DRAFT

2022 VENTURA COUNTY AIR QUALITY MANAGEMENT PLAN

Scheduled to be presented to the
Ventura County Air Pollution Control Board

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VENTURA COUNTY
AIR POLLUTION CONTROL DISTRICT

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Acronyms List

µg/m3	micrograms per cubic meter
AB	Assembly Bill
APCB	Air Pollution Control Board
APCD	Air Pollution Control District
APCO	Air Pollution Control Officer
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ATCM	Air Toxic Control Measure
BACT	Best Available Control Technology
BARCT	Best Available Retrofit Control Technology
BMP	Best Management Practices
BTU	British thermal units
CAA	Clean Air Act
CAAA	federal Clean Air Act Amendments
CAF	Clean Air Fund
Caltrans	California Department of Transportation
CAP	Community Air Protection
CARB	California Air Resources Board
CCAA	California Clean Air Act
CE	Control Efficiency
CEFS	California Emissions Forecasting System
CEIDARS	California Emission Inventory Development and Reporting System
CEPAM	California Emission Projection Analysis Model
CEQA	California Environmental Quality Act
CF	Control Factor
CFR	Code of Federal Regulations
CH&SC	California Health and Safety Code
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CTG	Control Technique Guidelines
CURB	City Urban Restriction Boundary
District	Ventura County Air Pollution Control District
DMV	California Department of Motor Vehicles
EIC	Emissions Inventory Code
EITAC	Emissions Inventory Technical Advisory Committee
EMFAC	EMission FACtors on-road vehicles model
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPP	Early Progress Plan
ERC	Emission Reduction Credit

FAA	Federal Aviation Administration
FARMER	Funding Agricultural Replacement Measures for Emissions Reductions
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FIP	Federal Implementation Plan
FR	Federal Register
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GF	Growth Factor
GHG	Greenhouse Gas
IF	Implementation Factor
ITS	Intelligent Transportation Systems
LAER	Lowest Achievable Emission Rate
LAFCo	Local Agency Formation Commission
LCFS	Low Carbon Fuel Standard
LPG	Liquefied Propane Gas
m	meters
MM	million
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NBVC	Naval Base Ventura County
NEI	National Emissions Inventory
ng/j	nanograms per joule
NH3	Ammonia
NO2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NSR	New Source Review
O3	Ozone
OCS	Outer Continental Shelf
OGV	Ocean-Going Vessel
PM	Particulate Matter
PM10	Particulate Matter less than 10 micrometers in diameter (coarse particulate matter)
PM2.5	Particulate Matter less than 2.5 micrometers in diameter (fine particulate matter)
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
QA	Quality Assurance
QC	Quality Control
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology

REMI	Regional Economic Models, Inc.
RFP	Reasonable Further Progress
ROC	Reactive Organic Compounds
ROG	Reactive Organic Gases
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCCAB	South Central Coast Air Basin
SCRAM	Support Center for Regulatory Air Models
SCS	Sustainable Communities Strategy
SIP	State Implementation Plan
SO2	Sulfur Dioxide
SOAR	Save Open Space and Agricultural Resources
State Strategy	ARB's 2007 State Implementation Plan
TCM	Transportation Control Measure
TDM	Transportation Demand Management
TOC	Total Organic Compounds
TOG	Total Organic Gases
tpd	tons per day
VC	Ventura County
VCTC	Ventura County Transportation Commission
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
VNRM	Voluntary NOx Remediation Measure
VSR	Vessel Speed Reduction
WOE	Weight of Evidence

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EXECUTIVE SUMMARY

Purpose

The mission of the Ventura County Air Pollution Control District (APCD or District) is to protect public health and agriculture from the adverse effects of air pollution by identifying air pollution problems and developing a comprehensive program to achieve and maintain state and federal air quality standards. To that end, pursuant to the federal Clean Air Act Amendments (CAAA) of 1990, the 2022 Ventura County Air Quality Management Plan (AQMP) presents Ventura County's: 1) strategy to attain the 2015 federal 8-hour ozone standard; 2) attainment demonstration for the federal 8-hour ozone standard; and, 3) reasonable further progress demonstration for the federal 8-hour ozone standard. Ventura County's air quality has come a long way since the District was first created in 1968. However, the District recognizes there is more work to do to alleviate the detrimental health effects of air pollution. This AQMP will strive to pave a path forward to ensure clean air for all its residents.

Background

The CAAA established clean air plan requirements for areas that exceed the National Ambient Air Quality Standards (NAAQS). These areas, called nonattainment areas, must develop and implement clean air plans to attain the NAAQS by specified dates. Clean air plans, also called Air Quality Management Plans, Nonattainment Plans, or State Implementation Plans (SIP), describe how an area, such as Ventura County, will attain the NAAQS.

Each state is responsible for implementing the CAAA within its jurisdiction. California state law designates the California Air Resources Board (CARB) as California's lead agency for all purposes set forth in the CAAA, including preparation of the California SIP. State law further specifies that the CARB must adopt clean air plans approved by local air districts, unless the CARB finds, after a public hearing, that a local clean air plan will not meet the requirements of the CAAA. CARB must submit SIPs and SIP revisions to the U.S. Environmental Protection Agency (EPA) for approval. The provisions and commitments in SIPs are federally enforceable.

On October 1, 2015, EPA strengthened its NAAQS for ground-level ozone, the principal component of photochemical smog, to improve public health protection. EPA revised the 8-hour "primary" ozone standard, designed to protect public health, to a level of 70 parts per billion (ppb). The previous standard, set in 2008, was 75 ppb. EPA also strengthened the secondary 8-hour ozone standard to 70 ppb making it identical to the revised primary standard. Secondary standards provide public welfare protection, including protection against decreased atmospheric visibility and damage to animals, crops, vegetation, and buildings. Current ozone air quality concentrations in many areas of the country – including some areas that meet the 2008 ozone standards – are still high enough to harm sensitive vegetation, including agricultural crops and ecosystems.

Attainment Strategy

Building on previous Ventura County AQMPs, the 2022 AQMP presents a combined local and state clean air strategy based on concurrent reactive organic gases (ROG) and nitrogen oxides (NOx) emission reductions to bring Ventura County into attainment of the 2015 federal 8-hour ozone standard. ROG and NOx emitted by both anthropogenic and natural sources react in the atmosphere with sunlight to produce photochemical smog. Ventura County was the first area in the nation to institute such a dual-emissions strategy for meeting ozone standards.

The 2022 AQMP control strategy consists of a local component implemented by the APCD and a combined state and federal component implemented by the CARB and EPA. The local strategy includes emission control measures carried forward from previous Ventura County clean air plans plus new and further study emission control measures. It also includes a transportation conformity budget that sets the maximum amount of on-road motor vehicle emissions produced while continuing to demonstrate progress towards attainment.

The new control measures are proposed new rules and revisions to existing Ventura County APCD rules that District staff has found practicable for Ventura County. The further study measures are proposals that may help Ventura County achieve the federal and state ozone standards but need additional air quality, feasibility, and environmental scrutiny before District staff can recommend them for adoption as District rules. They will become District rules and be implemented only if the District's governing board finds them to be practicable and appropriate for Ventura County. Both the new control measures and those further study measures recommended for adoption by District staff will also serve to meet the "every feasible measure" requirement of the California Clean Air Act.

Several of the local control measures from the 2016 AQMP are not in the 2022 AQMP. In each case, District staff determined that the measure is either obsolete or infeasible for Ventura County based on technological or economic considerations. Additionally, no control measures from previous AQMPs were deleted from the 2022 AQMP if deletion would slow the county's progress towards attaining either the federal 8-hour ozone standard or the state ozone standards.

The 2022 AQMP includes a new transportation conformity budget for Ventura County. Transportation Conformity is a federal Clean Air Act (CAA) regulatory process that coordinates air quality planning and transportation planning to help ensure that highway and transit projects will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. Once the 2022 AQMP's conformity budget is found adequate by EPA, it will replace the Early Progress Plan conformity budget and serve as the transportation conformity budget for future transportation conformity decisions in Ventura County. The 2022 AQMP transportation conformity budget for ROG and NOx is shown in Table 3-6.

Ventura County's strategy for attaining the 2015 federal 70 ppb ozone standard also relies on CARB's 2022 State Implementation Plan (SIP), also known as the State SIP Strategy. The 2022

State SIP Strategy includes measures and commitments to reduce emissions from State-regulated sources (mobile sources, consumer products, and pesticides) to support attainment of the 70-ppb standard in all nonattainment areas across California. The 2022 SIP is a comprehensive and far-reaching set of emission reduction programs designed to support and complement local efforts to meet the latest federal clean air standards for ozone and fine particulate matter ($PM_{2.5}$). At the time of this writing, CARB has released its Draft 2022 State SIP Strategy for public review, ending on March 4, 2022. The 2022 State SIP Strategy is expected to be adopted by CARB in the summer of 2022. The Draft 2022 State Strategy and supporting documentation are available on CARB's website at https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy.

Ventura County's overall control strategy to attain the 2015 federal 8-hour ozone standard is presented in Section 3 and Appendices B, C, D, E, F, and G.

Attainment Demonstration

Photochemical modeling, which includes the photochemical modeling protocol, the photochemical modeling performance analysis, the unmonitored area analysis, as well as supporting analyses completed as part of the supplemental Weight of Evidence (WOE) evaluation, indicates that Ventura County can expect to attain the 2015 federal 8-hour ozone standard by 2027, the attainment date for serious ozone nonattainment areas. The attainment demonstration for the 2022 AQMP is presented in Section 5, *Attainment Demonstration*, and Appendices H, I, J, and K.

Reasonable Further Progress Demonstration

In addition to showing attainment of the federal 8-hour ozone standard by 2027, the 2022 AQMP also must show steady progress towards attaining the 2015 federal 8-hour ozone standard by that date. Such steady progress towards attainment is called reasonable further progress (RFP). EPA defines RFP as "annual incremental reductions in air pollutant emissions as reflected in a State Implementation Plan that EPA deems sufficient to provide for the attainment of the applicable national ambient air quality standards by the statutory deadline." (https://sor.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do)

The RFP demonstration shows that Ventura County will meet RFP requirements for the serious area milestone years 2024, and 2026 (all required RFP emission reductions must be in place by the beginning of the 2027 ozone season).

Air Quality Improvement

Ventura County continues to make great progress towards meeting federal clean air standards for ozone by a steady decades-long decrease in countywide ozone levels. In 1990, Ventura County had 18 days over the now revoked federal 1-hour (120 ppb) ozone standard. However, by 2003 there were only two days over that standard, and none in 2004 and 2005. Consequently, on May 27, 2009, the EPA formally found that Ventura County had attained the federal 1-hour ozone

standard by its applicable attainment date of November 15, 2005. Likewise, all areas of the county have enjoyed similar reductions in 8-hour ozone levels.

There were 70 days countywide over the 1997 federal 8-hour (80 ppb) ozone standard in 1990 but only eight in 2009, four in 2010, and two in 2011. On September 14, 2012, the EPA found that Ventura County had attained the 1997 federal ozone standard by its applicable attainment date of June 15, 2013. The EPA revoked the 1997 federal ozone standard effective April 6, 2015. Likewise, in 1990, the county exceeded the previous 2008 standard (75 ppb) 117 times but only seven times in 2014, three times in 2015 and four times in 2016. These improvements have occurred despite a 28 percent increase in county population from 1990 through 2016.

Ventura County's air quality continues to improve towards the more stringent 2015 federal 8-hour (70 ppb) ozone standard. In 1990, the county exceeded that standard 138 times but only 22 times in 2020 and 9 times in 2021. These improvements have occurred despite a 25 percent increase in county population from 1990 through 2021 and should continue as local, state, and federal clean air programs continue to reduce air emissions responsible for ozone formation.

Important Partners

The District has not worked alone to improve Ventura County's air quality. We have benefited greatly from efforts of CARB, EPA, the South Coast Air Quality Management District and other California air districts, the Southern California Association of Governments, the County of Ventura and local cities, the Ventura County Transportation Commission, Ventura County Regional Energy Alliance, the Protecting Blue Whales and Blue Skies partnership, county businesses, regional non-profit organizations, and the public. We greatly appreciate their efforts on behalf of clean air in Ventura County and we look forward to these efforts continuing as we continue to work towards achieving the federal and state ozone standards.

SECTION 1. PURPOSE AND BACKGROUND

1.1. Purpose

The mission of the Ventura County Air Pollution Control District (APCD or District) is to protect public health and agriculture from the adverse effects of air pollution by identifying air pollution problems and developing a comprehensive program to achieve and maintain state and federal air quality standards. To that end, pursuant to the federal Clean Air Act Amendments of 1990 (CAAA), the 2022 Ventura County Air Quality Management Plan (AQMP) presents Ventura County's: 1) strategy to attain the 2015 federal 8-hour ozone standard; 2) attainment demonstration for the federal 8-hour ozone standard; and, 3) reasonable further progress demonstration for the federal 8-hour ozone standards. Ventura County's air quality has come a long way since the District was first created in 1968. However, the District recognizes there is more work to do to alleviate the detrimental health effects of air pollution. This AQMP will strive to pave a path forward to ensure clean air for all its residents.

1.2. Background

1.2.1. Health Effects of Air Pollution

Air pollution is hazardous to human health. The World Health Organization (WHO) estimates 4.2 million deaths occur every year as a result of exposure to ambient outdoor air pollution. CARB's air monitoring data indicates that over 90 percent of Californians breathe unhealthy levels of one or more air pollutants during some part of the year. Air pollution also diminishes the yield and quality of agricultural crops, reduces atmospheric visibility, degrades soils and materials, and damages native vegetation. Damage to agricultural crops from air pollution is an economic concern in Ventura County. According to the California Air Resources Board (CARB), several agricultural crops grown in Ventura County suffer from exposure to air pollution. A 1991 study concluded that ozone exposure in Ventura County caused a reduction in orange crop yield of 19 percent. As a result, federal and state ambient air quality standards are set to protect public health and welfare and minimize the effects of air pollution. These standards pertain to pollutants in ambient air – the air that people breathe outdoors. This plan focuses on one of those pollutants – ozone. Ventura County is designated a serious ozone nonattainment area for the 2015 federal ambient ozone standard.

Although the federal Clean Air Act (CAA) has significantly improved our nation's air quality, many areas still have serious air quality problems. Ozone, the main constituent of smog, is the most serious and widespread air pollution problem in the country. Ozone forms in the atmosphere by a series of chemical reactions and transformations involving Reactive Organic Gases (ROG) and Nitrogen Oxides (NOx) in the presence of sunlight. These "ozone precursor" pollutants come from a wide variety of sources such as gasoline vapors, fuel combustion, chemical solvents, and household products such as cleaners and paints.

Ozone is a pungent, pale blue, toxic gas consisting of three atoms of oxygen that can chemically burn and cause narrowing of airways, forcing the lungs and heart to work harder to provide oxygen

to the body. A powerful oxidant, ozone is capable of destroying organic matter – including human lung and airway tissue. Ozone damages cells in the lungs, making the passages inflamed and swollen. Ozone also causes shortness of breath, nasal congestion, coughing, eye irritation, sore throat, headache, chest discomfort, breathing pain, throat dryness, wheezing, fatigue, and nausea. It can damage alveoli, the individual air sacs in the lungs where oxygen and carbon dioxide exchange occur. Ozone also has been associated with a decrease in resistance to infections.

People most affected by ozone include the young, elderly, and athletes. Ozone may pose the worst health threat to people who already suffer from respiratory diseases such as asthma, emphysema, and chronic bronchitis, and those with cardiovascular diseases. Ozone also damages agricultural crops, native vegetation, and various natural and manufactured materials.

1.2.2. Meteorology of Ventura County

California is divided into 15 air basins to regionally manage the state's air resources. An air basin generally has similar meteorological and geographic conditions throughout. Ventura County is in the South Central Coast Air Basin (SCCAB), along with Santa Barbara and San Luis Obispo Counties. Each county in the air basin has its own air pollution control agency. APCD is the air pollution control agency for Ventura County and, along with CARB, is charged by state law to protect the people and the environment of Ventura County from the harmful effects of air pollution.

The air above Ventura County often exhibits weak vertical and horizontal dispersion characteristics, which limit the dispersion of emissions and cause increased ambient air pollutant levels. Persistent temperature inversions prevent vertical dispersion. The inversions act as a "ceiling" that prevents pollutants from rising and dispersing. Mountain ranges act as "walls" that inhibit horizontal dispersion of air pollutants. The diurnal land/sea breeze pattern common in Ventura County recirculates air contaminants. Air pollutants are pushed toward the ocean during the early morning by the land breeze, and toward the east during the afternoon, by the sea breeze. This creates a "sloshing" effect, causing pollutants to remain in the area for several days. Residual emissions from previous days accumulate and chemically react with new emissions in the presence of sunlight, thereby increasing ambient air pollutant levels.

This pollutant "sloshing" effect happens most predominantly from May through October (smog season). Air temperatures are usually higher and sunlight more intense during the smog season. This explains why Ventura County experiences the most exceedances of the state and federal ozone standards during this six-month period. In order to record exceedances, APCD continuously monitors the air at stations in El Rio, Ojai, Piru, Simi Valley, and Thousand Oaks. Those stations are shown in Figure 1-1 as red stars. Most monitoring stations continuously sample the air for ozone and fine Particulate Matter ($PM_{2.5}$), with the station in El Rio additionally sampling for coarse Particulate Matter (PM_{10}). APCD also monitors and forecasts fire weather daily by issuing Agricultural Burn Status updates for local farmers needing to burn their agricultural waste (with approved permits from the Ventura County Fire Department). Forecasting for "Burn" or "No Burn Days" is separated into six meteorologically distinct geographical regions, called burn regions and

shown in Figure 1-2. More information on the District's ambient air monitoring can be found in the District's Monitoring Division website.

Figure 1-1
APCD Monitoring Stations in Ventura County

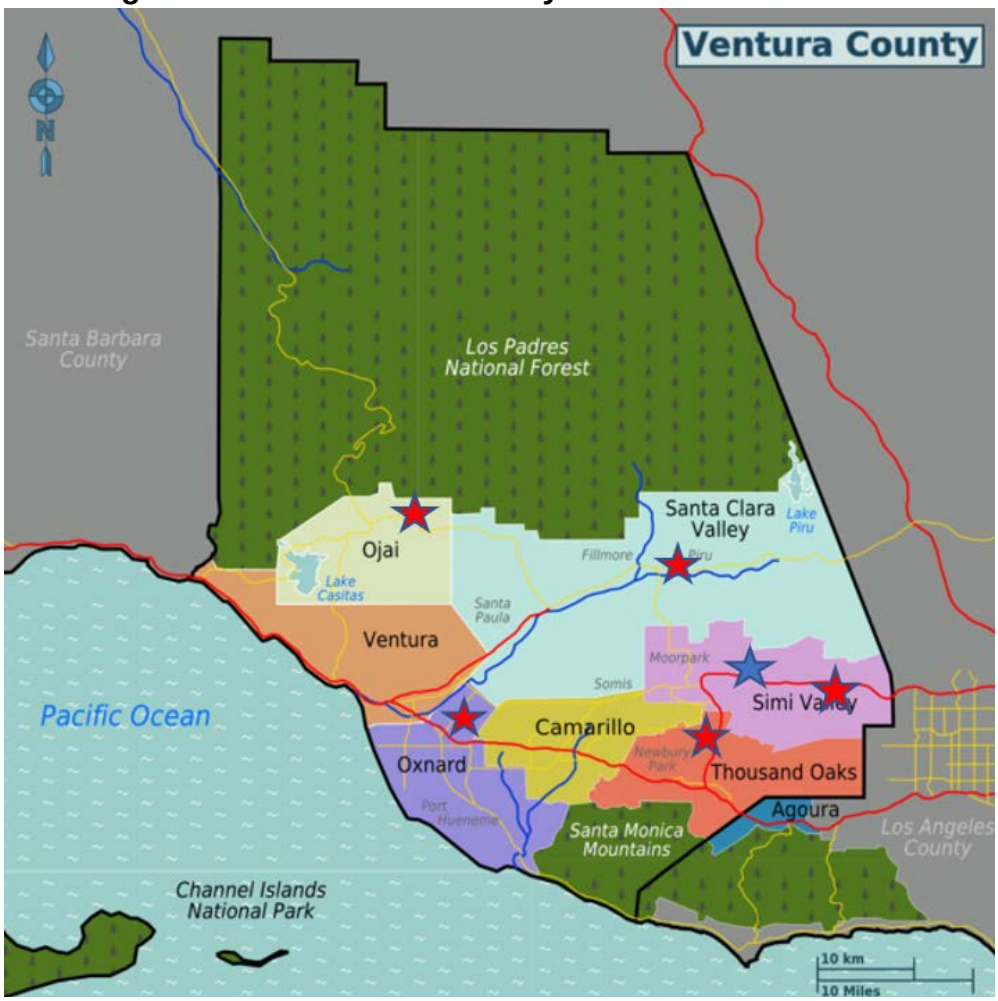
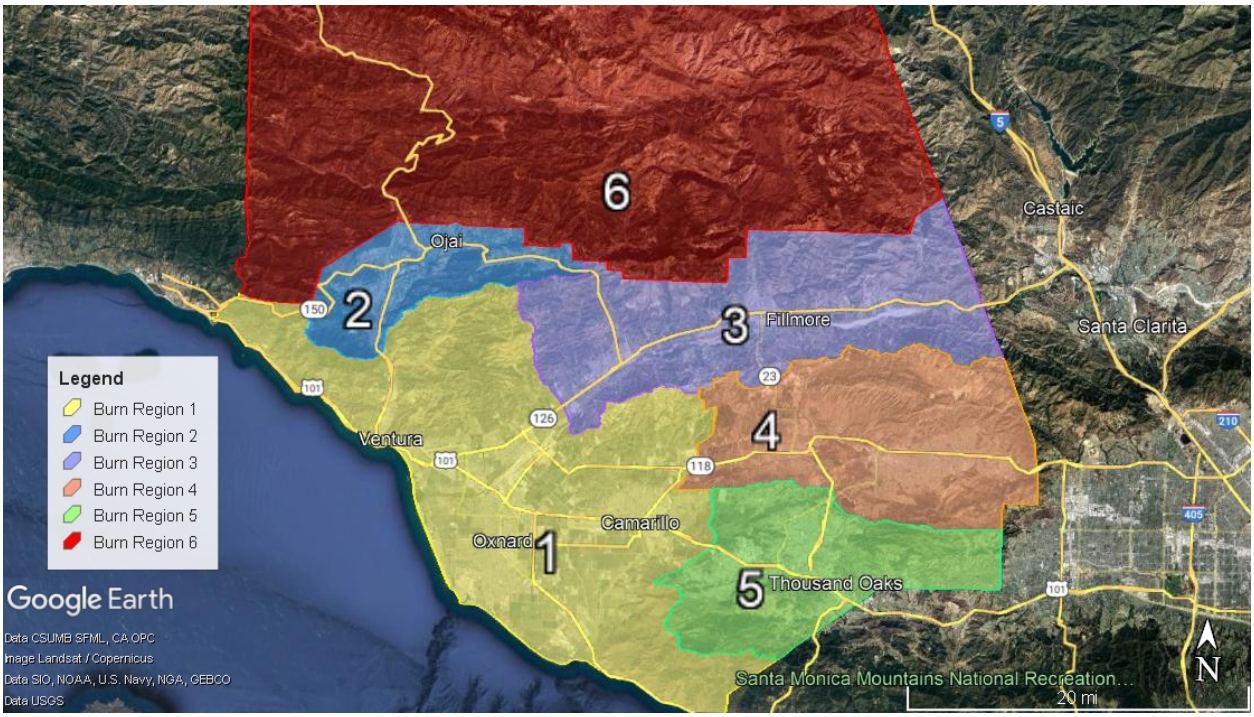


Figure 1-2
APCD Burn Regions

Geographic areas in California that exceed clean air standards are called nonattainment areas.



Ventura County is a nonattainment area for the 2015 federal 8-hour ozone standard. The Ventura County 8-hour ozone nonattainment area includes all of mainland Ventura County (including ocean areas out to three miles from the mainland shore) but excludes Anacapa and San Nicolas Islands. A map of the Ventura County 8-hour ozone nonattainment area is available in the U.S. Environmental Protection Agency (EPA) website. Ventura County is also in nonattainment for the California 1-hour and 8-hour ozone standards. In Ventura County, ozone generally reaches peak levels by mid-afternoon and, along with ozone precursors, is often blown inland by the prevailing winds. Thus, inland areas such as Simi Valley, Thousand Oaks, Ojai, Fillmore, and Piru often have higher ozone levels and more days over the federal and state ozone standards than the county's coastal areas. The smoggiest days tend to occur from May through October (smog season) when high temperatures and stable atmospheric conditions produce conditions conducive to ozone formation and buildup.

1.3. Federal Clean Air Act and Air Quality Standards

On November 15, 1990, President George H.W. Bush signed the CAAA into law. The purpose of the CAAA is to provide clean, healthful air for all people of the country. The CAAA specifies dates by which areas of the country must meet the National Ambient Air Quality Standards (NAAQS).

The EPA sets NAAQS as the maximum concentrations in the atmosphere for specific air contaminants in order to protect public health and welfare. The EPA has adopted NAAQS for Ozone (O_3), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), fine particulate matter ($PM_{2.5}$), coarse particulate matter (PM_{10}), and sulfur dioxide (SO_2). Ventura County is designated nonattainment for the federal 2015 8-hour ozone standard and attainment of all other federal air quality standards.

The CAAA delegates primary responsibility for achieving the NAAQS to the states. The State Implementation Plan (SIP) is the principal mechanism for complying with the CAAA and meeting clean air standards. SIPs are "roadmaps" to clean air. A SIP outlines the actions, programs, and commitments each state will take to carry out its CAAA responsibilities to provide clean air for its citizens.

SIPs are not single documents; rather, they are compilations of new and previously submitted plans, programs (such as air quality monitoring and modeling, permitting, etc.), district rules, state regulations, and federal emission controls. Many California SIPs rely on the same core set of control strategies, including emission standards for motor vehicles, stationary internal combustion engines, fuel regulations, and limits on emissions from consumer products.

The provisions and commitments in SIPs are federally enforceable. Moreover, the CAAA require that EPA impose sanctions on areas that fail to submit a SIP, fail to submit an adequate SIP, or fail to implement a SIP unless the state corrects such failures. Sanctions include 2-to-1 emission offsets for new air pollution sources and a ban on most federal highway grants. An additional ban on air quality grants is discretionary. Ultimately, EPA may impose a federal clean air plan, called a federal implementation plan (FIP), if EPA finds that the state failed to submit or implement an adequate SIP.

CARB is the lead state agency for the California SIP. Local and regional air agencies, as well as other local and state agencies, such as the Southern California Association of Governments (SCAG) and the Bureau of Automotive Repair, prepare SIP elements and submit them to CARB for review and approval. CARB then forwards the SIP revisions to EPA for approval and publication in the Federal Register (FR). The Code of Federal Regulations (CFR) Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all the items and elements included in the California SIP.

Since its formation in 1968, the District has prepared many air quality documents to satisfy federal and state clean air requirements. The most important of these are the AQMPs. These plans are not one-time documents but are periodically revised and updated in response to changes in governing law and air pollution control science and technology. The 2022 AQMP is the first Ventura County clean air plan for the 2015 federal 8-hour ozone standard.

1.3.1. 1979 Federal 1-hour Ozone Standard

In 1979, EPA established a NAAQS for ozone at 120 parts per billion (ppb) in any one-hour period. The CAAA classifies areas based on the severity of each area's respective ozone problem. These classifications are marginal, moderate, serious, severe, and extreme. Areas with more severe air quality problems have progressively greater requirements to meet under the CAAA. In addition, areas with higher nonattainment classifications also have later attainment dates. Marginal areas have the least amount of time to attain the standard; extreme areas have the most amount of time. On November 6, 1991, EPA designated Ventura County a severe nonattainment area for the 1-hour ozone standard with an attainment deadline of November 15, 2005.

Ventura County attained the 1979 federal 1-hour ozone standard in 2003 and subsequent air quality data shows that the county has remained in attainment since that time. Effective June 15, 2005, the EPA revoked the federal 1-hour ozone ambient air quality standard, including associated designations and classifications, in most areas of the country, including Ventura County. However, a court decision related to the revocation of the 1-hour ozone standard found that areas that were subject to certain planning requirements based on their 1-hour ozone nonattainment designation were still obligated to meet those requirements even though the standard had been revoked (anti-backsliding provision).

On April 15, 2009, CARB requested that EPA find that Ventura County had attained the revoked 1-hour standard. On May 27, 2009, EPA made that finding (effective July 27, 2009). In conjunction with that finding, EPA also found that Ventura County was no longer required to implement contingency measures nor required to impose CAAA Section 185 penalty fees on certain large air emission sources. However, the attainment finding was not a redesignation of Ventura County from a nonattainment area to an attainment area. Redesignation would have been a far more complex EPA action involving an ozone maintenance plan. The attainment finding only established that Ventura County had successfully fulfilled its statutory and regulatory obligations under the CAAA and corresponding federal regulations to attain the federal 1-hour ozone standard by its designated attainment deadline. Although an attainment finding under the CAA does not constitute a redesignation to attainment, under EPA's Clean Data Policy, an attainment finding allows suspension of certain SIP requirements, such as attainment and progress plans. Such a suspension applies as long as the area remains in attainment or until the area completes the requirements for redesignation to attainment.

1.3.2. 1997 Federal 8-hour Ozone Standard

Based on medical studies demonstrating that the 1-hour standard was inadequate for protecting public health, in 1997 the EPA adopted an 8-hour standard to replace the 1-hour standard. This change lowered the standard for ozone from 120 ppb, averaged over one hour, to 80 ppb, averaged over eight hours. That standard was more stringent than the 1-hour standard and better protected human health from the effects of smog.

The federal 1997 8-hour ozone rule set new planning requirements for nonattainment areas. These requirements address such topics as classification and attainment deadlines, 1-hour ozone standard to 8-hour ozone standard transition, anti-backsliding provisions, reasonably available control technology (RACT), reasonable further progress (RFP) plans for 2002 - 2008, post-2008 RFP plans, transportation control measures (TCM), including reasonably available control measures (RACM), attainment demonstrations, and transportation and general conformity.

As with the federal 1-hour ozone standard, 1997 8-hour ozone nonattainment areas have increasingly stringent requirements based on the severity of their respective 8-hour ozone attainment status. On April 30, 2004, the EPA determined that areas violated the federal 8-hour ozone standard based on their design values. These attainment status designations became effective June 15, 2004. Ventura County's 8-hour ozone design value was 95 ppb. Based on that value, EPA designated Ventura County a moderate nonattainment area for the federal 8-hour ozone standard. Moderate areas were to attain the federal 8-hour ozone standard by June 15, 2010. CAAA allows federal nonattainment areas to voluntarily reclassify ("bump-up") to higher nonattainment classifications (e.g., from moderate to serious). That provision gives areas additional time to attain if they are doing everything practicable to attain but are not able to do so by their statutory attainment dates. EPA is obligated to grant voluntary bump-ups but bumped-up areas must still attain as expeditiously as practicable and meet all CAAA requirements for their new, higher classifications.

On February 14, 2007, at the direction of the District, CARB formally requested that EPA bump-up Ventura County from its original moderate 8-hour ozone nonattainment classification to the higher serious 8-hour ozone nonattainment classification with an attainment deadline of June 15, 2013. EPA approved the request on May 20, 2008. The voluntary bump-up was necessary because the photochemical modeling conducted for the 2007 AQMP (prepared for the 1997 federal 8-hour ozone standard) indicated that Ventura County would not attain that standard until June 15, 2013, the attainment deadline for serious ozone nonattainment areas. A serious classification means that Ventura County had to meet the requirements for that classification in addition to the requirements for the lower marginal and moderate ozone nonattainment classifications.

On June 20, 2012, CARB requested that EPA find that Ventura County had attained the 1997 8-hour ozone standard. In addition, CARB also requested that EPA suspend the attainment plan and progress plan requirements as allowed by EPA's Clean Data Policy.

On September 14, 2012, EPA made that finding (effective November 13, 2012). Similar to the 1-hour attainment finding, the 8-hour attainment finding also suspended certain State Implementation Plan requirements for as long as Ventura County continues to meet the 1997-ozone standard or completes requirements for redesignation to attainment.

1.3.3. 2008 Federal 8-hour Ozone Standard

On March 12, 2008, EPA strengthened the federal 8-hour ozone standard to better protect public health and welfare. EPA revised the 8-hour primary ozone standard, designed to protect public health, to 75 ppb from 80 ppb. EPA also strengthened the secondary 8-hour ozone standard to 75 ppb making it identical to the revised primary standard.

EPA estimated that the revised ozone standards will yield health benefits valued between $2 billion and $17 billion. Those benefits include preventing bronchitis, aggravated asthma, hospital and emergency room visits, non-fatal heart attacks and premature death, among others.

On May 21, 2012, EPA finalized its first of two ozone implementation rules for the 2008 ozone NAAQS. The rule established the air quality thresholds (marginal, moderate, serious, severe, and extreme) that define the classifications assigned to all nonattainment areas for the 2008 75 ppb ozone NAAQS that were promulgated on March 12, 2008. The rule also granted reclassification for six California ozone nonattainment areas that voluntarily reclassified themselves to higher nonattainment classifications under the 1997 ozone standard. Ventura County was one of those areas. Hence, its 2008 75 ppb 8-hour ozone nonattainment classification is serious, the same as under the 1997 80 ppb 8-hour ozone standard. Lastly, the rule revoked the 1997 ozone NAAQS for transportation conformity purposes one year after the effective date of designations for the 2008 75 ppb ozone NAAQS.

On March 6, 2015, EPA published its second implementation rule for the 2008 ozone standards that were promulgated on March 12, 2008. This rule addresses additional nonattainment area state implementation plan requirements for the 2008 ozone NAAQS, including requirements pertaining to attainment demonstrations, RFP, RACT, RACM, major new source review (NSR), emission inventories, and the timing of SIP submissions and of compliance with emission control measures in the SIP. Other issues addressed in the rule include revocation of the 1997 ozone standard for all purposes, including transportation conformity, and anti-backsliding requirements that applied to the 1997 ozone standard. Anti-backsliding requirements help ensure that air quality in non-attainment areas does not get worse when a federal air quality standard is revoked.

As a serious nonattainment area for the 2008 ozone standard, Ventura County submitted its attainment plan through CARB to EPA on April 11, 2017. The plan shows how Ventura County will meet the 2008 ozone standard by the July 20, 2021 statutory deadline. However, a December 23, 2014 D.C. Circuit Court decision vacated the portion of the Classifications Rule that established December 31 of the applicable year as the maximum attainment date for each ozone nonattainment classification. Pursuant to the ruling, moderate and above area attainment demonstrations must ensure emissions controls are implemented no later than the beginning of the ozone season prior to the attainment date (e.g., beginning of the 2020 ozone season for serious areas). This effectively shortens the maximum allowable attainment date for all classifications by one ozone season.

1.3.4. 2015 Federal 8-hour Ozone Standard

On October 26, 2015, EPA again strengthened the federal 8-hour ozone standard to better protect public health and welfare (80 FR 65292). EPA revised the 8-hour primary ozone standard, designed to protect public health, to 70 ppb from 75 ppb. EPA also strengthened the secondary 8-hour ozone standard to 70 ppb making it identical to the revised primary standard.

EPA estimates that the revised ozone standards will yield health benefits valued between $2.9 billion and $5.9 billion. Those benefits include preventing bronchitis, aggravated asthma, hospital and emergency room visits, non-fatal heart attacks and premature death, among others.

On June 4, 2018, EPA published the final rule Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards with an effective date August 3, 2018. Ventura County is classified as a serious nonattainment area for the 2015 70 ppb 8-hour ozone standard, which is the same classification under the 2008 and 1997 Ozone standards. As a serious nonattainment area for the 2015 ozone standard, Ventura County must submit an air quality plan (attainment plan) by August 3, 2022 (four years from the effective date of designation on August 3, 2018) that shows how Ventura County will meet the 2015 ozone standard by the August 3, 2027 (2026 ozone season).

The EPA final rule Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements (Implementation Rule) for the 2015 ozone NAAQS was published in the Federal Register on December 6, 2018 with an effective date of February 4, 2019. This rule addresses nonattainment area state implementation plan requirements for the 2015 ozone NAAQS, including requirements pertaining to attainment demonstrations, RFP, RACT, RACM, major new source review (NSR), emission inventories, and the timing of SIP submissions and of compliance with emission control measures in the SIP. The Implementation Rule retained many of the same requirements that were promulgated for the 2008 ozone NAAQS, updated with appropriate dates and ambient ozone concentrations.

Another primary requirement that Ventura County has to meet for the 2015 ozone standard is an RFP plan showing 15 percent ROG and/or NOx reductions over the initial six-year period (2018-2024) and three percent per year thereafter to 2026 (attainment year). The RFP plan is also due August 3, 2022 and has been incorporated into the 2022 attainment plan.

Effective December 31, 2020, EPA determined it would retain the 2015 ozone NAAQS without revision after completion of its review of the standard. However, on October 28, 2021 EPA announced it would reconsider the decision to retain 2015 standards, based on the existing scientific record. EPA is targeting the end of 2023 to complete this reconsideration.

1.4. Progress in Improving Ventura County Air Quality

1.4.1. Reduction in Ozone Levels

Since 1990, all areas of the county have enjoyed significant reductions in ozone levels. Figure 1-3 shows that, despite a population increase of 25 percent, there were 138 days countywide over the current federal 8-hour ozone standard of 70 ppb in 1990, but only 22 in 2020 and 9 in 2021. Over the same time period, the county's 8-hour ozone values (called "design values") used to determine compliance with the federal 8-hour ozone standard fell dramatically as well. More significantly, the 8-hour ozone design values at all of the county's APCD air quality monitoring stations are approaching or are now lower than the 2015 federal 8-hour ozone standard. An exceedance of a standard is not necessarily related to a violation of the standard. However, the federal 8-hour standard is violated when the average of the three annual fourth highest 8-hour averages over three years is greater than 70 ppb.

As shown in Figure 1-4, the countywide 8-hour ozone design value dropped from 130 ppb in 1990 to 75 ppb in 2021 Moreover, as shown in Figures 1-5 through 1-7, the design values at each of the County's monitoring stations are near (Simi) or below (Ojai Valleys, Piru, Thousand Oaks, Ventura, and El Rio) the current federal 8-hour ozone standard (70 ppb).

Figure 1-3
Days Over Federal Ozone Standard vs. County Population Growth

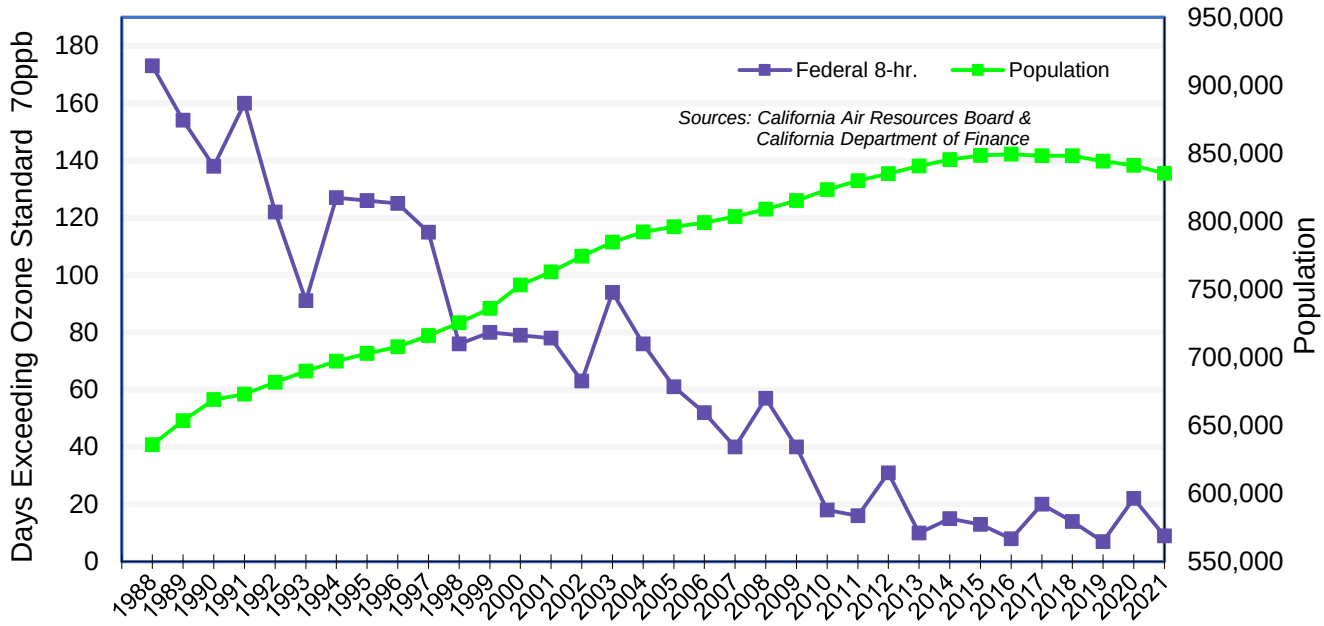


Figure 1-4
Countywide 8-Hour Ozone Design Values

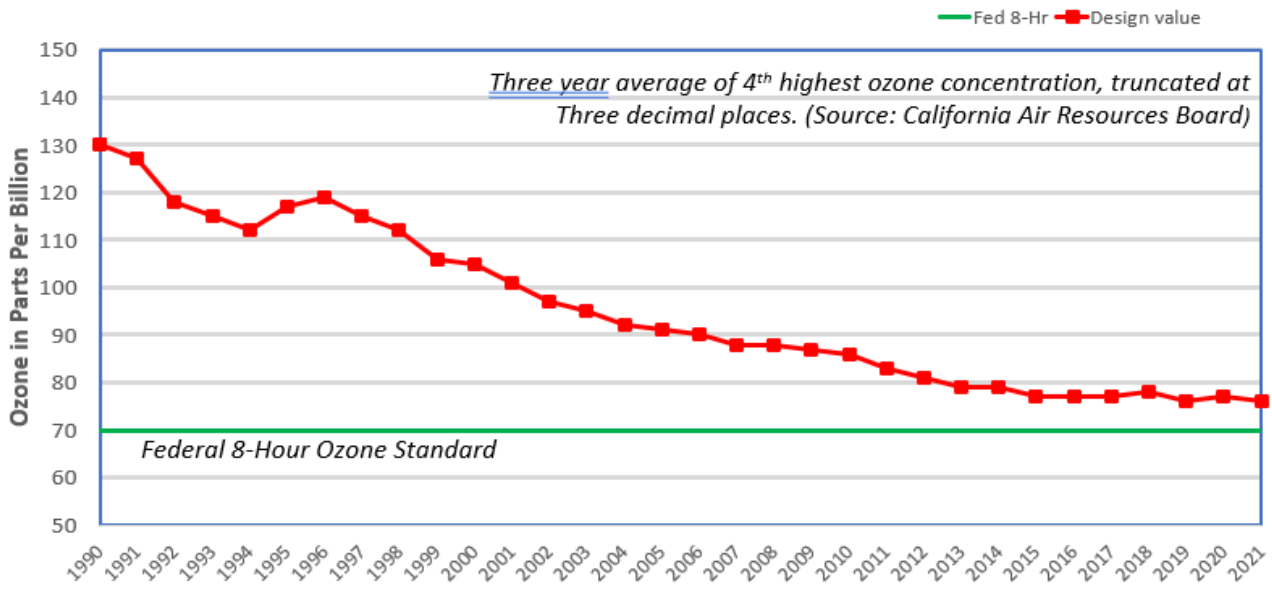


Figure 1-5
8-Hour Ozone Design Values for Simi Valley & Piru

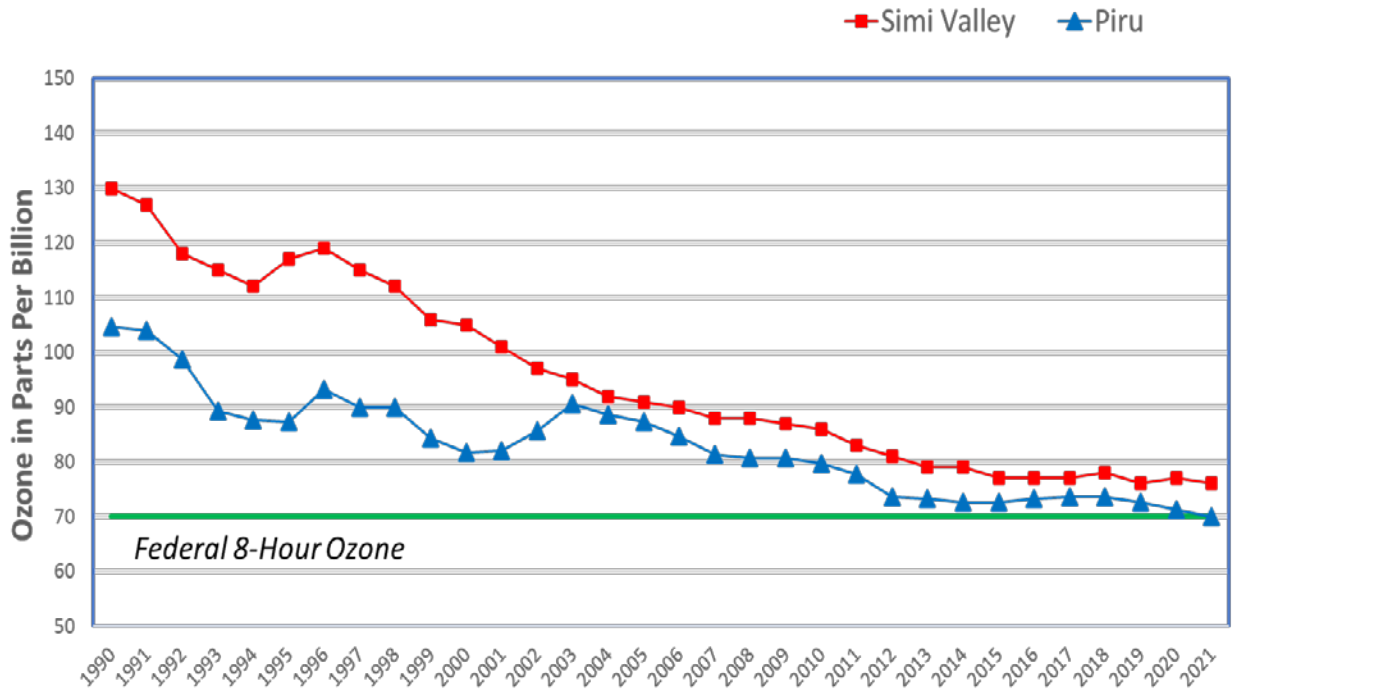


Figure 1-6
8-Hour Ozone Values for Thousand Oaks & Ojai Valley

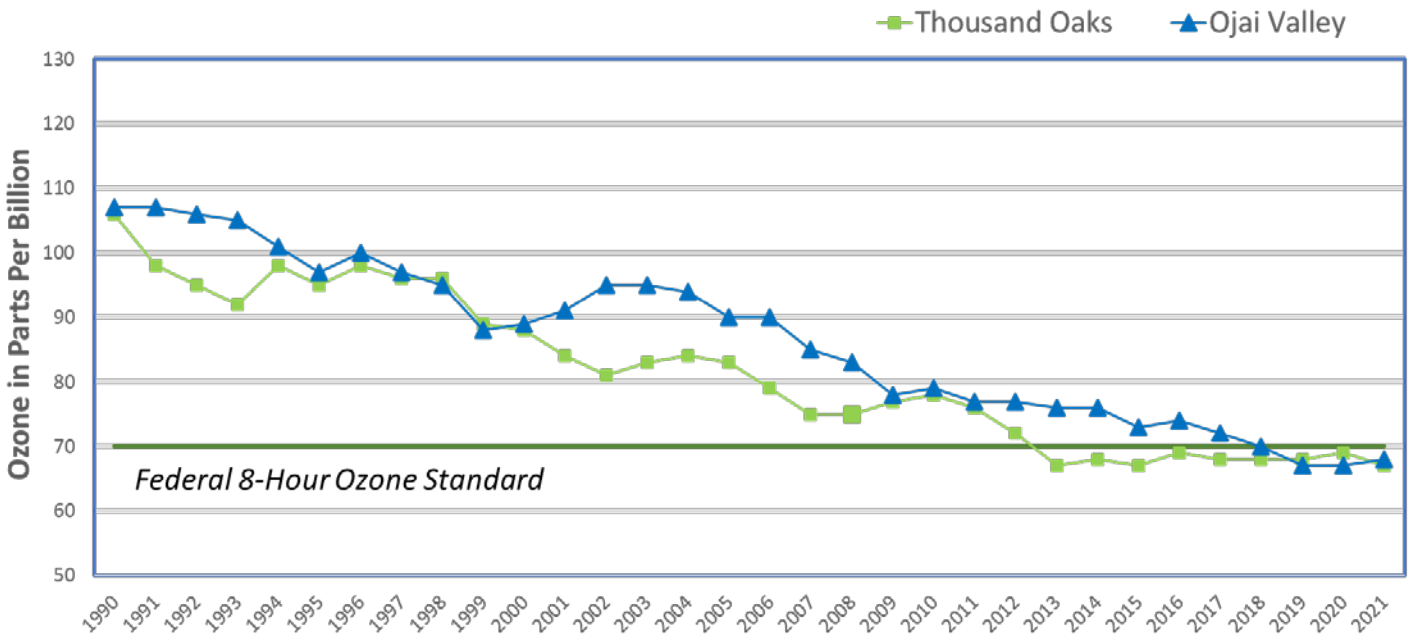
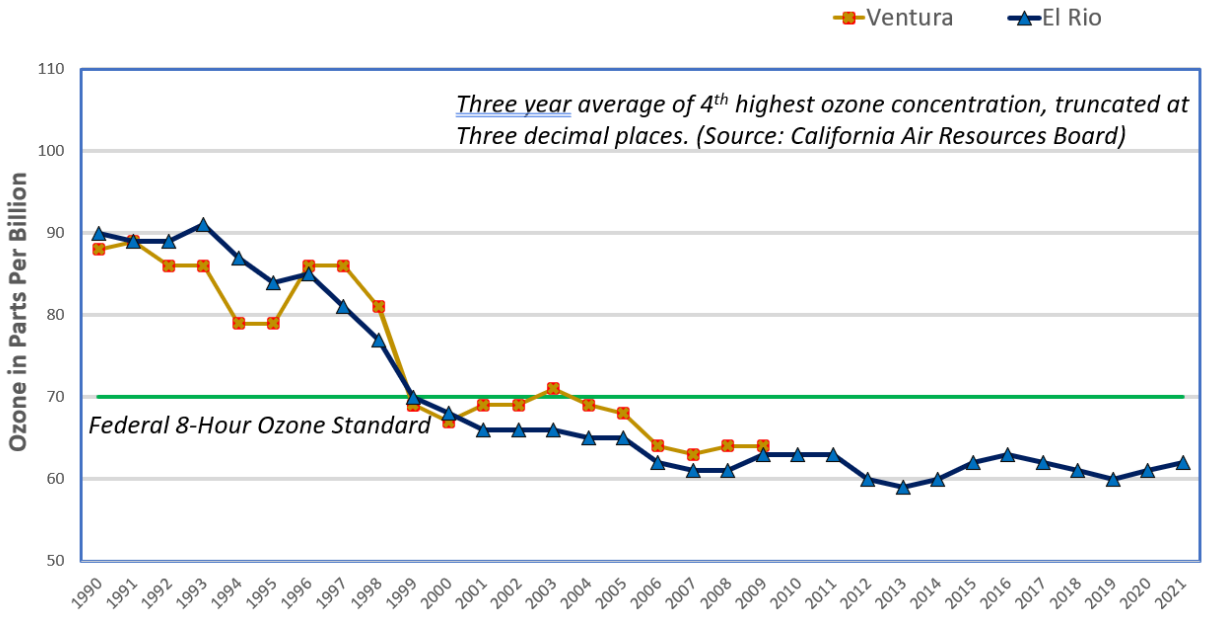


Figure 1-7
8-Hour Ozone Values for Ventura & El Rio



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SECTION 2. 2018 BASELINE EMISSIONS INVENTORY

An emissions inventory is a large dataset that describes emission sources and quantifies pollutants released into the atmosphere from a large variety of sources. Ozone nonattainment areas, such as Ventura County, must develop and continually update their baseline emissions inventories to evaluate federal, state, and local control programs and report emission reduction progress.

