.0553
7	0.0357	0.0363	0.0525	0.0536
8	0.0348	0.0277	0.0496	0.0514
9	0.0320	0.0179	0.0474	0.0494
10	0.0400	0.0367	0.0449	0.0473
11	0.0459	0.0513	0.0369	0.0389
12	0.0431	0.0528	0.0289	0.0306
13	0.0400	0.0583	0.0330	0.0375
14	0.0329	0.0569	0.0364	0.0396

15	0.0336	0.0501	0.0357	0.0380
16	0.0310	0.0445	0.0358	0.0269
17	0.0278	0.0406	0.0349	0.0227
18	0.0254	0.0343	0.0236	0.0193
19	0.0200	0.0266	0.0216	0.0142
20	0.0181	0.0189	0.0158	0.0110
21	0.0142	0.0156	0.0089	0.0098
22	0.0105	0.0098	0.0076	0.0070
23	0.0098	0.0099	0.0067	0.0039
24	0.0080	0.0078	0.0076	0.0076
25	0.0061	0.0055	0.0073	0.0096
26	0.0051	0.0041	0.0060	0.0090
27	0.0049	0.0037	0.0049	0.0094
28	0.0040	0.0031	0.0039	0.0091
29	0.0034	0.0028	0.0038	0.0077
30	0.0172	0.0125	0.0305	0.0368

San Diego County

Age ID	2017		2026		2032	
	Age Fraction		Age Fraction		Age Fraction	
	Passenger Car	Passenger Truck/Light Commercial Truck	Passenger Car	Passenger Truck/Light Commercial Truck	Passenger Car	Passenger Truck/Light Commercial Truck
0	0.0600	0.0708	0.0556	0.0630	0.0577	0.0634
1	0.0794	0.0720	0.0620	0.0664	0.0644	0.0668
2	0.0841	0.0653	0.0615	0.0628	0.0640	0.0632
3	0.0678	0.0573	0.0607	0.0594	0.0629	0.0596
4	0.0701	0.0523	0.0602	0.0579	0.0617	0.0575
5	0.0577	0.0427	0.0511	0.0489	0.0600	0.0557
6	0.0406	0.0454	0.0414	0.0396	0.0575	0.0533
7	0.0406	0.0348	0.0485	0.0526	0.0551	0.0515
8	0.0364	0.0210	0.0572	0.0634	0.0521	0.0496
9	0.0462	0.0420	0.0596	0.0660	0.0494	0.0479
10	0.0489	0.0522	0.0599	0.0517	0.0462	0.0454
11	0.0445	0.0548	0.0602	0.0445	0.0374	0.0372
12	0.0408	0.0578	0.0433	0.0406	0.0288	0.0291
13	0.0359	0.0601	0.0434	0.0331	0.0318	0.0371
14	0.0351	0.0512	0.0330	0.0255	0.0356	0.0421
15	0.0324	0.0457	0.0209	0.0259	0.0344	0.0411

16	0.0291	0.0385	0.0191	0.0189	0.0334	0.0306
17	0.0270	0.0347	0.0169	0.0101	0.0317	0.0249
18	0.0211	0.0249	0.0195	0.0185	0.0207	0.0212
19	0.0187	0.0177	0.0185	0.0209	0.0195	0.0159
20	0.0146	0.0134	0.0150	0.0194	0.0139	0.0114
21	0.0105	0.0082	0.0122	0.0191	0.0080	0.0106
22	0.0097	0.0078	0.0100	0.0188	0.0069	0.0074
23	0.0077	0.0058	0.0093	0.0151	0.0062	0.0039
24	0.0061	0.0041	0.0085	0.0122	0.0071	0.0072
25	0.0048	0.0029	0.0072	0.0102	0.0064	0.0080
26	0.0050	0.0026	0.0068	0.0088	0.0052	0.0076
27	0.0039	0.0023	0.0054	0.0065	0.0042	0.0078
28	0.0034	0.0020	0.0051	0.0044	0.0037	0.0078
29	0.0026	0.0015	0.0040	0.0035	0.0036	0.0065
30	0.0152	0.0084	0.0241	0.0125	0.0305	0.0288

Sacramento Metro

(Representative County: Sacramento County)

Age ID	2018		2032	
	Age Fraction		Age Fraction	
	Passenger Car	Passenger Truck/ Light Commercial Truck	Passenger Car	Passenger Truck/ Light Commercial Truck
0	0.0393	0.0504	0.0426	0.0435
1	0.0595	0.0699	0.0537	0.0539
2	0.0666	0.0605	0.0581	0.0549
3	0.0719	0.0557	0.0598	0.0561
4	0.0640	0.0540	0.0600	0.0567
5	0.0659	0.0496	0.0592	0.0563
6	0.0530	0.0369	0.0574	0.0553
7	0.0362	0.0398	0.0555	0.0542
8	0.0376	0.0302	0.0530	0.0523
9	0.0343	0.0209	0.0511	0.0509
10	0.0429	0.0397	0.0484	0.0488
11	0.0502	0.0561	0.0397	0.0403
12	0.0455	0.0567	0.0310	0.0318
13	0.0426	0.0611	0.0341	0.0401
14	0.0354	0.0571	0.0367	0.0436