A baseline year or base year is a specific year used to gauge and evaluate past and future emissions estimates. The 2018 emissions inventory is the current baseline year for forecasting future year emissions and from which the SIP inventories are derived. The District chose 2018 as the base year inventory for this 70 ppb 8-hour Ozone SIP because it was the most recent year for which comprehensive emission estimates were available and representative of typical meteorology and climate.

This section summarizes the 2018 baseline ROG and NOx 8-hour ozone SIP emissions inventory for Ventura County. Appendix A, *Ventura County Emissions Inventory Documentation*, provides further information and documentation of the emissions inventory for the 2022 AQMP.

ROG and NOx are the most important pollutants in the air chemistry of ozone formation because they chemically react in the presence of ultraviolet light from the sun to form ozone, the primary constituent of smog. ROG is the photochemically reactive fraction of Total Organic Compounds (TOC) involved in the creation of ozone. ROG excludes methane and other compounds with inconsequential effects on ozone photochemical reactivity. For a list of negligibly reactive or low reactive compounds with respect to ambient ozone formation, refer to Exempt Organic Compounds in District Rule 2, Definitions. Even though the technical definition of ROG defined by CARB differs from the EPA definition of volatile organic compounds (VOC) and the District's definition of ROC, for the purpose of this document, the definition of ROG is equivalent to "reactive organic compounds" (ROC) used in District rules and operating permits, and "VOC" used by EPA. Going forward, the term "ROG" will be used throughout this document.

ROG and NOx emissions are reported in the emissions inventory in tons per day (tpd), calculated for the summer season (May - October) when the potential for ozone formation potential is greatest. Hence, May through October is considered ozone season in Ventura County. Ozone season summer day emissions also are referred to as "planning day emissions" and represent anthropogenic (man-made) emission sources only.

The planning day emissions inventory excludes non-anthropogenic "Natural Sources" emissions such as biogenics, geogenics, and wildfires. Although Natural Sources emissions are not subject to regulatory authority or control by the District or CARB, they are pertinent to ozone formation and are included in the Attainment Demonstration photochemical modeling emission inventory described in Section 5.

Emissions data are compiled into major source categories developed by CARB. Ventura County emissions are also distinguished by onshore and offshore geographic areas. The onshore area includes all of Ventura County out to the 3-mile State Tidelands Boundary area. This onshore and tidal area is the non-attainment area for Ventura County for the 70 ppb 8-hour ozone standard. This area is also referred to in this document as the Ventura County portion of the South Central Coast Air Basin, or SCCAB. The SCCAB comprises of Ventura, Santa Barbara, and San Luis Obispo Counties.

The offshore area beyond the State Tidelands out to 100 miles from shore is known as the Outer Continental Shelf and is divided into the Outer Continental Shelf-24 Miles (OC1) Air Basin, which is the offshore area beyond the State Tidelands out to 24 miles from shore, and the Outer Continental Shelf-100 Miles (OC2) Air Basin, which is the offshore area from 24 miles to 100 miles from shore. The OC1 and OC2 emissions are significant and are included in the photochemical modeling used to demonstrate attainment of the 8-hour ozone standard. These geographic areas distinguish the emissions in both this section and Section 4, *Emissions Inventory Forecasts*. Historically, OC1 and OC2 were grouped together as a single air basin and were referred to as the Outer Continental Shelf (OCS) air basin, but CARB recently divided the OCS area into the current OC1 and OC2 areas for reporting purposes.

2.1. Emissions Inventory Reporting Requirements

This document complies with both state and federal emissions inventory reporting requirements for the 2018 base year actual emissions and future year emission inventory forecast methodology in Section 4. Guidance on how to develop emission inventories to meet 8-hour ozone SIP requirements is in EPA document, *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations*. In addition, the California Health and Safety Code (CH&SC) Sections 40913(4)(5), 40914(c), 40918(a), 40924(b), and 40925 require emission inventory review, correction, and incorporation of the most current emission factors, growth and control data, and future year forecast estimates.

2.2. Clean Air Act Emissions Statement Requirements

Federal CAA section 182(a)(3)(B) Emissions statements defines Emissions Statement requirements for ozone nonattainment areas classified as marginal and above. CAA 182(a)(3)(B) subsection (i) requires states to have an Emissions Statement program (i.e., a rule) requiring stationary sources to report and certify the accuracy of NOx and ROG emissions, beginning in 1993 and annually thereafter.

Subsection (ii) has waiver provisions for subsection (i) for stationary sources emitting less than 25 tons/year NOx or ROG if the State provides an inventory of emissions from such class or category of sources, based on the use of the emission factors established by the EPA or other methods acceptable to the EPA, under CAA 182(a) subparagraph (1) (the nonattainment plan actual

emission inventory due for submittal to EPA in 1992) or subparagraph (3)(A) (the periodic triennial inventory CARB submits to EPA on behalf of all the nonattainment areas in California). The Emissions Statement requirements for the 2015 8-hour ozone standard are described in the Ozone SIP Requirements Rule, FR Volume 83, December 6, 2018, Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements; Final Rule (83 FR62998, December 6, 2018). If a non-attainment area has a previously approved emission statement rule in force for a previous ozone standard covering all portions of the nonattainment area for the 2015 8-hour ozone standard, the existing rule may be sufficient for the 2015 8-hour ozone standard. If the existing rule does not meet CAA 182(a)(3)(B) requirements, a revised or new rule would have to be submitted as part of the 2022 8-hour ozone SIP.

District Rule 24, *Source Recordkeeping, Reporting and Emission Statements*, Section C, *Emission Statements*, addresses CAA 182(a)(3)(B) Emissions Statement requirements. District Rule 24 was last revised in September 1992, submitted to EPA in November 1992 and adopted by EPA into the 2012 SIP on December 7, 2000 (65 FR 76567).

The first paragraph of Rule 24C deals with the reporting, certification, and reporting schedule requirements of CAA 182(a)(3)(B)(i). The owner or operator of any stationary source emitting NOx or ROG must provide the Air Pollution Control Officer (APCO) with a written statement showing actual NOx and ROG emissions from that source. Information in the emission statement shall be certified as accurate by a company or agency official. Emissions statements must be submitted annually thereafter.

The third paragraph of Rule 24C concerns the waiver requirements of CAA 182(a)(3)(B)(ii). The APCO may waive Rule 24 Section C requirements for any class or category of stationary sources which emit less than 25 tons/year of NOx and less than 25 tons/year of ROG if the District provides the CARB with an inventory of sources emitting more than 10 tons/year of either NOx or ROG based on the use of emission factors acceptable to the CARB.

The District updates emissions for stationary source facilities with 10 tons/year permitted NOx or ROG each year and reports the emissions to CARB's statewide emissions inventory. CARB in turn reports the process and emissions data to EPA in their triennial National Emissions Inventory (NEI) submittal. This satisfies the CAA 182(a)(3)(B)(ii) waiver provisions.

Since the Ventura County nonattainment area for the 2008 and 2015 8-hour ozone standards is the same as for the revoked Ventura County 1-hour ozone standard non-attainment area, it is the District's determination that the existing provisions of Rule 24C adequately meet the Emissions Statement program requirements of CAA 182(a)(3)(B) for the purposes of the 2015 8-hour ozone standard, as shown in Table 2-1, and no revision of the rule is required. The District submitted an Emission Statement Certification indicating that the existing rule met the requirements of the CAA in June 2020.

Table 2-1
CAA 182(a)(3)(B) Requirements and Provisions of District Rule 24 C

CAA 182(a)(3)(B) Requirements	District Rule 24 C
CAA 182(a)(3)(B)(i)	
State must submit revision to SIP within 2 years of November 15, 1990 requiring the owner/operator of stationary sources to report NOx or ROG emissions.	Rule 24 submitted to EPA in November 1992 and adopted by EPA into the SIP on December 7, 2000.
Require the owner/operator of stationary sources of NOx or ROG to provide the State with statements showing the actual NOx and ROG emissions.	The owner or operator of any stationary source that emits or may emit NOx or ROG shall provide the APCO with a written statement showing actual emissions of NOx and ROG from such stationary source.
First emissions statement shall be submitted within 3 years after November 15, 1990. Subsequent statements shall be submitted at least every year thereafter.	The first emission statement shall cover the calendar year of 1992 and shall be submitted to the APCO no later than November 1, 1993. Emissions statements shall be submitted annually thereafter.
Statement shall contain a certification that the information contained in the statement is accurate to the best knowledge of the individual certifying the statement.	The emission statement shall be certified by a company or agency official of such source and shall state that the information contained in the emission statement is accurate to the best knowledge of the individual certifying the statement.
CAA 182(a)(3)(B)(ii)	
State may waive the application of clause (i) to any class or category of stationary sources emitting less than 25 tons per year of ROG or NOx. State provides an inventory of emissions from such class or category of sources in its submissions under CAA 182(a) subparagraph 1 or CAA 182(a) subparagraph (3)(A).	The APCO may waive the requirements of this Section for any class or category of stationary sources which emit less than 25 tons per year of NOx and less than 25 tons per year of ROG if the District provides the CARB with an inventory of sources emitting 10 tons or more per year of either nitrogen oxides or reactive organic gases based on the use of emission factors acceptable to the CARB.

2.3. Emissions Inventory Major Categories

The 2018 base year emissions inventory is an aggregate of two general emission source types: 1) stationary and area-wide sources, and 2) mobile sources. Mobile sources include on-road motor vehicles and other mobile (off-road) sources. Stationary sources are those that have a fixed

geographic location, such as power plants, industrial engines, and oil storage tanks. Area-wide sources are emission sources occurring over a wide geographic area such as consumer products and architectural coatings. Mobile sources are mobile in nature, such as motor vehicles, boats, and aircraft.

CARB maintains the California Emission Inventory Development and Reporting System (CEIDARS), the comprehensive statewide emissions inventory database. The state's local air pollution control districts, including Ventura County, provide updates to CEIDARS every year using local data. Table 2-2 presents a summary of Ventura County's 2018 baseline summer planning day emissions for ROG and NOx for the combined SCCAB, OC1, and OC2 air basin. Figure 2-1 displays the pollutant distribution in the major categories.

Table 2-2
2018 Baseline Summer Planning Day Emissions

	(tons/summer day)	
Both SCC and OCS Air Basins	**ROG**	**NOx**
Total Stationary and Areawide Sources	17.66	2.62
Total On-road Vehicle Sources	4.28	7.03
Total Other Mobile Sources	9.39	22.16
Total Emissions	**31.32**	**31.82**

Notes:
Source: California Emission Projection Analysis Model (CEPAM) v1.01 (March 2022).
Includes OC1 and OC2 Air Basin emissions.
Data rounding may affect totals.

2.3.1. Stationary Sources

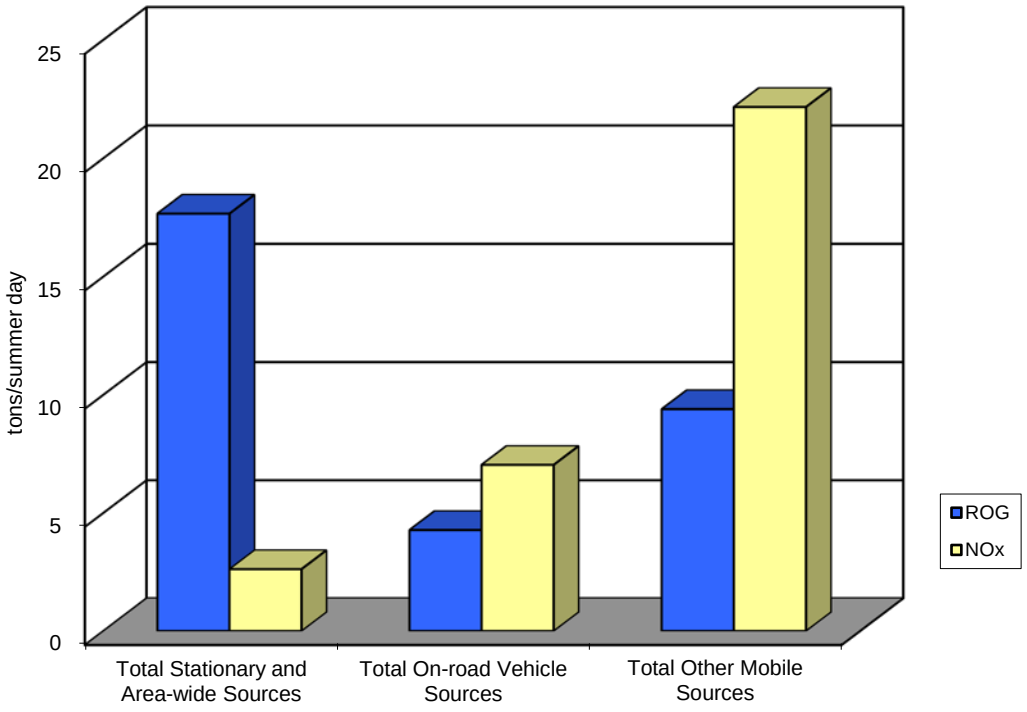
Stationary Sources are comprised of two major emission source types, point sources and area sources. Point sources are single, fixed sources of air pollution. Examples of point sources include electrical power generating plants, petroleum production facilities, and industrial engines. Initially, point sources are identified through the District's Permit to Operate evaluation or during the rule development process.

Permitted stationary sources are inspected by District staff annually and are subject to air pollution rules applicable to specific facility operations and equipment. In addition, the District surveys point source facilities annually to document changes to equipment and gather activity data used to calculate and update annual emissions.

Point sources that emit 25 tons or more per year of either ROG or NOx are considered major sources under CAAA Section 182(d). There were two ROG point sources emitting greater than 25 tons per year and three NOx point sources emitting greater than 25 tons per year in 2018. All of the major stationary sources are in the point source inventory along with 266 other permitted facilities for 2018.

Smaller permitted sources are accounted for in area source categories. Area source categories are groups of similar emission sources that do not individually emit large amounts of pollutants, but when aggregated on a countywide basis can contribute significant air emissions. Examples of permitted area sources include gasoline stations and dry cleaners. The District has approximately 1,800 permitted sources in its 2018 baseline emissions inventory, accounted for as either point or area sources.

Figure 2-1
2018 Baseline Summer Planning Day Emissions
Pollutant Distribution



Other area source categories also include sources not under district permit. Examples of unpermitted area sources include organic material composting, small combustion sources such as engines and boilers, and fugitive ROG losses from natural gas transmission.

Emissions from area sources are determined in a variety of ways. One accepted estimation method, generally referred to as the "bottom-up" method, surveys local emission sources, such as organic composting operations, to obtain specific countywide data. Another method is referred to as the

"top-down" approach. National or statewide data such as metal parts coating and architectural coating usage are gathered and apportioned down to the county level based on distribution factors representative of Ventura County.

Area source category emissions estimates are developed by both the District and the CARB. Area source methodologies are described in Appendix A and summaries of the area source methodologies are posted on the CARB's Index of Methodologies website.

Every year District staff evaluates the data and methods used in order to improve and update the emissions inventory. CARB and District staff coordinate the update process through the state's Emissions Inventory Technical Advisory Committee (EITAC). The refinement of the emissions categories is ongoing and necessary to better classify and quantify the emissions, and to evaluate feasibility of new control technologies and cost-effectiveness of controls when developing state or local rules.

2.3.2. Mobile Sources

There are two major source categories for mobile sources: On-Road Motor Vehicles and Other Mobile Sources. Mobile sources contribute the largest amount of criteria air pollutants into the air statewide. CARB calculates mobile source emissions with input from detailed mobile source emission models. Complete documentation for mobile source category emissions and models is available at CARB's website: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory. Appendix A of the 2022 AQMP includes a general description of the mobile source emissions for Ventura County.

2.3.2.1. On-Road Motor Vehicles

CARB developed the EMission FACtors (EMFAC) model to assess state-wide and regional emissions from On-Road Motor Vehicles, including passenger cars, heavy-duty trucks, and buses operating on highways, freeways, and local roads in California, and to support CARB's regulatory and air quality planning efforts to meet the Federal Highway Administration's transportation planning requirements.

EPA approves EMFAC for use in SIPs and transportation conformity analyses. EMFAC uses regional transportation model outputs and motor vehicle-related data from the California Department of Transportation (Caltrans) and the California Department of Motor Vehicles (DMV) to calculate on-road vehicle emissions.

EMFAC2017 is the latest version of the model and represents CARB's current understanding of motor vehicle travel activities and their associated emission levels. The 2018 base year and future year On-Road Motor Vehicles emissions for Ventura County are calculated using EMFAC2017. Current transportation and socioeconomic data in the SCAG 2020 Connect SoCal Regional Transportation Plan (RTP) were calculated using EMFAC2014, which was the current version of the model when SCAG began its analysis and was an acceptable model at the time the RTP was

adopted. The Final 2020 RTP was adopted by SCAG's governing board on September 3, 2020. On-road motor vehicle emissions for Ventura County are based on CARB's EMFAC2017 (v1.0.3) model runs.

2.3.2.2. Other Mobile Sources

Other Mobile Sources encompass a wide variety of off-road equipment. The major categories include aircraft; locomotives; commercial and recreational marine vessels; agricultural, construction and lawn and garden equipment; off-road recreation vehicles, and a wide variety of equipment from hedge trimmers to cranes.

CARB estimates the majority of off-road emissions using a suite of emission estimation models and methods. The OFFROAD model is an integrated statewide mobile source emissions model that estimates population, activity, and emissions for specific categories of equipment and fuel types at the county level. OFFROAD is used to generate base year emissions and to project changes in future inventories of Other Mobile Sources emissions.

For some off-road equipment, the OFFROAD model is being replaced by category-specific methods and inventory models developed by CARB for specific regulatory projects, such as Off-Road Equipment (Construction, Industrial, Ground Support and Oil Drilling), Cargo Handling Equipment, Transport Refrigeration Units, Commercial Harbor Craft, Ocean-going Vessels and Locomotives.

Additional information on CARB's Off-Road Emissions Inventory Program and the OFFROAD and other emission inventory models is available on CARB's website at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory and in Appendix A of the 2022 AQMP.

In addition to the Other Mobile Sources categories estimated by CARB, the District estimates emissions from civil and commercial aircraft and military aircraft and vessels.

Table 2-3 presents 2018 baseline planning day emissions by major source category for the Ventura County portion of the SCCAB. A more detailed summary of ROG and NOx emissions can be found in Appendix A. Figure 2-2 and Figure 2-3 exhibit those emissions in percentages of ROG and NOx by major source category in the non-attainment area.

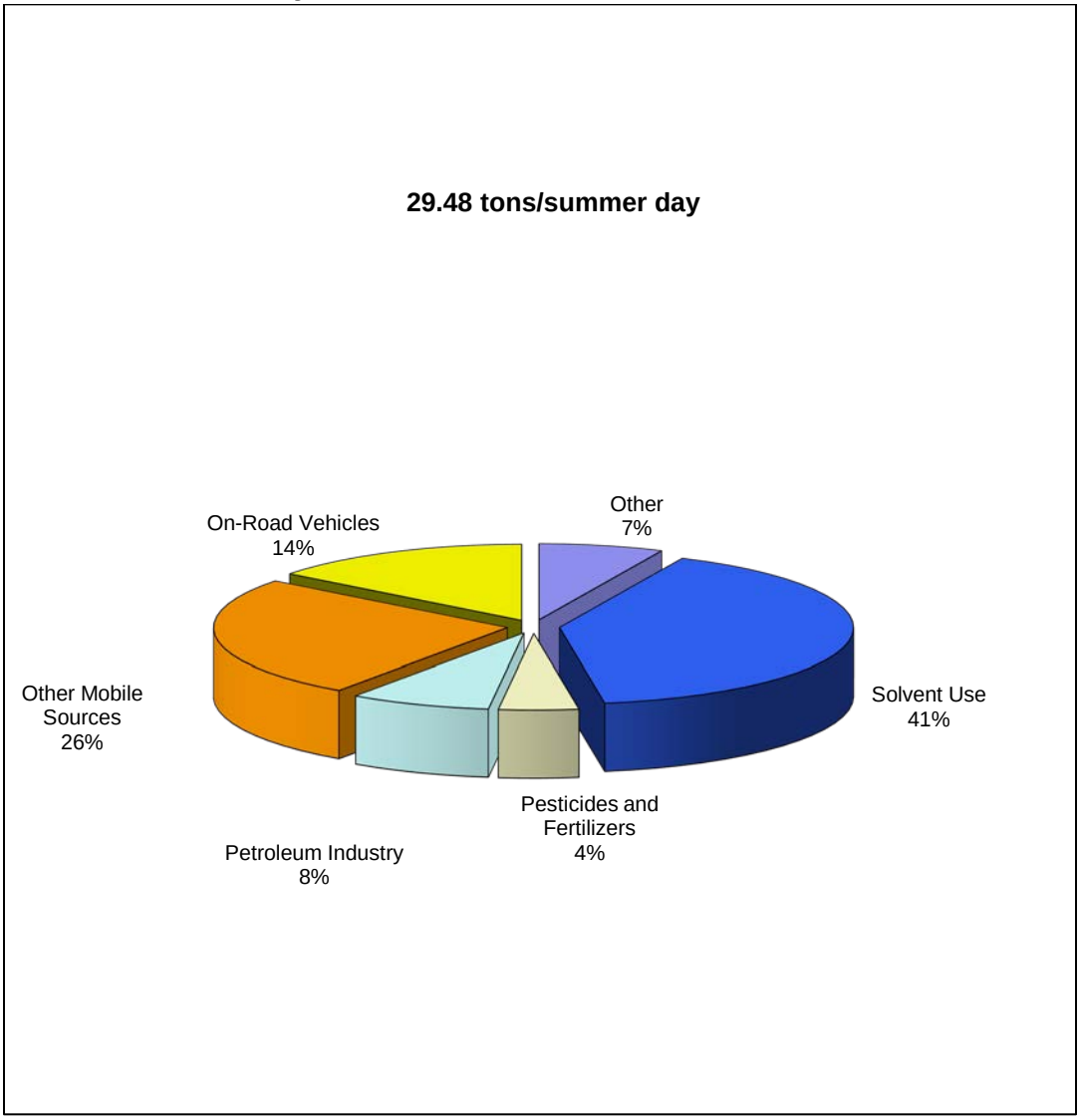
Table 2-3
2018 Baseline Planning Day Emissions
by Major Source Category

Ventura County South Central Coast Air Basin (SSCAB) Major Source Category Name	(tons/summer day) ROG	 NOx
Stationary Sources		

Fuel Combustion	**0.12**	**1.57**
Waste Disposal	**0.79**	**0.07**
Cleaning And Surface Coatings	**4.18**	**0.00**
Petroleum Production And Marketing	**2.28**	**0.10**
Industrial Processes	**0.54**	**0.06**
Total Stationary Sources	**7.91**	**1.79**
Area-wide Sources		
Solvent Evaporation	**9.10**	**0.00**
Miscellaneous Processes	**0.59**	**0.58**
Total Area-wide Sources	**9.69**	**0.58**
Mobile Sources		
On-Road Motor Vehicles	**4.28**	**7.03**
Other Mobile Sources	**7.60**	**8.66**
Total Mobile Sources	**11.88**	**15.69**
Total SCCAB	**29.48**	**18.07**

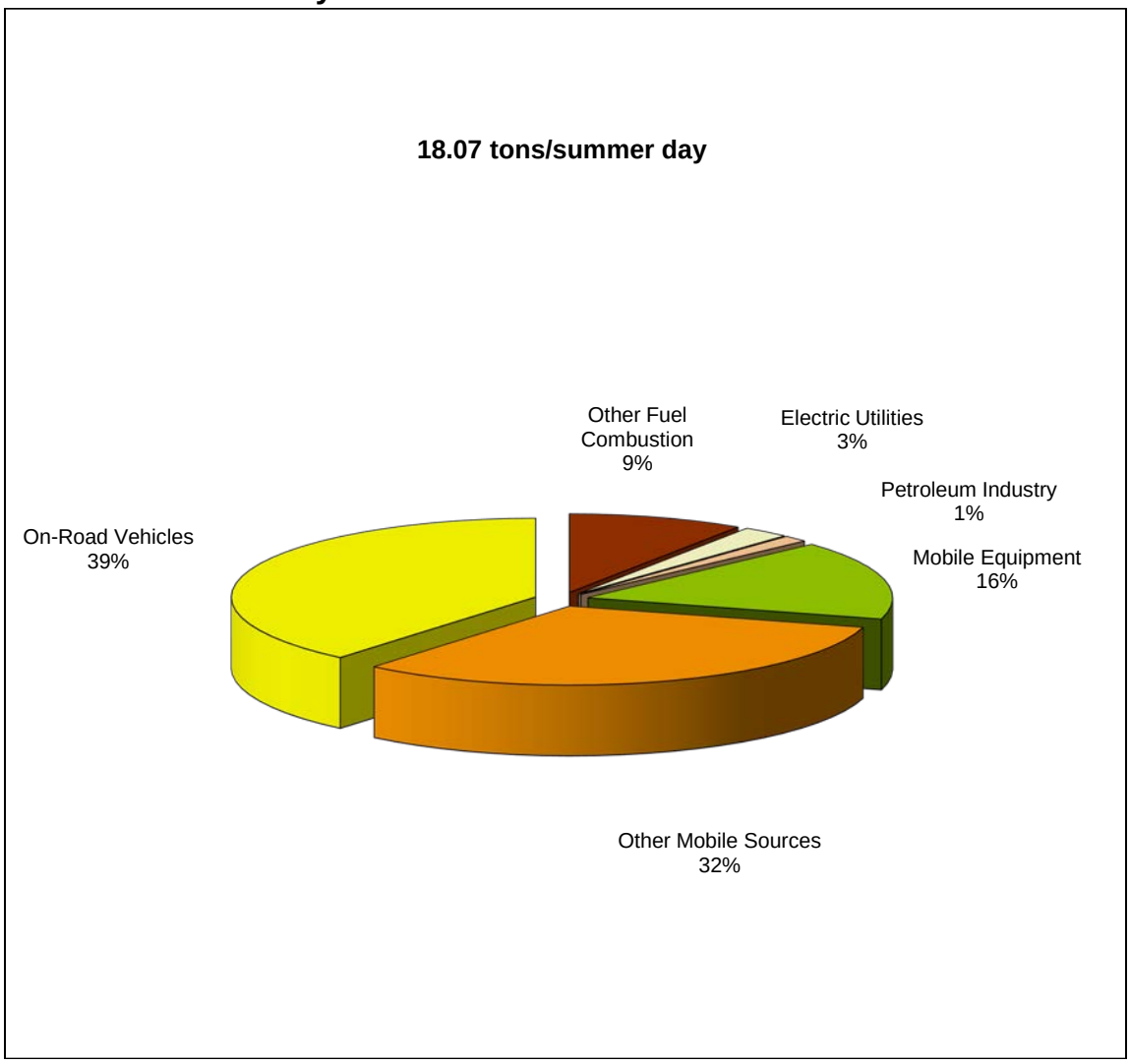
Notes:
Source: CEPAM v1.01 (March 2022).
Excludes OC1, OC2, and Natural Sources.
Data rounding may affect totals.

Figure 2-2
Ventura County 2018 Planning Day
ROG Emissions Inventory



Reference:
CARB CEPAM v1.01 (March 2022).
Natural sources, OC1, and OC2 excluded.

Figure 2-3
Ventura County 2018 Planning Day
NOx Emissions Inventory



Reference:
CARB CEPAM v1.01 (March 2022).
Natural sources, OC1, and OC2 excluded.

2.4. Ventura County Marine Emissions Inventory

Marine emission sources include those in both the State Tidelines region of Ventura County and those in the OC1 and OC2 Air Basins. Examples of marine-related activities include ocean-going vessels, commercial harbor craft, and recreational boats. Also included are military aircraft operating out of Naval Base Ventura County (NBVC) and onshore cargo handling equipment at the Port of Hueneme.

Emission sources related to marine activities are a significant part of the overall base year emissions inventory for Ventura County. CARB undertook an extensive process to develop a new statewide emissions inventory for several important categories of marine emission sources used for the 8-hour Ozone SIP and ozone attainment modeling. CARB staff, in cooperation with local air districts, developed a consistent statewide emissions estimation methodology for Ocean-going Vessels, Commercial Harbor Craft, and Cargo Handling Equipment operating in California coastal waters, ports and inland waterways. The methodologies reflect updated vessel population and operational data, engine characteristics and emission factors.

2.4.1. Ventura County Marine Emissions in the SCCAB

Coastal emission sources (i.e., within three miles of the shoreline) in the Ventura County portion of the SCCAB in Table 2-3 are represented in Other Mobile Sources emission categories, including Ocean-going Vessels, Commercial Harbor Craft, Recreational Boats, Aircraft and Cargo Handling Equipment in the Off-Road Equipment category. Coastal marine emissions are shown in Table 2-4. Cumulatively these categories accounted for 3.67 tons/day of ROG and 3.39 tons/day of NOx in 2018, 12 percent of the total ROG and 19 percent of total NOx in the SCCAB.

Table 2-4
2018 SCCAB
Marine Planning Day Emissions

Ventura County Emission Category	(tons/summer day) ROG	NOx
Ocean-going Vessels	0.05	1.31
Commercial Harbor Craft	0.10	1.14
Recreational Boats	3.04	0.52
Aircraft	0.48	0.39
Cargo Handling Equipment	0.00	0.03
Total SCCAB Marine Emissions	**3.67**	**3.39**

Notes:
CEPAM2022 v1.01 (March 2022).

Ocean-going vessels include large commercial vessels calling on Port Hueneme (auto carriers, bulk cargo carriers, container vessels, passenger vessels, roll-on/roll off vehicle carriers, refrigerated cargo vessels, and tankers) and military vessel operations occurring at the U.S. Naval

facilities at the Port of Hueneme, as well as some non-military vessels utilizing Ventura County Naval facilities. Ocean-going vessels generated 1.31 tons/day NOx in 2018 in coastal waters, 39 percent of total coastal NOx in 2018, with over 75 percent from commercial marine vessels. The majority of the commercial marine vessels are auto carriers, container vessels, and refrigerated produce vessels. Some container vessels may carry refrigerated cargo.

Commercial harbor craft include commercial and charter fishing vessels, excursion boats, tug and towboats, barges and dredges, crew and supply boats associated with the four offshore oil and gas production platforms, and military support and operations vessels, tugboats and other vessels utilizing U.S. Naval facilities at the Port of Hueneme. Commercial harbor craft (including military) contributed over 33 percent of coastal NOx in 2018, 1.14 tons/day. Non-military commercial harbor craft were responsible for 54 percent of commercial harbor craft NOx emissions in 2018. Most of the commercial boats in Ventura County are commercial fishing boats or charter fishing boats.

Recreational boats operate at the three ports, marinas, and lakes in Ventura County, and include vessels with outboard, inboard, and stern-drive engines, sailboat auxiliary engines, and personal watercraft. Recreational vessels accounted for 15 percent or 0.52 tons/day of the coastal NOx emissions in 2018 and 3.04 tons/day or 82 percent of the coastal ROG emissions.

Aircraft emissions are associated with military aircraft operations at the U.S. Naval facility at Point Mugu, including transports, jet aircraft, helicopters, and missile launches. Military aircraft activities were responsible for about 0.43 tons/day of coastal ROG emissions and 0.37 tons/day of NOx in 2018.

Cargo Handling Equipment in the coastal waters include port operations/cargo handling equipment operating in association with large commercial vessels calling at the Port of Hueneme, such as yard tractors, forklifts, cranes, loaders, and other material handling equipment. Although Cargo Handling Equipment contributed one quarter of coastal NOx in 2002, this emission source became subject to CARB's Cargo Handling Equipment Regulation in 2007 and contributed less than 1% of total coastal NOx emissions in 2018.

2.4.2. Outer Continental Shelf Air Basin Marine Emissions (OC1 and OC2)

Marine activities are the most significant emission sources in the OC1 and OC2 Air Basins (beyond three miles of the shoreline). Some stationary sources are present in the OC1 and OC2 basins due to the presence of four oil and gas platforms and the U.S. naval base on San Nicolas Island. As presented in Table 2-5, Figure 2-4, and Figure 2-5, emissions from other mobile sources emission categories, including ocean-going vessels and commercial harbor craft, comprised the vast majority of emissions in the OC1 and OC2 Air Basins, 13.5 tons/day or 98% of total NOx, and 97% of total ROG in 2018.

Ocean-going vessels encompass large commercial vessels operating in the Santa Barbara Channel shipping lanes offshore of Ventura County, including vessels calling on Port Hueneme or the ports of Los Angeles/Long Beach and transiting vessels passing through southern California waters but without calling at either port, and military vessels operating offshore and in the approach corridors to the Port of Hueneme and San Nicolas Island. Ocean-going vessels emitted 13.0 tons/day of NOx in 2018, 94% of total NOx in OC1 and OC2, as well as nearly 33% of total ROG. Virtually all emissions are from commercial vessels.

Commercial harbor craft include commercial fishing and charter vessels, excursion boats, tug and towboats, crew and supply boats affiliated with the offshore oil and gas production platforms, military support and operations vessels, and other vessels operating offshore and in the approach corridors to Port Hueneme and San Nicolas Island. Commercial harbor craft contributed 63% of offshore ROG and 3.8% of NOx in 2018. Commercial (non-military) vessels were responsible for 93% of NOx and 35% of ROG from commercial harbor craft and ocean-going vessels.

Aircraft emissions are associated with military aircraft operations at the U.S. Naval facility on San Nicolas Island, including transports, jet aircraft, and helicopters. Military aircraft activities were responsible for less than 1% of offshore ROG and NOx emissions in 2018.

Stationary sources on the oil and gas platforms and the U.S naval base on San Nicolas Island were responsible for considerably less offshore emissions in 2018 than mobile sources, contributing 3% of total offshore ROG and 2% of NOx. Offshore emission sources contributing less than 3% of total offshore ROG or NOx include fuel combustion sources such as electric generating types of equipment, coatings and solvents ROG emissions from routine maintenance operations for the offshore oil and gas production platforms and the U.S. Naval facility on San Nicolas Island, and oil and gas production, all of which are associated with permitted point sources.

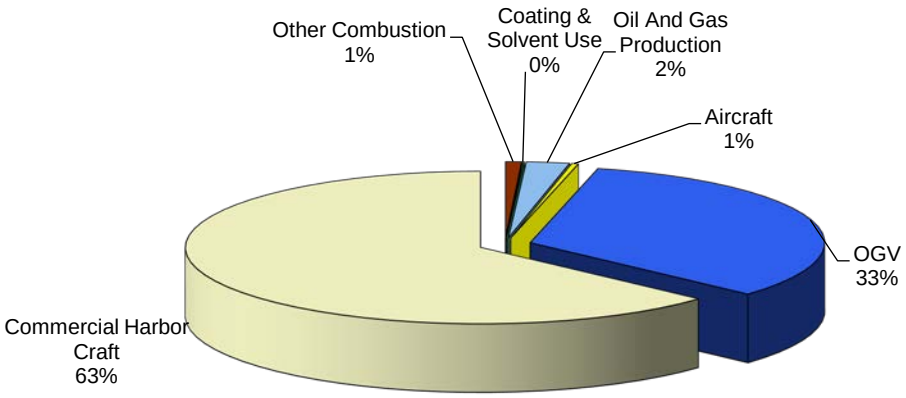
Table 2-5
2018 OC1 and 2 Baseline Planning Day Emissions by Emissions Summary Category

Ventura County Outer Continental Shelf Air Basins (OC1 and OC2) Summary Category Name	ROG (tpd)	NOx (tpd)
Stationary Sources		
Fuel Combustion		
Oil And Gas Production (Combustion)	0.00	0.01
Service And Commercial	0.02	0.23
Total Fuel Combustion	**0.02**	**0.24**
Cleaning And Surface Coatings		
Coatings And Related Process Solvents	0.00	0.00
Total Cleaning And Surface Coatings	**0.00**	**0.00**
Petroleum Production And Marketing		
Oil And Gas Production	0.04	0.00
Petroleum Marketing	0.00	0.00
Total Petroleum Production And Marketing	**0.04**	**0.00**
Total Stationary Sources	**0.06**	**0.25**
Mobile Sources		
Other Mobile Sources		
Aircraft	0.01	0.03
Ocean-going Vessels	0.61	12.95
Commercial Harbor Craft	1.17	0.52
Total Mobile Sources	**1.79**	**13.50**
Total OC1 and OC2 Air Basins	**1.85**	**13.75**

Notes:
Source: CEPAM2022 v1.01 (March 2022).
Excludes Natural Sources.
Data rounding may affect totals.

Figure 2-4
Ventura County 2018 Planning Day
ROG Emissions Inventory (OC1 and OC2 Air Basins)

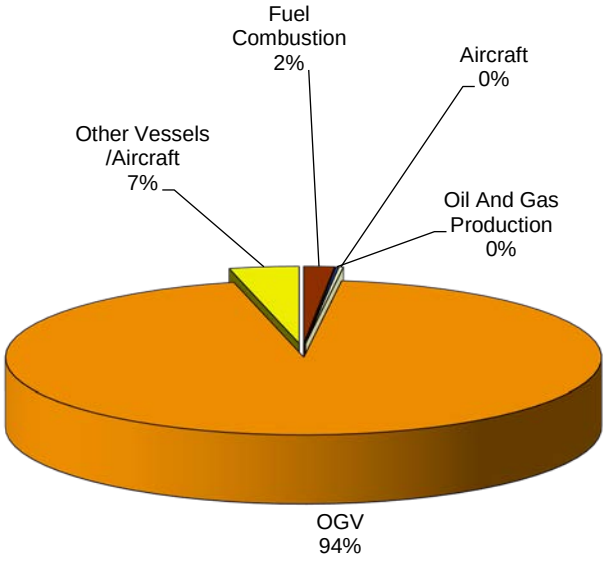
1.85 tons/summer day



Reference:
CARB CEPAM v1.01 (March 2022).
3 – 100 miles offshore. Includes both OC1 and OC2

Figure 2-5
Ventura County 2018 Planning Day
NOx Emissions Inventory (OC1 and OC2 Air Basins)

13.75 tons/summer day



Reference:
CARB CEPAM v1.01 (March 2022).
3 – 100 miles offshore. Includes both OC1 and OC2

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SECTION 3. CONTROL STRATEGY

This section presents the control strategy for the 2022 AQMP to achieve the 2015 federal 8-hour ozone standard. Since 1979, Ventura County's ozone strategy has been to use concurrent ROG and NOx emission reductions from stationary and mobile sources. Ventura County was the first area in the nation to institute a dual ROG/NOx strategy for meeting state and federal clean air standards for ozone.

The 2022 AQMP control strategy consists of a local component implemented by the District and a combined state and federal component implemented by CARB and EPA. The District has primary responsibility for regulating stationary sources, including some area sources, within Ventura County. CARB regulates on-road motor vehicles, some off-road mobile sources, and consumer products, and sets motor vehicle fuel specifications in California. EPA regulates emissions from locomotives, aircraft, heavy-duty trucks used in interstate commerce, and some off-road engines exempt from state authority or best regulated at the national level. State and federal laws prohibit local air districts from regulating mobile sources.

The District's component of the 2022 AQMP control strategy consists of cost-effective stationary source control measures, TCMs, and the District's voluntary mobile source incentive programs. Most of these local control program elements were in previous Ventura County clean air plans. California air agencies, including this air district, have aggressively pursued measures to meet state and federal clean air standards and have developed many of the most innovative and effective clean air strategies in the world.

Ventura County, along with other California air agencies, long ago implemented clean air measures that other parts of the country are just now considering. By 2002, the District fully implemented most of the local control measures in earlier Ventura County AQMPs, and most stationary sources in the county are now subject to stringent clean air regulations. Consequently, new local emission reductions are becoming ever smaller and often not economically or technologically feasible for sources in Ventura County.

CARB's component of the 2022 AQMP control strategy consists of its new 2022 State Strategy for the State Implementation Plan (State SIP Strategy), a comprehensive clean air strategy designed to achieve federal air quality standards through a combination of technologically feasible, cost-effective, and far-reaching measures. It describes the scope of California's ozone and fine particulate matter ($PM_{2.5}$) nonattainment problems and presents CARB staff's recommendations on how California can comply with federal clean air standards. The 2022 SIP Strategy is undergoing a public review period and is expected to be adopted by CARB in late 2022.

As elsewhere in California, Ventura County's ongoing progress towards clean air depends largely on current and proposed mobile source strategies under state and federal jurisdiction. District efforts will nonetheless remain crucial for Ventura County to attain and maintain state and federal clean air standards.

3.1. Stationary Source Control Measures

Stationary source control measures are comprised of equipment and techniques for reducing air pollutant emissions from stationary sources. Examples of stationary source control measures include vapor collection systems on gasoline and oil storage tanks, landfill gas recovery systems, low NOx burners on boilers, and replacing internal combustion engines with electric motors. Control measures provide the framework for District clean air rules that reduce ROG and NOx emissions. The Ventura County APCD List of Current Rules website lists all District rules referenced in this and other sections of the 2022 AQMP.

For the development of 2022 AQMP, APCD has used different years as baseline year inventory for the purpose of forecasting and regularity decision making. Ventura County APCD and other federal 8-hour ozone non-attainment air quality agencies in southern California have used the 2018 as the base year for the emissions forecasting utilized in photochemical modeling. However, the 2017 is used as the base year for regularity purposes such as Reasonable Further Progress (RFP) and Contingency Measure emission reduction requirements, as allowed by EPA.

Previous AQMPs include descriptions of control measures which have been incorporated into District rules. Those control measures which have been fully implemented before the 2018 base year are considered part of the baseline emissions for the 2022 AQMP. The District will continue to implement these measures as part of the EPA-approved SIP.

3.1.1. Control Measures with Emission Reductions Beyond the Base Year

This section presents ROG and NOx control measures already adopted as APCD rules but not fully implemented by the end of 2018, the base year for the 2022 AQMP. Table 3-1 presents these measures with expected emission reductions expressed in tons per day. The District will continue to implement these measures.

Table 3-1
Stationary Source Control Measures - Local Measures Only

Control Measure Number	Control Measure Name	District Rule	Year Adopted/ Amended	Year Fully Impl'd	Summer Planning Day Emissions Reductions (tons per summer day) 2018	2026	2040
ROG Control Measures							
R-433	Liquefied Petroleum Gas Transfer and Dispensing	74.33	2015	2020	0	0.0068	0.0066
R-314-2018	Adhesives and Sealants	74.2	2018	2023	0	0.0442	0.0438
R-303-2020	Architectural Coatings	74.2	2020	2021	0	0.0406	0.0428
R-330	Surface Cleaning and Degreasing	74.6	2020	2022	0	0.0152	0.0157
R-414-2021	Transfer of Reactive Organic Compound Liquids	71.3	2021	2022	0	0.0137	0.0206
Total ROG Control Measure Emissions Reductions						0.1205	0.1295
NOx Control Measures							
N-102-2012	Boilers, Steam Gen., Heaters <1MMBTU	74.11.1	2012	2023	0	0.0068	0.0062
N-105-2012	Boilers, Steam Generators, Heaters 1-2 MMBTU (2012)	74.15.1	2012	2022	0	0.0001	0.0001
N-105-2015	Boilers, Steam Generators and Process Heaters 2-5 MMBTU	74.15.1	2015	2025	0	0.0022	0.0023
N-113	Natural Gas-Fired Water Heaters <75,000 BTU/hr	74.11	2010	2020	0	0.0459	0.0491
N-114	NOx Reductions from Miscellaneous Sources	74.34	2016	2020	0	0.0491	0.0491
N-101-2019	Stationary Gas Turbines	74.23	2019	2024	0	0.1898	0.1250
N-115	Boilers, Steam Generators and Process Heaters	74.15	2020	2027	0	0.0172	0.0255
Total NOx Control Measure Emissions Reductions					0	0.3111	0.2573

Notes:
Data rounding may affect displayed values and totals.
This table does not list control measures fully implemented before 2018.
Emission reductions shown are relative to 2018 baseline inventory.

3.1.2. New Stationary Source Control Measures

This section presents new stationary source control measures recommended for inclusion in the 2022 AQMP as part of Ventura County's strategy to attain the federal and state ozone standards. The new measures are either a revision to an existing District rule or a new rule applicable to a previously unregulated source category. Some of these new control measures have been adopted in the years between the 2018 baseline and the 2022 adoption of this AQMP, while others are planned for adoption. These measures are summarized in Table 3-2, *New Stationary Source Control Measures*. The emission forecasts do not reflect emission reductions from these measures.

Table 3-2
New Stationary Source Control Measures

Control Measure Number	District Rule	Control Measure Name	Proposed Rule Adoption	Proposed Full Implementation
N-608 R-608	74.35	Flare Minimization	2022	2024
N-110-2016	74.22	Fan-Type Central Furnaces	2022	2045
R-607	74.32	Composting and Organic Material Conversion Operations	2023	2024
R-432	74.36	Oil Well Degassing	2025	2026

Note: Emissions reductions from these new measures are not reflected in the emission forecasts.

N-608 and R-608, Flare Minimization: This control measure is a new rule to reduce ROG and NOx emissions from flares at landfills, wastewater treatment plants, oil and gas facilities and facilities that handle ROG containing liquids. The emission standards are similar to South Coast Air Quality Management District (SCAQMD) Rule 1118.1, *Control of Emissions from Non-Refinery Flares* and San Joaquin Valley APCD (SJVAPCD) Rule 4311, *Flares*. The applicability is based on the equipment's annual fuel throughput meeting specific thresholds. Restricting the applicability of the emission limits to sources with greater utilization improves the cost-effectiveness of the proposed rule.

Rule 1118.1 was adopted January 4, 2019 and restricted the NOx and ROG emissions from flaring equipment. Out of the 288 flares located at 146 facilities in SCAQMD jurisdiction, the adoption of Rule 1118.1 required 28 flares to be upgraded, reducing NOx emissions by 0.28 tpd. Cost effectiveness for this rule was estimated between $30,179 and $50,338 per ton of NOx reduced.

In Ventura County there are 63 permitted flares of which 4 would be exempt due to their small size and 49 would not be required to reduce emission concentrations due to either meeting proposed standards or the annual throughput would not exceed cost-effectiveness thresholds. Preliminary calculations for this source category in APCD jurisdiction indicate a possible NOx emission reduction of 0.020 tons per day, and a possible ROG emission reduction of 0.018 tons per day.

Proposed District Rule: 74.35
Proposed Rule Adoption Date: 2022
Proposed Rule Implementation Date: 2024
Required Board Action: Adoption of a new rule
Cost-effectiveness: $30,000 per ton NOx reduced
Estimated Control Efficiency: 5%
Estimated Emission Reductions: 0.02 tons NOx per day, 0.018 tons ROG per day

N-110-2016, Fan-Type Central Furnaces: This control measure would reduce NOx emissions from fan-type central furnaces rated at less than 175,000 BTU per hour heat through revisions to District Rule 74.22, *Natural Gas Fan-Type Central Furnaces.* SCAQMD revised its Rule 1111, *NOx Emissions from Natural Gas-Fired, Fan-Type Central Furnaces,* applicable to similar source equipment, on November 6, 2009, reducing the NOx limit from 40 nanograms per joule (ng/j) to 14 ng/j.

This control measure was included in the APCD 2016 AQMP, but adoption was delayed while determining whether the technology forcing amendments to SCAQMD Rule 1111 were achievable. Due to uncertainties in technical feasibility, APCD will not adopt the rule until all limits in revised SCAQMD Rule 1111 are achieved in practice. Implementation of the new SCAQMD limits began on April 1, 2015 and ends on October 1, 2023.

This control measure affects new or replacement units through a sales prohibition and certification requirements. Due to the lifespan of regulated equipment of 20-25 years, the low-emission units will not achieve saturation of the in-use sources until 2045 or later.

District Rule: 74.22
Rule Adoption Date: 2022
Rule Implementation Date: 2023
Required Board Action: Adoption of a rule revision
Cost-effectiveness: Between $10,000 and $16,000 per ton of NOx reduced
Estimated Control Efficiency: 65% (overall)
Estimated Emission Reductions: 0.41 tons per day (overall, full saturation), NOx

R-607, Composting and Organic Material Conversion Operations: This control measure was included in the 2016 AQMP to implement new District Rule 74.32, *Composting and Organic Material Conversion Operations,* to incorporate requirements similar to SCAQMD) Rules 1133.1, *Chipping and Grinding Activities*, and 1133.3, *Emission Reductions from Greenwaste Composting Operations*. Since it has been last included in the previous 2016 AQMP, concerns about meeting state organic waste diversion targets in addition to an evolving landscape of data have delayed implementation of this control measure. The purpose of this control measure is to minimize ROG

emissions through inadvertent decomposition during chipping and grinding activities (as Rule 1133.1) and during greenwaste composting operations (as Rule 1133.3).

Rule 1133.1 was revised July 8, 2011 to establish Best Management Practices (BMP) for chipping and grinding of greenwaste to produce materials other than compost material, and to better manage stockpile operations associated with chipping and grinding activities, consistent with greenwaste processing requirements established in the state regulation Title 14 of the California Code of Regulations. Rule 1133.1 covers 70 facilities in the SCAQMD. Emission reductions were not quantified for the rule revisions.

Rule 1133.3 was adopted as a new rule on July 8, 2011, to establish operational BMP for greenwaste composting operations that produce compost material and applies to greenwaste composting operations involving greenwaste, wood waste, manure, or food waste. Rule 1133.3 affects 17 facilities in that region and is estimated to reduce 0.9 tons of ROG per day from greenwaste composting operations. Cost-effectiveness was estimated to be $1,340 per ton of ROG reduced.

Greenwaste composting is an increasing source of ROG emissions in California. Ventura County has several greenwaste composting facilities to which this new rule could apply. However, the District does not currently require air permits for such facilities and none of the existing facilities are in the District's emission inventory system. If this new rule were adopted, District permit rules would have to be amended to require that composting facilities obtain District air permits and air emissions associated with the facilities would have to be determined and added to the District's emission inventory system.

Concerns remain about meeting state organic material diversion targets, organic material decomposition emissions calculations and offsets which may be required by the permitting of subjected facilities. This new rule will be adopted only if subsequent analysis demonstrates it to be appropriate and cost-effective in Ventura County.

Proposed District Rule: 74.32
Proposed Rule Adoption Date: 2023
Proposed Rule Implementation Date: 2024
Required Board Action: Adoption of a new rule
Cost-effectiveness: $1,340 per ton of ROG reduced (overall)
Estimated Control Efficiency: 41%
Estimated Emission Reductions: 0.278 tons per day, ROG

R-432 Oil Well Degassing: This control measure is a new rule to minimize ROG emissions from rod pump oil well degassing. The emission standards are based on SCAQMD Rule 1148.1, *Oil and Gas Production Wells*.

Rule 1148.1 was originally adopted on March 5, 2004, and it requires the control of emissions from petroleum well degassing with at least 95% control efficiency. Conversations with SCAQMD staff confirm this is achieved through the routing of well gas to portable combustion equipment or through carbon adsorption systems.

There are approximately 1,692 active rod pump oil wells in Ventura County, each of which can be expected to degas once every 3 years for routine maintenance. Due to the frequency and the large volumes vented to the atmosphere, the preliminary estimates for this rule are estimated to reduce emissions by up to 47.3 tons of ROG per year. Due to regionally specific considerations for this source category, this regulation would only be adopted if considered technologically feasible and cost effective.

New District Rule: 74.36
New Rule Adoption Date: 2025
New Rule Implementation Date: 2027
Board Action: Adoption of a new rule
Cost-effectiveness: $22,000 per ton of ROG reduced
Estimated Control Efficiency: 95%
Estimated Emission Reductions: 0.13 tons per day (ROG)

3.1.3. Further Study Control Measures

Further study measures are emission control methods that are not proposed for adoption as District rules at this time, due to inconclusive information about their technical feasibility, economic feasibility, or appropriateness for Ventura County. District staff will evaluate these measures and will adopt them as District rules if they prove feasible and appropriate for Ventura County.

CH&SC 40914 requires that the District's clean air plan for the California ambient ozone standards include expeditious implementation of "every feasible measure" to reduce ozone precursor emissions, ROG and NOx. Measures that help Ventura County attain the state ozone standard also help the county attain the federal 8-hour ozone standard.

District staff reviewed the District's rules for its periodic rule evaluation for the California Clean Air Act. This review determined that the existing rules listed in Table 3-3, Further Study Control Measures, have potential for enhancement, thereby realizing additional emission reductions for both the federal and state ozone standards. In addition, staff identified potential new rules to control emissions from vacuum truck operations and minimize the use of industrial flares. Consequently, the further study control measures listed in Table 3-3 will serve a dual purpose.

They will serve as potential measures for the District's federal 8-hour ozone plan and to meet the "every feasible measure" requirement for the state ozone standard. The emission reduction potential of these measures is unknown at this time but is likely significant in total. The District commits to evaluate the feasibility of each of the measures listed in Table 3-3 for Ventura County.

For measures found feasible, District staff will provide emission reduction estimates prior to rule adoption.

Table 3-3
Further Study Control Measures

District Rule	Control Measure Name or Rule Title	Control Measure Description
70	Storage and Transfer of Gasoline	**R-431**: Consider semi-annual testing for high volume stations, operation and maintenance manuals, and 98% control efficiency for Phase I (ROG)
70	Storage and Transfer of Gasoline	As suggested in Technical Support Document for the 2014 RACT SIP, consider reducing emission limit for gasoline transfer from bulk tank to delivery trucks similar to Bay Area AQMD Rule 8-33, *Gasoline Bulk Terminals and Gasoline Cargo Tanks* (ROG)
71	Crude Oil and Reactive Organic Compound Liquids	Revise rule to set lower leak definition thresholds similar to SCAQMD Rule 463, *Storage of Organic Liquids* (ROG)
74.6.1	Batch Loaded Vapor Degreasers	**R-331**: Revise rule to limit vapor degreaser solvent to 25 grams ROG per gallon (ROG)
74.9	Stationary Internal Combustion Engines	**N-108-2024**: Revise rule to set new NOx emission limits consistent with SJVUAPCD Rule 4702, *Internal Combustion Engines* (NOx)
74.13	Aerospace Assembly and Component Manufacturing Operations	Revise rule to reduce ROG emissions from coatings used on aerospace components by establishing ROG limits for certain new coating categories and reducing the allowable ROG content for several existing coating categories similar to SCAQMD Rule 1124, *Aerospace Assembly and Component Manufacturing Operations*, and SJVAPCD Rule 4605, *Aerospace Assembly and Component Manufacturing Operations* (ROG)
74.14	Polyester Resin Operations	Revise rule to include a small source exemption limit of 50 gallons per year, consistent with Santa Barbara County APCD Rule 349, *Polyester Resin Operations* (ROG)
74.19.1	Screen Printing Operations	Revise rule to limit screen printing cleaners to 100 grams per liter consistent with SCAQMD Rule 1171, *Solvent Cleaning Operations* (ROG)

District Rule	Control Measure Name or Rule Title	Control Measure Description
74.20	Adhesives and Sealants	Revise rule to align ROG content limits with proposed revisions to SCAQMD Rule 1168, *Adhesive and Sealant Operations* (ROG)
74.21	Semiconductor Manufacturing	Revise rule to reduce allowable ROG content of solvents used in regulated operations so the limits are similar to SCAQMD Rule 1164, *Semiconductor Manufacturing* (ROG)
74.25	Restaurant Cooking Operations	Revise rule to limit NOx from commercial food preparation ovens similar to SCAQMD Rule 1153.1, *Emissions of Oxides of Nitrogen From Commercial Food Ovens* (NOx)
74.26 & 74.27	Storage Tank Degassing Operations	Revise both rules to establish new limits and expand applicability to smaller tanks, pipelines and cleaning equipment consistent with SCAQMD Rule 1149, S*torage Tank and Pipeline Cleaning and Degassing* (ROG)
TBD [a]	Wastewater Treatment Plants	**R-605**: New rule to reduce ROG emissions from wastewater aeration by requiring steam stripping at the point of generation or capturing and controlling ROG emissions at wastewater treatment plants (ROG)
TBD[a]	Vacuum Truck Operations	Adopt a new rule to limit ROG emissions from vacuum truck operations similar to Bay Area AQMD Rule 8-53, *Vacuum Truck Operations* (ROG)

Note: [a] To be determined.

3.1.4. Reasonably Available Control Technology

CAAA sections 182(b)(2) and 182(f) (42 U.S.C. §7511a) require ozone nonattainment areas to implement Reasonably Available Control Technology (RACT) for sources that are subject to CTGs and for "major sources" of ROG and NOx, which are ozone precursors. RACT is the lowest emissions limitation that a particular source is capable of meeting by application of control technology that is reasonably available considering technological and economic feasibility (44 FR 53762; September 17, 1979).

RACT requirements are included in the CAAA 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), best available retrofit control technology (BARCT), or lowest achievable emission rate (LAER) levels, expected for new or

modified existing major stationary sources. CTGs are EPA documents that define RACT for existing sources of air pollution. Emission sources covered by CTGs are termed CTG sources.

3.1.5. 2020 RACT SIP

According to the EPA's *Final Rule to Implement the 8-Hour Ozone NAAQS* (83 FR 62998; December 6, 2018), areas classified as moderate nonattainment or higher must submit a demonstration that their current rules fulfill 8-hour ozone RACT for all CTG categories and all major, non-CTG sources as a revision to their SIPs. RACT SIP submittals are in addition to the 8-hour ozone attainment plans. The RACT SIPs were due to EPA by August 3, 2020.

The District approved its RACT SIP on July 14, 2020 and sent it to CARB for submittal to EPA. CARB submitted the District's RACT SIP to EPA on July 28, 2020 and EPA has yet to take action to approve it. The RACT SIP found that all District rules subject to RACT review fulfill RACT requirements for the 8-hour ozone NAAQS.

The rules meet RACT, or more commonly, exceed RACT because they comply with more current and stringent control requirements of the California Clean Air Act. The 2020 RACT SIP also found that all CTG sources and major non-CTG sources within District boundaries meet or exceed RACT. These findings are not surprising since Ventura County has had a very aggressive clean air program for many years.

3.1.6. Updated CTGs

The CAAA requires the EPA to revise RACT, update existing CTG documents, or develop new documents on a frequent basis to provide states and local clean air agencies with the most current technical information and assist them in determining RACT.

District staff evaluated the CTGs updated since the last RACT analysis was performed in 2014, during the 2020 RACT SIP development process. During this evaluation District staff determined the only CTG updated in 2016, which applies to sources in the District, is the CTG for the Oil and Natural Gas Industry in October 2016. In order to avoid the need for individual air districts to submit individual RACT SIP revisions, CARB submitted the state Oil and Gas Methane Regulation as a statewide SIP revision. The statewide SIP revision, in combination with District rules and a Memorandum of Agreement between CARB and the District to implement and enforce GHG emission standards within Ventura County, satisfies the RACT requirement for this source category for Ventura County.

3.1.7. New Source Review

NSR is a permitting program required by the CAAA to help ensure that new or modified equipment and facilities (e.g., boilers, turbines, crude oil storage tanks, power plants, and factories) do not significantly degrade air quality or slow progress towards clean air. NSR permits are legally binding documents that specify what can be constructed, what emission limits must be met, and

how emission sources must be operated. The primary components of NSR are BACT and emission offsets. The District's Engineering Division administers the District's NSR program. Further information regarding NSR is available on EPA's NSR website. Further information about the District's air permitting program is available on the District's Engineering Division website.

BACT is an emission limitation based on the maximum degree of reduction for each regulated air pollutant emitted from, or resulting from, any new or modified stationary source. It is generally determined on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs. Emission reduction credits (ERC) are banked emission reductions available to offset emission growth from new, replacement, modified or relocated emissions units.

The District implements NSR through District Rule 26, *New Source Review*. Rule 26, which includes Rule 26 through 26.13, applies to new sources of air pollution and to modifications, replacements, and relocations of existing sources. The provisions of Rule 26 are applicable on a pollutant-by-pollutant and an emissions-unit-by-emissions-unit basis. Rule 26 requires that source owners and operators apply BACT to minimize air emissions from these sources. BACT is determined on a case-by-case basis by District staff during the permit approval process. Rule 26 also requires that certain emission increases be offset with emission decreases. However, it allows banking of certain emission decreases as ERCs for later use as offsets.

3.1.8. Control Measures Not Retained in the 2022 AQMP

Previous AQMPs contained stationary source control measures to help attain the federal and state 1-hour and 8-hour ozone standards. This section presents stationary source control measures identified in previous AQMPs but not retained in the 2022 AQMP. Table 3-4 lists these measures. In each case, the District has not adopted the measure as a District rule because the measure became obsolete or infeasible for Ventura County based on technological or economic considerations. Additionally, for the reasons given with each measure, no emission reductions would be lost by not retaining it in the 2022 AQMP. The following discussion includes a brief description of each measure and the reason for not retaining it in the 2022 AQMP.

(No control measure number assigned), Boilers, Steam Generators, and Process Heaters: This control measure was originally included as Control Measure N-27 (Boilers, Steam Generators and Process Heaters) in the District's 1987 AQMP. The adoption of Rule 74.15 exceeded N-27 requirements by implementing portions of two additional further-study control measures, N-2 (Thermally Enhanced Oil Recovery Steam Generators), and N-23 (External Combustion NOx Control) and established a NOx emissions limit of 40 ppm for affected equipment. A potential Boiler, steam generator, and process heater rule was included as a "further study" measure in the District's 2016 AQMP

The District adopted control measure N-115 as an amendment to Rule 74.15, *Boilers, Steam Generators and Process Heaters*, on November 10, 2020. During the rulemaking process it was determined retrofit of the regulated equipment was cost effective if implementation was required

at the time of next burner replacement. The adopted rule revisions limit NOx from affected modified natural gas equipment to 12 ppm or less. Analysis indicates all emission reductions will be achieved by 2027 so no emission reductions will be lost by not retaining control measure N105.

Table 3-4
Control Measures Not Retained in the 2016 AQMP

Control Measure Number	Control Measure Name	Reason
Not assigned	Boilers, Steam Generators, and Process Heaters	Accomplished by implementation of control measure N-105

3.2. Transportation Control Measures

Transportation Control Measures (TCMs) are strategies that reduce motor vehicle emissions by reducing vehicle trips, vehicle use, vehicle miles traveled (VMT), vehicle idling, and traffic congestion. The Clean Air Act (CAA) requires TCMs to meet milestones and help demonstrate attainment of the National Ambient Air Quality Standards (NAAQS). TCMs are based on the Southern California Association of Government's (SCAG) adopted Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and Federal Transportation Improvement Program (FTIP).

The following strategies include some of the most common TCMs that can reduce emissions from transportation sources. These strategies were also included in the 2007 and 2016 AQMPs.

Trip Elimination: This strategy reduces vehicle emissions by eliminating vehicle trips. The primary emissions eliminated are the cold-start emissions that occur when vehicle engines have been at rest for a period and then restarted. Cold-start emissions occur after engine startup but before the engines are warm enough for the emission control systems to work effectively. Cold-start emissions are a large percentage of total vehicle emissions and thus a major source of ozone precursors. Telecommuting, carpooling, combining trips, flexible work schedules, and land use policies that provide housing near jobs and shopping centers are measures that eliminate vehicle trips.

Vehicle Substitution: This strategy reduces emissions associated with motor vehicle use by using non-motorized transportation modes that do not produce air emissions. Walking, biking, and telecommuting measures are all examples of vehicle substitution. Adopting trip reduction ordinances to encourage installation of walking and biking facilities and discourage motor vehicle use in highly congested areas are measures to reduce air pollutants.

Vehicle Miles Traveled Reduction: This strategy reduces motor vehicle emissions because vehicles traveling fewer miles produce fewer emissions. This strategy does not reduce cold-start emissions. However, park-and-ride lots, carpooling, and land-use measures are all ways to reduce trip distances and, therefore, vehicle miles traveled and vehicle emissions.

Vehicle Occupancy: Increasing the number of passengers per vehicle can reduce all emissions associated with motor vehicle use. Transit, carpools, and vanpools are all measures to implement this strategy. Other measures include providing ride-match services to establish carpools and vanpools, restricting roads for high occupancy vehicles and passenger buses, establishing employer-based transportation management programs that encourage carpooling, vanpooling and transit use among employees.

Technological Improvements: This strategy reduces emissions through technological improvements to the operation of motor vehicles and the technologies used to improve the performance of transportation systems. Technological improvements such as clean-fuel/electric vehicles, vehicle emission controls, and global positioning system tracking devices used in vehicles that reduce trips and VMT multiply the emission reduction benefits. In addition, Intelligent Transportation Systems (ITS), signal synchronization and freeway management systems, and programs to control the extended idling of vehicles are technological measures to improve the performance of transportation systems and reduce emissions as well.

3.2.1. Transportation Control Measures Project Categories

This section presents the TCMs in the 2022 AQMP. The TCMs are grouped by project categories under the District's "umbrella" control measure R-700/N-700, Transportation Control Measures, retained from the 1994, 2007, 2016 AQMPs. To be included in the AQMP, potential TCM projects must be in SCAG's Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS) and Federal Transportation Improvement Program (FTIP).

Candidate projects are first screened by the District, Ventura County Transportation Commission (VCTC), and SCAG staff to determine if they are TCMs as defined by the project categories listed in Table 3-5 and SCAG's FTIP Guidelines. SCAG's Transportation Conformity Working Group, the local agency group responsible for interagency consultation confirms the projects as TCMs and the TCMs are subsequently programmed into the FTIP.

The interagency consultation process is part of the federal transportation conformity regulation that requires procedures for federal, state, and local air districts and transportation agencies to consult with each other on transportation plans, programs, and projects. Transportation conformity is a regulatory process to help ensure that transportation plans, programs, and projects are consistent with air quality goals of the AQMP. District Rule 221, *Transportation Conformity*, contains a memorandum of understanding that outlines the interagency consultation process. Further information regarding transportation conformity is presented later under the Conformity section.

Table 3-5
TCM Project Categories Included in R-700/N-700

Project Category
A. Ridesharing Measures Carpooling, Vanpooling, Park and Ride Lots, Ride Matching Services, Incentive Programs, Guaranteed Ride Home Programs, Station Cars, Onsite Services
B. Non-Motorized Measures Bicycle Paths/Facilities, Pedestrian Paths/Facilities, Telecommuting, Flexible Work Schedules, Bicycle and Pedestrian Programs, Satellite Work Centers
C. Traffic Flow Improvement Measures Signal Synchronization, Intersection Improvements, Incentive/Disincentive Programs, High Occupancy Vehicle Lanes, Intelligent Transportation Systems, Ramp Metering
D. Land Use Measures Transportation Demand Management (TDM) Ordinances, Smart Growth/Sustainable Community Projects, Mixed Use Development, Parking Management and Standards, Congestion Management Plan, TDM Strategies
E. Transit Measures Bus Fleet Expansion, Shuttles and Paratransit Vehicles Expansion, Transit Stations and Facilities, Express Busways, Passenger Rail Service, Rail Stations and Facilities, Real-Time Transit Information Systems, Transit Subsidies

3.2.2. The RTP/SCS and FTIP

The Regional Transportation Plan (RTP) is a long-range (2020-2045) transportation plan, covering a period of 25 years that provides a blueprint for future transportation improvements and investments based on specific transportation goals, objectives, policies, and strategies. The RTP, which is based on federal transportation law, identifies the strategies needed to meet mobility, financial, and air quality requirements in the SCAG region.

The Sustainable Communities Strategy (SCS) was introduced as part of the 2012 RTP. The SCS supports the State's required greenhouse gas (GHG) emission reduction targets for the region that is set by CARB. SCAG develops the transportation and land-use planning patterns and goals through the RTP and SCS and coordinates among various committees and local governments to allow the region to meet its GHG reduction targets. Once the SCS is adopted by SCAG, as part of the RTP/SCS approval process, CARB reviews the adopted SCS and determines whether its implementation will meet the regional GHG emission reduction targets.

The recently adopted 2020 RTP/SCS (also known as Connect SoCal) is the prevailing multi-modal plan outlining a better regional transportation system, integrated with the best possible growth pattern for the region out to year 2045. The plan provides the basic policy and program framework for long-term investment in the region's vast transportation system in a coordinated, cooperative, and continuous manner.

Transportation investments in the SCAG region that receive state or federal transportation funds must be consistent with the RTP/SCS and must be included in the SCAG FTIP when ready for funding. SCAG's 2020 RTP/SCS provides the basis for the transportation control strategy of the 2022 AQMP and includes the total regional emissions forecasts from transportation projects in Ventura County. SCAG is the Metropolitan Planning Organization responsible for updating the RTP/SCS every four years.

The FTIP is the short-term transportation program, with a six-year planning horizon, that identifies specific transportation projects that will implement the overall goals of the RTP/SCS. All transportation projects that receive approval and funding must be listed and programmed in the FTIP. TCMs are also listed and programmed in the SCAG FTIP.

3.2.3. TCM Commitments

The AQMP enforceable commitments for TCMs (called TCM Commitments) are the TCM projects scheduled in the first two years of the current six-year FTIP.

EPA's conformity regulation requires that all TCM commitments undergo a timely implementation analysis at each FTIP update. The timely implementation requirement assures that TCMs are implemented on schedule. The timely implementation report tracks each committed TCM and demonstrates their timely implementation and completion.

Appendix B, *Ventura County TCM Commitments*, presents the projects identified by SCAG and the District as the current TCM Commitments for Ventura County and thus, subject to the timely implementation requirement of Transportation Conformity (discussed below).

3.2.4. TCM Rollover and Substitution

SCAG is responsible for updating the FTIP every two years. At each FTIP update, a new list of TCM commitments comprising of new TCMs (only TCMs in the first two years of the update), plus ongoing TCM commitments from the previous FTIP, are rolled over to automatically update the State Implementation Plan (SIP) upon approval by CARB and EPA. This "rollover" list, consisting of new and ongoing TCM projects, becomes the committed TCMs for tracking timely implementation.

TCM commitments are monitored for compliance according to the scheduled completion date established in the new FTIP. Once a TCM project is completed, it is reported in the next FTIP update as completed and removed from future FTIPs. FTIP updates can occur more frequently than the required biennial update in the form of amendments. However, the rollover process applies when the FTIP update requires a conformity analysis and finding, typically every two years.

A TCM substitution is required when a committed TCM project cannot be completed or will be significantly delayed. The VCTC and/or the project sponsor must notify SCAG of the problem and

propose a substitute TCM project or group of projects. The TCM substitution must follow the process set forth in the CAA section 176(c) and the Federal Conformity Regulation. The substitute project(s) may not come from the current list of committed TCMs because a committed TCM cannot substitute another committed TCM.

Usually, SCAG, VCTC, and the project sponsor will identify a replacement TCM project(s) and formally present the changes to the interagency consultation group, the Transportation Conformity Working Group (SCAG group). If there are no air quality concerns identified during the replacement process, and the substitute TCM provides equivalent or greater emissions reductions, the new TCM is adopted without requiring a new conformity finding or formal SIP revision. Both the TCM rollover and substitution process are detailed in SCAG's FTIP guidelines.

3.3. Conformity

Conformity is a federal regulatory process required in nonattainment areas by the CAA Section 176(c) to ensure that federal funding and approvals will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. Section 176(c) prohibits federal agencies, departments, or instrumentalities from engaging in, supporting, providing financial assistance for, licensing, permitting, or approving any action which does not conform to an approved state or federal clean air implementation plan. It is called conformity because federal agencies, such as the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and Federal Aviation Administration (FAA), must show that their actions "conform with" (i.e., do not undermine or hinder) approved, applicable SIPs.

A conformity determination is a formal demonstration that the subject federal action is consistent with the applicable SIP. Federal agencies make such demonstrations by performing a conformity analysis of their proposed federal actions. The conformity analysis evaluates and documents project-related air pollutant emissions, local air quality impacts, and the potential need for emissions mitigation.

In 1993, EPA promulgated two sets of conformity regulations to implement Section 176(c): 1) transportation conformity and, 2) general conformity. Transportation conformity is applicable to highway and mass transit projects and to transportation plans, programs, and projects funded under the Federal Highway and Transit Act. General conformity is applicable to other non on-road federal actions and approvals such as, airport expansion projects or new water treatment facilities. The District currently has two conformity rules, Rule 221, *Transportation Conformity*; and, Rule 220, *General Conformity*.

3.3.1. Transportation Conformity

Transportation conformity is a CAA and Infrastructure Investment Jobs Act (IIJA) regulatory process that coordinates air quality planning and transportation planning to help ensure that highway and transit projects will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. Conformity applies to transportation plans,

transportation improvement programs, and highway and transit projects funded or approved by the FHWA and FTA. Both the RTP/SCS and FTIP must demonstrate conformity with the clean air plans covering the SCAG region, including Ventura County.

Metropolitan planning organizations, such as SCAG, make initial conformity determinations in metropolitan areas, while state departments of transportation (i.e., Caltrans) usually do so in areas outside the metropolitan areas. The major requirements of transportation conformity are:

- Comparison of the SCAG regional emission forecasts to the SIP conformity budget, and use of the latest planning assumptions and emissions models.
- Implementation of TCMs on a timely basis and conduct interagency consultations on regional transportation issues.
- FHWA and FTA make final conformity determinations.
- Final conformity determinations are made by the FWHA and FTA.
- Availability of information covering transportation conformity on FHWA and FTA websites.

3.3.2. Motor Vehicle Emissions Budget

The 2022 AQMP includes a motor vehicle emissions budget (MVEB) for the Ventura County portion of the SCCAB. The MVEB has been developed in consultation with CARB, SCAG, and EPA. The emissions budget presented in Table 3-6, *Motor Vehicle Emissions Budget*, used EMFAC with SCAG's modeled VMT and speed distributions from the 2020 RTP/SCS adopted by SCAG on September 12, 2020. The Air Resources Board released EMFAC2017 that updated the emission rates and planning assumptions used in calculating motor vehicle emissions budgets. EMFAC2017 was approved by U.S. EPA on August 15. 2019.

The federal conformity rule allows a SIP to create a safety margin in an emissions budget (40 CFR 93.101, 93.118(e)(4)(vi)). A "safety margin" is the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance. CARB has decided not to include a safety margin in the emissions budget for this AQMP.

Table 3-6
Motor Vehicle Emissions Budget
(tons per day)

	2018		2026	
	ROG	**NOx**	**ROG**	**NOx**
Baseline Emissions	4.28	7.03	2.56	5.30
MVEB Totals	**5**	**8**	**3**	**6**

Note: Based on EMFAC2017.
Budget totals are rounded upward to the nearest ton.

3.3.3. Transportation Conformity Budget

Central to transportation conformity is the conformity budget. When the AQMP is submitted to EPA as part of the SIP, EPA will review the MVEB. An approval, disapproval, or adequacy finding of the MVEB will be determined by EPA. An approval or adequacy finding of the MVEB by EPA will establish the conformity budget that sets the maximum amount of on-road mobile source emissions that a nonattainment area can produce while continuing to demonstrate progress toward attainment of the required NAAQS.

All future RTPs and FTIPs in the SCAG region must conform to the conformity budget. In other words, the vehicle emissions forecasts of the RTP/SCS (Connect SoCal) and FTIP must be equal to or less than the conformity budget approved or found adequate by EPA for SIP and conformity purposes. A conformity budget therefore acts as a "ceiling" for future total on-road mobile source emissions. Exceedances of a conformity budget indicate an inconsistency with the applicable AQMP/SIP. The continued federal funding for transportation projects in the Ventura County portion of the SCCAB depends on a positive conformity determination of the RTP/SCS and FTIP.

3.3.4. General Conformity

General conformity is a CAA regulatory process that applies to most federal actions other than transportation actions (see transportation conformity). Examples of federal actions subject to general conformity include issuance of Army Corps of Engineers permits, water and wastewater projects funded by EPA, and other federal projects impacting harbors, airports, and reservoirs. Certain federal projects are exempt from general conformity. Those include projects whose air pollutant emissions would be below specified de minimis emission levels (based on the area's nonattainment classifications) and certain projects presumed to conform, such routine maintenance activities, activities at Superfund sites, and activities conducted in response to national emergencies.

Activities in an attainment area are generally not subject to general conformity, unless the area was formally a nonattainment area and is now under a federal clean air maintenance plan. The federal agency that approves or funds a project or activity, that may be subject to the general conformity, is responsible for the making a conformity determination. Environmental documents required under the National Policy Act (NEPA) and California Environmental Quality Act (CEQA) may provide a statement about a project's general conformity status. General conformity requirements are covered under the District's Rule 220, *General Conformity*. EPA's General Conformity website contains additional information about the federal regulation.

3.4. State Mobile Source Strategy

Appendix C, *Key Mobile Source Regulations and Programs Providing Emission Reductions,* presents an overview of key California mobile source regulations and programs.

3.5. Reasonably Available Control Measures Analyses

Federal Clean Air Act Sections 172(c)(1) and (c)(2) require the District to demonstrate that it has adopted all control measures necessary to attain the 2015 federal 8-hour ozone standard as expeditiously as practicable and to meet Reasonable Further Progress (RFP) requirements. Reasonably Available Control Measures (RACM) applies to stationary source control measures, Transportation Control Measures, and mobile source control measures.

A potential control measure is considered "reasonably available" and must be implemented if it would advance attainment by at least one year, either alone or in combination with other reasonably available control measures. This means the combined emission reductions from RACM must be sufficient to reduce the emissions inventory projected for 2025 (or earlier) to that currently projected for 2026, the attainment year. If such emission reductions can be demonstrated, the combined RACM must be implemented.

The projected NOx, and ROG emissions are 27.4 and 30.1 tons per day, respectively, in the attainment year 2026. The projected 2025 NOx and ROG emissions are 27.6 and 30.3 tons per day respectively. Therefore, in order to be considered RACM, the combined control measures must reduce NOx emissions by 0.2 tons per day.

Since the ROG inventory relatively remains stable for the several years prior to the District's modeled attainment, it is unclear how much ROG emissions reductions would be required to advance the attainment date. However, District staff believes reducing ROG emissions less than 2% of the county's anthropogenic emissions inventory is insufficient to advance the attainment date.

3.5.1. Stationary Source RACM

District stationary source ROG and/or NOx prohibitory rules that were not fully addressed in the District's 2020 RACT SIP were evaluated for potential RACM emission reductions for the 2022 AQMP. Staff compared District rules to rules adopted by other air districts with higher or "worse" nonattainment classifications, namely the SCAQMD and the San Joaquin Valley Air Pollution Control District (SJVAPCD). Staff also reviewed rules from other air districts such as the Bay Area Air Quality Management District (BAAQMD).

District staff also identified a few rules from other air districts that apply to unregulated source categories in Ventura County. District staff conducted preliminary evaluations of the potential emission reductions, including the cost effectiveness and timing of the potential reductions.

A very conservative estimate of the total emission reductions achievable through potential RACM new and amended rules are as follows:

NOx: 0.013 tons per day
ROG: 0.436 tons per day

As noted above, in order to advance attainment by one year, emission reductions of at least two tons of NOx per day must be achieved. The potential RACM identified by the District are a tiny fraction of the required NOx reductions.

Appendix D, *Stationary Source Reasonably Available Control Measure Assessment*, provides the details of the stationary source RACM evaluations.

3.5.2. Transportation Control Measure RACM

The Clean Air Act requires a review of RACM for TCMs during AQMP development. Review of RACM provides an analysis of all potential TCMs that can be included as part of the control strategy in the AQMP. TCMs must be both technologically and economically feasible and must advance the projected attainment date of the air quality standard by at least one year to be considered RACM.

Appendix E, *Ventura County Transportation Control Measure Reasonably Available Control Measure Assessment*, lists the TCM RACM assessments conducted for the 2022 AQMP.

3.5.3. State Source RACM

Appendix F, *Ozone Reasonable Available Control Measures Assessment – State Sources*, presents California's emission standards, fuel specifications, and incentive programs for heavy-duty vehicles that are technologically and economically feasible in California, including Ventura County. It also includes the RACM evolutions for non-mobile sources regulated primarily at the state level, including consumer products, and pesticides.

3.5.4. RACM Conclusion

The combination of feasible state and local RACM measures (stationary source, mobile source, transportation control measures, consumer products, and pesticides) not already implemented in Ventura County would provide only about one tenth of the 0.2 tons NOx per day reductions needed to advance the county's attainment date by at least one year.

A vessel speed reduction (VSR) regulation requiring all ocean-going vessels to travel at less than 10 knots in California-regulated waters or federally-regulated waters off California would clearly reduce NOx emissions by many times the 0.2 tons of NOx per day needed to advance attainment by a year in Ventura County. However, since the District does not have authority to implement such regulations, none of the potential additional local control measures are reasonably available, and therefore, none are required for adoption for the 2022 AQMP. The District has implemented and encouraged participation in a voluntary VSR incentive program, but not all shipping companies participate in the program, and the companies that do participate in the program do not have complete compliance. A state or federal VSR requirement would reduce ROG and NOx emissions in Ventura County by enough to advance the attainment date.

3.6. Incentive Programs

The District participates in several clean air incentive programs to help Ventura County meet state and federal clean air standards: the Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program), the Lower Emissions School Bus Program, Clean Air Fund, the Voluntary NOx Remediation Measure (VNRM), the Funding Agricultural Replacement Measures for Emissions Reductions (FARMER) Program, the Community Air Protection (CAP) Incentive Program, and the Protecting Blue Whales and Blue Skies vessel speed reduction incentive program (VSR Program). Below are summaries of these programs. Further information regarding the District's clean air incentive programs is available on the District's Grants/Incentive Programs website.

3.6.1. Carl Moyer Memorial Air Quality Standards Attainment Program

The California State Legislature created the Carl Moyer Program in 1998, named after the late Dr. Carl Moyer to recognize his work in the air quality field and his efforts to develop this important program. The Carl Moyer Program provides grants to owners of heavy-duty diesel vehicles, vessels, locomotives, and/or stationary agricultural pumps to replace, repower, or retrofit heavy-duty diesel engines to reduce NOx, ROG, and PM. The Carl Moyer Program complements California's regulatory clean air program by obtaining extra emission reductions to help meet state and federal clean air standards. Carl Moyer Program grants are available to both private companies and public agencies.

The Carl Moyer Program is a cooperative effort of CARB and local air pollution agencies. Each year, CARB awards grants to local air agencies that apply for funds for local Carl Moyer Programs. In turn, air districts, following guidelines adopted by CARB, provide grants to public and private entities for cleaner-than-required engines and equipment. CARB's Carl Moyer Program requires, in part, that funded projects in Ventura County operate for at least three years and 75 percent of their use be within the county. In addition, to qualify for funding, projects must meet cost-effectiveness requirements.

The District has operated its Carl Moyer Program since 1999. To date, over $52 million in Carl Moyer Program funding has been awarded to help replace 1,285 high-polluting diesel engines with new, much cleaner engines in Ventura County. The District's Carl Moyer Program has funded new, cleaner mobile agricultural equipment, marine vessel engines, construction equipment engines, alternative fuel heavy-duty trucks, agricultural irrigation pump engines, and publicly-accessible electric vehicle charging stations. The total emission reductions from those engine replacements were 113.8 tons per year of ROG, 886.3 tons per year of NOx, and 51.4 tons per year of PM.

3.6.2. Lower-Emission School Bus Program

The CARB adopted the Lower-Emission School Bus Program in December 2000. This program provides grants to school districts for new, lower emission school buses to reduce schoolchildren's exposure to both toxic particulate emissions and smog-forming NOx emissions. The program has two components: the Lower-Emission School Bus Replacement Program, and the School Bus Retrofit Program.

The Lower-Emission School Bus Replacement Program originally replaced older, in-use, high-polluting diesel school buses with new lower-emission buses. The School Bus Retrofit Program reduced diesel particulate matter emissions from diesel school buses by retrofitting the bus engines with particulate filters. The District participated in both programs. These programs offered the District a unique opportunity to work with the school districts in the county to reduce children's exposure to diesel exhaust, which is a toxic air contaminant and a human carcinogen.

The Lower-Emission School Bus Replacement Program enabled local school districts to replace pre-1987 model year school buses with either new cleaner compressed natural gas (CNG) buses or new lower-emission diesel buses. Eligible school districts contributed $25,000 (reduced to $10,000 in 2008) to replace in-use, 1977 through 1986 model year school buses. The program paid the remainder. Co-funding was not required of school districts for pre-1977 school bus replacements, school bus retrofits, or alternative-fueled school buses meeting 2010 emission standards. Moreover, school districts that purchased CNG buses could obtain an additional 10 percent of their grant for CNG refueling facilities. Replaced buses were destroyed so that they could no longer operate in the county or elsewhere.

Recent amendments to the state guidelines now allow air districts to fund the replacement of 1987 or newer model year school buses having two-stroke diesel engines. Funding for these replacements may be available from AB 923 $2 DMV fees. Besides CNG and clean diesel-powered buses, propane-powered school buses and electric school buses are both potential replacements for existing eligible school buses. AB 923 funds may also be used to replace CNG fuel tanks on existing eligible CNG-powered school buses. To date, 20 CNG school buses and nine lower-emission diesel school buses have replaced 29 pre-1987 school buses in Ventura County.

3.6.3. Clean Air Fund

The Clean Air Fund provides grants for air quality improvement projects in Ventura County. The 3M Company created the Clean Air Fund in 1991 with a $1.5 million donation. Three hundred thousand dollars of that amount was set aside as a permanent endowment, which is now more than $689,768 (as of December 15, 2021). The nonprofit Ventura County Community Foundation holds the funds in a trust. The Ventura County Air Pollution Control Board oversees the Clean Air Fund and authorizes project funding. The Clean Air Fund Advisory Committee (Committee) reviews all grant proposals and makes recommendations for funding to the Air Pollution Control Board. The Committee is comprised of representatives from transportation, environmental, business, and citizen interest groups.

Since its inception, the Clean Air Fund has allocated over $2 million for 60 clean air projects of various types. Examples of funded projects include clean air educational programs, solar pool heaters for local schools, cleaner boat engines, a lawn mower exchange program, electric bikes for law enforcement, a gasoline-powered leaf blower exchange program, a pesticide emissions reduction research program, publicly accessible level 2 and DCFC electric vehicle charging stations, electrification of a multiple agencies landscaping equipment, fuel-efficient tire voucher program, plug-in electric vehicle voucher program, and compressed natural gas transit buses and trash trucks.

3.6.4. VNRM Program

In 2007, CARB approved the Low Carbon Fuel Standard (LCFS) as a Discrete Early Action Measure to reduce greenhouse gas emissions from transportation fuels in California. The Fresno County Superior Court issued a modified writ of mandate in *POET, LLC* v. *California Air Resources Board* on October 18, 2017 related to CARB's CEQA analysis for the LCFS. In response to this modified writ of mandate, CARB is taking specified actions relating to the issue of potential NOx emissions from biodiesel.

On March 6, 2018 CARB publicly released a Draft Supplemental Disclosure Discussion of Oxides of Nitrogen Potentially Caused by the Low Carbon Fuel Standard Regulation (Draft Disclosure Discussion) identifying potential NOx emissions that may have been caused in the past and could be caused in the future by the LCFS regulation. The Draft Disclosure Discussion outlined a CARB commitment, "consistent with CARB's mission to promote and protect public health and welfare through the effective and efficient reduction of air pollutants," to remediate potential historical LCFS NOx emissions by seeking additional reductions of NOx emissions. CARB adopted Resolution 18-22 *Voluntary NOx Remediation Measure (VNRM) Funding* on April 27, 2018 to fulfill this commitment.

The VNRM program is implemented through a partnership between CARB and local air districts. CARB distributes funds, and develops and revises the Guidelines for District Grants to Remediate Potential Historic Biodiesel NOx Emissions Conservatively Attributable to the LCFS (Guidelines for Remediation). Local air districts conduct outreach, solicit, evaluate, select, fund, and monitor specific remediation projects in their jurisdictions. To facilitate the most timely and efficient achievement of the targeted remedial NOx emissions reductions, the funding grants issued to the districts pursuant to this plan were administered and tracked analogously to incentive funds distributed through the Carl Moyer Program, pursuant to the 2017 CMP Guidelines.

CARB awarded the District with a single grant through the VNRM. The District awarded two grants to replace agricultural tractors with total grant funding of $158,529. The total emission reductions from the equipment replacements funded by the VNRM were 0.3 tons per year of ROG, 2.1 tons per year of NOx, and 0.2 tons per year of PM.

3.6.5. FARMER Program

Initiated in 2018, the FARMER Program is a grant program developed by CARB to implement legislative direction to reduce criteria, toxic, and GHG emissions from the agricultural sector. The Legislature directed CARB to "reduce agricultural sector emissions by providing grants, rebates, and other financial incentives for agricultural harvesting equipment, heavy-duty trucks, agricultural pump engines, tractors, and other equipment used in agricultural operations." In addition, the FARMER Program targets funding for priority populations by including minimum percentages of funding for projects benefiting disadvantaged and low-income communities.

The FARMER Program is implemented through a partnership between CARB and local air districts. CARB manages program funds and develops and revises the FARMER Program Guidelines, protocols, and criteria for covered vehicle and equipment projects and determines the methodologies used for evaluating project cost-effectiveness. Local air districts conduct outreach, solicit, evaluate, select, fund, and monitor specific FARMER Program projects in their jurisdictions.

The FARMER Program is similar to the Carl Moyer Program and although it is limited to agricultural equipment, the guidelines allow for funding additional types of equipment not eligible for funding from the Carl Moyer Program. To date, over $4.6 million in FARMER Program funding has been awarded to help replace 93 high-polluting diesel engines with new, much cleaner engines in Ventura County. The total emission reductions from those engine replacements were 54.9 tons per year of ozone precursors, and 3.7 tons per year of PM.

3.6.6. CAP Program

Initiated in 2018, the CAP Program is a grant program developed by CARB to implement legislative direction to reduce criteria, toxic, and GHG emissions from the agricultural sector. The Legislature directed CARB to reduce pollution exposure in communities most impacted by air pollution. To achieve that goal, the CAP Program targets funding for priority populations by including minimum percentages of funding for projects benefiting disadvantaged and low-income communities.

The CAP Program is implemented through a partnership between CARB and local air districts. CARB manages program funds and develops and revises the CAP Program Guidelines, protocols, and criteria for projects and determines the methodologies used for evaluating project cost-effectiveness. Local air districts conduct outreach, solicit, evaluate, select, fund, and monitor specific CAP Program projects in their jurisdictions.

The CAP Program is very similar to the Carl Moyer Program but the guidelines allow for funding additional types of equipment not eligible for funding from the Carl Moyer Program. In addition, maximum funding percentages are increased for some projects benefiting priority populations. To date, over $4.0 million in CAP Program funding has been awarded to help replace 37 high-polluting diesel engines with new, much cleaner engines and install electric school bus chargers in

Ventura County. The total emission reductions from those engine replacements were 15.25 tons per year of ozone precursors, and 1.01 tons per year of PM.

3.6.7. VSR Program

The District is a founding partner in the Protecting Blue Whales and Blue Skies Program, a voluntary VSR Program along the coast of California. The VSR Program has become a highly successful program both in the Santa Barbara Channel region and the San Francisco Bay Area since its launch in 2014. The VSR Program incentivizes large marine cargo ships to reduce their speeds, typically ranging between 12 and 18 knots, to less than 10 knots in order to reduce the risk of lethal whale strikes, reduce ocean noise pollution, and reduce air pollution from these vessels. These ships are a significant source of air pollution. Air emissions from ocean-going vessels traversing the Channel Islands region constitute approximately 40 percent of the NOx emissions in Ventura County's jurisdiction. In addition to NOx emissions, ships are a significant source of other air pollutants such as sulfur dioxide, GHG, and diesel particulate matter.

The VSR Program has evolved since its launch in 2014 as a pilot program targeting individual ships. It now provides incentives based on the percentage of fleet miles transiting VSR zones at 10 knots or less, with some companies achieving over 90% cooperation rate. In 2020, the VSR Program achieved 748 tons of NOx reductions during the period from May 15, 2020 through November 15, 2020. Since 2014 the VSR program has reduced NOx emissions from ocean-going vessels by over 1,600 tons. However, these reductions are not permanent since this is a program based on behavioral changes, not replacing high-emissions equipment with cleaner equipment.

The Protecting Blue Whales and Blue Skies partners have secured funding to manage the program through the 2022 ozone season. The partners are seeking additional funds to sustain the program for future years.

3.7. Ventura County Smart Growth Policies and Programs

Ventura County has been a leader in controlling urban growth and sprawl for decades. As a result, Ventura County cities are geographically distinct from each other, with greenbelt buffers and agricultural land separating the urbanized areas of the county. Moreover, nearly 90 percent of the county's population live within the county's ten cities. Ventura County has successfully accommodated growth while remaining a leading agricultural area in California. Some of the notable urban growth guidelines, policies, and programs in Ventura County are summarized below for informational purposes.

3.7.1. Guidelines for Orderly Development

Adopted by the County Board of Supervisors, all City Councils, and the Local Agency Formation Commission (LAFCo), the *Guidelines for Orderly Development* help facilitate orderly development in Ventura County by directing urban development to the cities rather than to the county's unincorporated areas. The *Guidelines for Orderly Development's* primary policy states:

"Urban development should occur, whenever and wherever practical, within incorporated cities which exist to provide a full range of municipal services and are responsible for urban land use planning." The LAFCo administers the *Guidelines for Orderly Development*. LAFCo is a regulatory commission that coordinates changes in the county's city boundaries; conduct special studies which review ways to streamline government structure; and prepare Spheres of Influence for each city and special district.

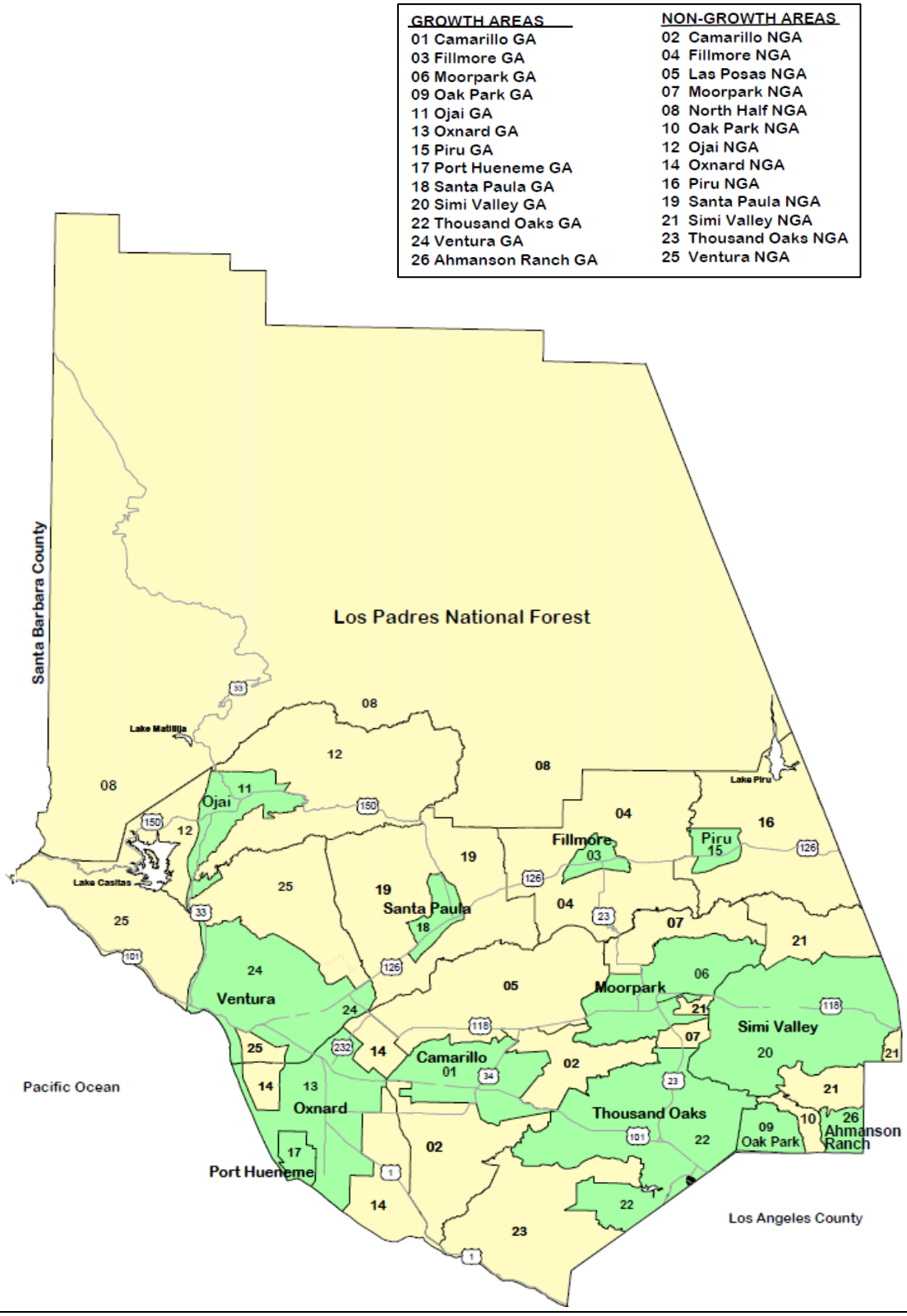
The County of Ventura, all ten cities in the county, and the LAFCo have adopted the Guidelines for Orderly Development as policy. The *Guidelines for Orderly Development* were first adopted in 1969 and later amended in 1996. The *Guidelines for Orderly Development*:

- Provide a framework for cooperative intergovernmental relations.
- Allow for urbanization in a manner that will accommodate the development goals of the individual communities while conserving the resources of the County.
- Promote efficient and effective delivery of community services for existing and future residents.
- Identify in a manner understandable to the public the planning and service responsibilities of local governments providing urban services.

3.7.2. Growth and Non-Growth Areas

Growth and Non-Growth Areas, otherwise known as GAs and NGAs, are based on a network of analysis zones created by the State Department of Transportation and the Ventura County Public Works Agency. The Growth and Non-Growth Areas are comprised of aggregated analysis zones. Figure 3-1 shows the growth and non-growth areas in the county. The entire present and projected boundary area of each of the ten cities in the county is within a respective growth area. In addition to the ten growth areas, there are three unincorporated growth areas. The unincorporated growth areas include urbanized development that has already occurred or is expected to occur under the Ventura County General Plan. An example is the Piru Growth Area. These areas are not expected to receive significant urban development. All of the GA and NGAs are used in the environmental review process for assessing a project's consistency with the AQMP using SCAG's RTP population forecasts for that respective geographical subarea.