15	0.0360	0.0486	0.0359	0.0417
16	0.0337	0.0441	0.0352	0.0301
17	0.0315	0.0388	0.0328	0.0245
18	0.0279	0.0314	0.0234	0.0222
19	0.0219	0.0235	0.0218	0.0174
20	0.0191	0.0162	0.0153	0.0119
21	0.0154	0.0134	0.0086	0.0116
22	0.0112	0.0079	0.0077	0.0083
23	0.0094	0.0076	0.0067	0.0049
24	0.0076	0.0062	0.0073	0.0088
25	0.0058	0.0040	0.0073	0.0110
26	0.0048	0.0034	0.0059	0.0102
27	0.0051	0.0026	0.0049	0.0102
28	0.0033	0.0024	0.0040	0.0094
29	0.0030	0.0020	0.0039	0.0074
30	0.0193	0.0092	0.0392	0.0318

Eastern Kern

(Representative County: Kern County of Mojave Desert part)

Age ID	2018		2026		2032	
	Age Fraction		Age Fraction		Age Fraction	
	Passenger Car	Passenger Truck/Light Commercial Truck	Passenger Car	Passenger Truck/Light Commercial Truck	Passenger Car	Passenger Truck/Light Commercial Truck
0	0.0423	0.0462	0.0497	0.0454	0.0525	0.0449
1	0.0630	0.0674	0.0582	0.0544	0.0616	0.0539
2	0.0700	0.0580	0.0603	0.0548	0.0639	0.0543
3	0.0745	0.0524	0.0599	0.0550	0.0633	0.0544
4	0.0646	0.0495	0.0586	0.0556	0.0613	0.0544
5	0.0647	0.0433	0.0490	0.0481	0.0588	0.0540
6	0.0535	0.0382	0.0392	0.0400	0.0556	0.0531
7	0.0358	0.0370	0.0414	0.0553	0.0529	0.0520
8	0.0359	0.0304	0.0495	0.0630	0.0496	0.0505
9	0.0333	0.0188	0.0529	0.0679	0.0472	0.0491
10	0.0418	0.0371	0.0568	0.0514	0.0443	0.0474
11	0.0477	0.0503	0.0575	0.0440	0.0363	0.0394
12	0.0449	0.0481	0.0440	0.0410	0.0283	0.0313
13	0.0419	0.0552	0.0434	0.0327	0.0288	0.0415
14	0.0342	0.0525	0.0349	0.0269	0.0333	0.0450

15	0.0343	0.0459	0.0218	0.0257	0.0336	0.0460
16	0.0332	0.0412	0.0202	0.0200	0.0352	0.0330
17	0.0284	0.0389	0.0184	0.0108	0.0337	0.0266
18	0.0259	0.0344	0.0215	0.0202	0.0236	0.0234
19	0.0218	0.0271	0.0218	0.0249	0.0218	0.0172
20	0.0185	0.0208	0.0190	0.0224	0.0162	0.0134
21	0.0147	0.0192	0.0160	0.0241	0.0093	0.0120
22	0.0112	0.0130	0.0122	0.0217	0.0080	0.0089
23	0.0106	0.0131	0.0114	0.0179	0.0073	0.0046
24	0.0081	0.0108	0.0115	0.0143	0.0082	0.0084
25	0.0065	0.0079	0.0093	0.0126	0.0077	0.0101
26	0.0054	0.0065	0.0091	0.0104	0.0067	0.0091
27	0.0055	0.0059	0.0072	0.0077	0.0055	0.0098
28	0.0039	0.0050	0.0066	0.0057	0.0043	0.0088
29	0.0039	0.0049	0.0053	0.0052	0.0041	0.0073
30	0.0201	0.0211	0.0337	0.0210	0.0371	0.0363

Ventura County

Age ID	2018		2026	
	Age Fraction		Age Fraction	
	Passenger Car	Passenger Truck/ Light Commercial Truck	Passenger Car	Passenger Truck/ Light Commercial Truck
0	0.0696	0.0881	0.0786	0.0845
1	0.0946	0.1078	0.0855	0.0855
2	0.1007	0.0842	0.0833	0.0779
3	0.0939	0.0766	0.0784	0.0710
4	0.0773	0.0616	0.0740	0.0669
5	0.0748	0.0528	0.0600	0.0546
6	0.0602	0.0436	0.0464	0.0428
7	0.0400	0.0430	0.0504	0.0575
8	0.0382	0.0317	0.0561	0.0654
9	0.0344	0.0189	0.0565	0.0661
10	0.0396	0.0350	0.0540	0.0483
11	0.0409	0.0437	0.0506	0.0424
12	0.0359	0.0431	0.0373	0.0349
13	0.0319	0.0450	0.0358	0.0273
14	0.0265	0.0446	0.0271	0.0210
15	0.0252	0.0402	0.0161	0.0198

16	0.0218	0.0326	0.0144	0.0141
17	0.0185	0.0264	0.0128	0.0073
18	0.0168	0.0218	0.0135	0.0130
19	0.0120	0.0160	0.0126	0.0148
20	0.0103	0.0104	0.0100	0.0133
21	0.0076	0.0084	0.0079	0.0129
22	0.0055	0.0049	0.0061	0.0124
23	0.0049	0.0046	0.0055	0.0106
24	0.0038	0.0035	0.0049	0.0082
25	0.0028	0.0023	0.0038	0.0066
26	0.0021	0.0016	0.0036	0.0053
27	0.0022	0.0014	0.0026	0.0039
28	0.0016	0.0013	0.0023	0.0026
29	0.0015	0.0009	0.0018	0.0022
30	0.0051	0.0038	0.0083	0.0069