Figure 3-1
Growth and Non-Growth Areas in Ventura County



3.7.3. Greenbelt Agreements

Greenbelt Agreements (Agreements) are voluntary policy statements adopted by resolution or ordinance between the County of Ventura and one or more of the county's ten cities. Greenbelts in Ventura County are areas where cities have agreed not to annex areas and the County of Ventura has pledged to permit only open space or agricultural uses. The Agreements protect property owners, open space, and agricultural lands from urbanization by preventing premature conversion to agriculturally incompatible uses. The Agreements also help ensure that the cities do not sprawl into each other. However, greenbelt boundaries may be amended, and proposals may be brought forth by the cities or county which must undergo a review process prior to being considered by the city or county decision-making bodies.

Although not a party to the Agreements, the Ventura County LAFCo will not approve a development that conflicts with any greenbelt agreement unless exceptional circumstances exist. City and County elected officials in Ventura County were pioneers in designing and adopting greenbelts.

There are seven greenbelt agreements in Ventura County:

- Ventura-Santa Paula Greenbelt
- Santa Paula-Fillmore Greenbelt
- Camarillo-Oxnard Greenbelt
- Santa Rosa Valley Greenbelt
- Tierra Rejada Greenbelt
- Ventura-Oxnard Greenbelt
- Fillmore-Piru Greenbelt

3.7.4. SOAR and CURB

The Save Open Space and Agricultural Resources (SOAR) and City Urban Restriction Boundary (CURB) resulted from voter-approved ballot initiatives in the unincorporated areas of Ventura County and eight of the county's ten cities. The SOAR initiatives require voter approval in the affected jurisdictions before specified General Plan land use designations, such as agriculture and open space, can be rezoned for development. The CURB initiatives define a boundary around the affected jurisdictions and require voter approval before urban development can occur outside the CURB lines.

The SOAR and CURB measures work together to direct urban growth to within existing city boundaries, thereby restricting urban sprawl, encouraging infill and higher density development, and protecting agricultural, open space, and natural lands in Ventura County. The city SOARs established CURBs around each city. With limited exceptions, development beyond a city's CURB cannot occur unless the city voters approve an extension of the CURB. The city CURBs complement the County SOAR by preventing annexations of adjacent unincorporated areas into the cities for development unless the voters approve such annexations. The following are the Ventura County jurisdictions covered by SOAR initiatives:

- County of Ventura
- City of Oxnard

- City of Ventura
- City of Camarillo
- City of Thousand Oaks
- City of Simi Valley
- City of Moorpark
- City of Santa Paula
- City of Fillmore

A map of the SOAR and CURB boundaries is available on the County of Ventura's Resource Management Agency's website at: https://www.ventura.org/gis-and-mapping/regulatory-boundaries-rma/. The SOAR initiative was extended by voter approval in November 2016 with a sunset date of December 31, 2050.

3.7.5. Ventura County Air Quality Assessment Guidelines

The Ventura County Air Quality Assessment Guidelines (AQAG) is a District document that provides District staff, lead agencies, consultants, and project applicants with uniform procedures for preparing the air quality sections of environmental documents pursuant to the California Environmental Quality Act (CEQA). CEQA applies to all discretionary development projects, unless an exemption applies, and requires that any significant environmental effects of such projects be mitigated to the extent feasible. CEQA thereby provides a mechanism to help minimize air emissions associated with urban growth.

The AQAG recommend specific criteria and threshold levels for determining whether a proposed project may have a significant adverse impact on air quality. The criteria follow the State CEQA Guidelines criteria for evaluating air quality impacts, such as whether a project will interfere with the applicable air quality plan, expose sensitive receptors to toxic or substantial air pollutants, contribute an odor impact, and result in a cumulatively considerable net increase of a criteria pollutant that is in nonattainment by comparing a project's emissions to adopted numerical thresholds. The AQAG also provides for mitigation measures to lessen or eliminate air quality impacts of development projects found to be significant and includes methodologies for each air quality criteria to be evaluated.

The District does not require that lead agencies use the AQAG; however, most lead agencies in the county, including the ten cities and the County of Ventura, do so and have adopted the AQAG as part of their environmental review process for air quality. Additionally, District staff routinely review and comment on the air quality sections of environmental documents prepared by local, state, and federal lead agencies for projects occurring in Ventura County.

SECTION 4. EMISSIONS INVENTORY FORECASTS

This section summarizes the ROG and NOx planning emissions inventory for future years. Although the forecast contains other air pollutants, only ROG and NOx are pertinent to ozone formation and emission forecast reporting requirements. Appendix A, *Ventura County Emissions Inventory Documentation*, provides further information and documentation of the emissions forecasts for the 2022 AQMP.

The 2022 AQMP incorporates all anthropogenic emission categories using the latest emissions estimates and control implementation schedule. Emissions forecasts are calculated using the actual 2018 base year emissions inventory presented in Section 2, *2018 Baseline Emissions Inventory*, and control measure data in Section 3, *Control Strategy*.

4.1. Forecast Methodology

The 8-hour Ozone SIP base year emissions inventory and future year emissions forecast are a joint effort by the District and the CARB. The CARB's California Emission Projection Analysis Model (CEPAM) is a computer model that uses pollutant-specific algorithms to calculate future year emissions for all areas throughout the state. The District relies on this model to produce future-year and historical-year emissions in accordance with EPA's 8-hour Ozone SIP and the CCAA of 1988 emissions inventory reporting requirements.

Forecasted emissions are a product of two principal components: growth factors and control factors. The forecast methodology involves applying growth and control factors to 2018 base year emissions by pollutant-emitting process category. Growth and control factors are calculated by analyzing the 2018 actual emissions, future socioeconomic assumptions, and the future impact of district, state, and federal control strategies.

The CEPAM forecast model generated the summer planning day ROG and NOx emissions specific to Ventura County for 2018, 2024, 2026, 2030, 2035, and 2040 (CEPAM emission projection v1.01, March 2022). 2018 is the baseline emission year, 2024 is a Rate-of-Progress milestone year and 2026 is Ventura County's 8-hour ozone standard attainment year.

Forecasted emissions after the 2026 attainment year are included out to 2040 for emission trend analysis and are not intended for the regulatory purposes of the 8-hour Ozone SIP and should be considered for informational purposes only.

The algorithm used in CARB's CEPAM emission forecasting model is:

$FY_t = BY * GF_t * CF_t$

Where:

FY_t = controlled planning day emissions for the forecast year (t)

BY = base year (2018) planning day emissions per process

GF_t = growth factor for forecast year (t)

CF_t = control factor for forecast year (t).

Growth factors (GF) account for changes in future year socioeconomic conditions relative to the 2018 base year using a variety of activity indicators. Activity indicators are collected from a number of sources to track the economic status or social trends of the surrounding area. Examples include economic output and employment by industry, population, housing, natural gas usage, agricultural-related activity, military aircraft and vessel activity, and activity for specialized types of facilities such as landfills and civilian airports.

District and CARB staff assign activity indicators to emissions categories that best characterize the source activity. The District updates the socioeconomic data used in the CEPAM model for every SIP planning cycle and as an ongoing process for rule development analyses. CARB's CEPAM calculates the growth factors, which reflect the change in future year ROG and NOx emissions relative to the base year before controls from rules and regulations are applied. The forecast activity indicators, growth factors and data sources used in the CEPAM2022 v1.01 emissions projections are presented in Table 4-1.

Control factors (CF) represent the overall expected effectiveness of each control measure or rule to reduce emissions in a given future year. All emission categories in a base year are reviewed for potential assignment to control measures, and control factors are updated for every planning cycle. District staff calculates control measure effectiveness estimates based on the best data available, knowledge of local sources already under control, and future control technologies. Control factors may change in the future as better information becomes available during the rule development process.

A control factor is a composite of the following four multipliers:

1) technological control efficiency (CE) of the control technology, equipment or strategy requirements of the control measure;
2) compliance efficiency, or rule effectiveness (RE) of the control measure, reflecting the actual "real world" ability of a control measure to achieve expected emission reductions;
3) rule penetration (RP), or impact factor, representing the relative amount of emissions in a source category subject to a control measure, accounting for exemptions and other control measures; and,
4) implementation factor (IP), or relative amount of total control occurring in a given year, for control measures having phased implementation or control requirements occurring in tiers (i.e. increasing levels of control stringency over a period of years).

Control factors are applied to future year emissions projected from base year emissions using growth factors, resulting in the emissions remaining in a source category after control is applied, represented by the following equation: CF = 1-(CE*RE*RP*IP).

Table 4-1
Future Year Growth Factor Summary

Ventura County 2018 Base Year Forecast Activity Indicator	2024 GF	2026 GF	2030 GF	2035 GF	2040 GF	Data Source
Accommodation and Food Services	1.090	1.120	1.170	1.210	1.250	SCAG
Administrative & Building Services, Waste Mgmt. Employment	1.040	1.050	1.070	1.090	1.110	SCAG
Agricultural Aircraft	0.820	0.760	0.660	0.660	0.660	ARB/EI SUB
Agricultural Harvest Acres	0.990	0.990	0.980	0.970	0.970	FMMP
Agriculture, Forestry, Fishing & Hunting Economic Output	1.120	1.160	1.210	1.240	1.270	SCAG
Arts, Entertainment & Recreation Economic Output	1.140	1.190	1.260	1.320	1.380	SCAG
Beverage & Tobacco Products Economic Output	0.960	0.947	0.938	0.912	0.829	SCAG
Beverage Manufacturing	1.030	1.070	1.140	1.260	1.400	REMI
Chemical Manufacturing Economic Output	1.090	1.130	1.150	1.150	1.150	SCAG
Civilian Airport Operations	1.020	1.030	1.050	1.070	1.100	FAA-TAF
Computer & Electronic Products Economic Output	1.170	1.230	1.310	1.340	1.370	SCAG
Construction Employment	1.050	1.070	1.090	1.120	1.150	SCAG
Consumer Product Use - Aerosol Coatings	1.000	1.000	1.000	1.000	1.000	DOF
Disposable Personal Income	1.090	1.120	1.210	1.340	1.470	REMI
Drycleaning PERC Use	0	0	0	0	0	District
Dwelling Units	1.030	1.040	1.060	1.080	1.100	SCAG
Electric Generating Unit (Power Plant) Natural Gas Usage	2.620	2.900	2.240	2.070	1.910	CEC
Electrical Equipment & Components Economic Output	1.100	1.130	1.160	1.160	1.160	SCAG
Fabricated Metal Products Economic Output	1.080	1.100	1.120	1.110	1.100	SCAG
Federal Military Employment	1.100	1.090	1.080	1.070	1.060	REMI
Food & Agriculture	0.990	1.040	1.110	1.220	1.350	REMI
Food Manufacturing Economic Output	1.080	1.110	1.130	1.130	1.130	SCAG
Furniture & Related Products Economic Output	1.130	1.180	1.230	1.250	1.260	SCAG
Information Industries Economic Output	1.200	1.270	1.370	1.470	1.570	SCAG
Landfill Gas Emission	1.110	1.140	1.210	1.300	1.110	LandGEM
Laundering and Drycleaning (non-PERC)	1.040	1.050	1.070	1.090	1.110	SCAG
Machinery Manufacturing Economic Output	1.100	1.140	1.170	1.170	1.170	SCAG
Manufacturing and Industrial Residual Oil Use	1.050	1.060	1.070	1.060	1.050	SCAG
Merchant Wholesalers, Durable Goods Employment	1.030	1.030	1.040	1.060	1.070	SCAG
Military Coastal OGV	1.220	1.320	1.530	1.860	2.250	NBVC
Military Jets in OC1	1.265	1.368	1.600	1.947	2.368	NBVC

Ventura County 2018 Base Year Forecast Activity Indicator	2024 GF	2026 GF	2030 GF	2035 GF	2040 GF	Data Source
Military Jets in OC2	1.270	1.370	1.607	1.953	2.374	NBVC
Military Jets in SCC	1.342	1.496	1.759	2.059	2.572	NBVC
Military Piston Aircraft in SCC	1.270	1.372	1.608	1.953	2.378	NBVC
Military Vessels - Outer Continental Shelf 24-100 miles	1.230	1.330	1.550	1.890	2.300	NBVC
Military Vessels - Outer Continental Shelf 3-24 miles	1.270	1.370	1.600	1.950	2.370	NBVC
Military Vessels - Outer Continental Shelf 3-24 miles	1.270	1.370	1.600	1.950	2.370	NBVC
Miscellaneous Manufacturing Economic Output	1.120	1.170	1.210	1.220	1.220	SCAG
Motor Vehicle Gasoline Consumption	0.850	0.800	0.740	0.690	0.680	EMFAC2017
Natural Gas Combustion Commercial Space Heating	0.970	0.930	0.870	0.820	0.760	SocalGas
Natural Gas Combustion Commercial Unspecified	0.950	0.900	0.830	0.770	0.700	SocalGas
Natural Gas Combustion Commercial Water Heating	0.950	0.910	0.850	0.790	0.720	SocalGas
Natural Gas Combustion Industrial	0.910	0.900	0.880	0.850	0.830	SocalGas
Natural Gas Combustion Residential Space Heating	1.070	1.040	0.970	0.970	0.950	SocalGas
Natural Gas Combustion Residential Unspecified	1.090	1.070	1.030	1.040	1.050	SocalGas
Natural Gas Combustion Residential Water Heating	1.060	1.030	0.970	0.960	0.940	SocalGas
No Growth (Unity)	1.000	1.000	1.000	1.000	1.000	District
Nonmetallic Mineral Mining & Quarrying Economic Output	1.030	1.040	1.050	1.040	1.030	SCAG
Nonmetallic Mineral Products Economic Output	1.070	1.090	1.110	1.100	1.090	SCAG
Oil & Gas Extraction Economic Output	1.370	1.520	1.770	2.020	2.290	SCAG
Oil & Gas Extraction Economic Output - OCS	1.370	1.520	1.770	2.020	2.290	SCAG
Other Services, Except Public Administration Employment	1.030	1.040	1.050	1.070	1.090	SCAG
Paper Manufacturing Economic Output	1.080	1.100	1.130	1.120	1.120	SCAG
Petroleum & Coal Products Manufacturing Economic Output	1.150	1.210	1.270	1.290	1.310	SCAG
Pipeline Transportation Economic Output	1.160	1.210	1.300	1.360	1.430	SCAG
Plastics & Rubber Products Manufacturing Economic Output	1.040	1.050	1.050	1.040	1.020	SCAG
Population	1.030	1.040	1.050	1.070	1.090	SCAG
Population 0-4, 65-up (Hospitals)	1.160	1.200	1.270	1.330	1.390	SCAG
Primary Metal Manufacturing Economic Output	1.160	1.220	1.280	1.300	1.320	SCAG
Printing & Related Support Activities Economic Output	1.170	1.230	1.300	1.320	1.350	SCAG
Professional, Scientific & Technical Services Employment	1.040	1.050	1.070	1.090	1.110	SCAG
Public Administration Employment	1.030	1.040	1.050	1.060	1.080	SCAG
Service and Commercial LPG Use	1.090	1.120	1.170	1.210	1.250	SCAG

Ventura County 2018 Base Year Forecast Activity Indicator	2024 GF	2026 GF	2030 GF	2035 GF	2040 GF	Data Source
Total Employment	1.040	1.050	1.070	1.090	1.110	SCAG
Transit & Ground Passenger Transportation Economic Output	1.170	1.230	1.330	1.420	1.520	SCAG
Transportation Equipment Economic Output	1.100	1.140	1.170	1.180	1.190	SCAG
Water Transportation Economic Output	1.270	1.360	1.520	1.640	1.770	SCAG
Wholesale Warehousing Employment	1.020	1.000	0.970	0.960	0.980	REMI
Primary Metal Manufacturing Economic Output	1.160	1.220	1.280	1.300	1.320	SCAG

FMMP = Farmland Mapping and Monitoring Program
REMI = Regional Economic Models, Inc.
FAA-TAF – Federal Aviation Administration Terminal Area Forecast
DOF = Department of Finance
CEC = California Energy Commission
LandGEM = Landfill Generation Emission model

Each customized control factor is specific to an emission source category and reflects a future year's anticipated emission control relative to the level of control in the 2018 base year for adopted rules and regulations. Table 3-3 in Section 3 includes a summary table showing potential district control measures. Section 3.1 describes potential control measures and expected future year emissions reductions.

Table 4-1 shows the assignment of growth factors and sources of those factors for emission source categories. Table A-1 and lists adopted district rules reflected in the base year and forecast emissions in this AQMP.

The CARB Air Quality Planning and Science Division has the primary responsibility for developing on-road and off-road mobile source emission forecasts in California. CEPAM integrates the emissions estimates from the EMFAC on-road motor vehicles model and the OFFROAD and other models for off-road other mobile sources into the future year emissions projections.

Growth assumptions for these mobile source categories are a product of collaboration among transportation agencies, local planning agencies, CARB, and SCAG. Appendix A contains a discussion of data and methods used by CARB to forecast future year mobile source emissions. This Plan uses the most current version of those emissions estimates modeled by the SCAG regional transportation model and the CARB EMFAC and other mobile source models.

Table 4-2 shows important motor vehicle growth indicators from the CARB EMFAC2017 v1.0.3 on-road vehicle model and the SCAG 2020 RTP. On-road motor vehicle planning day emissions for the base year and forecast years specific to Ventura County are shown in Table 3-6.

Table 4-21
Motor Vehicle Growth Trends

Ventura County Totals	Indicator	2018	2024	2026	2030	2035	2040
Population	Residents	861,000	889,000	895,000	906,000	920,000	934,000
All vehicle categories	Vehicles	511,800	520,831	525,016	534,741	548,906	568,591
Vehicle miles traveled (x 1000)	VMT/ 1000	19,238	19,418	19,435	19,525	19,647	19,928
All vehicle trips	Trip	2,472,493	2,527,501	2,551,400	2,605,490	2,685,216	2,789,371
Fuel Consumption (1000 gallons)	Gasoline	747	614	571	512	471	456
	Diesel	88.3	95.3	95.9	96.5	98.8	102.9

Notes:
EMFAC2017 v1.0.3.
Population Derived from SCAG Connect SoCal 2020 Report, rounded to the nearest thousand.

4.1.1. External Adjustments to CEPAM2022 v1.01

For the 2022 AQMP, all emission inventory adjustments developed by CARB were made using the CARB CEPAM2022 v1.01 data processing. No external adjustments to the CEPAM2022 v1.01 data were required, so the District has not incorporated data changes to the emissions inventory developed by CARB.

4.1.2. Emission Reduction Credits

District New Source Review permitting Rules 26-26.13 require any facility that has the potential to emit five tons/year or more ROG or NOx from new, replacement, modified or relocated emissions sources to provide emission offsets for the emissions increase. ERCs represent emission reductions that already have occurred and can be used to offset emissions growth from a new or modified permitted facility. EPA policy, the federal CAA sections 172(c)(5) and 173 and the CFR (40 CFR 51.165(a)(3)(ii)(C)(1)) require ERCs from emission reductions occurring before a nonattainment plan base year to be treated as potential growth in forecast years in order for them to be used as offsets.

Unless pre-base year ERCs are included in future year growth factors, future year forecasted inventories must be adjusted to account for pre-base year inventory ERCs. Total available ERC balances as of January 2018 were 1.59 tons/day ROG and 0.87 tons/day NOx.

The projected emission growth for stationary sources from 2018 to 2026 is 1.05 tons/day ROG and 0.96 tons/day NOx. All of the pre-base year banked NOx ERCs, and a majority of the pre-base year banked ROG ERCs, are accounted for in the growth projections in the CEPAM inventory. The projected growth of NOx emissions is greater than the available pre-base year NOx ERC balance; therefore, the growth is sufficient to account for the maximum possible NOx ERC use. However, the pre-base ROG ERCs exceed the projected growth of ROG emissions from stationary sources. To prevent the usage of ROG ERCs to offset new emissions that exceed the projected emission growth from stationary sources, the District will limit the use of pre-baseline ROG ERCs to no more than 1.05 tons/day (383.25 tons/year) through its permitting process. New emissions requiring ERCs that would result in the use of more than a cumulative use of 1.05 tons/day of ROG ERCs from the pre-2018 base year will not be permitted by the District. The District intends this commitment to be federally enforceable upon approval by the EPA of the AQMP into the California SIP. The District will track and report usage of pre-base year ERCs to EPA by including a statement about the use of pre-base year ERCs in its annual ERC reports to EPA. The District will revise the AQMP and submit the revision to EPA for inclusion in the California SIP if a situation arises where ROG ERCs are expected to be needed in excess of the projected ROG growth of 1.05 tons/day before attaining the 2015 ozone standard. A list of pre-2018 ERCs is shown in Appendix G.

4.2. Emissions Forecast Summary

ROG and NOx summer planning day emissions in the SCCAB (onshore Ventura County and within three miles of the coastline) for the 2018 base year and forecast years 2024, 2026, 2030, 2035 and 2040 are presented in the figures and tables below. Forecast emissions represent the effects of future socioeconomic changes and implementation of adopted local, state, and federal control measures but do not include emission reductions from proposed local control measures or CARB's Proposed 2022 State SIP Strategy (August 2022).

Figure 4-1 and Figure 4-2 graphically present anticipated ROG and NOx emission trends from the 2018 base year through the interval of forecast years by emission category. Table 4-3 and Table 4-4 numerically summarize those emissions by major emission category for years 2018 through 2040.

Figure 4-1 and Table 4-3 show that summer planning day ROG emissions should decrease by 1.7 tons/day or 5.8% by 2026 and 2.6 tons/day or 8.9% by 2040. Quantities and percentages of the change in ROG emissions reductions are described below.

- Mobile Sources: 3.2 tons/day (27%) decrease by 2026, 6.1 tons/day (52%) decrease by 2040
  - On-Road Vehicles: 1.7 tons/day (40%) decrease by 2026, 2.8 tons/day (66%) decrease by 2040

    On-road vehicles represent the third largest emission category in the base year, responsible for 26% of ROG emissions, this category accounts for 9.2% of the total by 2026 and becomes the fourth largest category. By 2040, on-road mobile sources account for and 5.5% of the total ROG emissions and are the fifth largest source of ROG.
  - Other Mobile Sources: 1.5 tons/day (19%) decrease by 2026, 3.3 tons/day (44%) decrease by 2040

    This category contributed about 26% of ROG in 2018, the second leading emission category in the base year. Other mobile sources will continue to be the second largest source of ROG through 2040.
- Stationary Sources: 1.5 tons/day (8%) increase by 2026, 3.5 tons/day (20%) increase by 2040
  - Solvent Use: 0.7 tons/day (6%) increase by 2026, 1.8 tons/day increase (15%) by 2040

    Solvent use includes evaporative emissions from consumer products, architectural coatings, surface coatings, and cleaning solvent use. Solvent use accounted for 41% of total ROG emissions in 2018 as the largest emission category. Solvent use is responsible for 46% of ROG emissions by 2026 and 52% by 2040, by far the largest ROG emission category.

- Pesticide Application: .1 tons/day (7.5%) increase by 2026, 0.07 tons/day (5.5%) increase by 2040

  Pesticide Application is almost entirely attributable to agricultural pesticides (non-methyl bromide use) and contributed 4.4% of total ROG in 2018. Pesticide Application becomes about 5% of the total ROG emissions in 2026 and 2040.

- Petroleum Industry and Other Sources. 0.7 tons/day increase (16%) by 2026, 1.6 tons/day increase (37%) by 2040

  The petroleum industry includes oil and gas production and related combustion activities, and petroleum product marketing such as gasoline dispensing. Other sources such as stationary and residential fuel combustion, agricultural burning, industrial processes related to manufacturing, and waste disposal are relatively small emission categories individually. Together the petroleum industry and other sources accounted for about 15% of ROG in 2018, 18% in 2026 and 22% in 2040.

Figure 4-1
ROG Major Emission Category Trends

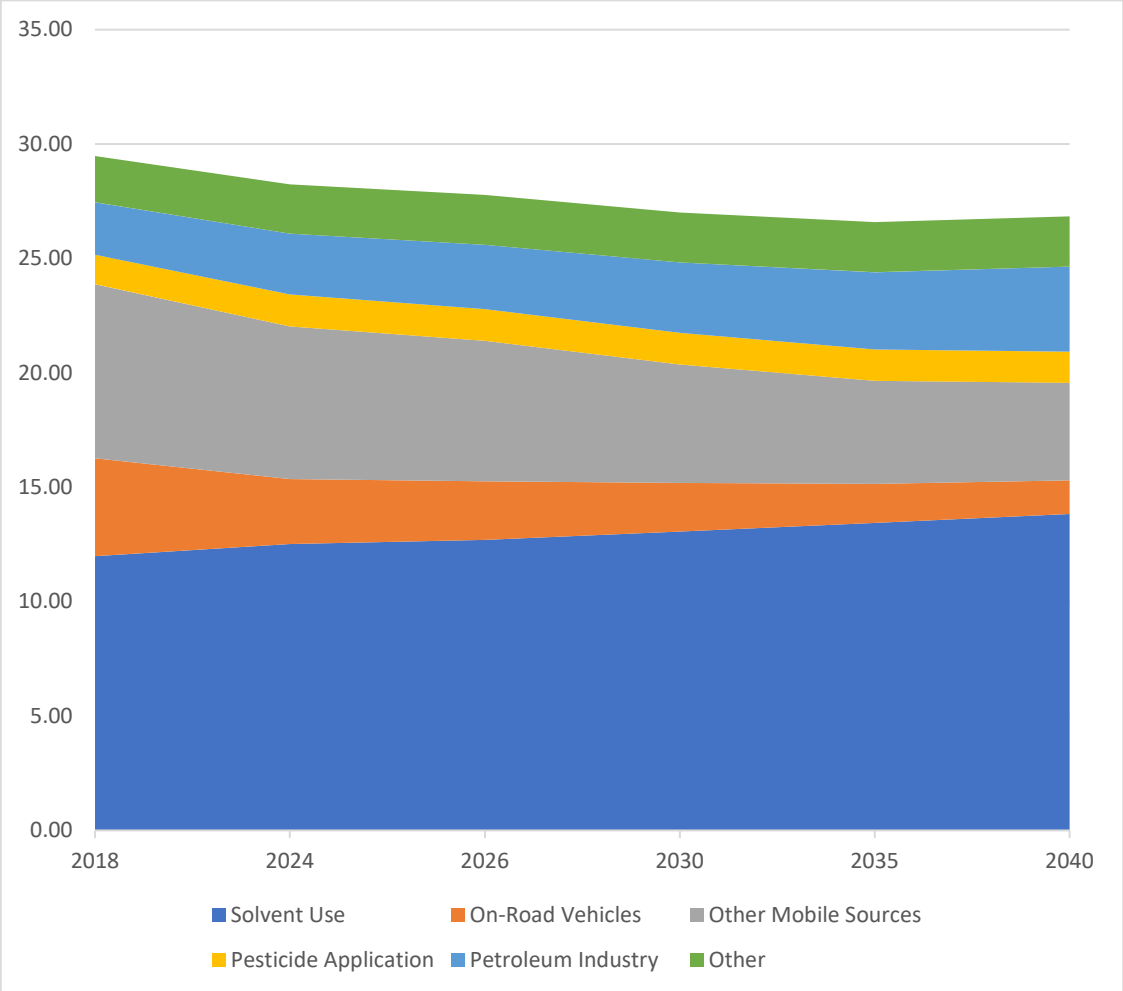


Table 4-32
Summer Planning Day ROG Emissions

Major Emission Category	ROG (tons/summer day)					
	2018	2024	2026	2030	2035	2040
Solvent Use	11.99	12.52	12.71	13.07	13.45	13.83
On-Road Vehicles	4.28	2.83	2.56	2.13	1.70	1.47
Other Mobile Sources	7.60	6.68	6.13	5.17	4.50	4.26
Pesticide Application	1.29	1.39	1.39	1.38	1.37	1.36
Petroleum Industry	2.29	2.66	2.81	3.09	3.38	3.72
Other	2.02	2.15	2.18	2.17	2.18	2.20
ERC Balance	0.00	1.59	1.59	1.59	1.59	1.59
ROG Total Emissions	**29.48**	**29.83**	**29.37**	**28.59**	**28.17**	**28.434**

Notes:
Based on CARB CEPAM2022 v1.01 (March 2022).
Data rounding may affect displayed values and totals.
OC1 and OC2 not included

Figure 4-2 and Table 4-4 show that total summer planning day NOx emissions decrease by 5.2 tons/day or 29% by 2026, and by 7.3 tons/day or 40 percent by 2040. The vast majority of emissions reductions are attributable to Mobile Sources. Amounts and percentages of emissions changes are shown below.

- Mobile Sources: 5.8 tons/day (37%) decrease by 2026, 7.7 tons/day (49%) decrease by 2040
  - On-Road Vehicles: 4.2 tons/day (60%) decrease by 2026, 5.6 tons/day (80%) decrease by 2040

    On-Road Vehicles are the largest NOx emission category in 2018, responsible for 39% of NOx emissions. By 2026, on-road vehicles contribute 25% of total NOx and are the second largest emission category behind other mobile sources.
  - Other Mobile Sources: 0.4 tons/day decrease (7%) by 2026, 0.2 tons/day decrease (3.0%) by 2040

    Other Mobile Sources include aircraft, train locomotives, ships and commercial boats, recreational boats, off-road recreational vehicles, and farm equipment. Other Mobile Sources accounted for 32% of NOx in 2018 and are the second largest NOx emission category. Other mobile sources account for 39% of NOx emissions in 2026 and are the largest NOx emission category. By 2040 other mobile sources represent 41% of total NOx emissions, and remain the largest emission category.
  - Mobile Equipment: 1.2 tons/day (40%) decrease by 2026, 1.9 tons/day (65%) decrease by 2040

Mobile equipment categories include industrial equipment such as forklifts, construction and mining equipment, commercial and residential lawn and garden equipment, airport ground support equipment and transport refrigeration units. Mobile equipment represented 16% of NOx emissions in 2018, 15% by 2026 and 14% by 2040.

- Stationary Sources: 0.6 tons/day increase (26%) by 2020, 0.4 tons/day increase (18%) by 2040
  - Other Fuel Combustion: 0.12 tons/day (7%) decrease by 2026, 0.14 tons/day (8%) decrease by 2040

    Other Fuel Combustion includes stationary industrial and commercial sources (excluding electric utilities and oil and gas production), agricultural irrigation engines, landfill gas flaring, residential uses, and agricultural burning. Other Fuel Combustion sources contributed approximately 9% of NOx in 2018, 12% in 2026 and 12% by 2040.
  - Electric Utilities and the Petroleum Industry: 0.6 tons/day (142%) increase by 2026, 0.3 tons/day (61%) increase by 2040.

    Emissions from these sources are not expected to change significantly from the base year. They contributed 1% of NOx emissions in 2018, 2% by 2026 and 3% by 2040.

Summaries of forecast ROG and NOx emissions by Major Source Category and air basin follow in Table 4-5 and Table 4-6 for 2018, 2024, 2026, 2030, 2035, and 2040. The relative contributions by major emission category appear in Figure 4-3 and Figure 4-4 for ROG and NOx planning day emissions in 2026 and Figure 4-5 and Figure 4-6 for 2040.

Figure 4-2
NOx Major Emission Category Trends

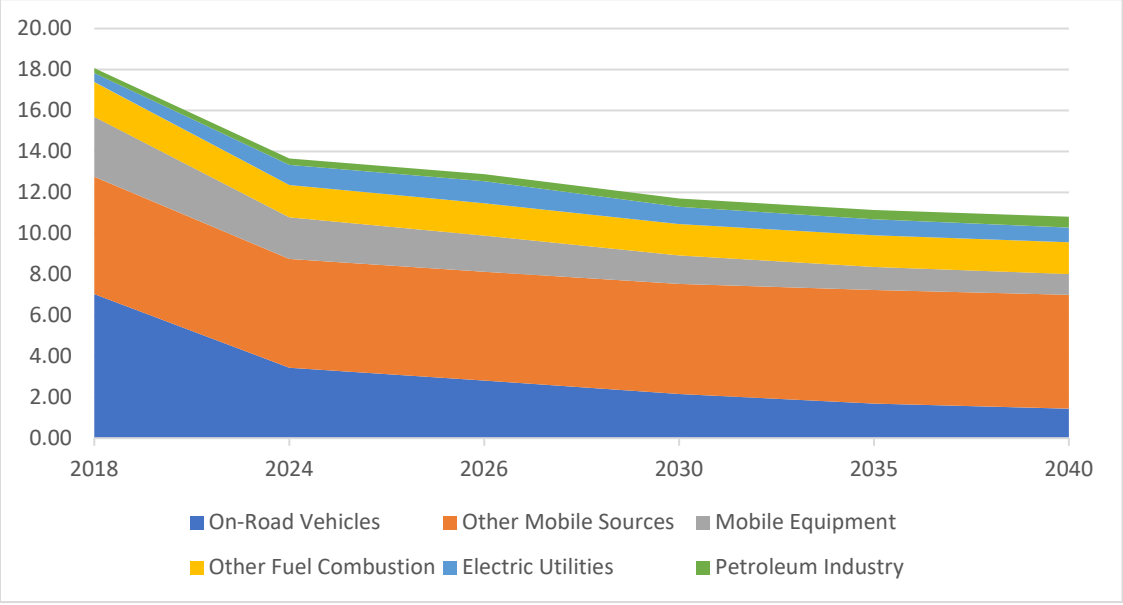


Table 4-43
Summer Planning Day NOx Emissions

Major Emission Category	NOx (tons/summer day)					
	2018	2024	2026	2030	2035	2040
On-Road Vehicles	7.03	3.43	2.82	2.16	1.69	1.44
Other Mobile Sources	5.73	5.31	5.30	5.37	5.55	5.56
Mobile Equipment	2.93	2.03	1.77	1.38	1.12	1.01
Other Fuel Combustion	1.69	1.59	1.57	1.54	1.55	1.55
Electric Utilities	0.45	0.98	1.08	0.84	0.78	0.72
Petroleum Industry	0.24	0.32	0.35	0.40	0.46	0.52
ERC Balance		0.87	0.87	0.87	0.87	0.87
NOx Total Emissions	**18.07**	14.52	13.76	12.56	12.01	11.67

Notes:
Based on CARB CEPAM2022 v1.01 (March 2022).
Data rounding may affect displayed values and totals.
OCS not included.

Table 4-54
ROG Planning Emissions Forecast by Major Source Category

Ventura County	ROG (tons/summer day)					
Major Source Category Name	**2018**	**2024**	**2026**	**2030**	**2035**	**2040**
OC1 and OC2 AIR BASINS						
Stationary Sources						
Fuel Combustion	0.12	0.20	0.21	0.19	0.18	0.18
Waste Disposal	0.79	0.81	0.82	0.83	0.84	0.85
Cleaning And Surface Coatings	4.18	4.36	4.43	4.49	4.47	4.45
Petroleum Production And Marketing	2.28	2.64	2.79	3.06	3.35	3.69
Industrial Processes	0.54	0.57	0.57	0.58	0.59	0.59
Total Stationary Sources	**7.91**	**8.58**	**8.83**	**9.14**	**9.43**	**9.76**
Areawide Sources						
Solvent Evaporation	9.10	9.55	9.67	9.96	10.35	10.74
Miscellaneous Processes	0.59	0.60	0.60	0.60	0.60	0.60
Total Areawide Sources	**9.69**	**10.15**	**10.26**	**10.56**	**10.95**	**11.35**
Mobile Sources						
On-Road Motor Vehicles	4.28	2.83	2.56	2.13	1.70	1.47
Other Mobile Sources	7.60	6.68	6.13	5.17	4.50	4.26
Total Mobile Sources	**11.88**	**9.51**	**8.69**	**7.30**	**6.21**	**5.73**
TOTAL SCC AIR BASIN	**29.48**	**28.24**	**27.78**	**27.00**	**26.58**	**26.84**
ERC Balance		**1.59**	**1.59**	**1.59**	**1.59**	**1.59**
TOTAL SCC AIR BASIN+ERC	**29.48**	**29.83**	**29.37**	**28.59**	**28.17**	**28.43**
OC1 AIR BASIN						
Stationary Sources						
Fuel Combustion	0.00	0.00	0.00	0.00	0.00	0.00
Cleaning And Surface Coatings	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Production And Marketing	0.04	0.06	0.06	0.07	0.08	0.09
Total Stationary Sources	**0.04**	**0.06**	**0.06**	**0.08**	**0.09**	**0.10**
Mobile Sources						
Aircraft	0.00	0.00	0.00	0.01	0.01	0.01
Ocean Going Vessels	0.41	0.44	0.45	0.48	0.52	0.57
Commercial Harbor Craft	1.16	1.47	1.58	1.85	2.25	2.73
Total Mobile Sources	**1.58**	**1.91**	**2.04**	**2.34**	**2.77**	**3.30**
TOTAL OC1 AIR BASIN	**1.62**	**1.97**	**2.11**	**2.41**	**2.86**	**3.40**
OC2 AIR BASIN						
Stationary Sources						
Fuel Combustion	0.02	0.02	0.02	0.02	0.02	0.02
Cleaning And Surface Coatings	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Production And Marketing	0.00	0.00	0.00	0.00	0.00	0.00
Total Stationary Sources	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**
Mobile Sources						
Aircraft	0.00	0.00	0.00	0.00	0.01	0.01
Ocean Going Vessels	0.20	0.22	0.22	0.23	0.24	0.25
Commercial Harbor Craft	0.00	0.00	0.00	0.00	0.00	0.00
Total Mobile Sources	**0.21**	**0.22**	**0.23**	**0.24**	**0.25**	**0.26**
TOTAL OC2 AIR BASIN	**0.23**	**0.24**	**0.25**	**0.26**	**0.27**	**0.28**
TOTAL VENTURA COUNTY	**31.32**	**32.04**	**31.73**	**31.26**	**31.30**	**32.11**

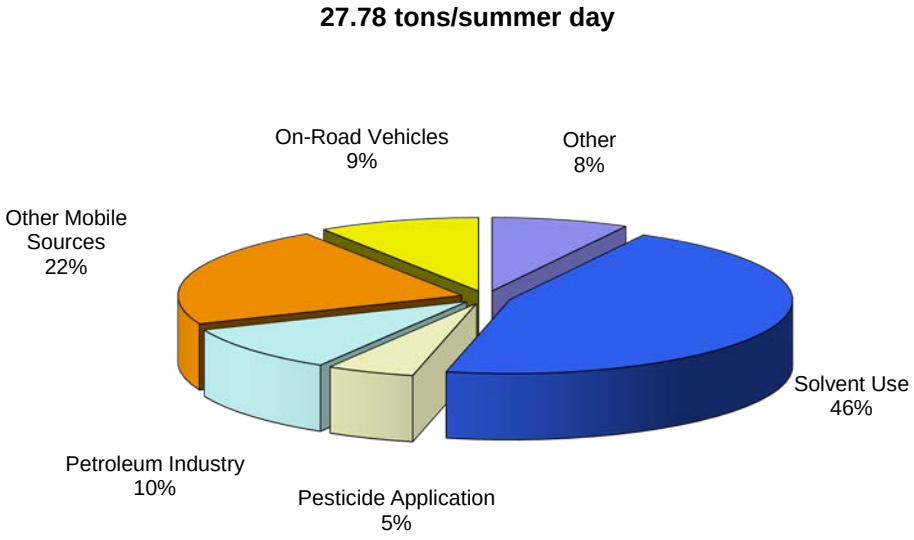
Notes:
Source: CEPAM2022 v1.01 (March 2022).
Data rounding may affect totals.

Table 4-65
NOx Planning Emissions Forecast by Major Source Category

Ventura County	NOx (tons/summer day)					
Major Source Category Name	**2018**	**2024**	**2026**	**2030**	**2035**	**2040**
SCC AIR BASIN						
Stationary Sources						
Fuel Combustion	1.57	2.04	2.15	1.93	1.90	1.89
Waste Disposal	0.07	0.08	0.08	0.09	0.09	0.10
Cleaning And Surface Coatings	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Production And Marketing	0.10	0.13	0.15	0.17	0.20	0.22
Industrial Processes	0.06	0.06	0.06	0.06	0.06	0.06
Total Stationary Sources	**1.79**	**2.31**	**2.44**	**2.25**	**2.25**	**2.27**
Areawide Sources						
Solvent Evaporation	0	0	0	0	0	0
Miscellaneous Processes	0.58	0.57	0.56	0.53	0.53	0.52
Total Areawide Sources	**0.58**	**0.57**	**0.56**	**0.53**	**0.53**	**0.52**
Mobile Sources						
On-Road Motor Vehicles	7.03	3.43	2.82	2.16	1.69	1.44
Other Mobile Sources	8.66	7.34	7.07	6.75	6.67	6.57
Total Mobile Sources	**15.69**	**10.78**	**9.90**	**8.92**	**8.36**	**8.01**
TOTAL SCC AIR BASIN	**18.07**	**13.66**	**12.90**	**11.70**	**11.14**	**10.81**
ERC Balance		**0.87**	**0.87**	**0.87**	**0.87**	**0.87**
TOTAL SCC AIR BASIN+ERC	**18.07**	**14.53**	**13.77**	**12.57**	**12.01**	**11.68**
OC1 AIR BASIN						
Stationary Sources						
Fuel Combustion	0.00	0.00	0.00	0.00	0.00	0.00
Cleaning And Surface Coatings	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Production And Marketing	0.02	0.02	0.03	0.03	0.04	0.04
Total Stationary Sources	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.04**
Mobile Sources						
Aircraft	0.03	0.03	0.04	0.04	0.05	0.06
Ocean Going Vessels	9.04	9.38	9.60	10.12	10.98	9.12
Commercial Harbor Craft	0.47	0.52	0.54	0.58	0.65	0.73
Total Mobile Sources	**9.53**	**9.93**	**10.18**	**10.75**	**11.68**	**9.91**
TOTAL OC1 AIR BASIN	**1.62**	**1.97**	**9.55**	**9.96**	**10.21**	**10.78**
OC2 AIR BASIN						
Stationary Sources						
Fuel Combustion	0.23	0.25	0.25	0.25	0.25	0.24
Cleaning And Surface Coatings	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Production And Marketing	0.00	0.00	0.00	0.00	0.00	0.00
Total Stationary Sources	**0.23**	**0.25**	**0.25**	**0.25**	**0.25**	**0.24**
Mobile Sources						
Aircraft	0.01	0.01	0.01	0.01	0.01	0.01
Ocean Going Vessels	3.91	3.93	3.97	4.01	4.12	3.07
Commercial Harbor Craft	0.05	0.05	0.05	0.05	0.05	0.05
Total Mobile Sources	**3.97**	**3.99**	**4.03**	**4.07**	**4.19**	**3.14**
TOTAL OC2 AIR BASIN	**0.23**	**0.24**	**4.20**	**4.24**	**4.28**	**4.32**
TOTAL VENTURA COUNTY	**31.82**	**28.73**	**28.25**	**27.67**	**28.16**	**25.02**

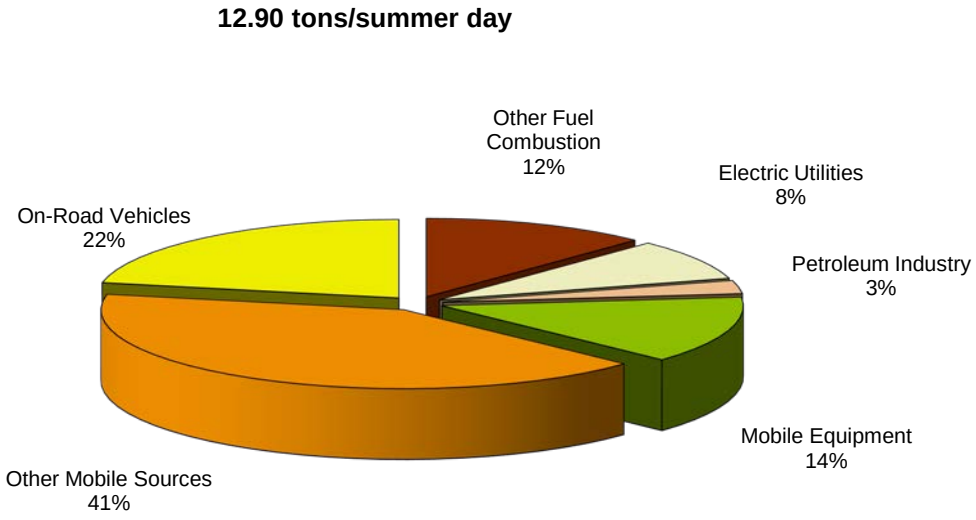
Notes:
Source: CEPAM2022 v1.01 (March 2022).
Data rounding may affect totals.

Figure 4-3
Ventura County 2026 Planning Day
ROG Emissions Inventory



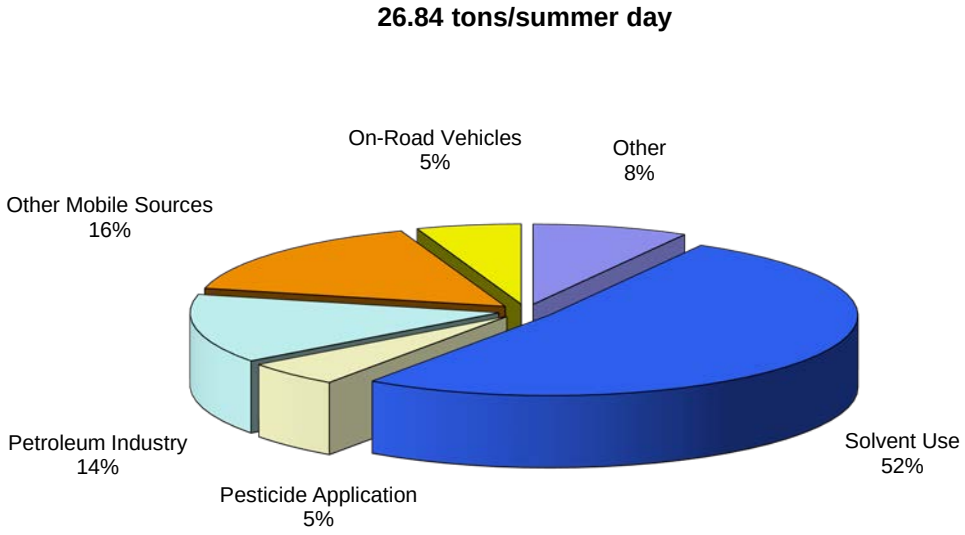
Reference:
CARB CEPAM2022 v1.01 (March 2022)
Excludes OC1, OC2, and Natural Sources

Figure 4-4
Ventura County 2026 Planning Day
NOx Emissions Inventory



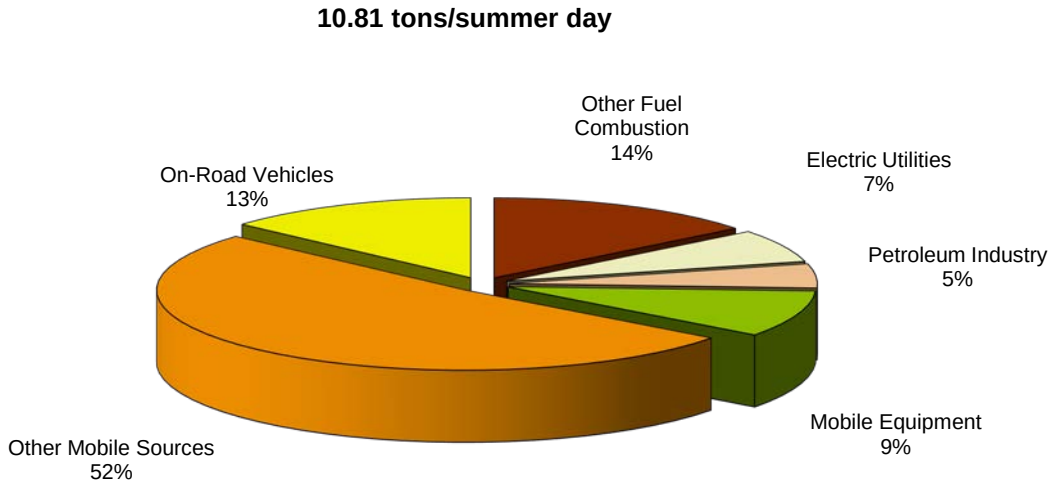
Reference:
CARB CEPAM2022 v1.01 (March 2022)
Excludes OC1, OC2, and Natural Sources

Figure 4-5
Ventura County 2040 Planning Day
ROG Emissions Inventory



Reference:
CARB CEPAM2022 v1.01 (March 2022)
Excludes OC1, OC2, and Natural Sources

Figure 4-6
Ventura County 2040 Planning Day
NOx Emissions Inventory



Reference:
CARB CEPAM2022 v1.01 (March 2022)
Excludes OC1, OC2, and Natural Sources

4.3. Ventura County Marine-Related Emissions Forecast

As discussed in Section 2, *2018 Baseline Emissions Inventory*, coastal and offshore marine emissions sources are important segments of Ventura County's overall emissions inventory. A substantial effort has been made to improve and refine emissions estimates for these sources, described in detail in Section 2.

4.3.1. SCCAB Marine-Related Emissions

Coastal marine emission sources are located in the State Tidelands within three miles of the Ventura County coastline in the SCCAB, which also incorporates the onshore portion of Ventura County, including the Port of Hueneme and its approach corridors.

As shown in Table 4-7, coastal marine emission sources include ocean-going vessels, commercial harbor craft, recreational boats, aircraft, and cargo handling equipment. Cumulatively these categories accounted for 3.69 tons/day each of ROG and 3.40 tons/day of NOx in 2018. ROG emissions from these categories will decrease by 17% by 2026, and NOx emissions from these categories will increase by 12% by 2026. Total ROG emissions decrease by about 24% and NOx emissions increase by 30% by 2040. The most important ROG and NOx emission sources and their relative contributions to total coastal emissions in 2026 and 2040 are described below.

- Ocean-Going Vessels: 1.42 tons/day NOx by 2026 (37%), 1.54 tons/day by 2040 (33%)

  Ocean-going vessels include large commercial vessels calling on Port Hueneme (auto carriers, bulk cargo carriers, container vessels, passenger vessels, roll-on/roll off vehicle carriers, refrigerated cargo vessels and tankers) and military vessel operations occurring at the U.S. Navy facilities at the Port of Hueneme, as well as some non-military vessels utilizing Navy facilities. Ocean-going vessels comprised 39% of total coastal NOx in 2018, with 78% from commercial (i.e., non-military) vessels. Coastal emissions of NOx from Ocean going vessels will increase 8% (0.11 tons/day) in 2026 and 18% (0.23 tons/day).By 2040 NOx emissions from military ocean-going vessels exceeds the NOx emissions from commercial vessels and accounts for 70% of NOx emissions from coastal ocean-going vessels.

- Commercial Harbor Craft: 1.30 tons/day NOx by 2026 (34%), 1.78 tons/day by 2040 (37%)

  Commercial harbor craft include commercial and charter fishing vessels, excursion boats, tug and towboats, barges and dredges, crew and supply boats associated with the four offshore oil and gas production platforms, and military support and operations vessels, tugboats and other vessels utilizing U.S. Navy facilities at the Port of Hueneme. Commercial harbor craft contributed 33% of coastal NOx in 2018. Emissions from all commercial harbor craft are expected to increase by 14% (0.16 tons/day) by 2026 and 56% (0.64 tons/day) by 2040. Military commercial harbor craft were responsible for 45% of NOx emissions from commercial harbor craft in 2018, and they will account for 69% of NOx emissions from commercial harbor craft.

- Recreational Boats: 2.17 tons/day ROG by 2026 (71%), 1.37 tons/day by 2040 (49%) and 0.48 tons/day NOx by 2026 (13%), 0.45 tons/day by 2040 (9%)

  Recreational Boats operate at the ports, marinas, and lakes in Ventura County, and include vessels with outboard, inboard and stern-drive engines, sailboat auxiliary engines, and personal watercraft. Recreational vessels accounted for 82% of coastal ROG emissions in 2018 and decrease by 29% (0.87 tons/day) by 2026 and 55% (1.67 tons/day) by 2040. Recreational boats are responsible for 13% of coastal NOx emissions in 2026. Those emissions are expected to decrease by 8% (0.04 tons/day) by 2026 and 14% (0.07 tons/day) by 2040.

- Aircraft: 0.70 tons/day ROG by 2026 (23%), 1.17 tons/day ROG increase by 2040 (42%) and 0.58 tons/day NOx by 2026 (15%), 0.98 tons/day NOx by 2040 (21%)

  Aircraft emissions are associated with military aircraft operations at the U.S. Naval facility at Point Mugu, including transports, jet aircraft, helicopters, and missile launches. Military aircraft activities were responsible for 88% of coastal ROG emissions from aircraft and 95% of coastal NOx from aircraft in 2018. ROG and NOx emissions are expected to increase by almost 50% by 2026 and almost one and one-half times by 2040.

- Cargo Handling Equipment: Less than 0.1 ton/day by 2026 and 2040 (1%)

  Cargo handling equipment includes port operations/cargo handling equipment operating in association with large commercial vessels calling on Port Hueneme, such as yard tractors, forklifts, cranes, loaders, and other material handling equipment. Although Cargo Handling Equipment contributed one quarter of coastal NOx in 2002 in the 2007 AQMP, this emission source became subject to CARB's Cargo Handling Equipment Regulation in 2007 and contributed less than 1% of total coastal NOx emissions in 2018. Emissions continue to decline in 2026 and 2040 but the relatively small amount of emissions results in a negligible benefit from this decrease.

Table 4-76
SCC Air Basin Coastal Marine Emissions Categories 2018 – 2040

Ventura County Emission Category	ROG Planning Day Emissions (tons/summer day) 2018	2024	2026	2030	2035	2040
Ocean-Going Vessels	0.05	0.06	0.06	0.07	0.07	0.08
Commercial Harbor Craft	0.10	0.12	0.13	0.14	0.16	0.18
Recreational Boats	3.04	2.35	2.17	1.87	1.58	1.37
Aircraft	0.48	0.64	0.70	0.82	0.95	1.17
Cargo Handling Equipment	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total SSCAB Coastal ROG	**3.685**	**3.17**	**3.06**	**2.89**	**2.76**	**2.81**

Ventura County Emission Category	NOx Planning Day Emissions (tons/summer day) 2018	2024	2026	2030	2035	2040
Ocean-going Vessels	1.31	1.38	1.42	1.55	1.74	1.54
Commercial Harbor Craft	1.14	1.25	1.30	1.42	1.58	1.78
Recreational Boats	0.52	0.49	0.48	0.47	0.46	0.45
Aircraft	0.39	0.52	0.58	0.68	0.79	0.98
Cargo Handling Equipment	0.03	0.02	0.02	0.01	0.00	0.00
Total SSCAB Coastal NOx	**3.40**	**3.66**	**3.80**	**4.11**	**4.56**	**4.75**

Notes:
CEPAM2022 v1.01 (March 2022).
No CARB Adjustments.

4.3.2. OC1 and OC2 Air Basin Marine-Related Emissions

Offshore emissions marine sources shown in Table 4-8 and Figures 4-7 through 4-10 occur in the region beyond three miles of the coastline in the OC1 and OC2 Air Basins, San Nicolas Island, and the offshore shipping lanes in the Santa Barbara Channel. OC1 and OC2 emissions sources accounted for 13.75 tons/day of NOx and 1.85 tons/day ROG in 2018. Total OC1 and OC2 NOx emissions increase by 5% by 2026 but decrease by 3% to 13.34 tons/day by 2040. ROG emissions increase by over 27% by 2026 and almost double by 2040. The most important ROG and NOx emission sources and their change in contributions to total OC1 and OC2 emissions in 2026 and 2040 are described below.

- Ocean-Going Vessels: 0.67 tons/day ROG by 2026 (29%), 0.82 tons/day by 2040 (22%) and 13.57 tons/day NOx by 2026 (94%), 12.20 tons/day by 2040 (91%)

This category pertains to large commercial vessels traversing the Santa Barbara Channel shipping lanes offshore of Ventura County, including vessels calling on Port Hueneme or the ports of Los Angeles/Long Beach and transiting vessels passing through southern California waters but without calling at either port, and large military vessels operating offshore and in the approach corridors to Port Hueneme and San Nicolas Island. Ocean-going vessels accounted for 94% of NOx and 33% of ROG emissions in the OC1 and OC2 Air Basins in 2018. Emissions of NOx should increase 5% by 2026 but decrease by 6% from the baseline by 2040 due largely to state and federal commercial vessel control measures. ROG emissions are expected to increase by 10% by 2026 and 33% by 2040. Virtually all ROG emissions are from commercial vessels. Commercial vessels will account for 93% of NOx emissions from marine-related ocean-going vessels in 2026, and 87% of NOx emissions from marine-related ocean-going vessels in 2040.

- Commercial Harbor Craft: ROG by 2026 (67%), 2.73 tons/day by 2040 (74%) and 0.59 tons/day NOx by 2026 (4%), 0.78 tons/day by 2040 (6%) and 1.59 tons/day

  Commercial harbor craft include commercial and charter fishing vessels, excursion boats, tug and towboats, crew and supply boats affiliated with the offshore oil and gas production platforms, military support and operations vessels, tugboats and other vessels operating offshore and in the approach corridors to Port Hueneme and San Nicolas Island. Commercial harbor craft contributed nearly 63% of offshore ROG and about 4% of NOx in 2018. ROG emissions should increase by 36% by 2026 and 134% by 2040, while NOx emissions will increase by 14% by 2026 and 51% by 2040. From 2018 to 2040, the proportion of the commercial harbor craft emissions from military sources will increase from 82% of ROG to 90% of ROG and from 4% of NOx to 12% of NOx.

- Aircraft: 0.01 tons/day ROG by 2026 (1%), 0.02 tons/day by 2040 (1%)

  Aircraft emissions are associated with military aircraft operations at the U.S. Naval facility on San Nicolas Island, including transports, jet aircraft, helicopters, and missiles. Aircraft activities will remain a small contributor to offshore emissions until 2040.

- Stationary Sources: 0.09 tons/day ROG by 2026 (4%), 0.12 tons/day by 2040 (3%), and 0.28 tons/day NOx by 2026 (2%), 0.28 ton/day by 2040 (2%)

  Stationary Sources include oil & gas production, fuel combustion and coatings & solvents emissions categories. Oil & gas production ROG emissions are fugitive hydrocarbon losses from oil and gas production components and production and processing equipment on the offshore oil and gas production platforms; natural gas flaring is responsible for ROG and NOx emissions. Fuel combustion sources primarily are related to electric generating types of equipment. Coatings & solvents ROG emissions are from routine maintenance surface coating and cleaning operations for the offshore oil and gas production platforms and the U.S. Naval facility on San Nicolas Island. Stationary Sources contributed 3% of ROG emissions and 2% of NOx in the OC1 and OC2 air basins 2018. Emissions from stationary sources in the OC1 and OC2 air basins remain relatively low through 2040.

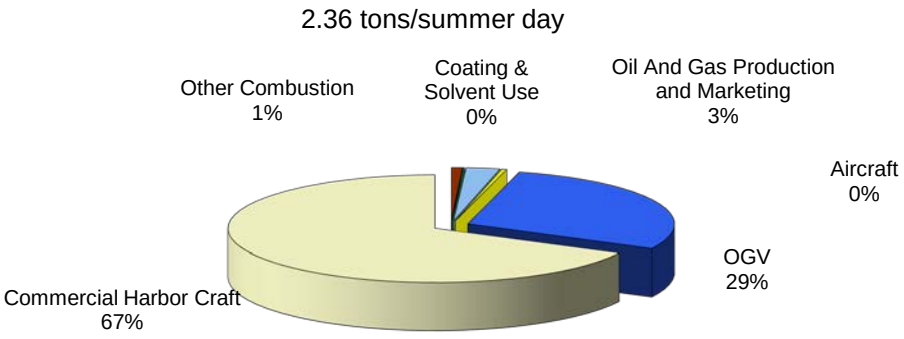
Table 4-87
OC1 and OC2 Air Basin Marine Emissions Categories 2018 – 2040

Ventura County Emission Category	ROG Planning Day Emissions (tons/summer day) 2018	2024	2026	2030	2035	2040
Other Combustion	0.02	0.02	0.02	0.02	0.02	0.02
Coating/Solvent Use	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Oil And Gas Production and Marketing	0.04	0.06	0.06	0.07	0.08	0.09
Aircraft	0.01	0.01	0.01	0.01	0.01	0.02
OGV	0.61	0.66	0.67	0.71	0.76	0.82
Commercial Harbor Craft	1.17	1.47	1.59	1.85	2.25	2.73
Total OCS Air Basin ROG	**1.85**	**2.21**	**2.36**	**2.67**	**3.13**	**3.68**

Ventura County Emission Category	NOx Planning Day Emissions (tons/summer day) 2018	2024	2026	2030	2035	2040
Oil And Gas Production	0.02	0.02	0.03	0.03	0.04	0.04
Aircraft	0.03	0.04	0.04	0.05	0.06	0.08
OGV	12.95	13.31	13.57	14.13	15.11	12.20
Commercial Harbor Craft	0.52	0.57	0.59	0.64	0.70	0.78
Other Combustion	0.23	0.25	0.25	0.25	0.25	0.24
Total OCS Air Basin NOx	**13.75**	**14.20**	**14.48**	**15.10**	**16.15**	**13.34**

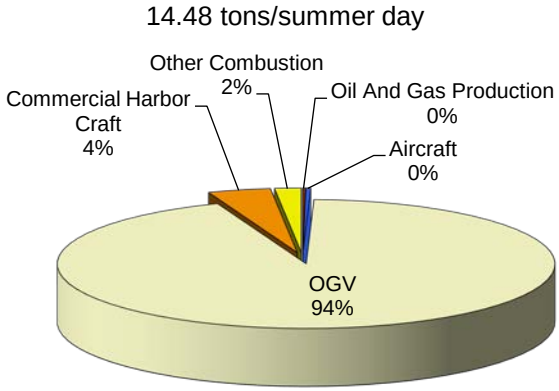
Notes:
CEPAM2022 v1.01 (March 2022).
No CARB Adjustments.

Figure 4-7
Ventura County 2026 Planning Day
ROG Emissions Inventory (OC1 and OC2 Air Basins)



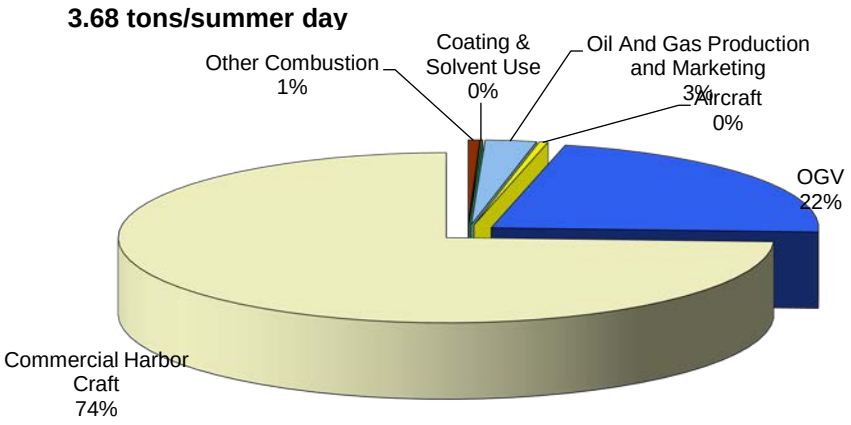
Reference:
CARB CEPAM2022 v1.01 (March 2022).
OC1 is 3 – 24 miles offshore. OC2 is 24-100 miles offshore

Figure 4-8
Ventura County 2026 Planning Day
NOx Emissions Inventory (OC1 and OC2 Air Basins)



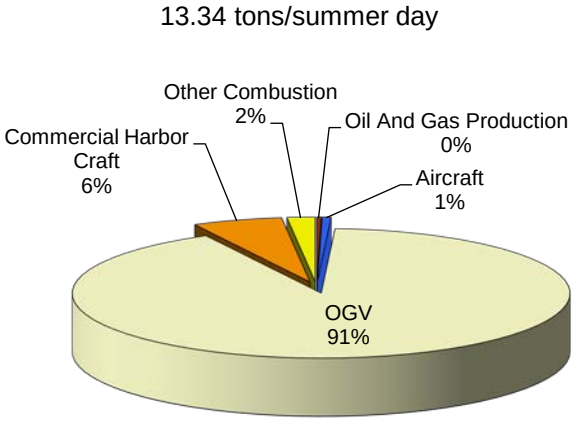
Reference:
CARB CEPAM2022 v1.01 (March 2022).
OC1 is 3 – 24 miles offshore. OC2 is 24-100 miles offshore

Figure 4-9
Ventura County 2040 Planning Day
ROG Emissions Inventory (OC1 and OC2 Air Basins)



Reference:
CARB CEPAM2022 v1.01 (March 2022).
OC1 is 3 – 24 miles offshore. OC2 is 24-100 miles offshore

Figure 4-10
Ventura County 2040 Planning Day
NOx Emissions Inventory (OC1 and OC2 Air Basins)



Reference:
CARB CEPAM2022 v1.01 (March 2022).
OC1 is 3 – 24 miles offshore. OC2 is 24-100 miles offshore

4.4. Naval Base Ventura County Emission Forecasts

EPA's General Conformity Rule discussed in Section 3, *Control Strategy*, ensures federal actions or projects do not interfere with a nonattainment area's ability to attain and maintain national air quality standards by requiring emissions associated with the federal action or project to be accounted for in the attainment demonstration of the applicable State Implementation Plan.

The 2022 AQMP includes emissions associated with potential growth or change in activity at NBVC. The baseline and projected emissions are from aircraft and missile operations associated with NBVC Point Mugu and ship operations at Port Hueneme occurring within the Ventura County nonattainment area (the SCCAB, including the mainland and three nautical miles offshore) and are included in the AQMP's base year inventory and emissions forecasts. Baseline and emissions projections were provided to the District by NBVC in February 2021. Increases in motor vehicle activity at NBVC are part of SCAG's regional transportation model and are not included in NBVC's baseline emissions or projections.

Table 4-9 summarizes the 2018 emissions, estimated future year emissions from potential projects, and an additional 4% annual growth allowance[1] for NBVC through year 2026 within the Ventura County nonattainment area. The 4% annual growth allowance is intended to account for uncertainties in potential projects resulting from future actions and unknown projects in response to national security and possible mission requirements. This additional growth would result in a base-wide emissions budget for NBVC of 241.4 tons per year of ROG and 597.21 tons per year of NOx by the 2026 attainment year.

Table 4-98
Naval Base Ventura County Emissions Budget
(tons per year)

Pollutant	2018	2021	2022	2023	2024	2025	2026
ROG	175.69	197.93	206.42	214.04	223.22	234.57	241.40
NOx	429.59	480.06	505.38	521.14	547.08	581.88	597.21

Notes:
Source: Revised Final 2 Naval Base Ventura County Mobile Source Emissions 2017 Baseline emissions and Future Emission Projection for 8-Hour Ozone SIP Planning (February 2021).

4.5. Emissions by Jurisdiction

The District has reviewed emission sources by the agency primarily responsible for regulating those sources. Those source categories and the agency responsible for regulating them is shown in Table 4-10. The District is committed to achieving the 2015 70-ppb ozone air quality standard and has implemented some of the strictest emission standards for ozone precursors for sources under District jurisdiction. However, the District only has jurisdiction over 8% of NOx emitted in its

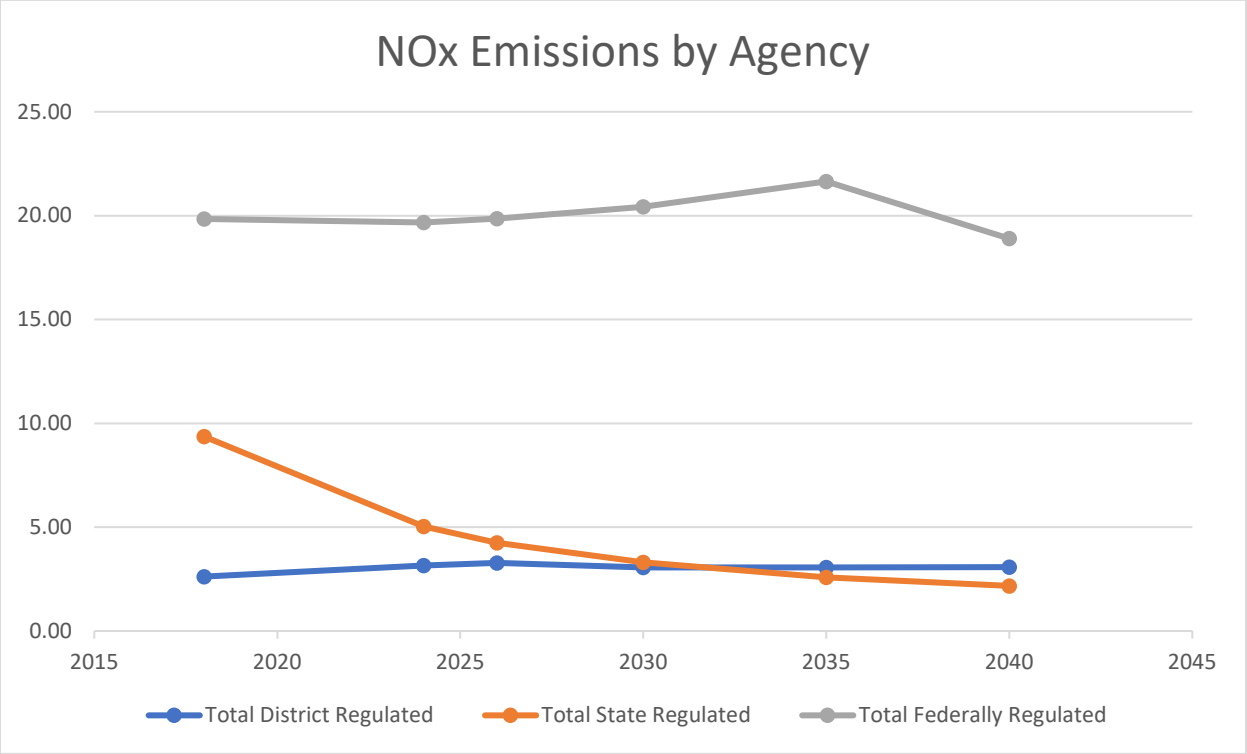
[1] 4% growth for all sources except a 2% growth rate assumed for cargo vessels at NBVC Berth N3.

jurisdiction for the 2018 baseline, and the District will only have primary regulatory authority over 12% of NOx emissions in 2026. Figure 4-10 shows NOx emissions by primary jurisdiction over time. The EPA is the primary regulatory agency over 62% of NOx emissions in 2018 and will be the primary regulatory agency over 73% of emissions in 2026. The greatest potential for NOx reductions is from sources not controlled by the District.

Table 4-10
Source Categories by Primary Regulatory Agency

Regulatory Jurisdiction	Source Category
District	Fuel combustion Waste management Cleaning and surface coating Petroleum production and marketing Industrial processes Architectural coating Asphalt paving/roofing Residential fuel combustion Construction and demolition Dust Fires Managed burning and disposal Cooking Other
State	Consumer products Pesticides On-road motor vehicles Off-road portable equipment (PERP) Off-road mobile equipment Farm equipment Commercial harbor craft Fuel storage and handling
Federal	Aircraft Trains Ocean going vessels Recreational boats Off-road recreational vehicles

Figure 4-10
Ventura County NOx Emissions by Jurisdiction



SECTION 5. ATTAINMENT DEMONSTRATION

5.1. Introduction

This section presents the attainment demonstration to show that the proposed control strategy for the 2022 AQMP will provide sufficient emission reductions for Ventura County to attain the 2015 federal 8-hour ozone standard by no later than 2026, the county's mandated ozone attainment year under the federal CAAA. The attainment demonstration consists of two primary components: photochemical modeling and Weight of Evidence (WOE) assessment.

The SCAQMD conducted the photochemical modeling for the 2022 AQMP. The SCAQMD also conducted the photochemical modeling for the South Coast, San Diego County, Imperial County, Coachella Valley, and Western Mojave Desert ozone nonattainment areas. CARB prepared the WOE for the 2022 AQMP, presented in Appendix H.

5.1.1. Photochemical Modeling

Section 181(a)(1) of the federal CAAA requires that ozone nonattainment areas attain the federal 8-hour ozone standard as expeditiously as practicable but no later than by specific dates based on their ozone nonattainment area classifications – marginal, moderate, serious, severe, and extreme. Moreover, Section 182(c)(2)(A) of the federal CAAA requires that serious and above ozone nonattainment areas, including Ventura County, use a photochemical grid model to show attainment.

Photochemical grid models are computer programs that mathematically simulate each of the physical and chemical processes that govern air pollution in the lower atmosphere. Such processes include air pollutant release into the air, air pollutant transport and diffusion by the wind, air pollutant creation and destruction in the air through chemical reactions, and deposition of pollutants onto the ground. Further information regarding air quality models, including photochemical grid models of the type used for the 2022 AQMP, can be found on EPA's website at https://www.epa.gov/scram/photochemical-air-quality-modeling.

The region analyzed by a photochemical air pollution model is termed the modeling region or modeling domain and is a geographical area divided into a three-dimensional array of grid cells. The model calculates air pollutant concentrations in each grid cell for each hour of the modeling period and often displays the results graphically.

EPA modeling guidance, *Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze*, recommends that nonattainment areas supplement their photochemical modeling results with a WOE assessment to address the uncertainties inherent to photochemical modeling assessments. Further, EPA guidance indicates that as an area approaches the target attainment date, ambient air quality and emissions data become an increasingly important element in demonstrating progress toward air quality goals.

The photochemical modeling for the 2022 AQMP contains three principal components.

The first, presented in Appendix G, is the *Protocol for Photochemical Modeling of Ozone for Ventura County*, which is excerpted from Appendix V of the 2022 SCAQMD AQMP. The Protocol defines the scope of the regional modeling analyses including the attainment demonstration methodology and chemical transport platforms, gridded and speciated emission inventories, and geographical characteristics of the modeling domains. The Protocol also defines the methodology to assess model performance and the selection of the simulation periods.

The second, presented in Appendix H, is the *Model Performance Analysis*. This analysis evaluated how well the photochemical model for the 2022 AQMP was able to predict 8-hour ozone concentrations at each monitoring site in the county compared to observed 8-hour ozone concentrations at those same monitoring sites.

The third, presented in Appendix I, is the *Ventura County Unmonitored Area Analysis*. This analysis estimated 8-hour ozone design values in areas of Ventura County that do not have ambient ozone monitors, such as the Los Padres National Forest region of the county. It is required by EPA modeling guidance to show that all grid cells in a modeling domain will attain the federal ozone standard.

5.1.2. Weight of Evidence Assessment

A Weight of Evidence (WOE) assessment is a set of analyses intended to verify modeled predictions of future air quality, especially at levels near the federal standards. These analyses can include air quality trends, emission trends, meteorological data, evaluation of other air quality indicators, and additional air quality modeling.

Because all analysis methods have strengths and weaknesses, examining an air quality problem using various analysis methods helps offset the limitations and uncertainty inherent in all air quality modeling methods. The scope of a WOE analysis is different for each nonattainment area. The level of detail appropriate for an area depends upon the complexity of the air quality problem in the area, how far into the future the attainment deadline is, and the amount of data and modeling available.

To complement regional photochemical modeling analyses included in the 2022 AQMP, the WOE assessment for Ventura County includes detailed analyses of county ambient ozone data, ozone precursor emission trends, population exposure trends, and a discussion of conditions that contribute to exceedances of the 70-ppb federal ozone standard in Ventura County. Further, the rate of progress toward air quality goals was evaluated by considering trends in the county's ozone design values, precursor emission reductions, and the relationship between ozone air quality and past emission reductions.

The WOE assessment for Ventura County evaluated ambient air quality and emission trends to complement the regional photochemical modeling analyses conducted to evaluate Ventura County's progress toward meeting its 2026 ozone attainment date. Control measures implemented in the county through federal, state, and local programs have led to a substantial decline in emissions of ozone precursors and a substantial improvement in ozone air quality countywide.

Between 2000 and 2021, total NOx emissions in Ventura County declined by 50 percent and total ROG emissions declined by 45.5 percent. Moreover, between 2000 and 2021, the number of exceedance days in the County declined by 95 percent and the design value decreased by over 27 percent, from 105 ppb to 75 ppb (Simi Valley). In 2021, four out of five monitoring sites in the County met the standard.

Ventura County is classified as a serious nonattainment area with a 2026 ozone attainment date. Regression trends derived from ozone design values, as well as the association between NOx emissions and the fourth highest 8-hour ozone concentration, indicate that Ventura County is on track to attain the 70-ppb standard by 2026, which is consistent with design value projections derived from the regional photochemical modeling assessment conducted by the SCAQMD for Ventura County.

Appendix J, *Ventura County Weight of Evidence Assessment*, contains the WOE for the 2022 AQMP.

5.2. Attainment Demonstration Summary

Based on photochemical modeling design value projections presented in Table 5-1, as well as the supporting WOE assessment, Ventura County can expect to attain the federal 75 ppb 8-hour ozone standard by no later than August 3, 2027, the attainment date for serious ozone nonattainment areas.

Table 5-1
Regional Modeling Design Value Projections (ppb)

Site	2018 Design Value	2026 Baseline Design Value	2026 Control Design Value
Thousand Oaks	68.3	65.8	65.0
Piru	71.3	67.6	66.5
Ojai	68.0	65.5	64.9
Simi Valley	75.7	71.7	70.5
El Rio	60.7	59.4	59.0

5.3. 2026 Target Attainment Date

The photochemical modeling and accompanying WOE assessment project the earliest date that a nonattainment area could meet the standard. The photochemical modeling and WOE show Ventura County will meet the federal 8-hour ozone standard in 2026. Neither analysis indicated a likelihood the area could meet the standard earlier than the statutory attainment date.

Annual variations in air quality make it difficult to pinpoint a specific year that an area will first achieve clean data and thus meet the standard. Therefore, Ventura County has identified 2026 as its attainment year, the attainment year for serious nonattainment areas, for this and the following reason.

EPA's *Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze,* dated April 2007, acknowledges the variability in year-to-year weather patterns, among other factors, when compared to photochemical modeling results by stating,

> "Past modeling analyses have shown that future design value uncertainties of 2-4 ppb for ozone, can result from use of alternate, yet equally appropriate, emissions inputs, chemical mechanisms, and meteorological inputs (Jones, 2005; Sistla, 2004)[1]."

The photochemical modeling and WOE analysis in this plan demonstrate a design value of 70 ppb in 2026. The modeling uncertainty of 2-4 ppb referenced in the previous EPA modeling guidance indicates this modeled result is not an absolute predictor of future attainment. The supplemental information in the WOE indicates attainment is achievable by the statutory attainment deadline but it is unlikely the area would attain the standard prior to that date.

Additionally, NOx and ROG emissions contribute significantly to ozone formation in Ventura County and likewise, reductions in NOx and ROG emissions will reduce ozone concentrations. In Ventura County, mobile sources contribute to over 90 percent of NOx emissions. Achieving NOx reductions leading up to the 2026 attainment year is reliant upon current CARB mobile source programs. While continuation of the existing mobile source program will achieve reductions between now and 2026, those reductions are represented in the model and there are no additional mobile source programs that will begin implementation in this period to further accelerate emission reductions in Ventura County.

[1] Pg. 105,https://www.epa.gov/scram/sip-modeling-guidance-documents

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SECTION 6. REASONABLE FURTHER PROGRESS

6.1. RFP Requirements

Sections 172(c)(2) and 182(b)(1) of the Clean Air Act (Act) require ozone attainment plans to provide for Reasonable Further Progress (RFP). RFP is defined in section 171(1) of the Act 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 ozone nonattainment areas depending upon their classification. For ozone nonattainment areas classified as Moderate or above, there is a one-time requirement for a 15 percent reduction in reactive organic gases (ROG) emissions over the first six years of the planning period (section 182(b)(1)). For ozone nonattainment areas classified as Serious or higher, section 182(c)(2)(B) of the Act has an additional requirement to demonstrate 3 percent per year cumulative reduction of ozone precursors averaged over each consecutive three-year period until attainment.

In 1997, U.S. EPA approved a 15 percent ROG-only rate of progress demonstration for the Ventura County for the 1-hour ozone standard covering the entire nonattainment area for the 70 ppb 8-hour ozone standard.[1] 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 Ventura County ozone nonattainment area.

For the 182(c)(2)(B) RFP requirement for Serious and higher areas, U.S. EPA guidance allows for oxides of nitrogen (NOx) substitution to demonstrate the annual 3 percent reductions of ozone precursors if it can be demonstrated that substitution of NOx emission reductions (for ROG reductions) yields equivalent ozone reductions.[2] Additional U.S. EPA guidance states that certain conditions are needed to use NOx substitution in an RFP demonstration.[3] First, an equivalency demonstration must show that cumulative RFP emission reductions are consistent with the NOx and ROG emission reductions determined in the ozone attainment demonstration. Second, the reductions in NOx and ROG emissions should be consistent with the continuous RFP emission reduction requirement. The guidance states that "Any combination of VOC (ROG)

[1] 62 FR 1150 https://www.gpo.gov/fdsys/pkg/FR-1997-01-08/pdf/97-144.pdf

[2] P1001E8Z.PDF (epa.gov)

[3] https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/19931201_oaqps_nox_substitution_guidance.pdf

and NOx emission reductions which totals 3 percent per year and meet other SIP consistency requirements described in this document are allowed."

6.1. RFP Demonstration

Table 6-1 demonstrates that the cumulative ROG and NOx emission reductions in Ventura County meets the RFP targets in the 2023 milestone year and the attainment year, 2026. In accordance with U.S. EPA guidance for implementation of the 70 ppb 8-hour ozone 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 occur inside the nonattainment area, are achieved through existing control regulations, and start from a baseline year of 2017.[4]

The Ventura County 70 ppb 8-hour ozone RFP demonstration is developed using CARB's California Emissions Projection Analysis Model (CEPAM), 2022 Emission Projections, Version 1.01 (see Appendix A for more information on the planning emissions inventory). Emissions Reductions Credits (ERCs) banked prior to the RFP baseline year of 2017 must be accounted for in RFP demonstrations for the 70 ppb 8-hour ozone standard. For Ventura County, all of the pre-baseline year banked NOx ERCs, and a majority of the pre-baseline year banked ROG ERCs, are accounted for in the growth projections in the CEPAM inventory.

The projected emission growth for stationary sources from 2018 to 2026 is 1.05 tons/day ROG and 0.96 tons/day NOx. The projected growth of NOx emissions is greater than the available pre-base year NOx ERC balance; therefore, the growth is sufficient to account for the maximum possible ERC use. However, the pre-baseline ROG ERCs exceed the projected growth of ROG emissions from stationary sources. In order to ensure that pre-baseline year banked ROG ERCs in excess of amount accounted for in the CEPAM inventory are not used, the District is proposing a cap on the use of pre-baseline year banked ROG ERCs through the 2026 attainment year that is equal to the amount accounted for in the CEPAM inventory, 1.05 tpd (see Appendix L for a listing of ERCs).

New emissions requiring ROC ERCs that would result in the use of more than a cumulative use of 1.05 tons/day of ROG ERCs from the pre-2017 baseline will not be permitted by the District. The District intends this commitment to be federally enforceable as part of the adopted SIP. The District will also include a statement about the use of pre-baseline ROC ERCs in its annual ERC reports to the EPA.

[4] 83 FR 62998, 2018-25424.pdf (govinfo.gov)

Table 6-1: Ventura County RFP demonstration for the 70 ppb 8-hour ozone standard

Year	2017	2023	2026
ROG emissions	29.96	28.35	27.78
Required % change since 2017		18%	27%
Target ROG Level		24.56	21.87
Shortfall (-)/ Surplus (+) in ROG		-3.79	-5.91
Shortfall (-)/ Surplus (+) in ROG, %		-12.6%	-19.7%
Year	2017	2023	2026
NOx emissions	19.61	14.48	12.90
Change in NOx since 2017		5.13	6.71
Change in NOx since 2017, %		26.1%	34.2%
NOx reductions since 2017 used for ROG substitution in this milestone year, %		12.6%	19.7%
Shortfall (-)/ Surplus (+), %		13.5%	14.5%
RFP shortfall (-), if any		0%	0%
RFP Met?		YES	YES

SECTION 7. CONTINGENCY MEASURES

7.1. Contingency Measures Introduction

Contingency measures are required by the Clean Air Act 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 continues to strive to meet the requirements, but U.S. 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, 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, U.S. EPA guidance required contingency measures to achieve approximately one year's worth of emission reductions. CARB's 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, U.S. 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 U.S. EPA must issue guidance to provide clarity and direction for states to move forward and pursue contingency measures that will meet the requirements.

7.2. Background

The Clean Air Act specifies that SIPs must provide for contingency measures, defined in section 172(c)(9) as "specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date…." The Clean Air Act 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, U.S. 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 needed (57 Federal

Register 13510, 13512 (April 16, 1992)). Further, U.S. EPA ozone 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". U.S. EPA, though, has accepted contingency measures that equal less than a year's worth of progress when the circumstances fit under "U.S. 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 area.'"[1]

Historically, U.S. 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 U.S. EPA has approved in the past. In 2016, in *Bahr v. U.S. Environmental Protection Agency*[2] *(Bahr),* the 9th Circuit Court of Appeals determined U.S. EPA erred in approving a contingency measure that relied on an already-implemented measure for a nonattainment area in Arizona, thereby rejecting U.S. EPA's longstanding interpretation of section 172(c)(9). U.S. 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 reasonable further progress. This decision was applicable to the states covered by the 9th Circuit Court. In the rest of the country, U.S. EPA was still approving contingency measures using their pre-Bahr stance. In January 2021, in *Sierra Club v. Environmental Protection Agency*[3], 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*).

In response to *Bahr* and as part of the 75 ppb 8-hour ozone SIPs due in 2016, CARB developed the statewide Enhanced Enforcement Contingency Measure (Enforcement Contingency Measure) as a part of the *2018 Updates to the California State Implementation Plan* to address the need for a triggered action as a part of the contingency measure requirement. CARB worked closely with U.S. EPA regional staff in developing the contingency measure package that included the triggered Enforcement Contingency Measure, a district triggered measure and emission reductions from implementation of CARB's mobile source emissions program. However, as part of the *San Joaquin Valley 2016 Ozone Plan for 2008 8-hour Ozone Standard* SIP action, U.S. EPA wrote in their final approval that the Enforcement Contingency Measures did not satisfy requirements to be approved as a "standalone contingency measure" and approved it only as a "SIP strengthening" measure. U.S. EPA did approve the district triggered measure and the implementation of the mobile reductions along with a CARB emission reduction commitment as meeting the contingency measure requirement for this SIP.

[1] See, e.g. 78 Fed.Reg. 37741, 37750 (Jun. 24, 2013), approval finalized with 78 Fed.Reg. 64402 (Oct. 29, 2013).

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

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

Subsequently, the Association of Irritated Residents filed a lawsuit against the U.S. EPA for their approval of various elements within the *San Joaquin Valley 2016 Ozone Plan for 2008 8-hour Ozone Standard*, including the contingency measure. The 9th Circuit Court of Appeals issued its decision in *Association of Irritated Residents v. EPA*[4] (*AIR*) that U.S. EPA's approval of the contingency element was arbitrary and capricious and rejected the triggered contingency measure that achieves much less than one year's worth of emission reductions. Most importantly, the 9th Circuit Court said that, in line with U.S. EPA's longstanding interpretation of what is required of a contingency measure and the purpose it serves, together with *Bahr*, all reductions needed to satisfy the Clean Air Act's contingency measure requirements need to come from the contingency measure itself and the amount of reductions needed for contingency should not be reduced by the fact of surplus emission reductions from ongoing programs absent U.S. EPA formally changing its historic stance on the amount of reductions required. U.S. EPA staff has interpreted AIR to mean that triggered contingency measures must achieve the entirety of the required one year's worth of emission reductions on their own. In addition, surplus emission reductions from ongoing programs cannot reduce the amount of reductions needed for contingency.

In response to *Bahr* and *Sierra Club*, in 2021, U.S. EPA convened a nation-wide internal task force to develop guidance to support states in their development of contingency measures. That task force is now also considering the impact of *AIR*. U.S. EPA has indicated that the contingency measure guidance may be released fall 2022. The SIPs for the 70 ppb 8-hour ozone standard are due to U.S. EPA August 3, 2022. In their updated guidance, U.S. EPA needs to recognize that many state control programs are mature and opportunities to withhold measures for contingency are scarce.

Since *Bahr*, CARB has worked closely with our U.S. EPA regional office in developing contingency measures with little success. CARB is committed to meeting the Clean Air Act requirements for contingency measures, but without finalized national guidance on this complex issue, it is not a good use of resources to pursue contingency measures that may not ultimately coincide with the upcoming new guidance.

7.3. CARB's Opportunities for Contingency Measures

Much has changed since U.S. EPA's 1992 guidance on contingency measures. Control programs across the country have matured as have the health-based standards. Ozone standards have strengthened in 2008 and 2015 with attainment dates out to 2037. California has the only two

[4] *Association of Irritated Residents v. U.S. Environmental Protection Agency*, (9th Cir. 2021) 10 F.4th 937

extreme areas in the country. Control measures identified for these areas must be implemented for meeting the standard and not held in reserve.

To address contingency measure requirements given the courts' decisions and current U.S. 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 46 percent of statewide NOx emissions by 2026[5], 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 require 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 U.S. 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.

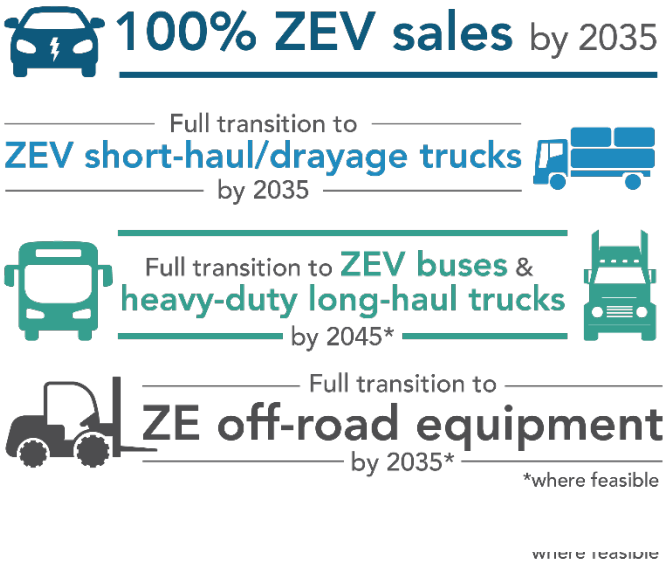
CARB has over 50 years of experience reducing emissions from mobile and other sources of pollution under State authority. The Reasonably Available Control Measures for State Sources analysis illustrates the reach of CARB's current programs and regulations, many of which set the standard nationally for 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. There is a lack of additional control measures that would

[5] Source: CARB 2022 CEPAM v1.01; based on 2026 emissions totals.

be able to achieve the necessary reductions for a contingency measure. 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 U.S. EPA's written guidance. CARB anticipates that U.S. EPA's guidance will allow an assessment of viability of such a state-wide 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 1) 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 7-1. Governor Newson Executive Order N-79-20



CARB is 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 7-2 below. 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.

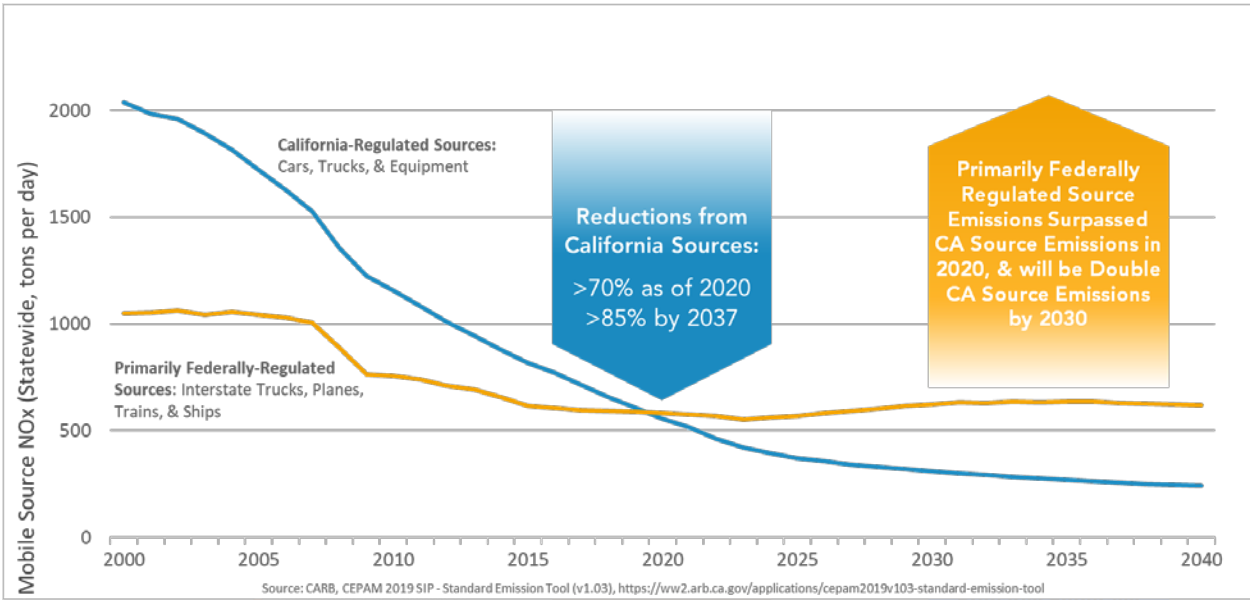
Table 7-1 - Emissions Sources and Respective CARB Programs with a Zero-Emissions Requirement/Component

Emission Source	Regulatory Programs
Light-Duty Passenger Vehicles and Light-Duty Trucks	• Advanced Clean Cars Program (I and II*), including the Zero Emission Vehicle Regulation • Clean Miles Standard *
Motorcycles	• On-Road Motorcycle Regulation*
Medium Duty-Trucks	• 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	• Zero-Emission Powertrain Certification Regulation • Advanced Clean Trucks Regulation • Advanced Clean Fleets Regulation*
Heavy-Duty Urban Buses	• Innovative Clean Transit • Advanced Clean Fleets Regulation*
Other Buses, Other Buses – Motor Coach	• Zero-Emission Airport Shuttle Regulation • Advanced Clean Fleets Regulation*
Commercial Harbor Craft	• Commercial Harbor Craft Regulation
Recreational Boats	• Spark-Ignition Marine Engine Standards*
Transport Refrigeration Units	• Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (Parts I and II*)
Industrial Equipment	• Zero-Emission Forklifts* • Off-Road Zero-Emission Targeted Manufacturer Rule*
Construction and Mining	• Off-Road Zero-Emission Targeted Manufacturer Rule*
Airport Ground Support Equipment	• Zero-Emission Forklifts*
Port Operations and Rail Operations	• Cargo Handling Equipment Regulation • Off-Road Zero-Emission Targeted Manufacturer Rule*
Lawn and Garden	• Small Off-Road Engine Regulation • Off-Road Zero-Emission Targeted Manufacturer Rule*
Ocean-Going Vessels	• At Berth Regulation
Locomotives	• 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, including interstate trucks, ships, locomotives, aircraft, and certain categories of off-road equipment, constituting a large source of potential emissions reductions. Figure 7-2 shows how primarily California-regulated source emissions compare to primarily federally regulated source emissions from 2000 to 2040. 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 7-2. Federal and State Regulated Emissions



7.4. Vessel Speed Reduction

The District believes that the only potential regulatory measure that could result in the reduction of one year of emissions is making the current voluntary Vessel Speed Reduction (VSR) program mandatory. The District does not have the jurisdiction to require VSR from OGV, but it believes that CARB and the EPA have the jurisdiction to require VSR within state waters.

The current voluntary VSR program resulted in the reduction of 748 tons of NOx reductions during ozone season of 2020, approximately 4.1 tons per day, as reported on the Protecting Blue Whales and Blue Skies website www.bluewhalesblueskies.org. Not all shipping companies participate in the voluntary VSR program, and compliance with speed reductions is not 100% for any participating shipping company. These NOx emission reductions exceed the total NOx emissions from sources primarily regulated by the District

VSR is a regulation that will have immediate emission reductions if implemented and enforced. Mandating a speed limit within the coastal waters off Ventura County does not require an

extended equipment replacement period, and it would have immediate impact on the emissions off the coast of Ventura County.

The District believes that CARB and the EPA should evaluate mandatory VSR as a potential contingency measure for the Ventura County 2022 SIP and justify any determination that it is not either a Reasonably Available Control Measure (RACM) or a viable contingency measure.

7.5. Summary

At this time, CARB is including a zero-emission component in most of our regulations, both those already adopted and those that are in development, and the vast majority of these regulations are statewide. Beyond the wide array of sources CARB has been regulating over the last few decades, and especially considering those we 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-federally and internationally regulated.

Given the courts' decisions over the last few years, 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 implement the measure to support expeditious attainment of the NAAQS as the Clean Air Act 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 Clean Air Act, but written U.S. 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 U.S. EPA's written guidance. Further, since it's been about 30 years, since U.S. EPA developed the guidance, this may be the time for U.S. 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.

GLOSSARY

Activity Indicator: A measure of socioeconomic conditions relative to a base year, such as population, housing, and employment data, used to project future year emissions by the relationship of the related activity. Example: Natural gas use per household.

Aerosols: Very small particles of solid or liquid matter suspended in the air.

Air Basin: An area of the state designated by the California Air Resources Board pursuant to Subdivision (a) of Section 39606 of the CH&SC that has similar meteorological and geographic conditions.

Air Contaminant: Any discharge, release, or other propagation into the atmosphere and includes but is not limited to, smoke, charred paper, dust, soot, grime, carbon, fumes, gases, odors, particulate matter, acids, or any combination thereof.

Air Monitoring: The periodic or continuous sampling and analysis of air pollutants in ambient air or from individual air pollutant sources.

Air Pollutants: Substances that are foreign to the atmosphere or are present in the natural atmosphere to the extent that they may result in adverse effects on humans, animals, vegetation, and/or materials.

Air Pollution Control Board (APCB): The governing body for an air pollution control district.

Air Pollution Control District (APCD): A county agency with authority to regulate sources of air pollution (other than emissions from mobile sources) such as refineries, manufacturing facilities, gasoline stations, dry cleaners, and power plants within a given county, and governed by a district APCB composed of elected city and county officials.

Air Pollution Control Officer (APCO): A person appointed by the APCB and given the authority to appoint district personnel for the purpose of observing and enforcing the provisions of Part 4, Division 26 of the CH&SC.

Air Quality Management District (AQMD): A group or portions of counties, or an individual county specified in law with authority to regulate stationary, indirect, and area sources of air pollution with the region and governed by a regional air pollution control board comprised mostly of elected officials within the region.

Air Quality Management Plan (AQMP): A plan prepared by an APCD for a county or region designated nonattainment for one or more federal or state air pollutants, for the purpose of bringing the area into compliance with the requirements of the federal and/or California ambient air quality standards. AQMPs are incorporated into the SIP.

Air Quality Standards: Those ambient air quality standards as promulgated by State or Federal pollution control agencies.

Ambient Air: Air occurring at a particular time and place outside of structures. Often used interchangeably with outdoor air.

Anthropogenic: Of, relating to, or influenced by the impact of humans on nature; man-made.

Area-wide Sources: Also known as "area" sources; are those sources which are not large enough to be tracked individually, but when added together can represent a large quantity of pollution. Examples of such sources include water heaters, gas furnaces, fireplaces, gas stations, dry cleaners, and woodstoves. Area sources of pollution are identified by Category of Emission Source codes.

Attainment: Achieving and maintaining one or more of the and/or California Ambient Air Quality Standards.

Atmosphere: The air that surrounds the earth but does not include the general volume of gases contained in any bona fide building.

Attainment Area: A geographic area that complies with one or more of the NAAQS or CAAQS.

Base Year: The year used in a predictive air pollution model that includes the known economic conditions, population, and air emissions. The base year, current or past, is used to predict the forecast year in a predictive model.

Best Available Control Technology (BACT): The most up-to-date methods, systems, techniques, and production processes available to achieve the greatest feasible emission reductions for given regulated air pollutants and processes. BACT is a requirement of NSR and Prevention of Significant Deterioration (PSD).

Best Available Retrofit Control Technology (BARCT): An emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each air pollutant source class or category (Section 40406 CH&SC).

Bike Lanes: The California Streets and Highway Code Section 890.4 defines a "Bikeway" (herein referred to as a "bike lane") as a facility that is provided primarily for bicycle travel. A Class I bikeway (or bike path) provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow by motorists minimized. A Class II bikeway (or bike lane) provides a striped lane for one-way bike travel on a street or highway. A Class III bikeway (or bike route) provides for shared use with pedestrian or motor vehicle traffic.

Biogenic: Produced by living organisms. Biogenic air pollutant emissions are of great interest because of the predominance of agriculture and natural vegetation in Ventura County. However, the District has no authority to regulate biogenic emissions. Preliminary studies indicate that biogenic emissions may be at least two times the total hydrocarbon emissions already quantified in the emissions inventory for the AQMP.

California Air Resources Board (CARB): The State's lead air quality agency consisting of an eleven-member Governor-appointed board and supporting staff fully responsible for motor vehicle pollution control, and having oversight authority over California's air pollution management program.

California Clean Air Act (CCAA): A California law passed in 1988 that provides the basis for air quality planning and regulation independent of federal regulations, and which establishes new authority for attaining and maintaining California's air quality standards by the earliest practicable date. A major element of the Act is the requirement that local air districts in violation of the California clean air standards must prepare attainment plans that identify air quality problems, causes, trends, and actions to be taken for attainment.

California Department of Transportation (Caltrans): A California state agency that oversees the state's transportation infrastructure.

California Emissions Inventory Development and Reporting System (CEIDARS): The state's emissions inventory data base system.

California Emission Forecasting System (CEFS): CARB's model to forecast air pollutant emissions. A major feature of the model is its ability to track the effects of emission control rules and growth activity for stationary and other mobile sources by linking these factors directly to the emission categories.

California Environmental Quality Act (CEQA): A California law that sets forth a process for public agencies to make informed decisions on discretionary projects such land use entitlements. The process aids decision makers to determine whether any environmental impacts are associated with a proposed project. It requires elimination or reduction of environmental impacts associated with a proposed project and the implementation of mitigation measures to reduce or remove those impacts.

California Health and Safety Code (CH&SC): The California Health and Safety Code is the collection of state laws that govern, among other things, the handling of air pollution, hazardous waste, corrective action and permitted facilities.

Carbon Monoxide (CO): A colorless, odorless gas resulting from the incomplete combustion of fossil fuels. Over 80 percent of the CO emitted in urban areas is contributed by motor vehicles. CO is a criteria pollutant and interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects.

Cargo Handling Equipment: Cargo handling equipment is equipment used at ports to transfer goods or perform maintenance and repair activities, including but not limited to equipment such as yard trucks (hostlers), rubber-tired gantry cranes, top handlers, side handlers, forklifts, and loaders, etc.

Carl Moyer Program: The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is an incentive program offered jointly by the California Air Resources Board and California's local air districts that provides grants for cleaner-than-required engines and equipment to help improve air quality in California. The grants are administered by the local air districts.

City Urban Restriction Boundary (CURB): A regional boundary set in an attempt to control urbanization by designating the area inside the boundary for higher density urban development and the area outside for lower density rural development.

Clean Air Act Amendments (CAAA): Amendments passed in 1977 and 1990 to the federal Clean Air Act of 1970 and which form the basis for the current national air pollution control effort. Basic elements of the amended act include national ambient air quality standards for major air pollutants, air toxics standards, acid rain control measures, and enforcement provisions.

Commercial Harbor Craft: Commercial harbor craft include ferries, excursion vessels, tugboats, towboats, crew and supply vessels, work boats, commercial and charter fishing boats, and barge and dredge vessels. In 2010, CARB staff estimated there are approximately 4,300 commercial harbor craft vessels with 8,700 diesel-fueled engines operating in California coastal waters.

Compressed Natural Gas (CNG): An alternative fuel that is cleaner burning and helps to meet CARB's mobile and stationary emission standards. CNG may be used in place of less clean fuels for powering motor vehicles.

Conformity: A formal demonstration of whether a federally-supported activity is consistent with the SIP – per section 176(c) of the federal CAA. Transportation conformity refers to plans, programs, and projects approved or funded by the Federal Highway Administration or the Federal Transit Administration. General conformity refers to projects approved or funded by other federal agencies.

Consumer Products: Products such as detergents, cleaning compounds, polishes, personal care products, and automotive specialty products that are part of our everyday lives and, through consumer use, may contribute to air pollution.

Contingency Measure: Requires back-up air pollution control measures to be implemented in the event of specific conditions, such as failure to meet interim milestone emission reduction targets or failure to attain an applicable air quality standard by the statutory attainment date. Both the state and federal clean air acts require that District clean air plans include contingency measures.

Control Efficiency (CE): A variable that estimates the technological efficiency of an air pollutant control strategy. Control efficiency is one of the variables used to develop a control factor.

Control Factor (CF): Data derived from adopted State and Federal regulations and local district rules that impose emission reductions or a technological change on a particular emission process. Control factors are closely linked to the type of emission process and type of industry. They also account for three types of variables which include control efficiency, rule effectiveness, and rule penetration.

Control Measure: A single measure in an air quality plan to maintain or reduce the emissions of criteria pollutants. Control measures are enforceable commitments in the air quality plan.

Control Strategy: A combination of control measures designed to reduce air contaminant emissions to attain and maintain ambient air quality standards.

Control Techniques Guidelines (CTG): Guidance documents issued by EPA designed to assist state and local pollution authorities to achieve and maintain air quality standards for certain air pollutant sources (e.g., organic emissions from solvent metal cleaning known as degreasing) through RACT. CTGs contain information on the economic and technological feasibility of available emission control techniques.

Criteria Air Pollutant: An air pollutant for which acceptable levels of exposure can be determined and for which a federal or state ambient air quality standard has been set to protect public health and welfare. Examples include ozone, carbon monoxide, lead, nitrogen dioxide, sulfur dioxide, and fine particulates.

Department of Motor Vehicles (DMV): The California state agency responsible for registering motor vehicle drivers and motor vehicles and collecting state and local motor vehicle fees.

Design Value: The pollutant concentration used by air quality managers as the basis for determining attainment of an air quality standard, generally by using an air quality model. The design value may or may not be the same as the designation value.

District: A local air pollution control agency as defined by the CH&SC Section 40150. The Ventura County Air Pollution Control District is the local air pollution control agency for Ventura County, California.

EMFAC: The EMission FACtor computer model used by CARB to estimate on-road mobile vehicle emissions. This model is part of CARB's overall on-road mobile source Mobile Vehicle Emission Inventory model.

Early Progress Plan (EPP): An air quality planning document that shows progress towards attaining the federal ozone standards and establishes transportation conformity budgets.

Emissions Data: Measured or calculated concentrations or weights of air contaminants emitted into the ambient air. Data used to calculate emissions data are not emissions data.

Emission Factor: For stationary sources, the relationship between the amount of pollution produced and the amount of raw material processed or burned. For mobile sources, the relationship between the amount of pollution produced and the number of vehicle miles traveled. By using the emission factor of a pollutant and specific data regarding quantities of material used by a given source, it is possible to compute emissions for the source.

Emission Offsets: Actual enforceable emission reductions from existing sources sufficient to offset anticipated emission increases associated with new or modified stationary sources. A rule-making concept, whereby approval of a new stationary source of air pollution, or an increase of emissions from an existing source of air pollution, is conditional on the equal or greater reduction of emissions from other existing stationary sources of air pollution. This concept is utilized in addition to reduction in emissions by employing BACT.

Emission Reduction Credit (ERC): Credits given for actual emission reductions that are real, enforceable, permanent, quantifiable, and surplus (beyond any required reductions). An actual credit is certified via a District-issued document that specifies the date of issuance, expiration date of credit, type of pollutant, and legal owner of emission reduction credits. In some cases, ERCs can be transferred to another owner or saved for future use.

Emission Standard: The maximum amount or rate of a pollutant permitted from a polluting source such as an automobile or smoke stack.

Emissions Inventory: An emissions inventory is a large dataset that, as a whole, describes emission sources and quantifies pollutants released into the atmosphere. Considerations that go

into the inventory include type and location of emission sources, the processes involved, and the level of activity (day, month) and year of activity.

Emissions Inventory Category: A group of similar air pollutant sources. Examples include oil and gas production, dry cleaning, and pesticide application.

Emissions Inventory Code (EIC): State computer coding scheme (14 digits) used to categorize emissions in the CEIDARS database.

Equipment: Any operation, article, machine, equipment, or contrivance that may emit or reduce the emissions of any air contaminant or affected air pollutant.

Exceedance: Measured concentration of an air pollutant in ambient air is higher than the state and/or federal ambient air quality standard for that pollutant.

Federal Aviation Administration (FAA): An agency of the United States Department of Transportation with authority to regulate and oversee all aspects of civil aviation in the U.S.

Federal Clean Air Act (CAA): A federal law passed in 1970 and significantly amended in 1977 and 1990 that forms the basis for the national air pollution control efforts. Basic elements of the Act include national ambient air quality standards for major air pollutants, air toxics standards, acid rain control measures, and enforcement provisions.

Federal Highway Administration (FHWA): A division of the United States Department of Transportation that specializes in highway transportation. The agency's major activities are grouped into two programs, The Federal-aid Highway Program, and the Federal Lands Highway Program.

Federal Implementation Plan (FIP): A plan prepared and enforced by the EPA that provides measures nonattainment areas must take to meet the requirements of the federal CAA. The EPA implements FIPs when states are unable or unwilling to adopt and implement adequate SIPs.

Federal Transit Administration (FTA): An agency within the United States Department of Transportation that provides financial and technical assistance to local public transit systems.

Forecast Year: The future year of interest in a predictive air pollution or emissions model. The predictivie model results produce future year emissions based on expectations of future land use, transportation changes, econmic conditions, population growth, and emission controls.

Greenhouse Gas (GHG): Gaseous components of the atmosphere that contribute to the greenhouse effect. Greenhouse gases include, in order of relative abundance: water vapor, carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbons.

Growth Factor (GF): Data derived from county-specific economic activity profiles, population forecasts, and other socio-demographic activity.

Hydrocarbon: Any of a large number of compounds containing various combinations of hydrogen and carbon atoms. They may be emitted into the air as a result of fossil fuel combustion and fuel volatilization and are a major contributor to smog.

Hydrofluorocarbons: A group of chemical compounds, consisting of alkanes, such as methane or ethane, with one or more halogens linked, such as chlorine or fluorine, making them a type of organic halide.

Implementation Factor (IF): A variable used to develop control factors, indicating the relative amount of total control from a control measure occurring in a given year to account for phased implementation or control requirements occurring in tiers.

Indirect Source: Any facility, building, structure, or installation, or combination thereof, which generates or attracts motor vehicle activity resulting in emissions of any pollutant (or precursor) for which there is a state or federal ambient air quality standard. Examples of indirect sources include employment sites, shopping centers, sports facilities, housing developments, airports, educational institutions, commercial and industrial developments, and parking lots and garages.

Internal Combustion Engine: A heat engine in which the combustion generates the heat inside the engine proper instead of in a furnace. An example of an IC engine is an automobile engine.

Inversion: A layer of warm air in the atmosphere that lies over a layer of cooler air, trapping pollutants beneath it.

Lead: A gray-white metal that is soft, malleable, ductile, and resistant to corrosion. Sources of lead resulting in concentrations in the air include industrial sources and crustal weathering of soils followed by fugitive dust emissions. Health effects from exposure to lead include brain and kidney damage and learning disabilities. Lead is the only substance currently listed as both a criteria air pollutant and a toxic air contaminant.

Local Agency Formation Commission (LAFCo): A decision making government entity in California with the responsibility to decide boundary issues pertaining to city and county (non-incorporated) lands, including spheres of influence, and issues about the annexation of county lands into a city or special district.

Local Sources: Air pollution sources for which local governments (cities, counties, air agencies) have primary regulatory authority.

Maintenance Plan: A plan that details the actions needed to maintain air quality at or below federal standards. The federal CAA requires maintenance plans for areas that have been re-designated attainment areas.

Major Source Category: A general, broad category of similar emission sources. Examples are Fuel Combustion, Waste Disposal, Solvent Evaporation, are broad category classifications which are made up of many sub-categories.

"Major" Sources under CAAA: A source with a potential to emit more than a specific threshold of emissions annually, determined by the nonattainment designation of an air quality district.

Memorandum of Understanding (MOU): A formal agreement made among agencies for the purposes of jointly accomplishing a goal, program, etc. The governing boards of the involved agencies must ratify the agreement.

Metropolitan Planning Organization (MPO): The organization designated as being responsible, together with the State, for conducting the continuing, cooperative, and comprehensive planning process under 23 U.S.C. 134 and 49 U.S.C. 1607. It is the forum for cooperative transportation decision-making.

Mobile Sources: Sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats, and airplanes.

Motor Vehicle: A self-propelled vehicle as defined in the California Vehicle Code, Division I, Section 415.

National Ambient Air Quality Standards (NAAQS): Standards set by the EPA for the maximum levels of certain air pollutants in outdoor air without unacceptable effects on human health or public welfare. There are NAAQS for ozone, particulates, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide.

Naval Base Ventura County: A major U.S. military facility in Ventura County, California.

New Source Review (NSR): The mechanism to ensure that new and modified stationary sources of air pollution will not interfere with the attainment or maintenance of any ambient air quality standard or prevent reasonable further progress towards the attainment or maintenance of any ambient air quality standard. A program used in a nonattainment area to permit or site new industrial facilities or modifications to existing industrial facilities that emit nonattainment criteria air pollutants. The two major requirements of NSR are Best Available Control Technology and Emission Offsets.

Nitrogen Dioxide (NO_2): A reddish-brown gas with a characteristic sharp, biting odor. Nitrogen dioxide is one of the most prominent air pollutants and a poison by inhalation.

Nonattainment Area: An area identified by the EPA and/or CARB as not meeting either federal or state clean air standards for a given criteria air pollutant.

Ocean-going Vessel: An ocean-going vessel (OGV) is a commercial ship greater than or equal to 400 feet in length or 10,000 gross tons; or propelled by a marine compression ignition engine with a displacement of greater than or equal to 30 liters per cylinder. The emissions inventory includes all OGV emissions occurring within 100 nautical miles of the California coastline.

OFFROAD Emissions Model: California Air Resources Board model that estimates population, activity, and emissions for specific categories of off-road (non-highway) equipment by fuel types at the county level.

Other Mobile Sources: A broad emissions category for mobile off-road equipment, including aircraft, locomotives, marine vessels, agricultural and construction equipment and more.

Organic Solvents: Liquids containing organic compounds which are used as dissolvers, viscosity reducers, or cleaning agents. These liquids are principally derived from petroleum and include petroleum distillates, chlorinated hydrocarbons, chlorofluorocarbons, ketones, and alcohols. Solutions, emulsions, and dispersions of water and soap, or water and detergent are not organic solvents. Soaps and detergents are water-based surfactants.

Outer Continental Shelf (OCS): All submerged lands lying seaward of state coastal waters (beyond 3 miles offshore) which are under U.S. jurisdiction as defined by the Outer Continental Shelf Lands Act of 1953.

Oxides of Nitrogen (NOx): A general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen. Nitrogen oxides are created during combustion processes and are major contributors to smog formation and acid deposition. NO_2 is a criteria pollutant and may result in numerous adverse human health effects.

Ozone: A reactive gas consisting of three oxygen atoms found in two layers of the atmosphere, the stratosphere, and the troposphere. In the stratosphere (the atmospheric layer 7 to 10 miles or more above the earth's surface), ozone is a natural form of oxygen that provides a protective layer shielding the earth from ultraviolet radiation.

In the troposphere (the layer extending up 7 to 10 miles from the earth's surface), ozone is a chemical oxidant and major component of photochemical smog. It can seriously impair the respiratory system and is one of the most widespread of all the criteria pollutants for which the federal Clean Air Act required EPA to set standards. Ozone in the troposphere is produced through

complex photochemical reactions of nitrogen oxides, which are among the primary pollutants emitted by combustion sources; hydrocarbons, released into the atmosphere through the combustion, handling and processing of petroleum products; and sunlight.

Ozone Precursors: Chemicals such as volatile organic compounds and nitrogen oxides, occurring either naturally or as a result of human activities, which contribute to the formation of ozone, a major component of smog.

Ozone Summer Season: May – October months, when ozone formation potential is the greatest.

Particulate Matter (PM): Any material, except pure water, that exists in the solid or liquid state in the atmosphere. The size of particulate matter can vary from coarse, wind-blown dust particles, to fine particle combustion products.

Particulate Matter - Fine ($PM_{2.5}$): A mixture of very small atmospheric particles with an aerodynamic diameter equal to or less than 2.5 microns. $PM_{2.5}$ consists of particles directly emitted into the air and particles formed in the air from the chemical transformation of gaseous pollutants. $PM_{2.5}$ particles result from activities such as industrial and residential combustion, and from vehicle exhaust. Particles 2.5 microns or smaller infiltrate the deepest portions of lungs, increasing the risks of long-term disease, including chronic respiratory disease, cancer, and increased and premature death.

Particulate Matter (PM_{10}): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and mists. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the air sacs deep in the lungs where they may be deposited to result in adverse health effects. PM_{10} also causes visibility reduction and is a criteria air pollutant.

Parts per million (ppm): Standard measurement of concentration by which ozone or other atmospheric gases are measured. 1 ppm is equivalent to 1,000 parts per billion (ppb).

Perfluorocarbons: Compounds derived from hydrocarbons by replacement of hydrogen atoms by fluorine atoms and made up of carbon and fluorine atoms only, such as octafluoropropane, perfluorohexane, and perfluorodecalin.

Photochemical Reaction: A term referring to chemical reactions brought about by the light energy of the sun. Photochemical reactions in the atmosphere create harmful air pollutants such as ozone.

Point Source: Stationary emission sources having a district permit to operate identified on an individual basis due to the quantity or nature of their emissions. Examples of point sources include electrical power generating plants or large surface coating operations.

Rate of Progress: Section 182(c)(2) of the federal CAA Amendments requires ozone nonattainment areas designated serious or above to demonstrate post-1996 volatile organic compound emission reductions of three percent per year, averaged over a three- year period. The U.S. Environmental Protection Agency refers to these reductions as the rate-of-progress requirement.

Reactive Fraction: The relative amount of TOG compounds which is photochemically reactive and participates in ozone formation, excluding methane and other compounds with inconsequential effects on ozone photochemical reactivity.

Reactive Organic Gas (ROG): A reactive chemical gas composed of hydrocarbon compounds that may contribute to the formation of smog by their involvement in atmospheric chemical reactions. Also, sometimes referred to as non-methane organic compounds (NMOCs). VOC emissions are a subset of ROG emissions.

Reasonably Available Control Measures (RACM): A broadly defined term referring to technologies and measures to control air pollution.

Reasonably Available Control Technology (RACT): A set of air pollution control technologies defined in the CFR 57 FR 55620, as "the lowest emission limitation that a unit is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility".

Reasonable Further Progress (RFP): A requirement for a State Implementation Plan showing increments of progress (emission reductions) from the date of designation of nonattainment for federal ozone standards to the attainment dates - applicable for both Subpart 1 and Subpart 2 ozone nonattainment areas.

Recreational Boats: Recreational boats include pleasure boats with inboard or outboard engines, and personal watercraft, etc.

Regional Transportation Improvement Plan (RTIP): A staged, multiyear, intermodal program of transportation projects covering a metropolitan planning area, consistent with the metropolitan transportation plan, and developed pursuant to 23 CFR Part 450.

Regional Transportation Plan (RTP): The official intermodal metropolitan transportation plan developed through the metropolitan planning process for the metropolitan planning area and developed pursuant to 23 CFR Part 450.

Rule Effectiveness: An estimate of how well an air pollution rule or control strategy works in "real-world" application. Rule effectiveness is one of the variables used to develop a control factor.

Rule Penetration: An estimate of the degree an air pollution control strategy will penetrate a certain regulated sector taking into account such things as equipment exemptions.

Save Open-Space and Agricultural Resources (SOAR): A local nonprofit citizen organization in Ventura County dedicated to making Ventura County a better place to live by limiting urban sprawl, protecting open space and agricultural lands, and promoting livable and sustainable communities in Ventura County.

South Central Coast Air Basin (SCCAB): An air basin established by CARB that has similar meteorological and geographical conditions that consists of San Luis Obispo, Santa Barbara, and Ventura Counties.

South Coast Air Quality Management District (SCAQMD): South Coast Air Quality Management District. A regional air quality control district encompassing four counties in Southern California (Los Angeles, Orange, Riverside and San Bernardino).

Southern California Association of Governments (SCAG): The organization, known in federal law as the Council of Governments and Metropolitan Planning Organization, representing Los Angeles, Ventura, San Bernardino, Riverside, Orange, and Imperial Counties, and the cities within those six counties. As the designated Metropolitan Planning Organization for the designated areas, the Association of Governments is mandated by the federal government to research and formulate plans for transportation, growth management, hazardous waste management, and air quality. Additional mandates exist at the state level.

Smog: A combination of smoke, ozone, hydrocarbons, nitrogen oxides, and other chemically reactive compounds, which, under various conditions of weather and sunlight, may result in a murky brown haze that causes adverse health effects and human welfare effects. A primary source of smog is motor vehicles.

Smog Check Program: A motor vehicle inspection program implemented by the California Bureau of Automotive Repair. It is designed to ensure the effectiveness of automobile emission control systems on a biennial basis. The program was enacted in 1979 and strengthened in 1990. Also known as the Inspection and Maintenance Program (I & M).

State Implementation Plan (SIP): A document prepared by each state describing existing air quality conditions and measures that it will take to attain and maintain national ambient air quality standards. The provisions and commitments in SIPs are federally enforceable.

State Tidelands: The offshore region three miles from the shoreline.

Stationary Sources: Non-mobile sources such as power plants, refineries, and manufacturing facilities, and turbines that emit air pollutants.

Sulfur Dioxide (SO_2): A colorless, extremely irritating gas or liquid of sulfur and oxygen and whose chemical formula is SO_2. Sulfur dioxide mainly enters the atmosphere as a pollutant through burning high sulfur-content fuel oils and coal, and from chemical processes occurring at chemical plants and refineries. SO_2 is a criteria air pollutant.

Summer Planning Day Emissions: Emissions occurring during a typical summer day during the months of May – October. This term is interchangeable term with "ozone season" day emissions.

Tons per day (tpd): A unit of measurement often used in air pollutant emission inventories.

Total Organic Compounds (TOC): Organic compounds of carbon including methane emitted to the atmosphere. TOCs exclude carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate.

Total Organic Gases (TOG): Total organic gases mean "compounds of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate." TOG includes all organic gas compounds emitted to the atmosphere, including the low reactivity, or "exempt VOC", compounds (e.g., methane, ethane, various chlorinated fluorocarbons, acetone, perchloroethylene, volatile methyl siloxanes, etc.).

TOG also includes low volatility or "low vapor pressure" organic compounds (e.g., some petroleum distillate mixtures). TOG includes all organic compounds that can become airborne (through evaporation, sublimation, as aerosols, etc.), excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

Transportation Control Measure (TCM): Any control measure or strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. TCMs include encouraging the use of carpools and mass transit.

United States Environmental Protection Agency (EPA): The United States agency charged with setting policy, guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

Vehicle Miles Traveled (VMT): A measure of both the volume and extent of motor vehicle operation; the total number of vehicle miles traveled within a specified geographical area over a given period of time.

Ventura County Transportation Commission (VCTC): Agency responsible for planning and funding transportation and transit improvements in Ventura County. VCTC develops and implements transportation policies, projects, and funding priorities for a wide variety of transportation projects.

Visibility: The distance that atmospheric conditions allow a person to see at a given time and location. Visibility reduction from air pollution is often due to the presence of sulfur and nitrogen oxides, as well as particulate matter, including aerosols.

Volatile Organic Compounds (VOC): Hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor, and examples include gasoline, alcohol, and paint solvents.

Weight of Evidence (WOE): A supplementary set of analyses intended to verify modeled predictions of future air quality, especially at levels near the federal standards. These analyses can include air quality trends, emission trends, meteorological data, evaluation of other air quality indicators, and additional air quality modeling.

APPENDIX A

VENTURA COUNTY

EMISSIONS INVENTORY DOCUMENTATION

CARB Ventura County 70 ppb 8-Hour Ozone NAAQS Emissions Inventory Write-Up
CEPAM 2022 v1.01

(August 2022)

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Emissions Inventory Background

Emissions inventories are required by the Clean Air Act (CAA) and the Ozone SIP Requirements Rule for the 2015 ozone National Ambient Air Quality Standards (NAAQS), also called the Ozone Implementation Rule.[1] Specifically, they are required for those areas that exceed the health-based 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 State Implementation Plan (SIP) that demonstrates how they will attain the standards by specified dates. This document describes the emissions inventory included in the Ventura County 70 ppb 8-Hour Ozone SIP, which encompasses ocean going vessel and commercial harbor craft emissions out to 100 nautical miles.

Emissions Inventory Overview

Emissions inventories are estimates of the amount and type of pollutants emitted into the atmosphere by facilities, mobile sources, and areawide 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.

The California Air Resources Board (CARB) and the Ventura County Air Pollution Control District (District) have developed a comprehensive current emissions inventory consistent with the requirements set forth in Section 182(a)-(f) of the federal Clean Air Act[2]. 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 areawide sources are based on the most recent approved models and methodologies.

CARB also reviewed the growth profiles for point and areawide source categories and worked with District staff to update 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.

The United States Environmental Protection Agency (U.S. EPA) regulations require that the emissions inventory for an Ozone SIP contain emissions data for the two precursors to ozone formation: oxides of nitrogen (NOx) and volatile organic compounds (VOC)[3]. The inventory included in this plan substitutes

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[1] 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*).

[2] Section 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*

[3] Section 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*

VOC with reactive organic gases (ROG), which, in general, represent a slightly broader group of compounds than those in U.S. EPA's list of VOCs.

Agency Responsibilities

CARB and District staff worked jointly to develop the emissions inventory for the Ventura County 8-hour ozone nonattainment area. The District worked closely with operators of major stationary facilities in their jurisdiction to develop the point source emissions estimates. CARB staff developed the emissions inventory for mobile sources, both on-road and off-road. The District and CARB shared responsibility for developing estimates for the nonpoint (areawide) sources such as architectural coatings and agricultural burning. CARB and the District worked with several State and local agencies such as the Department of Transportation (Caltrans), the Department of Motor Vehicles (DMV), the Department of Pesticide Regulation (DPR), the California Energy Commission (CEC), and the Southern California Association of Governments (SCAG) to assemble activity information necessary to develop the mobile and areawide source emissions estimates.

Inventory Base Year

The District selected the base year 2018 for the purposes of the modeling emission inventory since that was the year U.S. EPA designated Ventura County as nonattainment for the 70 ppb 8-Hour Ozone NAAQS[4]. The baseline year of 2018 is the most complete and representative emission year for purposes of inventory and emission modeling and is consistent with the baseline year of 2018 selected by the adjacent South Coast Air Quality Management District (SCAQMD). SCAQMD also performed the photochemical modeling for the attainment demonstration.

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)[5], 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 NAAQS[6]. The District is using 2017 as the baseline year for the purposes of the RFP calculation only.

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[4] *https://www.epa.gov/green-book/green-book-8-hour-ozone-2015-area-information*.

[5] 40 CFR 51.1315(a). *https://www.govinfo.gov/content/pkg/CFR-2021-title40-vol2/pdf/CFR-2021-title40-vol2-sec51-1315.pdf*.

[6] 40 CFR 51.1310(b). *https://www.govinfo.gov/content/pkg/CFR-2020-title40-vol2/pdf/CFR-2020-title40-vol2-sec51-1310.pdf*.

Forecasted Inventories

In addition to base year emissions, emissions projections are needed for a variety of reasons, including redesignation maintenance plans, the attainment projected inventory for a nonattainment area (NAA), and air quality modeling for attainment plans[7].

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 Ventura County 70 ppb Ozone SIP is modeled by the California Emission Projection Analysis Model (CEPAM), 2022 Emission Projections, Version 1.01. Emission years presented in this AQMP are the modeling baseline year (2018), the milestone year (2024), the required attainment year (2026), and future years to show continuing emission changes (2030, 2035, and 2040).

Growth profiles for point and areawide 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. Emission reductions from adopted control measures are presented in Chapter 3 of the AQMP.

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 with emission projections from stationary and area source categories 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.

Temporal Resolution

40 CFR 51.1315(c) requires emissions values included in the base year inventory to be actual ozone season day emissions as defined by 40 CFR 51.1300(q)[8]. Since ozone 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).

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[7] 40 CFR 51.114. *https://www.govinfo.gov/content/pkg/CFR-2000-title40-vol2/pdf/CFR-2000-title40-vol2-sec51-114.pdf*.
[8] 40 CFR 51.1315(c). *https://www.govinfo.gov/content/pkg/CFR-2021-title40-vol2/pdf/CFR-2021-title40-vol2-sec51-1315.pdf*.

Geographical Scope

The inventories presented in this Plan consist of emissions for the county of Ventura, including offshore emissions out to 100 nautical miles. Only the South Central Coast Air Basin (SCCAB) is designated as a non-attainment area. The SCCAB includes all emissions from sources on land and out to 3 nautical miles from the coast. The offshore air basins, OC1 and OC2, include emissions from sources from three to 24 miles from the coast and 24 to 100 miles from the coast, respectively.

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.

Emission Inventory Components

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

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.

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 Southern California Association of Governments (SCAG), 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*

EMFAC2017 SAFE Vehicles Rules Off-Model Adjustment Removal

On September 27, 2019, U.S. EPA and National Highway Traffic Safety Administration (NHTSA) published the "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program" (SAFE-1).[9] 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, U.S. 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 rescinded[10].

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.

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 F*. These adjustment factors were calculated based on emission estimates using *EMFAC2021* under two scenarios: (1) controlled scenario-estimated emissions with adopted

[9] 84 FR 51310. *https://www.govinfo.gov/content/pkg/FR-2019-09-27/pdf/2019-20672.pdf*.
[10] 87 FR 14332. *https://www.govinfo.gov/content/pkg/FR-2022-03-14/pdf/2022-05227.pdf*.

regulations (EMFAC2021 default) and (2) uncontrolled scenario - estimated emissions without accounting for the benefits of adopted regulations, including ACT and other regulations such as 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/2021-08/emfac2021_technical_documentation_april2021.pdf

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 D* 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

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

EMFAC2017 Heavy-Duty Inspection and Maintenance Off-Model Adjustment

On Dec. 9th, 2021, California Air Resources Board 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 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 D* 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.

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. The sections below summarize the updates made by CARB to specific off-road categories.

Recreational Marine Vessels

Pleasure craft or recreational marine vessel (RMV) is a broad category of marine vessels 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

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

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

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

Ocean Going Vessels

Ocean going vessels (OGVs) were updated in 2021 based on AIS (transponder) data. These data, along with vessel information supplied by IHS Fairplay provides vessel visit counts, speed, engine size, and other vessel characteristics. The inventory adopts US EPA's methodology for emissions based on vessel speed, engine model year and horsepower. The inventory includes transit, maneuvering, anchorage and at-berth emissions, updating the 2019 at-berth-only inventory. The comprehensive national model Freight Analysis Framework (FAF) was used to develop growth rates for forecasting.

Additional information on CARB's general OGV update is available at:
https://ww2.arb.ca.gov/sites/default/files/2022-03/CARB_2021_OGV_Documentation_ADA.pdf

Commercial Harbor Craft

Commercial Harbor Crafts (CHC) are grouped into 18 vessel types: articulated tug barge (ATB), bunker barge, towed petrochemical barge, other barge, dredge, commercial passenger fishing, commercial fishing, crew and supply, catamaran ferry, monohull ferry, short run ferry, excursion, ATB tug, push and tow tug, escort/ship assist tug, pilot boat, research boat, and work boat.

The CHC inventory was updated in 2021 and includes vessels used around harbors such as tug and tow boats, fishing vessels, research vessels, barges, and similar. The inventory was updated based on CARB's reporting data required by the CHC regulation for these vessels, as well as inventories from the Ports of Los Angeles and Long Beach and Oakland and Richmond. This supplied vessel characteristics, and the population was scaled up to match U.S. Coast Guard data on the annual number of vessels in California waters. Activity and load factors were based on a mix of reporting data and port-specific inventories. Emission factors were based on certification data for harbor craft engines. Population and activity growth factors were estimated based on historical trends in the past decade.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2021/chc2021/apph.pdf

Locomotives

All locomotive inventories were updated in 2020 and include linehaul (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, and Santa

Fe Railway (BNSF) for linehaul and switcher operations. Data for other categories was supplied by the locomotive owners. Emission factors for all categories were based on U.S. EPA emission factors for locomotives. The inventory reflects the 2005 memorandum of understanding (MOU) between CARB, 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

Diesel Agricultural Equipment

The agricultural equipment inventory covers all off-road vehicles of all fuel types used on farms or first processing facilities. 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

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 required by the offroad equipment regulation. 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

Cargo Handling Equipment

The Cargo Handling Equipment (CHE) inventory covers equipment of all fuels used at California ports and intermodal railyards, such as cranes, forklifts, container handling equipment, and more. The inventory population and activity were updated in 2021 based on the port inventories for the Ports of Los Angeles and Long Beach and Richmond, and the CARB reporting data for other ports and railyards, which had a more comprehensive inventory than available through reporting. Load factors were based on the previous inventory in 2007, and emission factors were based on the 2017 off-road diesel emission factor update. The inventory reflects the CHE Airborne Toxic Control Measures (ATCM), adopted in 2005 and completed in 2017.

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

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 U.S. 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

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 the Portable Equipment Registration Program (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

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 U.S. 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

Civil and Commercial Aircraft

The District used the Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) model version 5.1.2 and airport-specific aircraft operations and time-in-mode operating profiles based on local airport operational characteristics and the local mixing height to estimate 2008 criteria emissions and fuel consumption by aircraft operating mode for civil and commercial aircraft at civilian airport facilities operating in Ventura County. Civil and commercial aircraft include single and twin engine piston aircraft, turbine engine and jet powered aircraft and helicopters.

Sources of aircraft activity data include the FAA Air Traffic Activity Data System (ATADS) database and a Caltrans noise study in 1997 for the three largest airports and an EPA methodology for estimating aircraft operations at small facilities that do not report operations data to the FAA for one small private civilian airport and 14 heliports (*Environmental Protection Agency, Calculating Aviation Gasoline Lead Emissions in the 2008 NEI, (March 2009))*. 2008 emissions were projected to 2018 using the ratio of 2018 to 2008 ATADS operations for the two largest airports responsible for over 76% of county-wide aircraft operation. The District's growth profile is based on the 2020 FAA Terminal Area Forecast for the two largest airports.

Military Aircraft and Vessels

Emissions are associated with military aircraft operations at the U.S. Navy facility Naval Base Ventura County (NBVC) at Point Mugu on the Ventura County mainland and the facility on San Nicolas Island in the outer continental shelf from 24 to 100 nautical miles (OC2) air basin, and with military vessel operations occurring at the U.S. Navy facilities at the Port of Hueneme in Ventura County and large military vessels operating offshore and in the approach corridors to Port Hueneme and San Nicolas Island in the OC2 air basin.

NBVC provided 2017 baseline emissions estimates for military aircraft and vessel activities in the Ventura County attainment area (mainland and three nautical miles offshore), the outer continental shelf from 3 to 24 nautical miles air basin (OC1), and the OC2 air basin (Naval Base Ventura County Mobile Source Emissions 2017 Baseline Emissions and Future Emission Projection for 8-Hour Ozone SIP Planning (February 2021)). Aircraft include transports, piston and jet aircraft, helicopters, and missile launches. Emissions are from landings and takeoffs, touch and go aircraft operations and ground maintenance operations. Military vessels include large military ships, support and operations vessels, tugboats and some non-military vessels utilizing Navy facilities at Port Hueneme. Emissions occur from main propulsion and auxiliary engines during in-port at-berth and maneuvering operations and underway operations.

NBVC provided future year emissions estimates for military aircraft and vessels from planned projects and an additional 4% annual growth allowance through year 2026 within the Ventura County nonattainment area. The 4% annual growth allowance is intended to account for uncertainties in potential projects resulting from future actions and unknown projects. Beyond 2026 through 2040,

emissions in the nonattainment area and the OC1 and OC2 basins were assumed to grow at a rate of 4% per year, compounded annually. The only source in the NBVC mobile source emission inventory which was not projected to grow at 4% is the Port Hueneme Vessel Cargo emissions at Berth N3, which are assumed to grow at 2% for all years covered by this emission inventory.

Stationary Point and Area 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 (Air Emissions Reporting Requirements Rule) AERR. The inventory reflects actual emissions from industrial point sources reported to the District by the facility operators through calendar year 2020.

More information regarding the District's facility point source inventory is available at:
http://www.vcapcd.org/emissions_inventory.htm

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 by both CARB and the District using various models and methodologies. Estimation methods typically use emission factors from permits or literature, but can incorporate data from source testing, direct measurement by continuous emissions monitoring systems, or engineering calculations. Emissions for these categories are estimated by both CARB and the District.

Emission estimates for the categories below were developed by CARB and the District and have been reviewed by CARB and District staff to reflect the most up-to-date information and methods.

Fuel Combustion

Fuel Combustion includes stationary sources that burn combustible material fuel for heat or energy. The District categorizes fuel combustion emission sources by the type of fuel combusted and the type of facility that is using the fuel.

Natural Gas Combustion

Industrial and commercial natural gas combustion emissions estimates were revised by the District for 2018. Emissions were estimated based on the natural gas consumed by various industrial and commercial sectors (space heating, water heating, and other unspecified). Industrial and commercial natural gas usage reported by the gas utilities to the District for 2018 was distributed to the sectors using allocation factors from Southern California Gas Company. Emission factors were from EPA AP-42 Section 1.4 "Natural Gas Combustion" (July 1998). The growth profile is based on the natural gas usage demand forecasts developed by Southern California Gas Company for Ventura County and considers energy savings benefits from statewide energy efficiency programs and standards.

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

Stationary Agricultural Natural Gas Engines

The District updated emissions for 2010 based on fuel use and emission factor data from Emission Reduction Credits (ERC) applications submitted to the District for unpermitted agricultural well pump natural gas engines. Emissions were adjusted by the ratio of known engine fuel use and countywide natural gas fuel use data from the California Energy Commission (CEC) for - 'Ag & Water Pump' NAICS 221311 (Water Supply) - to account for unknown engines. The growth profile for natural gas irrigation pumps was developed by ARB/Pechan.

Agricultural Diesel Irrigation Pumps

This category includes emissions from the operation of diesel-fueled stationary and mobile agricultural irrigation pumps. The emission estimates are based on a 2003 CARB methodology updated in 2018 using statewide population and include replacements due to the Carl Moyer Program.

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

Other Liquid Fuel Combustion

Industrial and commercial liquid fuel combustion emissions were projected by the District for 2018 from 2010. State-wide distillate oil, residual oil and liquefied petroleum gas fuel consumption from the U.S. Dept. of Energy Information Administration (EIA) from 2009 was projected to 2010 using the 2010/2009 statewide ratio of either industrial or commercial employment from California Employment Development Department Labor Management Information (LMI) data, then allocated to the county level on the basis of the county/state ratio. Point source fuel use was then subtracted out. Distillate and residual fuel oil categories are subject to ARB's state-wide Diesel Fuel regulations and sulfur content is assumed to be 0.0015%. Emission factors are from EPA AP-42 Section 1.3 "Fuel Oil Combustion" and Section 1.5 "Liquefied Petroleum Gas Combustion". The growth profile is based on industry sector growth rates from SCAG.

Waste Disposal

Composting

The District developed a new methodology for 2018 to estimate ROG and NH_3 emissions from organic material composting operations in support of a proposed District rule to regulate ROG emissions from these sources. Annual 2018 composting, co-composting and chip-and-grind throughput was obtained from an annual survey of composting facilities in Ventura County. ROG and NH3 emission factors are from the ARB Composting Regulatory Workgroup, ARB Emissions Inventory Methodology for Composting Facilities (March 2015) Table III-1 and III-2. The growth profile is based on population projections from SCAG.

Landfills

The District developed a new point source category methodology for 2018 to estimate the ROG emissions from landfill gas escaping from the landfill surface. The District used the EPA's Landfill Gas Emission Model (LandGEM) to model ROG generation, then used that projection and the quantity of landfill gas collected as reported in surveys to project ROG emissions.

Cleaning and Surface Coatings

Cleaning and surface coatings are generally tracked by the District as an aggregate group and not at the facility level. Some large facilities report cleaning solution and surface coating use to the District.

Laundering

The District updated emissions from dry cleaning establishments using petroleum solvent or perchloroethylene for 2010. Emissions are based on solvent use and type of dry cleaning equipment used at dry cleaning facilities under District permit. Emissions from petroleum solvent were calculated using the solvent density. Because of its toxic effects, perchloroethylene use has been prohibited in California by the state-wide Dry Cleaning Air Toxic Control Measure (*ATCM*). The growth profile for petroleum solvent is based on industry projections from SCAG. Perchloroethylene use for dry cleaning has been eliminated in the District.

Degreasing

This category includes emissions from the use of solvents in degreasing operations (cold cleaning, vapor degreasing and handwipe cleaning) in the manufacturing and maintenance industries. ARB estimated 1993 emissions for this source category based on a 1996 study by E.H. Pechan and Associates, Inc. (Pechan) entitled, Solvent Cleaning/Degreasing Source Category Emission Inventory. To estimate degreasing emissions, Pechan collected activity data by surveying solvent users in two major groups: manufacturing and maintenance.

Emissions were estimated for 32 equipment and solvent pairs using employment in the nine industry groups and three emission variables: an activity factor (AF), which is the net solvent loss per employee accounting for recycled solvent; an emission factor (EF), which is the solvent density; and a user fraction

(UF), which is the fraction of employees using a particular equipment/solvent. For the manufacturer's survey, the emission factor for pure solvents is the density of the particular solvent. The emission factor for solvent blends is the density of the solvent multiplied by the total organic gas (TOG) content of the solvent. Exhaust controls were taken into account if used. For the maintenance survey, the emission factors are the density of the solvent with no exhaust controls.

The District revised the Pechan Report methodology for 2010, using 2010 employment data from the U.S Department of Labor *Bureau of Labor Statistics* database, the three Pechan Report variables, an additional variable to account for spray gun cleaning equipment not subject to District Rule 74.6 "Surface Cleaning and Degreasing" and revised control factors to account for exempt emissions. The growth profile is based on total industry output projections from SCAG.

Coatings and Process Solvents

The District updated 2010 ROG emissions in four Coatings & Process Solvent categories: Metal Parts and Products, Wood Furniture Coatings, Thinning and Cleaning Solvent, and Industrial Coatings (unspecified). 2010 national coating and solvent product data from the U.S. Census Bureau publication Current Industrial Reports, Paint & Allied Products: 2010 (July 2011) were allocated to the county level based on the county/national employment ratio using 2010 U.S. Department of Labor Bureau of Labor Statistics employment data. Thinning and clean-up solvent usage was adjusted for solvent usage already accounted for in Architectural Coatings area source categories. Coating and process solvent ROG emissions were determined using the composite emission factors from the corresponding point source emission categories reconciling with each area source category. The composite point source emission factors represent control from applicable district rules. Growth profiles are SCAG industry-specific economic output or total employment projections.

Printing

The District updated 2013 ROG emissions from printing operations. The 2018 emissions have been projected from that 2013 update. ROG emissions from printing facilities with permits were calculated using data from surveys and inspections available to the District. When data from surveys and inspections was not sufficient, the emissions from permitted facilities was scaled based on permitted ROG emissions and the emissions from permitted facilities and enough data to calculate emissions.

The number of permit-exempt printing facilities was estimated using data from a 2002 source category update and then estimating industry declines from 2002 to 2012. Emissions from permit-exempt facilities were assumed to be equal to the District permit exemption level of 200 pounds per year of ROG.

Petroleum Production and Marketing

Petroleum production and marketing includes emissions from the extraction, transportation, and transfer of oil and gas. It also includes the emissions from the transportation and transfer of finished

fuels such as gasoline and diesel fuel. Emissions from fuel combustion as part of the petroleum extraction and marketing process is included as part of the fuel combustion category.

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 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

Gasoline Cargo Tanks

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 for subsequent years 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

Oil and Gas Production

Most emissions from the oil and natural gas production inventory are based on facility surveys. This category is related to fugitive emissions from production-related fuel consumption, fugitive losses (sumps, pits, pumps, compressors, well heads, separators), 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 emission factors developed during facility permitting. These

factors were developed for classes of equipment using emission models such as GlyCalc and TANKS or obtained from emission factor references such as the Compilation of Air Emission Factors (AP-42).

The District updated 2010 ROG emissions for three Oil and Gas Production categories: Tertiary Oil Wells, Gas Stripping and Oil Production Fugitive Losses Well Heads.

ROG emissions in the Tertiary Oil Wells category are from thermally enhanced oil recovery (TEOR) steam drive and cyclic steam well casing vents. Emissions are calculated using the number of TEOR wells from the California Department of Conservation Division of Oil, Gas, and Geothermal Resources (*DOGGR*), 2009 Annual Report of the State Oil & Gas Supervisor, Injection 2009 Table (November 2011) and ROG emission factors developed by Radian Corporation in Assessment of VOC Emissions from Well Vents Associated with Thermally Enhanced Oil Recovery Report No. EPA 909/9-81-003 (September 1981). The controlled ROG emission factor assumes 90% control from vapor recovery systems.

Gas Stripping ROG emissions are from gas plant valves and fittings. Emissions are calculated using the annual million cubic feet of gas processed obtained from the DOGGR 2010 Annual Report of the State Oil & Gas Supervisor, Oil and Gas Production by County Table (January 2012) and fugitive gas emission factors developed in a study conducted by KVB entitled Emission Characteristics of Crude Oil Production Operations in California - Final Report No. KVB72 5810-1309 (January 1983). The controlled emission factor assumes 80% control from District Rule 74.10 "Components at Crude Oil and Natural Gas Production and Processing Facilities."

Oil Production Fugitive Losses Well Heads ROG emissions are from oil production well head maintenance. Well head maintenance refers to opening a producing well to replace or repair rod pumps, sucker rods or tubing, or to perform other well servicing operations, allowing the pressurized gas to escape or vent to the atmosphere. The 2010 methodology was revised to incorporate assumptions in ARB's, *2007 Oil & Gas Industry Survey Results Draft Report* released in August 2011. Emissions per maintenance event are estimated by determining the volume of well gas released during maintenance operations, which depends on well depth, casing diameter, tubing diameter, well gas pressure and gas temperature. Total annual emissions are determined from emissions per maintenance event, the number of operating wells obtained from the DOGGR 2010 Annual Report of the State Oil & Gas Supervisor, January 2012 and well maintenance operations per year from the 2007 ARB Oil & Gas Industry Survey.

The growth profile for the three categories is based on the SCAG industry-specific economic output for oil & gas extraction.

ARB staff updated the statewide emissions inventory for oil and natural gas production, which included the revision of emissions estimates and the addition of emission categories that previously were not estimated. For Ventura County, these categories included fugitive emissions from mud degassing (the practice of extracting entrained gas from drilling mud once it is outside the wellbore and venting the gas to the atmosphere), and pneumatic devices powered by high pressure produced gas for Ventura County. Emissions were calculated with a software tool developed by EPA that generates county-level emissions for upstream oil and gas activity.

This tool uses 2011 as the base year, with activity data taken from DOGGR and an industry database, and default emission factors provided in an associated report. Staff incorporated data from ARB's 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 estimates for 2012 and other years were forecasted using the historical trend in statewide oil production from DOGGR, which assumes a 2.2 percent annual decline.

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

Gasoline Bulk Plants

The District estimated 2012 ROG emissions from gasoline bulk loading facilities not captured in the point source inventory, including aviation gasoline bulk plants located at airports. Emissions are associated with tank breathing and working loss. Working loss emissions are a composite of several processes associated with loading/unloading gasoline into or from the storage tanks. Throughput and emission factors were obtained from the District permits for the facilities. The growth profile for GDFs and Bulk Plants is based on projections of gasoline consumption from ARB's EMFAC model.

LPG Transfer and Dispensing Losses

The District developed a new emission estimation methodology for fugitive ROG emissions from transfer and dispensing of liquefied petroleum gas (LPG) for 2012, based on the South Coast Air Quality Management District emission estimation methodology described in Final Staff Report for Proposed Rule 1177 'Liquefied Petroleum Gas Transfer and Dispensing' Appendix B 'Emission Inventory Calculations' (June 2012). LPG fugitive ROG emissions result from (1) venting of LPG through fixed liquid level gauges (FLLG) used as overfill safety devices on pressurized receiving containers, tanks and cylinders and (2) volatilization of entrapped LPG when transfer lines are disconnected.

FLLG venting emissions depend on the number of filling events, container filling time and whether gravity or pump assisted pressure filling is used to fill the receiving containers. Disconnect emissions depend on the number of disconnect events and the entrapment volume for a connector type. The number of container filling and disconnect events depends on annual LPG usage and average tank fill volume. LPG usage was estimated for seven different end-use sectors: residential, commercial, sales to retail, internal combustion engines, industrial, agricultural and chemical. Statewide LPG sales by market/end-use sector for 2009 from the American Petroleum Institute were allocated to Ventura County using allocation surrogates specific to each market sector. Each end-use sector has particular container configurations, fill times, fill volumes and product transfer methods which are used to derive FLLG and connector emission factors in pounds ROG/thousand gallons LPG. The growth profile for this category is based on industry-specific employment projections developed by ARB/REMI.

Industrial Processes

Industrial processes include lubricants and miscellaneous industrial emission sources that are not classified as fuel combustion, waste disposal, cleaning or surface coating, or petroleum production and marketing.

Industrial Lubricants

The District developed a new emission estimation methodology for estimating ROG emissions from industrial lubricants for 2012, based on South Coast Air Quality Management District's emission estimation methodology described in Final Staff Report for Proposed Amended Rule 1144 'Metalworking Fluids and Direct-Contact Lubricants' (May 2010). ROG emissions result from metalworking fluids and direct-contact lubricants such as vanishing oils, lubricants and rust inhibitors used during metalworking and/or metal forming operations in four industrial sectors: petroleum and coal products manufacturing, fabricated metal product manufacturing, machinery manufacturing and transportation equipment manufacturing. The Rule 1144 Staff Report contains an estimate of the baseline metalworking fluids emissions inventory based on a 2006 survey of local manufacturers, distributors and end-users of metalworking fluids and direct-contact lubricants.

Baseline emissions were calculated for individual metalworking fluid types using volume of fluid used (thousand gallons) and sales-weighted average ROG content. The quantity of metalworking fluids and direct contact lubricants in 2006 is assumed to be related to employment in the four industrial sectors. South Coast Air Quality Management District metalworking fluid use was projected to 2011 using the ratio of 2011 to 2006 U.S. Census Bureau County Business Patterns (*CBP*) employment in the four industrial sectors. Then the ratio of 2011 employment in the four sectors between Ventura County and South Coast Air Quality Management District was used to estimate 2011 industrial lubricant use for Ventura County, which was then projected to 2012 using growth in the four industrial sectors from 2011 to 2012. ROG emissions for 2012 were determined using volume of industrial lubricant usage and the average emission factor for all four industrial sectors from the South Coast Air Quality Management District Staff Report. The growth profile is based on total employment projections from SCAG.

Area-Wide Sources

Area-wide sources include categories where emissions take place over a wide geographic area, such as consumer products, architectural coatings, residential fuel combustion, and prescribed burning. Emissions for these categories are estimated by both CARB and the District using various models and methodologies.

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

Solvent Evaporation

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 ROG emissions for the various product categories. Growth for personal care products is based on real disposable personal income projections per REMI version 2.4.3. No growth is assumed for aerosol coatings. Growth for all other consumer products is based on SCAG population projections.

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

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 and surfaces, 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 2019 CARB Suggested Control Measure. These SCM were largely adopted by the District as Rule 74.2. These emissions are grown based on SCAG 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

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 Farmland Mapping and Monitoring Program (FMMP), 2016. Growth for structural pesticides is based on SCAG household 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

Asphalt Paving/Roofing

Asphalt paving and roofing emissions were grown from a 1995 estimate developed by the District. ROG emissions are estimated based on tons of asphalt applied in the county and a default emission factor for each type of asphalt operation from an ARB area source methodology document Methods for Assessing Area Source Emissions in California (December 1982). The growth profile for both categories is based on construction employment forecasts from SCAG.

Miscellaneous Area Source Processes

Residential Wood Combustion

Residential Wood Combustion estimates are based on a 2011 CARB methodology. It reflects survey data on types of wood burning devices and wood consumption rates, updates to the 2002 U.S. 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

Residential Natural Gas Combustion

The inventory for residential natural gas combustion emissions reflects estimates updated by the District for 2018. Emissions are estimated based on the natural gas consumed by various residential uses (space heating, water heating, cooking, other). Natural gas usage provided to the District by SoCalGas in 2018. Emission factors were from EPA AP-42 Section 1.4 "Natural Gas Combustion" (July 1998). The growth profile is based on the housing units forecast from SCAG.

Farming Operations

The livestock emissions estimates reflect animal population data from the *U.S. Department of Agriculture's (USDA) 2002 Census of Agriculture* and the Ventura County Agriculture Commissioner. The emissions reflect a no-growth assumption based on an analysis of livestock population trends that found no significant growth. CARB updated non-cattle livestock categories for 2017 using more recent activity data.

Unplanned Fires

Emissions from structural and automobile fires were updated for 2018 by the District. Structural fire emissions estimates are based on the number of structural fires, rates of structural and content material loss per fire, average combustible content, and an emission factor per ton of material burned. Automobile fire emissions are based the number of vehicle fires per year and a composite emission factor from EPA's AP-42 Section 2.5 "Open Burning", Table 2.5-1 and Section 2.6 "Automobile Body Incineration", Table 2.6-1 (October 1992). For the 2010 update, the number of structure and automobile

fires was obtained from the California Office of the State Fire Marshall, California All Incident Reporting System/National Fire Incident Reporting System (CAIRS/NFIRS) database, December 2011. The growth profile assumes there will be no growth in fire emissions.

Managed Burning and Disposal

The managed burning and disposal category is based on emissions data reported by the District for 2018. Emissions are calculated using crop-specific tons burned, fuel loadings and emission factors. Total 2018 tonnage burned for each agricultural debris and weed abatement crop type was obtained from the County of Ventura, Fire Protection District, Bureau of Planning and Fire Prevention, Activated Burn Permit Program. Total 2018 burn data for each range improvement and forest management crop type were obtained from the County of Ventura, Fire Department Wildland Fire and Aviation Division, and the U.S. Forest Service (USFS) for prescribed burning in the Los Padres National Forest.

ARB's managed burn emission factor table was used for all agricultural burn and prescribed burn crop categories, except for forest management crop categories “chaparral (piles)” and “pine”, for which the USFS Fire and Environmental Research Applications (FERA) Team Piled Fuels Biomass and Emissions Calculator and ARB's Emission Estimation System (EES) emission factors were used. The growth profile for agricultural burning and weed abatement is based on ARB’s projection of agricultural harvest acres. A no-growth assumption was used for forest management and range improvement emissions based on analyses of District reported data that don’t show a discernible trend.

Commercial Cooking

Commercial cooking emissions estimates were grown from 2002 estimates provided by the District. The original estimates were developed from the number of restaurants and types of cooking equipment data obtained from the County of Ventura, Resource Management Agency. Process rates were derived using the 1999 Pacific Environmental Services (PES) study, A Detailed Survey of Restaurant Operations in the South Coast Air Basin, Final Report. Emissions were calculated using emission factors from the 1997 South Coast Air Quality Management District Staff Report for the Proposed Rule 1138 ‘Control of Emissions From Restaurant Operations’, and EPA Methods for Developing a National Emission Inventory for Commercial Cooking Processes (2003). The growth profile is based on the SCAG total population forecast.

Point and Areawide Source Emissions Forecasting and Control Rules

Emission forecasts for 2019 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 were largely based on SCAG data growth factors shown in Table 4-1. The emissions inventory also reflects emission reductions from point and areawide sources subject to District rules and CARB regulations. The rules and regulations reflected in the inventory are listed below in Table A-1.

Table A-1: District and CARB Control Rules and Regulations Included in the Inventory

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
VEN_APCD	74.11.1	Large Water Heaters and Small Boilers	Fuel combustion / boilers, process heaters, and steam generators
VEN_APCD	74.15.1	Boilers, Steam Generators and Process Heaters (1 to 5 MMBTUs)	Fuel combustion / boilers, process heaters, and steam generators
VEN_APCD	74.22	Natural Gas-Fired, Fan-Type Central Furnaces	Fuel combustion / space heating
VEN_APCD	74.11	Natural Gas-Fired Water Heaters	Fuel combustion / water heaters
VEN_APCD	74.2	Architectural Coatings	Architectural Coatings
VEN_APCD	74.30	Wood Products Coatings	Coatings and related process solvents, Degreasing
VEN_APCD	74.18	Motor Vehicle and Mobile Equipment Coating Operations	Coatings and related process solvents
VEN_APCD	74.20	Adhesives and Sealants	Adhesives and Sealants
VEN_APCD	74.19	Graphic Arts	Printing operations
VEN_APCD	74.24	Marine Coating Operations	Coatings and related process solvents
VEN_APCD	74.6	Surface Cleaning and Degreasing	Surface cleaning and degreasing
VEN_APCD	74.12	Surface Coating of Metal Parts and Products	Coatings and related process solvents, Degreasing

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
VEN_APCD	74.13	Aerospace Assembly and Component Manufacturing Operations	Coatings and related process solvents, Degreasing
VEN_APCD	74.31	Metalworking Fluids and Direct-Contact Lubricants	Other processes / multi-purpose lubricants
VEN_APCD	74.33	Liquefied Petroleum Gas Transfer or Dispensing	Petroleum marketing
VEN_APCD	74.14	Polyester Resin Material Operations	Chemical / fiberglass manufacturing
VEN_APCD	74.25	Restaurant Cooking Operations	Cooking
VEN_APCD	74.29	Soil Decontamination Operations	Industrial processes / other
ARB	ARCH_SCM	2000 Suggested Control Measures (SCM) for Architectural Coatings	Architectural coatings
ARB	AC_SCM2007	2007 Suggested Control Measures (SCM) for Architectural Coatings	Architectural coatings
ARB	AC_SCM2019	2019 Suggested Control Measure (SCM) for Architectural Coatings	Architectural Coatings
ARB	ARB_R003 & ARB_R003_A	Consumer Product Regulations & Amendments	Consumer products
ARB	ARB_R007	Aerosol Coating Regulations	Consumer products / Aerosol coatings

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
ARB	GDF_HOSREG	Gasoline Dispensing Facility (GDF) Hose Emission Regulation	Petroleum marketing
ARB	ORVR	Fueling emissions from ORVR vehicles	Petroleum marketing
ARB	AG_IC_ENG	Ag IC Engine Emission Scalers	Agricultural irrigation internal combustion engines
ARB	NONAGICENG	Non-Ag IC Engine Scalers	Non-agricultural internal combustion reciprocating engines

External Adjustments

External adjustments were made in CEPAM to account for additional recent regulatory actions. The external adjustments reflected in the CEPAM2022v1.01 Ventura County SIP inventory are listed below in Table 2.

Table 2: 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

APPENDIX B

VENTURA COUNTY

TRANSPORTATION CONTROL MEASURE COMMITMENTS

Introduction

Transportation Control Measures (TCMs) are projects that reduce air pollutants from transportation sources by reducing vehicle use, traffic congestion, or vehicle miles traveled. TCM projects may be voluntary, incentive-based, market-based, or regulatory programs. Projects that use technology to reduce emissions, such as innovations in fuel technologies or low-emission vehicles, are not considered TCMs. Projects to enhance roadway capacity are also not typically TCMs. Project categories listed in Table 3-6 of the 2022 Air Quality Management Plan (AQMP) show examples of measures that are considered TCMs.

The federal Transportation Conformity regulation is a process designed to ensure timely implementation of TCMs, thus reinforcing the link between air quality and transportation planning. The Southern California Association of Governments (SCAG) is responsible for identifying committed TCM projects in Ventura County and assuring their timely implementation and completion as prescribed in the conformity regulation. Projects identified as TCMs become committed when:

1) The United States Environmental Protection Agency (EPA) approves the AQMP as part of the State Implementation Plan (SIP).
2) Projects are financially committed for right-of-way or construction in the first two years of the Federal Transportation Improvement Program (FTIP).
3) The FTIP is approved by SCAG, the California Department of Transportation, and the Federal Highway Administration.

The SCAG FTIP Guidelines provide extensive information about TCMs and TCM commitments.

This appendix includes the current projects in Table B-1 identified by SCAG and the District as the committed TCMs and thus, subject to the timely implementation requirement of transportation conformity. The process for tracking the implementation and completion of these committed TCMs begins with the Ventura County Transportation Commission (VCTC) and there required reporting of all ongoing transportation projects in Ventura County.

If a project sponsor or the VCTC identifies a committed TCM that cannot be completed or must be significantly delayed, then a substitution process is used to substitute a new TCM or enhance another committed TCM to make up for the emissions reduction shortfall. The SCAG Transportation Conformity Working Group is the interagency consultation committee for all regional conformity discussion and guidance, including issues involving TCMs.

TCMs are programmed and updated through the FTIP process. The FTIP is updated by SCAG every two years. All uncompleted TCM projects roll forward and their enforceable commitments are automatically revised without the need for a SIP revision. The completed TCMs are reported as complete and removed from subsequent FTIP updates. Also, new committed TCMs are added

to the FTIP, along with the "rollover" committed TCMs, for future timely implementation reports in subsequent FTIP updates.

Table B-1
Ventura County Transportation Control Measure Commitments

Lead Agency	Project ID	Description	2021 FTIP Completion Date
Camarillo	VEN160103	PLEASANT VALLEY ROAD CLASS 2 BIKE LANES PROJECT FROM 5TH STREET TO LAS POSAS ROAD (APPROX 8,700 FEET).	2022
Camarillo	VEN190114	IN CAMARILLO, SPRINGVILLE DRIVE BIKE TRAIL - EXTENS CLASS I BIKE TRAIL FROM LAS POSAS ROAD TO CENTRAL AVENUE APPROXIMATELY 2.2 MILES.	2023
Moorpark	VEN181001	IN MOORPARK, EXPAND NORTH RAIL STATION PARKING BY 30 SPACES.	2021
Oxnard	VEN130101	IN THE NORTHEAST COMMUNITY OF THE CITY OF OXNARD, NORTHEAST OF OXNARD TRANSPORTATION CENTER. INSTALL 1.9 MI CLASS II BIKE LANES, 6.3 MI CLASS III BIKE LANES AND IMPROVEMENTS TO 3.69 MI OF EXISTING BIKE LANES. BICYCLE BOULEVARDS AND PEDESTRIAN IMPROVEMENTS AT RAMONA, CHAVEZ, AND LEMONWOOD ELEMENTARY SCHOOLS, AND BICYCLE AND PEDESTRIAN IMPROVEMENTS ON CLOYNE STREET.	2020
Oxnard	VEN130102	ON C STREET FROM VINEYARD AVE TO CHANNEL ISLANDS BLVD, CONSTRUCT 4.9 MI OF CLASS II BIKE LANES. CONSTRUCT CLASS III BIKE LANES ON GUAVA ST/HEMLOCK AVE AND ALONG HILL ST 12/30/20.	2020
Oxnard	VEN150907	OXNARD BLVD. BICYCLE & PEDESTRIAN FACILITIES FROM 101 FREEWAY TO GONZALES ROAD APPROXIMATELY 14,800 FEET.	2021
Ventura County	VEN190703	IN VENTURA COUNTY, ON POTRERO ROAD CONSTRUCT APPROXIMATELY 3.2 MILES OF CLASS II BIKE LANES FROM HIDDEN VALLEY ROAD TO BRIDGE 231, IN UNINCORPORATED VENTURA COUNTY.	2020

Lead Agency	Project ID	Description	2021 FTIP Completion Date
Ventura County	VEN171007	IN VENTURA COUNTY AND THE CITY OF THOUSAND OAKS ON POTRERO ROAD CONSTRUCT 2.8 MILES OF CLASS II BIKE LANES IN THE COUNTY AND 500 FEET IN THE CITY OF THOUSAND OAKS FROM BRIDGE #231 TO .11 MILES EAST OF TRENTWOOD DRIVE.	2020
Ventura County Transportation Commission	VEN040405	AUTOMATIC VEHICLE LOCATOR SYSTEM UPGRADE FOR REAL-TIME BUS STOP SIGNAGE (ASSOCIATED TRANSIT IMPROVEMENT)	2021
Ventura County Transportation Commission	VEN93017	REGIONAL RIDESHARE PROGRAM FOR 18/19, 19/20, 20/21 AND 21/22. TOLL CREDITS IN THE AMOUNT OF $51 PER YEAR FOR 18/19, 19/20, 20/21, AND 21/22	2025

Source: *Adopted 2017 Federal Transportation Improvement Program*, Southern California Association of Governments.

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APPENDIX C

VENTURA COUNTY

KEY CARB MOBILE SOURCE REGULATIONS AND PROGRAMS PROVIDING EMISSION REDUCITONS

I. Key Mobile Source Regulations and Programs Providing Emission Reductions

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

- Stringent emissions standards that minimize emissions from new vehicles and equipment;
- In-use programs that target the existing fleet and require the use of the cleanest vehicles and emissions control technologies;
- Cleaner fuels that minimize emissions during combustion; and,
- Incentive programs that remove older, dirtier vehicles and equipment and replace those vehicles with the cleanest 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 federal Clean Air Act Amendments (Act) of 1970, which established the basic national framework for controlling air pollution. In recognition of the pioneering nature of CARB's efforts, the Act 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, 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 2037 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.

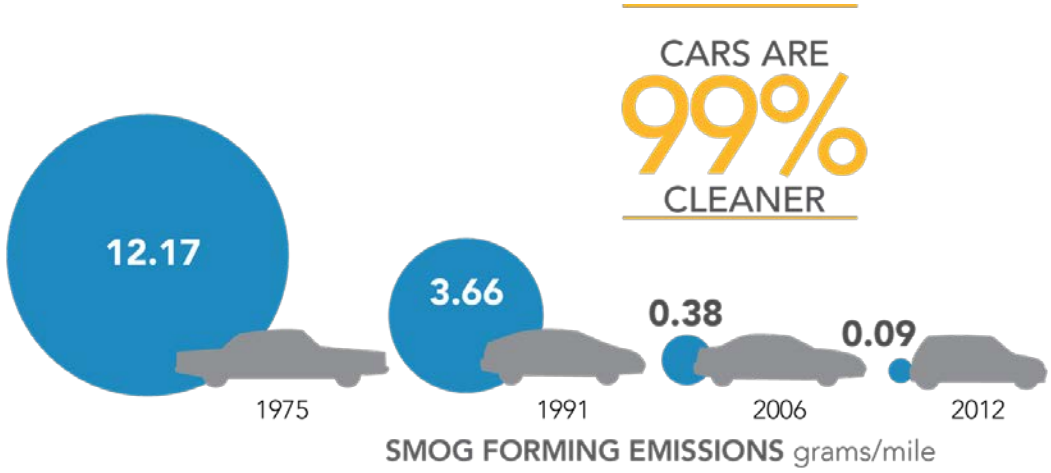
Further, CARB and District staff work closely on identifying and distributing incentive funds to accelerate cleanup of vehicles and engines. Key incentive programs include: Low Carbon Transportation, Air Quality Improvement Program, VW Mitigation Trust, Community Air

Protection, Carl Moyer Program, Goods Movement Program, Clean Off-Road Equipment (CORE) and Funding Agricultural Replacement Measures for Emission Reductions (FARMER). These incentive-based programs work in tandem with regulations to accelerate deployment of cleaner technology.

A. Light-Duty Vehicles

Figure C-1 illustrates the trend in CARB smog forming emission standards for light-duty vehicles. Cars are 99 percent cleaner than they were in 1975 due to CARB's longstanding light-duty mobile source program. 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. In 1970, CARB required auto manufacturers to meet the first standards to control NOx emissions along with hydrocarbon emissions. The simultaneous control of emissions from motor vehicles and fuels led to the use of cleaner-burning reformulated gasoline (RFG) that has removed the emissions equivalent of 3.5 million vehicles from California's roads. Since CARB first adopted it in 1990, the Low Emission Vehicle Program (LEV and LEV II) and Zero-Emission Vehicle (ZEV) Program have resulted in the production and sales of hundreds of thousands of zero-emission vehicles (ZEVs) in California.

Figure C-1: Light-Duty Emission Standards



As a result of these efforts, light-duty vehicle emissions in Ventura County have been reduced significantly since 1990 and will continue to go down through 2026. From today, light-duty vehicle NOx emissions are projected to decrease by over 55 percent in 2026. Key light-duty programs include Advanced Clean Cars (ACC), On-Board Diagnostics, Reformulated Gasoline, Incentive Programs, and the Enhanced Smog Check Program.

1. Advanced Clean Cars

CARB's groundbreaking ACC program is now providing the next generation of emission reductions in California, and ushering in a new zero emission passenger transportation system.

The success of this program is evident: California is the world's largest market for Zero Emission Vehicles (ZEVs), with over 87 models available today, including battery-electric, plug-in hybrid electric, and fuel cell electric vehicles. A wide variety are now available at lower price points, attracting new consumers. As of February 2022, Californians, who drive only 10 percent of the nation's cars, now account for over 40 percent of all zero-emission cars in the country. The U.S. makes up about half of the world market. This movement towards commercialization of advanced clean cars has occurred due to CARB's ZEV requirements, part of ACC, which affects passenger cars and light-duty trucks.

CARB's ACC Program, approved in January 2012, is a pioneering approach of a 'package' of regulations that - although separate in construction - are related in terms of the synergy developed to address both ambient air quality needs and climate change. The ACC program combines the control of smog, soot causing pollutants and greenhouse gas (GHG) emissions into a single coordinated package of requirements for model years 2015 through 2025. The program assures the development of environmentally superior cars that will continue to deliver the performance**,** utility, and safety vehicle owners have come to expect

The ACC Program also included amendments affecting the current ZEV requirements through the 2017 model year in order to enable manufacturers to successfully meet 2018 and subsequent model year requirements. These ZEV amendments are intended to achieve commercialization through simplifying the regulation and pushing technology to higher volume production in order to achieve cost reductions. The ACC Program will continue to achieve benefits into the future as new cleaner cars enter the fleet and displace older and dirtier vehicles.

Going beyond these regulations, California will be transitioning to zero emissions. In support of California's transition to zero-emission vehicles, in 2020, Governor Newsom signed Executive Order N-79-201 which established a goal that 100 percent of California sales of new passenger cars and trucks be zero-emission by 2035. Advanced Clean Cars 2 (ACC 2), a measure in the 2016 State SIP Strategy, is a significant effort critical to meeting air quality standards, and is still being developed. ACC 2 is consistent with the Governor Newson's Executive Order and 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.

With this order and many other recent actions, Governor Newsom has recognized that air pollution remains a challenge for California that requires bold action. Zero-emission vehicle commercialization in the light-duty sector is well underway. Longer-range battery electric vehicles are coming to market that are cost-competitive with gasoline fueled vehicles and hydrogen fuel cell vehicles are now also seeing significant sales. Autonomous and connected vehicle technologies are being installed on an increasing number of new car models. A growing

[1] Executive Order N-79-20 https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf

network of retail hydrogen stations is now available, along with a rapidly growing battery charger network.

2. On Board Diagnostics (OBD)

OBD systems serve an important role in helping to ensure that engines and vehicles maintain low emissions throughout their full life. OBD systems are designed to identify when a vehicle's emission control systems or other emission-related computer-controlled components are malfunctioning, causing emissions to be elevated above the vehicle manufacturer's specifications. Many states currently use the OBD system as the basis for passing and failing vehicles in their inspection and maintenance programs, as is exemplified by California's Smog Check program.

California's first OBD regulation required manufacturers to monitor some of the emission control components on vehicles starting with the 1988 model year. In 1989, CARB adopted OBD II, which required 1996 and subsequent model year passenger cars, light duty trucks, and medium duty vehicles and engines to be equipped with second generation OBD systems. The Board has modified the OBD II regulation in regular updates since initial adoption to address manufacturers' implementation concerns and, where needed, to strengthen specific monitoring requirements. Most recently, the Board amended the regulation in 2021 to require manufacturers to implement Unified Diagnostic Services (UDS) for OBD communications, which will provide more information related to emissions-related malfunctions that are detected by OBD systems, improve the usefulness of the generic scan tool to repair vehicles, and provide needed information on in-use monitoring performance. UDS implementation would be required for all 2027 and subsequent model year light- and medium-duty vehicles and engines, as well as some heavy-duty vehicles and engines.

3. California Enhanced Smog Check Program

The Bureau of Automotive Repair (BAR) is the State agency charged with administration and implementation of the Smog Check Program. The Smog Check Program is designed to reduce air pollution from California registered vehicles by requiring periodic inspections for emission-control system problems, and by requiring repairs for any problems found. In 1998, the Enhanced Smog Check program began in which Smog Check stations relied on the BAR-97 Emissions Inspection System (EIS) to test tailpipe emissions with either a Two-Speed Idle (TSI) or Acceleration Simulation Mode (ASM) test depending on where the vehicle was registered. For instance, vehicles registered in urbanized areas received an ASM test, while vehicles in rural areas received a TSI test.

In 2009, the following requirements were added in to improve and enhance the Smog Check Program, making it more inclusive of motor vehicles and effective on smog reductions:

- Low pressure evaporative test;
- More stringent pass/fail cutpoints;

- Visible smoke test; and
- Inspection of light- and medium-duty diesel vehicles.

The next major change in the Program was due to AB 2289, adopted in October 2010, a new law restructuring California's Smog Check Program, streamlining and strengthening inspections, increasing penalties for misconduct, and reducing costs to motorists. This new law, supported by CARB and BAR, promised faster and less expensive Smog Check inspections by talking advantage of the second generation of OBD software installed on all vehicles. The new law also directs vehicles without this equipment to high-performing stations, helping to ensure that these cars comply with current emission standards. This program will reduce consumer costs by having stations take advantage of diagnostic software that monitors pollution-reduction components and tailpipe emissions. Beginning mid-2013, testing of passenger vehicles using OBD was required on all vehicles model years 2000 or newer.

4. Reformulated Gasoline (CaRFG)

Since 1992, CARB has been regulating the formulation of gasoline through the California Reformulated Gasoline program (CaRFG). The CaRFG program has been implemented in three phases, and has resulted in California gasoline being the cleanest in the world. California's cleaner-burning gasoline regulation is one of the cornerstones of the State's efforts to reduce air pollution and cancer risk. Reformulated gasoline is fuel that meets specifications and requirements established by CARB, which reduced motor vehicle toxics by about 40 percent and reactive organic gases by about 15 percent. The results from cleaning up fuel can have an immediate impact as soon as it is sold in the State. Vehicle manufacturers design low-emission emission vehicles to take full advantage of cleaner-burning gasoline properties.

5. Incentive Programs

There are many different incentive programs focusing on light-duty vehicles that produce extra emission reductions beyond traditional regulations. Incentive programs encourage both the early retirement of dirty, older cars and the purchase of newer, lower-emitting vehicle engines and technologies. Several State and local incentive funding pools have been used historically -- and remain available -- to fund the accelerated turnover of on-road heavy-duty vehicles.

The State, in partnership with the local air districts, has a well-established history of using incentive programs to advance technology development and deployment, and to achieve early emission reductions. Since 1998, CARB and California's local air districts have been administering incentive funding to accelerate the deployment and turnover to cleaner vehicles, starting with the Moyer Program. In recognition of the key role that incentives play in complementing State and local air quality regulations to reduce emissions, the scope and scale of California's air quality incentive programs has since greatly expanded. Each of CARB's incentive programs has its own statutory requirements, goals, and categories of eligible

projects that collectively provide for a diverse and complex incentives portfolio. CARB uses this portfolio approach to incentives to accelerate development and early commercial deployment of the cleanest mobile source technologies and to improve access to clean transportation.

The Fiscal Year (FY) 2021-22 State Budget included an unprecedented level of investment in ZEVs, with $2.3 billion allocated for CARB over the next three years, specifically dedicated to incentive-based turnover of mobile source vehicles and equipment, as part of a $3.9 billion comprehensive, multi-agency package to accelerate progress toward the State's zero-emission vehicle goals established under Executive Order N-79-20. With the Proposed 2022-23 State Budget, Governor Newsom is further reinforcing California's commitment to transitioning away from combustion vehicles with a proposed additional $6.1 billion in ZEV investments over the next 5 years.

a) Low Carbon Transportation Investments and Air Quality Improvement Program (Clean Transportation Incentives)

California's Low Carbon Transportation Investments and the Air Quality Improvement Program form CARB's major incentive funding program, which works in concert with the State's larger portfolio of clean transportation investments. Together, the Low Carbon Transportation Investments and Air Quality Improvement Program are known as the Clean Transportation Incentives program; they provide mobile source incentives to reduce greenhouse gas, criteria pollutant, and toxic air contaminant emissions through the deployment of advanced technology and clean transportation in the light-duty and heavy-duty sectors.

The Clean Transportation Incentives Program is part of California Climate Investments, and is designed to accelerate the transition to advanced technology low carbon freight and passenger transportation, with a priority on providing health and economic benefits to California's most disadvantaged communities, and with a focus on increasing deployment of zero-emission vehicles and equipment wherever possible. Low Carbon Transportation Investments are supported by California's Cap-and-Trade auction proceeds. The Air Quality Improvement Program (AQIP) is a mobile source incentive program that focuses on reducing criteria pollutant and diesel particulate emissions with concurrent GHG reductions. AQIP is appropriated from the Air Quality Improvement Fund.

Each year, the legislature appropriates funding to CARB for the Low Carbon Transportation Investments and Air Quality Improvement Programs, and allocations are used to fund multiple programs in the passenger vehicle, on-road heavy-duty, and off-road vehicle sectors, including: the Clean Vehicle Rebate Project (CVRP); Enhanced Fleet Modernization Program and Plus-Up Pilot Project (Clean Cars 4 All); and the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP).

i. Clean Vehicle Rebate Program (CVRP)

As one of the programs funded through the Clean Transportation Incentives program, CVRP is a vehicle purchasing incentives program that provides consumer rebates to reduce the price for new ZEV purchases, and is designed to offer vehicle rebates on a first-come, first-serve basis for

light-duty ZEVs, plug-in hybrid electric vehicles, and zero-emission motorcycles. In FY 2021-22, CVRP was allocated $525 million.

ii. Clean Cars 4 All (CC4A)

Clean Cars 4 All (formerly known as the Enhanced Fleet Modernization Program Plus-Up Pilot Project) is another Clean Transportation Incentives program for passenger vehicles. Clean Cars 4 All provides incentives for lower-income consumers living in and near disadvantaged communities who scrap their old vehicles and purchase new or used hybrid, plug-in hybrid, or zero-emission vehicle replacement vehicles. The budget for FY 2021-22 included $75 million for the statewide expansion of CC4A.

iii. Other Clean Transportation Equity Investments

CARB also funds a suite of transportation equity pilot projects aimed at increasing access to clean transportation and mobility options for priority populations in disadvantaged and low-income communities, and for lower-income households. This includes clean vehicle ownership projects, clean mobility options, streamlining access to funding and financing opportunities, and increasing community outreach, education and exposure to clean technologies. Clean Transportation Equity pilot projects exemplify the importance of understanding the unique needs across communities and provide lessons for how we most directly address barriers to collectively achieve our equity, air quality, and climate goals. Major Clean Transportation Equity Investment programs include: Clean Mobility Options, Clean Mobility in Schools, Financing Assistance; and Sustainable Transportation Equity Project **(**STEP). Clean Transportation Equity Investment projects were allocated $150 million in the FY 2021-22 budget, which includes the $75 million for CC4A mentioned above.

Financing Assistance provides eligible consumers buy-down and financing opportunities to purchase or lease a new or used clean vehicle, such as a conventional hybrid electric vehicle (HEV), plug-in hybrid (PHEV), or battery electric vehicle (BEV). Clean Mobility in Schools Projects are located within disadvantaged communities, and are intended to encourage and accelerate the deployment of new zero-emission school buses, school fleet vehicles, passenger cars, lawn and garden equipment, and can incorporate alternative modes of transportation like transit vouchers, active transportation elements, and bicycle share programs. In the light-duty sector, some of the Clean Mobility Options programs that CARB funds include the Clean Mobility Options Voucher Pilot Program (CMO). CMO provides voucher-based funding for low-income, tribal, and disadvantaged communities to fund zero-emission shared and on-demand services such as carsharing, ridesharing, bike sharing, and innovative transit services. STEP is a new transportation equity pilot program that funds zero-emission carsharing, bike sharing, public transit and shared mobility subsidies, among other projects.

b) Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Moyer Program), funded by dedicated revenue from the DMV's smog abatement fee and a fee on the purchase of new

tires, provides approximately $60 million in grant funding annually through local air districts for cleaner-than-required engines and equipment. Since 1998, approximately $1 billion has been allocated to date. In the light-duty sector, the Moyer Program encourages voluntarily retirement of older, more polluting passenger vehicles through a Voluntary Accelerated Vehicle Retirement Program (VAVR), which is a car scrappage or old vehicle buy-back program that encourages the accelerated removal of higher-polluting vehicles that have passed their biennial Smog Check Test inspection, to be replaced with newer, cleaner vehicles or alternative transportation options.

c) Consumer Assistance Program

California's voluntary vehicle retirement program, the Consumer Assistance Program (CAP), is administered by BAR and provides low-income consumers repair assistance including up to $1,200 in emissions-related repairs if their vehicle fails its biennial Smog Check Test inspection, and/or up to $1,500 per vehicle for retiring operational vehicles at BAR-contracted dismantler sites.

B. Medium- and Heavy-Duty On-Road Trucks

Due to the benefits of CARB's longstanding heavy-duty mobile source program, heavy-duty on-road vehicle emissions in Ventura County have been reduced significantly since 1990 and will continue to decrease through 2026. From today, medium- and heavy-duty NOx emissions are projected to decrease by over 61 percent in 2026. Key programs contributing to those reductions include new heavy-duty engine standards, cleaner diesel fuel requirements, California's Truck and Bus Regulation and incentive programs.

1. Heavy-Duty Engine Standards

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 were allowed to certify to three optional NOx emission standards of 0.1g/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, and to encourage the development of cleaner engines.

2. Optional Low-NOx Standards for Heavy-Duty Diesel Engines

In 2013, California 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 federally required standard. The

optional low-NOx standards were developed to pave the way for more stringent mandatory standards by encouraging manufacturers to develop and certify low-NOx engines, and incentivizing potential customers to purchase these low-NOx engines. By 2019, a total of fifteen engines families, some using natural gas and others using liquefied petroleum gas, had been certified to the optional low-NOx standards.

3. Heavy-Duty Engine and Vehicle Omnibus Regulation

In 2021, CARB comprehensively overhauled how NOx emissions from new heavy-duty engines are regulated in California through the adoption of the Heavy-Duty Engine and Vehicle Omnibus Regulation which reduces NOx emissions from the engines in medium- and heavy-duty vehicle classes. The Omnibus Regulation includes NOx certification emission standards and in-use standards that significantly reduce tailpipe NOx emissions during most vehicle operating modes such as high-speed steady-state, transient, low load urban driving, and idling modes of operation. Additionally, revisions to the emissions warranty, useful life, emissions warranty and reporting information and corrective action procedures, and durability demonstration procedures provide additional emission benefits by encouraging more timely repairs to emission-related malfunctions and encouraging manufacturers to produce more durable emission control components, thereby reducing the rate at which engine emission controls fail and emissions increase.

4. Cleaner In-Use Heavy-Duty Trucks (Truck and Bus Regulation)

California's Truck and Bus Regulation or In-Use Heavy-Duty Truck Rule was first adopted in December 2008. This rule represents a multi-year effort to turn over the legacy fleet of heavy-duty on-road engines and replace them with the cleanest technology available. In December 2010, CARB revised specific provisions of the In-Use Heavy-duty Truck Rule, in recognition of the deep economic effects of the recession on businesses and the corresponding decline in emissions.

Starting in 2012, the Truck and Bus Regulation phases in requirements applicable to an increasingly larger percentage of California's truck and bus fleet over time, so that by 2023 nearly all older vehicles will be upgraded to have exhaust emissions meeting 2010 model year engine emissions levels. The regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds that are privately or federally owned, including on-road and off-road agricultural yard goat trucks, and privately and publicly owned school buses. Moreover, the regulation applies to any person, business, school district, or federal government agency that owns, operates, leases or rents affected vehicles. The regulation also establishes requirements for any in-State or out-of-state motor carrier, California-based broker, or any California resident who directs or dispatches vehicles subject to the regulation. Finally, California sellers of a vehicle subject to the regulation would have to disclose the regulation's potential applicability to buyers of the vehicles. Approximately 170,000

businesses in nearly all industry sectors in California, and almost a million vehicles that operate on California roads each year are affected. Some common industry sectors that operate vehicles subject to the regulation include: for-hire transportation, construction, manufacturing, retail and wholesale trade, vehicle leasing and rental, bus lines, and agriculture.

In 2017, California passed legislation ensuring compliance with the Truck and Bus Regulation through the California Department of Motor Vehicles (DMV) vehicle registration program. Starting January 1, 2020, DMV verifies compliance to ensure that vehicles subject to the Truck and Bus Regulation meet the requirements prior to obtaining DMV vehicle registration. The law requires the DMV to deny registration for any vehicle that is non-compliant or has not reported to CARB as compliant or exempt from the Truck and Bus Regulation.

CARB compliance assistance and outreach activities that are key in support of the Truck and Bus Regulation include:

- The Truck Regulations Upload and Compliance Reporting System (TRUCRS), an online reporting tool developed and maintained by CARB staff;
- The Truck and Bus regulation's fleet calculator, a tool designed to assist fleet owners in evaluating various compliance strategies;
- Targeted training sessions all over the State; and
- Out-of-state training sessions conducted by a contractor.

CARB staff also develops regulatory assistance tools, conducts and coordinates compliance assistance and outreach activities, administers incentive programs, and actively enforces the entire suite of regulations. Accordingly, CARB's approach to ensuring compliance is based on a comprehensive outreach and education effort.

5. Heavy-Duty Inspection and Maintenance Regulation

To ensure heavy-duty trucks remain clean in-use, CARB adopted in 2021 the Heavy-Duty Inspection and Maintenance Regulation, which requires periodic demonstrations 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 repaired in a timely fashion.

6. Heavy-Duty On-Board Diagnostics (HD OBD)

OBD systems serve an important role in helping to ensure that engines and vehicles maintain low emissions throughout their full life. OBD systems monitor virtually all emission controls on gasoline and diesel engines, including catalysts, particulate matter (PM) filters, exhaust gas recirculation systems, oxygen sensors, evaporative systems, fuel systems, and electronic powertrain components as well as other components and systems that can affect emissions when malfunctioning. The systems also provide specific diagnostic information in a standardized format through a standardized serial data link on-board the vehicles. The use and

operation of OBD systems ensure reductions of in-use motor vehicle and motor vehicle engine emissions through improvements in emission system durability and performance.

The Board originally adopted comprehensive Heavy-Duty OBD regulations in 2005 for model year 2010 and subsequent heavy-duty engines and vehicles, referred to as HD OBD. In 2009, the Board updated the HD OBD regulation, adopted specific enforcement requirements, and aligned the HD OBD with OBD requirements for medium-duty vehicles. In 2021, the Board again amended the HD OBD regulation; the 2021 amendments require manufacturers to implement Unified Diagnostic Services for OBD communications, which will provide more information related to emissions-related malfunctions that are detected by OBD systems, improve the usefulness of the generic scan tool to repair vehicles, and provide needed information on in-use monitoring performance.

7. Clean Diesel Fuel

Since 1993, CARB has required that diesel fuel have a limit on the aromatic hydrocarbon content and sulfur content of the fuel. Diesel powered vehicles account for a disproportionate amount of diesel particulate matter, which is considered a toxic air contaminant in California. In 2006, CARB required a low-sulfur diesel fuel to be used not only by on-road diesel vehicles but also for off-road engines. The diesel fuel regulation allows alternative diesel formulations as long as emission reductions are equivalent to the CARB formulation.

8. Advanced Clean Truck Regulation (ACT)

In June 2020, CARB adopted the Advanced Clean Trucks 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. The Advanced Clean Trucks regulation is a manufacturers ZEV sales requirement and a one-time reporting requirement for large entities and fleets. This regulation is expected to result in roughly 100,000 heavy-duty ZEVs operating on California's roads by 2030 and nearly 300,000 heavy-duty ZEVs by 2035. With the adoption of the Advanced Clean Trucks regulation, CARB Resolution 20-19 directs staff to return to the Board with a zero-emission fleet rule and sets the following targets for transitioning California's heavy-duty vehicle sectors to ZEVs:

- 100 percent zero-emission drayage, last mile delivery, and government fleets by 2035;
- 100 percent zero-emission refuse trucks and local buses by 2040;
- 100 percent zero-emission-capable vehicles in utility fleets by 2040; and
- 100 percent zero-emission everywhere else, where feasible, by 2045.

As mentioned earlier, the Governor signed Executive Order N-79-20 in September 2020, which directs CARB to adopt regulations to transition the State's transportation fleet to ZEVs. This includes transitioning the State's drayage fleet to ZEVs by 2035 and transitioning the State's truck and bus fleet to ZEVs by 2045 where feasible.

9. Innovative Clean Transit (ICT) and Zero-Emission Airport Shuttle Regulation

To achieve the needed emission reductions from heavy-duty applications, CARB is driving the use of zero-emission heavy-duty vehicles in strategic applications, including urban transit buses and airport ground transportation. The Innovative Clean Transit regulation was the first of these programs. It was adopted in December 2018 and requires all public transit agencies to gradually transition to a 100 percent zero-emission bus fleet and encourages them to provide innovative first- and last-mile connectivity and improved mobility for transit riders. Beginning in 2029, 100 percent of new purchases by transit agencies must be Zero Emission Buses, with a goal for full transition by 2040. It applies to all transit agencies that own, operate, or lease buses in California with a GVWR greater than 14,000 lbs. It includes standard, articulated, over-the-road, double-decker, and cutaway buses.

The Zero-Emission Airport Shuttle Regulation, adopted in June 2019, requires airport shuttle operators in California to transition to 100 percent ZEV technologies. Airport shuttle operators must begin adding zero-emission shuttles to their fleets in 2027, and complete the transition to ZEVs by the end of 2035. The regulation applies to airport shuttle operators who own, operate, or lease vehicles at any of the 13 California airports regulated under this rule.

10. Incentive Programs

There are many different incentive programs focusing on heavy-duty vehicles that accelerate turnover to cleaner technologies, and thereby produce extra emission reductions beyond traditional regulations. Several State and local incentive funding pools have been used historically -- and remain available -- to fund the accelerated turnover of on-road heavy-duty vehicles.

a) Low Carbon Transportation Investments and Air Quality Improvement Program (Clean Transportation Incentives)

In addition to funding passenger vehicle incentive programs, the Low Carbon Transportation Investments and the Air Quality Improvement Program (Clean Transportation Incentives) also provides incentive funding for heavy-duty vehicles. This program both funds projects to accelerate fleet and engine turnover to cleaner existing technologies through the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) and Truck Loan Assistance program, as well as funding demonstration and pilot projects.

Beyond the vehicle purchasing incentives programs (CVRP and Clean Cars 4 All) and Clean Transportation Equity Investments, an additional $873 million was allocated in the FY 2020-2021 budget for on-road heavy-duty trucks and off-road equipment. CARB provides these incentive funds following the principles of the portfolio approach, meaning that funding is provided across multiple sectors and applications – as well as across multiple technologies to support both the technologies that are providing emission reductions today, as well as those that are needed to meet future goals as the technology matures. This includes funding for

demonstration and pilot projects, vouchers for advanced clean technologies, and financing and support for small fleets transitioning to cleaner technologies. Additionally, this year funding was set aside specifically for drayage trucks, transit buses, and school buses, all of which are primed to rapidly transition to zero-emission.

i. Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)

CARB's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) serves as the cornerstone program in CARB's advanced technology heavy-duty incentive portfolio. HVIP has provided funding since 2010 to support the long-term transition to cleaner combustion and zero-emission vehicles in the heavy-duty market. The program helps offset the higher costs of clean vehicles, and additional incentives are available for providing disadvantaged community benefits. HVIP responds to a key market challenge by making clean vehicles more affordable for fleets through point-of-purchase price reductions. With an HVIP voucher, technology-leading vehicles can be as affordable as their traditional fossil-fueled counterparts, enabling fleets of all sizes to deploy advanced technologies that are cleaner and quieter. HVIP is the earliest model in the United States to demonstrate the function, flexibility, and effectiveness of first-come first-served incentives that reduce the incremental cost of commercial vehicles. HVIP is fleet-focused, providing a streamlined and user-friendly option to encourage purchases and leases of advanced clean trucks and buses throughout California. Approved dealers are a key part of HVIP success and are trained to facilitate the application process**.** Vocations include freight and drayage trucks, delivery vans, utility vehicles, transit, school, and shuttle buses, refuse trucks, and more. In FY 2021-22, the Legislature allocated $569.5 million for HVIP.

ii. Truck Loan Assistance Program

CARB's Truck Loan Assistance Program was created through a one-time appropriation of approximately $35 million in the 2008 State Budget to implement a heavy-duty loan program that assists on-road fleets affected by the Truck and Bus Regulation and the Heavy-Duty Tractor-Trailer Greenhouse Gas Regulation. CARB has continued to operate this program with subsequently appropriated AQIP funds of around $28 million annually to provide financing opportunities to small-business truckers who don't meet conventional lending criteria and are unable to qualify for traditional financing for cleaner trucks. As of February 2022, about $187 million in Truck Loan Assistance Program funding has been provided to small business truckers for the purchase of approximately 36,000 cleaner trucks, exhaust retrofits, and trailers. In FY 2021-22, $28.6 million was allocated for the Truck Loan Assistance Program.

iii. Demonstration and Pilot projects

In addition to funding HVIP and the Truck Loan Assistance Program, the Clean Transportation Incentives program is the only program in CARB's portfolio, and one of the only programs in the State, that funds demonstration and pilot projects to support early market deployment of nascent zero-emission technologies. The purpose of the Advanced Technology Demonstration and Pilot Projects is to help accelerate the next generation of advanced technology vehicles,

equipment, or emission controls, which are not yet commercialized. As such, it provides a testing ground for innovative projects focused on improving access to clean transportation for priority communities. In FY 2021-22, $80 million was allocated for heavy-duty advanced technology demonstration and pilot projects, which are intended to help bring to market-readiness zero emission (ZE) heavy-duty technologies that are poised to deploy commercially in the near future in both on- and off-road applications. This includes zero-emission long-haul trucks, strategic truck range extenders, and ZE applications along freight facilities/corridors.

In heavy-duty applications, the goods movement sector is a focus for incentive funding, with CARB funding multiple demonstration and pilot programs to drive zero-emission technologies in last mile delivery trucks, drayage trucks, and heavy-duty trucks and tractors. The *USPS Zero-Emission Delivery Truck Pilot Commercial Deployment Project* is deploying battery electric last-mile delivery trucks in the USPS fleet, together with the associated charging infrastructure. The project will demonstrate the practicality and economic viability of the widespread adoption of a variety of ZE medium- and heavy-duty vehicle technologies in delivery applications. The *Battery Electric Drayage Truck Demonstration* project is a $40 million Statewide demonstration of forty-four zero-emission battery electric and plug-in hybrid drayage trucks that, since 2018, have been in operation serving major California ports in five air districts (South Coast, Bay Area, San Joaquin Valley, Sacramento, and San Diego). Battery electric drayage trucks are used to transport cargo to or from California's ports and intermodal rail yards. Installation of charging infrastructure that enables safe charging of the trucks for statewide demonstration is also included as part of this project. To accelerate the deployment of zero-emission technologies in heavier freight applications, the $44.8 million *Volvo Low Impact Green Heavy Transportation Solutions* project is funding Class 8 heavy-duty battery electric trucks equipped with battery electric tractors to facilitate creation of a zero-emission goods movement system from the Ports of Long Beach and Los Angeles to four freight handling facilities in disadvantaged communities.

Clean transportation incentives have also funded demonstration and pilot projects for ZE urban transit buses. The $22.3 million *Fuel Cell Electric Bus Commercialization Consortium* in the Bay Area and Southern California is funding battery and fuel cell urban transit buses, which will better serve communities' transit needs, substantially reduce greenhouse gas emissions, eliminate criteria pollutants, and provide economic benefits.

iv. Clean Transportation Equity Investments

As mentioned earlier, Clean Mobility in Schools Projects are also encouraging and accelerating the deployment of new zero-emission heavy-duty engines and vehicles, including battery electric school buses and clean school fleet vehicles.

b) Moyer Program

In addition to funding passenger vehicle incentive programs, the Moyer Program provides monetary grants to private companies and public agencies to clean up their heavy-duty engines beyond that required by law through retrofitting, repowering or replacing their engines with

newer and cleaner ones. These grants are issued locally by air districts. Projects that reduce emissions from heavy-duty on-road engines qualify, including heavy-duty trucks, drayage trucks, emergency vehicles, public agency and utility vehicles, school buses, solid waste collection vehicles, and transit fleet vehicles.

As the regulatory, technological and incentives landscape has changed significantly since the creation of the Moyer Program and to address evolving needs, the Legislature has periodically modified the program to better serve California. Most recently, Senate Bill (SB) 513 (Beall, 2015) has provided new opportunities for the Moyer Program to contribute significant emission reductions alongside implemented regulations, advance zero and near-zero technologies, and combine program funds with those of other incentive programs.

In the FY 2021-22 budget, the Legislature appropriated an additional $45 million in Moyer Program funding to support the replacement of diesel trucks with ultra-low NOx trucks certified to meet the 0.02 g/bhp-hr NOx standard or lower. Currently, only the South Coast Air Quality Management District and the San Joaquin Valley Air Pollution Control District would be eligible for these funds. In November 2021, the Board approved increases to the Moyer Program cost-effectiveness limits and funding caps for optional advanced technology and zero-emission replacement projects for on-road heavy-duty trucks. Increasing the cost-effectiveness thresholds is designed to increase funding opportunities, and ensures that the Moyer Program continues to focus on developing the most advanced zero-emission and low emission technologies, consistent with encouraging further emissions reductions. These changes included increasing the threshold for on-road zero-emission vehicles, which includes zero-emission school buses, from $100,000 to $500,000 per unit.

The Moyer Program also funds CARB's On-Road Heavy-Duty Voucher Incentive Program (VIP), which provides funding opportunities for small fleet owners with 10 or fewer vehicles to quickly replace their older heavy-duty diesel or alternative fuel vehicles. Under this program, fleet owners may be eligible for funding of up to $410,000 for replacing their existing vehicle(s) to be scrapped and replaced by new trucks (zero-emission or certified to the optional 0.02 g/bhp-hr NOx standard), or up to $50,000 for replacing their existing fleet with used vehicles with 2013 model year or later engines. Air districts have the discretion to set certain local eligibility requirements based upon local priorities.

c) Goods Movement Emission Reduction Program (Prop 1B)

The Prop 1B Program was created to reduce exposure for populations living near freight corridors and facilities that were being adversely impacted by emissions from goods movement. This program provided incentives to owners of equipment used in freight movement to upgrade to cleaner technologies sooner than required by law or regulation. Voters approved $1 billion in total funding for the air quality element of the Prop 1B Program to complement $2 billion in freight infrastructure funding under the same ballot initiative.

Beginning in 2008, the Goods Movement Emission Reduction Program funded by Prop 1B has funded cleaner trucks for the region's transportation corridors; the final increment of funds implemented projects through 2020. The $1 billion program was a partnership between CARB and local agencies, air districts, and seaports to quickly reduce air pollution emissions and health risk from freight movement along California's trade corridors. While all Prop 1B Program funds have been awarded to the local air districts for implementation, the program framework exists to serve as a mechanism to award clean truck funds through newer funding programs.

d) Volkswagen (VW) Mitigation Trust

In 2015, after a CARB-led investigation, in concert with the United States Environmental Protection Agency (U.S. EPA), VW admitted to deliberately installing emission defeat devices on nearly 600,000 VW, Audi, and Porsche diesel vehicles sold in the United States, approximately 85,000 of which were sold in California. The VW California settlement agreement includes both a Mitigation Trust to mitigate the excess NOx emissions caused by the company's use of illegal defeat devices in their vehicles, as well as a ZEV Investment Commitment to help grow the State's expanding ZEV program. The Mitigation Trust includes approximately $423 million for California to be used as specified in the settlement agreement. Per the Beneficiary Mitigation Plan approved by CARB in 2018, this funding will be used to replace older heavy-duty trucks, buses, and freight vehicles and equipment with cleaner models, with a focus on zero-emission technologies where available and cleaner combustion everywhere else, as well as to fund light-duty ZEV infrastructure. In addition, there have been mitigation funds established as the result of other settlements from which funding is used to support clean technologies.

e) Community Air Protection Incentives (AB 617 | Community Air Protection Program)

Since the 2016 State SIP Strategy elucidated the need for additional legislative assistance in funding turnover programs to accelerate the deployment and adoption of cleaner technologies, the Legislature has since 2017 established a number of new incentive programs that are implemented through CARB through various budget bills. The State Legislature has provided substantial funding to achieve early emissions reductions in the communities most impacted by air pollution. In its 2018 funding allocation, the Legislature expanded the possible uses of AB 617 funds to include Moyer and Proposition 1B eligible projects with a priority on zero-emission projects, zero-emission charging infrastructure, stationary source projects, and additional projects consistent with the CERPs.

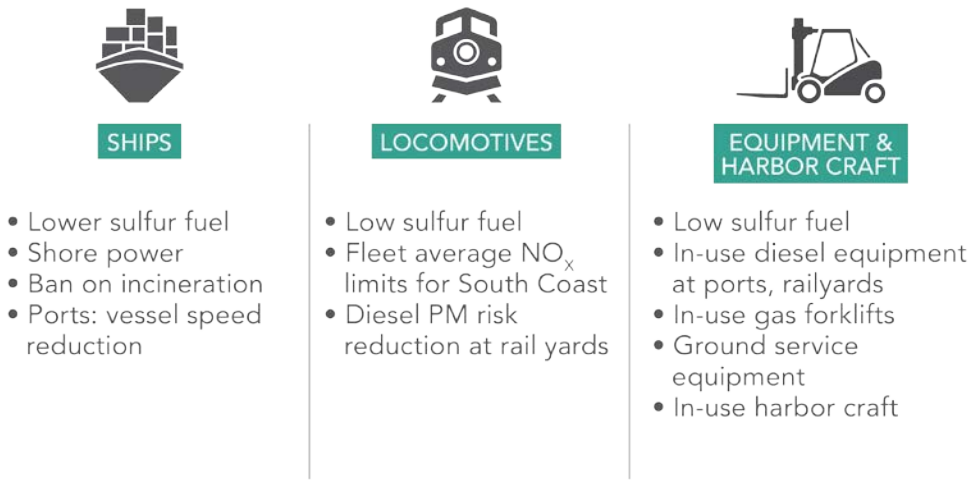
CARB and air districts partner to run the programs, with CARB developing guidelines and the districts administering funds for their regions. In most cases throughout the State, selected communities have identified mobile source emissions as a target for reductions. It is likely that a significant portion of the AB 617-allocated funding will incentivize the accelerated turnover to cleaner vehicles and equipment in and around low-income and disadvantaged communities.

C. Off-Road Sources

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 C-2 illustrates the comprehensive suite of emission control measures applicable to the broad variety of engines and vehicle that fall under the Off-Road category. As a result of these emission control efforts, off-road emissions in Ventura County have been reduced significantly since 1990 and will continue to decrease through 2026. From today, NOx emissions from off-road sources that are not primarily regulated Federally are reduced by over 24 percent by 2026. Key programs in this sector include the Off-Road Engine Standards, Locomotive Engine Standards, Clean Diesel Fuel, Cleaner In-Use Off-Road Regulation and In-Use Large Spark Ignition (LSI) Fleet Regulation.

Figure C-2: Off-Road Vehicle and Equipment Control Programs



1. Off-Road Engine Standards

The Clean Air Act preempts states, including California, from adopting requirements for new off-road engines less than 175 HP used in farm or construction equipment. California may adopt emission standards for in-use off-road engines pursuant to Section 209(e)(2), but must receive authorization from U.S. EPA before it may enforce the adopted standards.

CARB first approved regulations to control exhaust emissions from small off-road engines (SORE) such as lawn and garden equipment in December 1990 with amendments in 1998, 2003, 2010, 2011, 2016, and 2021. The 1990 - 2016 regulations were implemented through three tiers of progressively more stringent exhaust emission standards that were phased in between

1995 and 2008. The most recent suite of amendments (December 2021) requires most newly manufactured SORE engines be zero emission starting in 2024.

Manufacturers of forklift engines are subject to new engine standards for both diesel and Large Spark Ignition (LSI) engines. Off-road diesel engines were first subject to engine standards and durability requirements in 1996 while the most recent Tier 4 Final emission standards were phased in starting in 2013. Tier 4 emission standards are based on the use of advanced after-treatment technologies such as diesel particulate filters and selective catalytic reduction. LSI engines have been subject to new engine standards that include both criteria pollutant and durability requirements since 2001 with the cleanest requirements phased-in starting in 2010.

To control emissions from Transport Refrigeration Units (TRUs), CARB adopted in 2004 the Airborne Toxic Control Measure (ATCM) for In-Use Diesel-Fueled TRUs, TRU Generator Sets, and Facilities where TRUs Operate, which set increasingly stringent engine standards to reduce diesel particulate matter emissions from TRUs and TRU generator sets. The ATCM for TRUs was subsequently amended in 2010 and 2011, and most recently in February 2022, as the first phase of CARB's current push to develop new requirements to transition diesel-powered TRUs to zero-emission technology in two phases. The February 2022 adoption, Part 1 amendments to the existing TRU Airborne Toxic Control Measure (ATCM), requires the transition of diesel-powered truck TRUs to zero-emission. 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.

2. Cleaner In-Use Off-Road Equipment (Off-Road Regulation)

The Off-Road Regulation was first approved in 2007 and subsequently amended in 2010 in light of the impacts of the economic recession. Equipment affected by this regulation are used in construction, manufacturing, the rental industry, road maintenance, airport ground support and landscaping. In December 2011, the Off-Road Regulation was modified to include on-road trucks with two diesel engines.

The Off-Road Regulation will significantly reduce emissions of diesel PM and NOx from the over 150,000 in-use off-road diesel vehicles that operate in California. The Regulation affects dozens of vehicle types used in thousands of fleets by requiring owners to modernize their fleets by replacing older engines or vehicles with newer, cleaner models, retiring older vehicles or using them less often, or by applying retrofit exhaust controls.

The Off-Road Regulation imposes idling limits on off-road diesel vehicles, requires a written idling policy, and requires a disclosure when selling vehicles. The Regulation also requires that all vehicles be reported to CARB and labeled, restricts the addition of older vehicles into fleets, and requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing verified exhaust retrofits. The requirements and compliance dates of the Off-Road Regulation vary by fleet size.

Fleets are subject to increasingly stringent restrictions on adding older vehicles. The regulation also sets performance requirements. While the regulation has many specific provisions, in general by each compliance deadline, a fleet must demonstrate that it has either met the fleet average target for that year, or has completed the Best Available Control Technology requirements. The performance requirements of the Off-Road Regulation were phased in from January 1, 2014 through January 1, 2019.

Compliance assistance and outreach activities in support of the Off-Road Regulation include:

- The Diesel Off-road On-line Reporting System, an online reporting tool developed and maintained by CARB staff;
- The Diesel Hotline (866-6DIESEL), which provides the regulated public with questions about the regulations and access to CARB staff. Staff is able to respond to questions in English, Spanish and Punjabi; and
- The Off-road Listserv, providing equipment owners and dealerships with timely announcement of regulatory changes, regulatory assistance documents, and reminders for deadlines.

3. Clean Diesel Fuel

Since 1993, CARB has required that diesel fuel have a limit on the aromatic hydrocarbon content and sulfur content of the fuel. Diesel powered vehicles account for a disproportionate amount of the diesel particulate matter which is considered a toxic air contaminant by the State of California. In 2006, CARB required a low-sulfur diesel fuel to be used not only by on-road diesel vehicles but also for off-road engines. The diesel fuel regulation allows alternative diesel formulations as long as emission reductions are equivalent to the CARB formulation.

4. Locomotive Engine Standards

The Clean Air Act and the U.S. EPA national locomotive regulations expressly preempt states and local governments from adopting or enforcing “any standard or other requirement relating to the control of emissions from new locomotives and new engines used in locomotives” (U.S. EPA interpreted new engines in locomotives to mean remanufactured engines, as well). U.S. EPA has approved two sets of national locomotive emission regulations (1998 and 2008). In 1998, U.S. EPA approved the initial set of national locomotive emission regulations. These regulations primarily emphasized NOx reductions through Tier 0, 1, and 2 emission standards. Tier 2 NOx emission standards reduced older uncontrolled locomotive NOx emissions by up to 60 percent, from 13.2 to 5.5 g/bhphr.

In 2008, U.S. EPA approved a second set of national locomotive regulations. Older locomotives upon remanufacture are required to meet more stringent particulate matter (PM) emission standards which are about 50 percent cleaner than Tier 0-2 PM emission standards. U.S. EPA

refers to the PM locomotive remanufacture emission standards as Tier 0+, Tier 1+, and Tier 2+. The new Tier 3 PM emission standard (0.1 g/bhphr), for model years 2012-2014, is the same as the Tier 2+ remanufacture PM emission standard. The 2008 regulations also included new Tier 4 (2015 and later model years) locomotive NOx and PM emission standards. The U.S. EPA Tier 4 NOx and PM emission standards further reduced emissions by approximately 95 percent from uncontrolled levels.

In April 2017, CARB petitioned U.S. EPA for rulemaking, seeking the amendment of emission standards for newly built locomotives and locomotive engines and lower emission standards for remanufactured locomotives and locomotive engines. The petition asks U.S. EPA to update its standards to take effect for remanufactured locomotives in 2023 and for newly built locomotives in 2025. The new emission standards would provide critical criteria pollutant reductions, particularly in the disadvantaged communities that surround railyards. U.S. EPA has not yet responded to this petition.

5. Marine Sources and Ocean-Going Vessels (OGVs)

To reduce emissions from Ocean Going Vessels (OGV), CARB has adopted the Ocean-Going Vessel Fuel Regulation, "Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline" (2008) and the Ocean-Going Vessels At Berth Regulation (2007).

The At-Berth Regulation requires container ships, passenger ships, and refrigerated-cargo ships at six California ports to meet compliance requirements for auxiliary engines while they are docked, including emission or power reduction requirements. Reduced vessel speeds also provide emission reduction benefits, and programs are operated by local air districts along the California coast to incentivize lower speeds. CARB staff received comments during the public process about including a statewide vessel speed reduction program. In the 2022 State SIP Strategy, the CARB measure for 'Future Emissions Reductions from Ocean-Going Vessels' considers options available under CARB authority to achieve further emissions reductions, including developing a statewide vessel speed reduction program.

In 2007, CARB adopted the Commercial Harbor Craft Regulation (CHC Regulation), which reduces toxic and criteria emissions. Commercial harbor craft include any private, commercial, government, or military marine vessels including, but not limited to ferries, excursion vessels, tugboats (including ocean-going tugboats), barges, and commercial and commercial passenger fishing boats. This regulation was subsequently amended in 2010, and again in March 2022, to establish expanded and more stringent in-use requirements to cover more vessel categories and mandate accelerated deployment of zero-emission and advanced technologies in vessel categories where technology feasibility has been demonstrated.

To control emissions from personal watercraft, CARB staff is also exploring development of Spark-Ignition Marine Engine Standards, as described in the 2022 State SIP Strategy. For this measure, CARB would develop and propose catalyst-based standards for outboard and personal

watercraft engines greater than or equal to 40 kW in power that will gradually reduce emission standards to approximately 70 percent below current levels, and consider actions that would require a percentage of outboard and personal watercraft vessels to be propelled by zero-emission technologies for certain applications.

6. Large Spark-Ignition (LSI) Engines and Forklifts

Forklift fleets are subject to in-use fleet requirements either under the LSI fleet regulation, if fueled by gasoline or propane, or under the off-road diesel fleet regulation, if fueled by diesel. Both regulations require fleets to retire, repower, or replace higher-emitting equipment in order to maintain fleet average standards.

Large spark-ignition engines, which are defined as spark-ignition (i.e., Otto-cycle) engines greater than 25 horsepower, are used in a variety of equipment, including, but not limited to, forklifts, airport ground support equipment (GSE), sweeper/scrubbers, industrial tow tractors, generator sets, and irrigation pumps. LSI equipment is found in approximately 2,000 fleets throughout the state operating at warehouses and distribution centers, seaports, airports, railyards, manufacturing plants, and many other commercial and industrial facilities.

CARB first adopted emission standards for off-road LSI engines in 1998. The original LSI regulation required engine manufacturers to certify new LSI engines to a 3.0 gram per brake horsepower-hour (g/bhp-hr) standard that, by 2004, represented a 75 percent reduction in emissions compared with uncontrolled LSI. Building on this success, in 2002, U.S. EPA subsequently harmonized the national standard with California's standard, starting with the 2004 model year and adopted a more stringent 2.0 g/bhp-hr standard for 2007 and subsequent model year engines. The federal program demonstrated that additional reductions from new engines were technically feasible and cost-effective. In the 2003 State Implementation Plan for Ozone (2003 SIP), California committed to two additional LSI measures—one for the development of more stringent new engine standards and another for the development of in-use fleet requirements.

CARB adopted these two LSI measures in a 2006 rulemaking, which harmonized California's standard with U.S. EPA's 2.0 g/bhp-hr standard starting with the 2007 model year, set forth a more stringent 0.6 g/bhp-hr California standard starting with the 2010 model year, and established in-use LSI fleet requirements. The 0.6 g/bhp-hr standard represents a 95 percent emission reduction versus uncontrolled LSI engines and is still in effect today.

The in-use element of the 2006 rulemaking, adopted as the Large Spark-Ignition Engine Fleet Requirements Regulation (LSI Fleet Regulation), which was eventually amended in 2010 and 2016, requires fleet operators with four or more LSI forklifts to meet fleet average emission standards. The 2006 LSI rulemaking and 2010 amendments required specific hydrocarbon + NOx fleet average emission level standards that became increasingly more stringent over time. The focus of the 2016 amendments was to collect data from fleet operators in order to inform

the development of requirements that would support the broad-scale deployment of Zero-Emission equipment in LSI applications. The 2016 amendments also required fleet operators to report key compliance information to CARB, and extended to 2023 requirements from the prior LSI Fleet Regulations that were otherwise due to sunset in 2016.

7. Cargo Handling Equipment (CHE)

Cargo handling equipment (CHE) include yard trucks (hostlers), rubber-tired gantry cranes, container handlers, forklifts, dozers, and other types. The Cargo Handling Equipment (CHE) Regulation established requirements for in-use and newly purchased diesel-powered equipment at ports and intermodal rail yards. CARB adopted the CHE in 2005, which established best available control technology (BACT) for new and in-use mobile CHE that operate at California's ports and intermodal rail yards through accelerated turnover of older equipment through retrofits and/or replacement to cleaner on- or off-road engines. Since 2006, the CHE Regulation has resulted in reductions of diesel PM and NOx at ports and intermodal rail yards throughout California.

8. Incentive Programs

There are many different incentive programs focusing on off-road mobile sources that increase the penetration of cleaner technologies into the market. The incentive programs encourage the purchase of cleaner off-road combustion engines and equipment, and zero-emission technologies. CARB is expanding incentives for zero-emission off-road equipment through targeted demonstration and pilot project categories in the off-road sector, and increased funding.

a) Low Carbon Transportation Investments and Air Quality Improvement Program (Clean Transportation Incentives)

As mentioned earlier, $873 million was allocated in the FY 2020-2021 budget for off-road equipment and on-road heavy-duty trucks under the Clean Transportation Incentives programs. In the off-road sector, major programs include the Clean Off-Road Equipment Voucher Incentive Project (CORE), and Demonstration and Pilot Programs. Off-road equipment categories that are prioritized for funding include agricultural and construction equipment, small off-road engines (SORE) such as lawn and garden equipment, heavier cargo handling equipment (CHE), and ZE applications at railyards, marine ports, freight facilities, and along freight corridors.

i. Clean Off-Road Equipment Voucher Incentive Project

The Clean Off-Road Equipment Voucher Incentive Project (CORE) is a voucher project similar to HVIP, but for advanced technology off-road equipment. CORE is intended to accelerate deployment of advanced technology in the off-road sector by providing a streamlined way for fleets to access funding that helps offset the incremental cost of such technology. CORE targets commercial-ready products that have not yet achieved a significant market foothold. By promoting the purchase of clean technology over internal combustion options, the project is

expected to reduce emissions, particularly in areas that are most impacted, help build confidence in zero-emission technology in support of CARB strategies and subsequent regulatory efforts where possible, and provide other sector-wide benefits, such as technology transferability, reductions in advanced-technology component costs, and larger infrastructure investments. CORE provides vouchers to California purchasers and lessees of zero-emission off-road equipment on a first-come, first-served basis, with increased incentives for equipment located in disadvantaged communities.

CARB launched CORE at the end of 2019 through a one-time $40 million allocation in the fiscal year 2017-18 Funding Plan to support zero-emission freight equipment through CORE. Since that time, CORE has been allocated significant additional funds, including $194.95 million from the FY 2021-22 budget. This allocation includes $30 million of dedicated funds appropriated by the Legislature in SB 170 to provide incentives for professional landscaping services in California operated by small businesses or sole proprietors to purchase zero-emission small off-road equipment.

ii. Demonstration and Pilot Projects

As mentioned earlier, in FY 2021-22, $80 million was allocated for off-road and on-road heavy-duty advanced technology demonstration and pilot projects. CARB is focusing funding on off-road demonstration and pilot projects that include heavier cargo handling equipment (CHE), clean equipment in rail, marine, and ports applications, and zero-emission equipment along freight facilities/corridors.

For the *Port of LA Multi-Source Facility Demonstration Project*, the Los Angeles Harbor Department (Port of LA) was awarded $14.5 million to operate multiple near zero- or zero-emission technologies to move goods from ships through the Green Omni Terminal. This project is demonstrating the viability of electrified CHE, forklifts, and a ships at-berth vessel emissions control system. The *Zero-Emission Freight "Shore to Store"* Project will use $41.1 million to fund electric yard tractors, hydrogen fuel cell Class 8 on-road trucks, and a large capacity hydrogen fueling station in Ontario, CA. Additional zero- and near zero-emission freight facility projects include a $5.8 million *Zero-Emission for California Ports* project at the Port of LA, which will fund hybrid fuel cell and electric yard trucks, as well as hydrogen fueling stations. Further, the San Joaquin Valley's *Net-Zero Farming and Freight Facility Demonstration Project* is funding battery electric trucks equipped with all-electric transport refrigeration units (eTRUs) to facilitate clean freight transport, and transportation of agricultural produce between packing and warehouse facilities.

b) Funding Agricultural Replacement Measures for Emission Reductions (FARMER)

California's agricultural industry consists of approximately 77,500 farms and ranches, providing over 400 different commodities, making agriculture one of the State's most diverse industries. In recognition of the strong need and this industry's dedication to reducing their emissions, the

Legislature has allocated over $323 million towards the Funding Agricultural Replacement Measures for Emission Reductions (FARMER) Program since 2017. The program provides funding through local air districts for incentivizing the introduction of lower-emissions agricultural harvesting equipment, heavy-duty trucks, agricultural pump engines, tractors, and other equipment used in agricultural operations. Since October 2019, the FARMER Program also includes a project category for demonstration projects and modifications to the zero-emission agricultural utility terrain vehicle (UTV), heavy-duty agricultural truck, and off-road mobile agricultural equipment trade-up pilot project categories. As of September 30, 2021, the FARMER Program has spent $289.7 million on over 6,600 pieces of agricultural equipment and will reduce 1,120 tons of PM2.5 and 18,700 tons of NOx over the lifetime of the projects, Statewide.

c) Moyer Program

In addition to funding on-road incentives, the Moyer Program provides monetary grants to reduce emissions from off-road equipment such as construction and agricultural equipment, marine vessels and locomotives, forklifts, TRUs, and airport ground support equipment.

d) Goods Movement Emission Reduction Program (Prop 1B)

As discussed earlier, Proposition 1B was a $1 billion partnership between CARB and local agencies, air districts, and seaports to quickly reduce air pollution emissions and health risk from freight movement along California's trade corridors. Over the course of six years, the program has upgraded ships at-berth, cargo handling equipment, locomotives, TRUs, and harbor craft.

II. Conclusion

In conclusion, CARB has implemented the most comprehensive mobile source emissions control program in the nation. CARB's mobile source control program is robust and targets all sources of emissions through a four-pronged approach. First, increasingly stringent emissions standards drive the use of the cleanest available engines and equipment, and minimize emissions from new vehicles and equipment. Second, to speed the turnover of older, dirtier engines and equipment to cleaner new equipment, in-use programs target emissions from the existing fleet by requiring vehicle and fleet owners to transition legacy fleets and vehicles to the cleanest vehicles and emissions control technologies. Third, incentive programs help fleet owners to replace older, dirtier vehicles and equipment with the cleanest technologies, while also facilitating the development of the next generation of clean technologies that are needed to meet future air quality targets. Finally, cleaner fuels minimize emissions from all combustion engines being used across the State.

This multi-faceted approach has not only spurred the development and use of increasingly cleaner technologies and fuels, it has also provided significant emission reductions across all mobile source sectors that go far beyond national programs or programs in other states.

APPENDIX D

VENTURA COUNTY

STATIONARY SOURCE

REASONABLY AVAILABLE CONTROL MEASURE ASSESSMENT

Background

Federal Clean Air Act Sections 172(c)(1) and (c)(2) require the Ventura County Air Pollution Control District (District) to demonstrate that it has adopted all control measures necessary to attain the 2015 federal 8-hour ozone standard as expeditiously as practicable and to meet Reasonable Further Progress (RFP) requirements. Reasonably Available Control Measures (RACM) applies to stationary source control measures, transportation control measures, and mobile source control measures. Reasonably Available Control Technology, or RACT, is a subset of stationary source RACM.

A potential control measure is considered "reasonably available" and must be implemented if it would advance attainment by at least one year, either alone or in combination with other reasonably available control measures. This means the combined emission reductions from RACM must be sufficient to reduce the emission inventory projected for 2025 (or earlier) to the inventory currently projected for 2026, the attainment year, or lower. For the purpose of this analysis, estimated emission reductions are calculated for achievability by 2025 to advance this date. If such emission reductions can be demonstrated, the combined RACM measures must be implemented.

Stationary Source RACM

The District has been classified as a serious nonattainment area for all historical ozone National Ambient Air Quality Standards (NAAQS). The District has a mature and comprehensive set of prohibitory rules which are some of the strictest in the nation. The stringency and comprehensiveness of existing reactive organic gases (ROG) and nitrogen oxides (NOx) emission control requirements in the District significantly reduce the availability of new measures that could provide additional emission reductions sufficient to advance the attainment year.

The projected anthropogenic NOx and ROG emissions are 27.4 and 30.1 tons per day, respectively, in the attainment year 2026. The projected 2025 NOx and ROG emissions are 27.6 and 30.3 tons per day, respectively. Therefore, in order to be considered RACM, the combined control measures must reduce NOx emissions by 0.2 tons per day.

In addition, the actual and projected ROG emissions are stable at 31.3 ± 0.2 tons per day for nine years from 2018 through 2026. During this time the ozone design value is projected to decline by 7 ppb, apparently due to NOx emissions reductions. Therefore, at this stage in the attainment planning for Ventura County, it is unclear what level of anthropogenic ROG emission reductions would advance the attainment year.

2020 RACT State Implementation Plan (SIP)

The District approved its RACT SIP on June 9, 2020 and sent it to the California Air Resources Board (CARB) for submittal to the United States Environmental Protection Agency (EPA). CARB submitted the District's RACT SIP to EPA on July 28, 2020 and EPA has yet to take final action

to approve. The RACT SIP found that all applicable District rules that apply to ozone precursor emissions fulfill RACT requirements for the 8-hour ozone NAAQS.

However, RACT equivalency does not ensure that those rules meet RACM requirements. As presented by EPA on February 11, 2021, their *Reasonably Available Control Measure Demonstration for Ozone National Ambient Air Quality Standards* requires all rules and potential rules to be evaluated for RACM emission reductions.

RACM Evaluations

All District ROG and/or NOx prohibitory rules were evaluated for potential RACM emission reductions. Staff compared District rules to equivalent rules adopted or proposed as control measures by other air districts with higher or "worse" nonattainment classifications, namely the South Coast Air Quality Management District (SCAQMD) and the San Joaquin Valley Air Pollution Control District (SJVAPCD). Staff also reviewed equivalent rules from other air districts such as the Bay Area Air Quality Management District (BAAQMD). Table D-1 lists the District rules reviewed for the stationary source RACM requirement.

District staff also evaluated rules or proposed Control Measures from other air districts that apply to unregulated source categories in Ventura County. District staff conducted preliminary evaluations of the potential emission reductions, including the cost effectiveness and timing of the potential reductions. The identified source categories are shown in Table D-2.

A very conservative estimate of the total emission reductions achievable under RACM with new and amended District rules are as follows:

NOx: 0.013 tons per day

ROG: 0.436 tons per day

As noted above, in order to advance attainment by one year, emission reductions of at least 0.2 tons of NOx per day must be achieved. The potential RACM identified by the District could only achieve approximately one tenth of the required NOx reductions.

Since the ROG inventory remains stable for the eight years prior to the District's modeled attainment, it is unclear how much ROG emissions reductions would be required to advance the attainment date. However, District staff believes reducing ROG emissions less than 2% of the county's anthropogenic emissions inventory is insufficient to advance the attainment date. Such a reduction is well within the margin of error for the emissions inventory and the annual variability of emissions due to other factors.

Table D-1
District Rules Evaluated for RACM Determination

VCAPCD Rule	Rule Name	Other District Rule/CM Number(s)	Other District Rule(s) Stricter?	NOx Emission Reduction Potential (tons/day)	ROG Emission Reduction Potential (tons/day)
59	Electrical Power Generating Equipment - Oxides of Nitrogen Emissions	SC L-CMB-06 SJ 4306	Yes†	0	0
62.6	Ethylene Oxide - Sterilization and Aeration	SJ 7021 SC 1405	No	0	0
70	Storage and Transfer of Gasoline	SJ 4621 SC 462	Yes	0	0.020
71.1	Crude Oil Production and Separation	SJ 4623 SC 1178	No	0	0
71.2	Storage of Reactive Organic Compound Liquids	SJ 4623 SC 1178	Yes	0	0.045
71.3	Transfer of Organic Reactive Compound Liquids	SJ 4624 SC 462	No	0	0
71.4	Petroleum Sumps, Pits, Ponds, and Well Cellars	SJ 4402 SC 1176	No	0	0
71.5	Glycol Dehydrators	SJ 4408 SC 1148.1	No	0	0
74.2	Architectural Coatings	The rule is proposed as a contingency measure as discussed in Section 7.3 as part of Contingency Measure R-303-2022			
74.3	Paper, Fabric and Film Coating Operations	SJ 4607 SC 1128	Yes†	0	0
74.4	Cutback Asphalt	SJ 4641 SC 1108	Yes†	0	0
74.5.1	Petroleum Solvent Dry Cleaning	SJ 4672 SC 1102	Yes	0	0.012
74.5.2	Synthetic Solvent Dry Cleaning	SC 1102	Yes†	0	0
74.6	Surface Cleaning and Degreasing	SJ 4662 SJ 4663 SC 1122 SC 1171	No	0	0
74.6.1	Batch Loaded Vapor Degreasers	SJ 4662 SC 1122	No	0	0

Table D-1
District Rules Evaluated for RACM Determination

VCAPCD Rule	Rule Name	Other District Rule/CM Number(s)	Other District Rule(s) Stricter?	NOx Emission Reduction Potential (tons/day)	ROG Emission Reduction Potential (tons/day)
74.7	Fugitive Emissions of ROC at Petroleum Refineries and Chemical Plants (VOC)	SJ 4455 SC 1173	Yes†	0	0
74.8	Refinery Vacuum Producing Systems, Wastewater Separators, and Process Turnarounds	SJ 4453 SC 465	Yes†	0	0
74.9	Stationary Internal Combustion Engines	SJ 4702 SC 1110.2	Proposed as Control Measure		
74.10	Components at Crude Oil and Natural Gas Production and Processing Facilities	SJ 4409 SC 1173 SC FUG-01	Planned 2023 Amendment		
74.11	Natural Gas-Fired Water Heaters	SJ 4902 SC 1146.2 SC R-CMB-01	Yes†	0	0
74.11.1	Large Water Heaters and Small Boilers	SJ 4308 SC 1146.2 SC R-CMB-01	Yes	0.008	0
74.12	Surface Coating of Metal Parts and Products	SJ 4603 SC 1107 SC CTS-01	Yes†	0	0
74.13	Aerospace Assembly and Component Manufacturing Operations	SJ 4605 SC 1124	Yes	0	0.001*
74.14	Polyester Resin Material Operations	SJ 4684 SC 1162	Yes	0	0.02
74.15	Boilers, Steam Generators and Process Heaters (1 to 5 MMBTUs)	SJ 4320 SC 1146 SC C-CMB-01	Yes†	0	0
74.15.1	Boilers, Steam Generators and Process Heaters	SJ 4307 SC 1146.1	Yes	0.005	0
74.16	Oilfield Drilling Operations		N/A	0	0
74.17.1	Municipal Solid Waste Landfills	SJ 4642 SC 1150.1	No	0	0

Table D-1
District Rules Evaluated for RACM Determination

VCAPCD Rule	Rule Name	Other District Rule/CM Number(s)	Other District Rule(s) Stricter?	NOx Emission Reduction Potential (tons/day)	ROG Emission Reduction Potential (tons/day)
74.18	Motor Vehicle and Mobile Equipment Coating Operations	SC 1151 SC CTS-01	No	0	0
74.19	Graphic Arts	SJ 4607 SC 1130 SC 1171	No	0	0
74.19.1	Screen Printing Operations	SC 1130.1 SC 1171	Yes	0	0.022
74.20	Adhesives and Sealants	SJ 4653 SC 1168 SC CTS-01	No	0	0
74.21	Semiconductor Manufacturing	SC 1164 BA 8-30	No	0	0
74.22	Natural Gas-Fired, Fan-Type Central Furnaces	SJ 4905 SC 1111 SC R-CMB-02	Proposed as Control Measure		
74.23	Stationary Gas Turbines	SJ 4703 SC 1134 SC L-CMB-05	Yes†	0	0
74.24	Marine Coatings Operations	SC 1106	Yes	0	0.007
74.24.1	Pleasure Craft Coating and Commercial Boatyard Operations	SC 1106.1	No	0	0
74.25	Restaurant Cooking Operations	SC C-CMB-03	Yes†	0	0
74.26	Crude Oil Storage Tank Degassing	SC 1149	Yes	0	0.023
74.27	Gasoline and ROC Liquid Storage Tank Degassing Operations	SC 1149	Yes	0	0.001*
74.28	Asphalt Roofing Operations	MD 471	No	0	0
74.29	Soil Decontamination Operations	SJ 4651 SC 1166	Yes	0	0.12
74.30	Wood Products Coating	SJ 4606 SC 1136	No	0	0

Table D-1
District Rules Evaluated for RACM Determination

VCAPCD Rule	Rule Name	Other District Rule/CM Number(s)	Other District Rule(s) Stricter?	NOx Emission Reduction Potential (tons/day)	ROG Emission Reduction Potential (tons/day)
74.31	Metalworking Fluids and Direct Contact Lubricants	SC 1144	No	0	0
74.32	Organic Material Handling and Conversion	SC 1133.3	Proposed as Control Measure		
74.33	Liquified Petroleum Gas Transfer or Dispensing	SC 1177	No	0	0
74.34	NOx Reductions from Miscellaneous Sources	SJ 4309 SC 1147 SC L-CMB-01	Yes†	0	0

Notes:
SC = South Coast Air Quality Management District
SJV = San Joaquin Valley Air Pollution Control District
BA = Bay Area Air Quality Management District
MD = Mojave Desert Air Quality Management District
N/A = Not applicable – this rule does not include restrictions or mandate reductions in NOx or ROG emissions
* All values between 0 and 0.001 were rounded up to 0.001
† See discussion below

Table D-2
Stationary Source Categories for Which Other Districts Have Either Adopted Rules or Proposed as Control Measures and VCAPCD Has No Equivalent Rule

Rule Name	Other District Rule Number(s)	Applicable Sources in Ventura County?	NOx Emission Reduction Potential (tons/day)	ROG Emission Reduction Potential (tons/day)
Composting and Organic Material Conversion Operations	SC 1133 SJV 4566	New District Rule 74.32 will be adopted as discussed in Chapter 3 as part of control measure R-607		
Flares at Petroleum Refineries	BA 12-12 SC 1118	NO	None	None
Vacuum Truck Operations	BA 8-53	YES	Potential Increase*	0.16
Emissions of Oxides of Nitrogen from Commercial Food Ovens	SC 1153.1	YES	None	None
Food Products Manufacturing and Processing Operations	SC 1131	YES†	None	0.006
Residential Combustion Equipment	SC R-CMB-03 SC R-CMB-04	YES†	None	None
Emissions from Commercial Space Heating	SC C-CMB-02	YES†	None	None
Emergency Standby Engines	SC L-CMB-04	YES†	None	None

Notes:
BA = Bay Area Air Quality Management District
SC = South Coast Air Quality Management District
SJV = San Joaquin Valley Air Pollution Control District
MD = Mojave Desert Air Quality Management District
* If a combustion process is used to comply with emissions abatement requirements, this rule will increase NOx emissions
** All values between 0 and 0.001 were rounded up to 0.001
† See discussion below

The summaries below discuss the RACM evaluations and provide a determination whether rule updates or new rules could be considered RACM.

RULE 59: ELECTRICAL POWER GENERATING EQUIPMENT – OXIDES OF NITROGEN EMISSIONS (Last Revised 7/15/1997)

Rule 59 reduces NOx emissions from electric power generating steam boilers with a rated heat input capacity of greater than three hundred (300) million BTU's per hour and any auxiliary boiler with an electric power generating steam boiler not subject to Rule 74.15, *Boilers, Steam Generators, and Process Heaters*. In the 2020 RACT SIP, it was determined that Rule 59 was equivalent to SJVAPCD 4306 and met RACT requirements.

SCAQMD is proposing Control Measure L-CMB-06 to reduce the emissions from electrical generating facility equipment including turbines and the associated duct burners, boilers, and diesel internal combustion engines. Emission reductions for this control measure are associated with implementation of zero-emission technology and repowering with lower emission combustion units.

There is currently one facility in Ventura County that is subject to Rule 59, which is expected to decommission between 2025 and 2027 due to State regulations eliminating the use of once-through-cooling technology, which is utilized by this facility. VCAPCD will monitor potential emission reductions from this source category but at this time, it does not qualify for RACM due to emission reductions being realized before the attainment date of 2026.

RULE 62.6: ETHYLENE OXIDE – STERILIZATION AND AERATION (Last Revised 7/16/1991)

Rule 62.6 reduces ethylene oxide emissions from sterilizers using ethylene oxide. During the 2020 RACT analysis, it was determined there were two known and permitted facilities that employ ethylene oxide sterilizers in Ventura County. Cumulative permitted consumption was limited to 238 pounds of ethylene oxide per year.

SCAQMD Rule 1405 (last amended 1/4/1991) and SJVUAPCD Rule 7021 (last amended 12/17/1992) apply to similar process emissions as Rule 62.6 with nearly identical requirements. VCAPCD will monitor potential emission reductions from this source category but since Rule 62.6 is equivalent to SCAQMD and SJVAPCD rules at this time, no additional emission reductions are expected from this source category.

RULE 70: STORAGE AND TRANSFER OF GASOLINE (Last Revised 3/10/2009)

Rule 70 reduces ROG emissions from the storage and transfer of gasoline at bulk plants, terminals, and vehicle dispensing facilities (service stations). The storage of gasoline in containers with more than 40,000 gallons capacity is also regulated by the Rule 71.2, *Storage of Reactive Organic Compound Liquids*.

The CARB sets vapor recovery system standards for gasoline dispensing and is responsible for certifying fuel systems to meet those standards. California's local air districts have the primary authority for regulating gasoline dispensing facilities under vapor recovery rules. CARB began implementing enhanced vapor recovery requirements starting in 2001. BAAQMD amended its rules applicable to gasoline bulk terminals and plants, Rules 8-33 and 8-39, in April of 2009. The revised rules include lower emission limits (0.4 lb. ROG per 1,000 gallons transferred vs. 0.8 lb. ROG per 1,000 gallons transferred in Rule 70). Emission reductions for amendments to Rule 70 were estimated from improving bulk loading vapor control.

RULE 71.1: CRUDE OIL PRODUCTION AND SEPARATION (Last Revised 6/16/1992)

Rule 71.1 controls ROG emissions from equipment used in the production, gathering, storage, processing, and separation of crude oil and natural gas from any petroleum production unit prior to custody transfer.

SCAQMD Rule 1148.1 (last amended 9/4/2015) requires 95% control of produced gas that is not recovered, whereas Rule 71.1 requires 90% control of ROG emissions for produced gas not recovered or flared. SJVAPCD Rule 4623 (last amended 5/19/2005) tailors tank requirements based on tank size and vapor pressure of tank constituents, but the strictest requirements allow for vapor recovery systems similar to those allowed by Rule 71.1.

Currently, Ventura County has forty permitted facilities of which six are considered major sources (42 U.S.C. §7511a) of ROG subject to Rule 71.1. A review of all facilities' permits confirmed that most facilities route their produced gas into a fuel system, sales gas system, and/or flare, with only one facility utilizing a permanent carbon adsorption system which already achieves greater than 95% vapor control. The 90% control alternative does not apply to any existing source complying with Rule 71.1, therefore the requirement has no effect. It is important to note facilities operating a properly designed flare will achieve 98% destruction efficiency or greater. Any new source would be subject to BACT which would require a greater ROG destruction efficiency than required by Rule 71.1.

RULE 71.2: STORAGE OF REACTIVE ORGANIC COMPOUND LIQUIDS (Last Revised 9/26/1989)

Rule 71.2 reduces ROG emissions from equipment used to store crude oil or ROG liquids with a Modified Reid Vapor Pressure (MRVP) greater than 0.5 psia. The rule does not apply to any storage equipment subject to Rule 71.1, gasoline storage container with a capacity equal to or less than 40,000 gallons, or to any other storage container with a capacity equal to or less than 5,000 gallons.

SCAQMD Rules 463 (last amended 11/4/2011) and 1178 (last amended 11/6/2020) and SJVAPCD Rule 4623 (last amended 5/19/2005) apply to similar equipment as Rule 71.2. Rule 71.2 includes an exemption for tanks <5,000 gallons, while Rule 463 applies to all tanks >1,100 gallons. Rule 463 applies to above-ground tanks >19,815 gallons and above-ground gasoline tanks with capacities between 251 and 19,815 gallons. Rule 1178 applies only to tanks at petroleum facilities with greater than 20 tons of ROG emissions reported in the year 2000 and to tanks with capacities greater than 19,815 gallons. The rules contain many similar provisions and requirements for tanks containing volatile organic liquids. The rules all have minor differences in the detailed requirements. The provisions for fixed roof tanks are equivalent in all of the above-mentioned rules – a pressure-vacuum relief valve or vapor recovery system. Most of the differences relate to floating roof tanks.

The combined permitted emissions of the seven existing floating roof tanks in Ventura County are less than 17.33 tons ROG per year. By implementing BACT for Rule 71.2 (incorporating domed

coverings with 95% vapor control) ROG emissions would be reduced from the current permitted equipment by approximately 16.46 tons per year (0.045 tpd ROG). During the 2006 RACT SIP analysis, such retrofits had an estimated cost effectiveness of $12 per pound reduced, which is less than the current BACT threshold of $15 per pound. Due to differences between permitted emissions, actual emissions, and cost-effectiveness considerations which may influence rule language the actual emission reductions would likely be much less than this.

RULE 71.3: TRANSFER OF REACTIVE COMPOUND LIQUIDS (Last Revised 5/11/2021)

Rule 71.3 reduces ROG emissions from equipment used to transfer ROG liquids with a MRVP greater than or equal to 0.5 psia. The provisions of this rule do not apply to the transfer of gasoline or the transfer of ROG liquids via pipeline. This rule implemented BARCT on 5/11/2021 and achieved the maximum amount of emission reductions for this source equipment.

RULE 71.4: PETROLEUM SUMPS, PITS, PONDS, AND WELL CELLARS (Last Revised 6/8/1993)

Rule 71.4 controls ROG emissions from sumps, pits, ponds and well cellars at facilities where crude oil or petroleum material is produced, gathered, separated, processed, or stored. SCAQMD Rule 1176 (amended 9/13/1996) and SJVAPCD Rule 4402 (amended 12/15/2011) apply to similar equipment as District Rule 71.4.

Rule 71.4 requires covers on allowed sumps that physically cover 90% of the liquid surface area. Both SCAQMD and SJVAPCD's equivalent rules require sump covers that have very limited gaps at the edges. Alternatively, they must cover the liquid completely and have no open hatches, etc. However, Rule 71.4 includes a provision that the cover must not leak per the definition located in Rule 71.1 (1,000 ppm ROG as methane above background). In addition, Rule 71.4 applies to liquids with significantly lower ROG concentrations (5 mg ROG/L vs 35 mg ROG/L for Rule 4402). VCAPCD will monitor potential emission reductions from this source category but at this time no potential emission reductions are expected by increasing surface coverage with the existing leak-free requirements established in Rule 71.4.

RULE 71.5: GLYCOL DEHYDRATORS (Last Revised 12/13/1994)

Rule 71.5 controls and/or reduces ROG emissions from glycol dehydrators anywhere natural gas is dehydrated. SJVAPCD Rule 4408 (adopted 12/19/2002) applies to the same type of equipment as Rule 71.5. The rules are essentially equivalent, but Rule 71.5 has a lower exemption threshold and therefore applies to all glycol dehydrators in the District. SCAQMD Rule 1148.1 (last amended 9/4/2015) has a similar 95% emission control requirement on systems handling produced gas, but SCAQMD does not specifically regulate glycol dehydrators. VCAPCD will monitor potential emission reductions from this source category but since Rule 71.5 is equivalent to the SCAQMD and SJVAPCD rules at this time, no additional emission reductions are expected from this source category at this time.

RULE 74.2: ARCHITECTURAL COATINGS (Last Revised 11/10/2020)

Rule 74.2 reduces ROG emissions from architectural coatings and is applicable to any person who supplies, sells, offers for sale, or manufactures any architectural coating for use within the District, as well as any person who applies or solicits the application of any architectural coating within the District. Rule 74.2 was amended on 11/10/2020 which implemented the 2019 CARB SCM. The existing potential emission reductions from this source category due to the elimination of the small container exemption is proposed as a Contingency Measure in this Plan.

RULE 74.3: PAPER, FABRIC AND FILM COATING OPERATIONS (Last Revised 12/10/1991)

Rule 74.3 reduces ROG emissions from any application process involving the coating of paper, fabric or film. SCAQMD Rule 1128 (last amended 3/8/1996) and SJVAPCD Rule 4607 (last amended 12/18/2008) apply to the same operations as District Rule 74.3. The only comparable deficiencies found in Rule 74.3 with respect to both SCAQMD Rule 1128 and SJVAPCD Rule 4607 is the lack of plastisol ROG limits and not requiring application methods equivalent to the use of HVLP equipment.

Review of the District sources found no sources with emissions from activities which would be regulated by Rule 74.3. Any newly permitted sources would have to comply with more stringent BACT requirements pursuant to Rule 26, New Source Review. No further emission reductions are available from processes regulated by Rule 74.3.

RULE 74.4: CUTBACK ASPHALT (Last Revised 7/5/1983)

Rule 74.4 reduces ROG emissions from application of rapid cure cutback asphalt for highway or street paving or maintenance and applies to any person who manufactures, sells, or offers for sale cutback asphalt for such use or application. Rule 74.4 is equivalent to the cutback asphalt restrictions in other air districts in California. All reviewed rules prohibit the use of cutback asphalts with greater than 0.5% organic compounds with boiling points less than 500°F. Some rules, including Rule 74.4, have exemptions for material used at temperatures less than 50°F and therefore Rule 74.4 is considered BACT.

RULE 74.5.1: PETROLEUM SOLVENT DRY CLEANING (Last Revised 12/4/1990)

Rule 74.5.1 reduces ROG emissions from petroleum solvent dry cleaning operations through emission control, filtration equipment, and operating requirements. SCAQMD Rule 1102 (amended 11/17/2000) and SJVAPCD Rule 4672 (amended 12/17/1992) apply to similar equipment as District Rule 74.5.1. Rule 4672 has similar emission limits and operational requirements with the addition of a leak inspection and leak repair cycle information label requirement. Rule 1102 includes detailed leak check and repair requirements with time limits for repairing leaks. The Ventura County rule prohibits operating leaking equipment but does not include specific leak check and repair requirements or allowances for operating leaking equipment.

Rule 1102 prohibits operation of transfer machines effective January 1, 2005. District Rule 74.5.1 does not prohibit transfer machines and a review of District emissions inventory indicates petroleum-based dry-cleaning solvents contributed 14.34 tons of ROG in the base year 2018. SCAQMD discussed in their staff report for the 2000 amendments to Rule 1102 that banning transfer machines would reduce category emissions by 30%. If VCAPCD were to ban such equipment it would have the maximum emission reduction potential of 4.302 tons per year (0.012 tpd ROG), which is an upper bound estimate since any petroleum-based dry-cleaning operations permitted since 2000 would be required to implement BACT, not allowing the use of transfer machines.

RULE 74.5.2: SYNTHETIC SOLVENT DRY CLEANING (Last Revised 5/9/1995)

Rule 74.5.2 reduces ROG emissions from synthetic solvent dry cleaning equipment that does not use percholorethylene through emission control, filtration equipment, and operating requirements. SCAQMD Rule 1102 (amended 11/17/2000) applies to any dry cleaning equipment not using perchloroethylene solvent. SJVAPCD Rule 4672 applies only to petroleum solvent dry cleaning equipment and so is not applicable to the same sources. Rule 1102 includes detailed leak check and repair requirements with time limits for repairing leaks. Rule 74.5.2 prohibits operating leaking equipment but does not include specific leak check and repair requirements or allowances for operating leaking equipment. Rule 1102 prohibits operation of transfer machines effective January 1, 2005. District Rule 74.5.2 prohibits installation of transfer machines effective December 4, 1990. A review of District permits during the 2020 RACT SIP analysis indicated no transfer equipment using synthetic solvent remain operating in Ventura County.

RULE 74.6: SURFACE CLEANING AND DEGREASING (Last Revised 11/10/2020)

Rule 74.6 reduces ROG emissions from surface cleaning conducted outside of degreasing tanks (e.g., hand wipe cleaning, cleaning with handheld spray bottles) or using cold cleaning apparatus.

Due to comments received from EPA in 2020, BACT for Rule 74.6 was implemented with the 11/10/2020 amendments. During the rule development process, no further emission reductions were cost-effective for this source category.

RULE 74.6.1: BATCH LOADED VAPOR DEGREASERS (Last Revised 11/10/2020)

Rule 74.6.1 reduces ROG emissions from batch loaded vapor degreasers by specifying equipment and operating practice requirements.

SCAQMD Rule 1122 (amended 5/1/2009) and SJVAPCD Rule 4662 (amended 9/20/2007) regulate similar sources to those regulated by Rule 74.6.1. It should be noted that Rule 74.6.1 does not regulate conveyorized vapor degreasers but no equipment of that type is currently permitted in Ventura County. The rules are all essentially equivalent, although each has minor details in the requirements that the others do not. On 11/10/2020, Rule 74.6.1 was amended to eliminate an exemption for halogenated solvents and to require 85% control efficiency for degreasers. No further emission reductions were considered cost effective at the time of the amendment.

RULE 74.7: FUGITIVE EMISSIONS OF ROC AT PETROLEUM REFINERIES AND CHEMICAL PLANTS (Last Revised 10/10/1995)

Rule 74.7 reduces ROG emissions through operational and inspection requirements at petroleum refineries and chemical plants. Historically, only one petroleum refinery and only a few chemical plants have operated in Ventura County. The petroleum refinery has not operated since 1984. Only two facilities remain in the county, with a combined emissions of 8.95 tons per year.

SCAQMD Rule 1173 (last amended 2/6/2009) and SJVAPCD 4455 (last amended 4/20/2005) regulate similar sources to those regulated by 74.7. The leak repair requirements of Rule 1173 apply to any gaseous leak greater than 500 ppm while Rule 74.7 applies to leaks greater than 1,000 ppm. VCAPCD has no processes which are currently regulated by 74.7 at this time. Any new source would be subject to BACT which would require greater operational and inspection requirements than is found in Rule 74.7.

RULE 74.8: REFINERY VACUUM PRODUCING SYSTEMS, WASTEWATER SEPARATORS, AND PROCESS TURNAROUNDS (Last Revised 7/5/1983)

Rule 74.8 reduces ROG emissions from refinery vacuum producing systems, wastewater separators, and process turnarounds at petroleum refineries. Historically, only a single petroleum refinery operated in the county. The petroleum refinery has not operated since 1984. Rule 74.8 applies only to petroleum refineries. Therefore, Rule 74.8 does not have any potential emission reductions for the purpose of RACM.

RULE 74.9: STATIONARY INTERNAL COMBUSTION ENGINES (Last Revised 11/8/2005)

Rule 74.9 reduces NOx emissions from stationary spark-ignited or diesel internal combustion engines rated at 50 or more horsepower, operated on any gaseous fuel, including liquefied petroleum gas (LPG), or liquid fuel, and not subject to the provisions of Rule 74.16. Because Rule 74.9 is proposed as a Further Study Control Measure in this AQMP, it is not subject to evaluation for RACM.

RULE 74.10: COMPONENTS AT CRUDE OIL AND NATURAL GAS PRODUCTION AND PROCESSING FACILITIES (Last Revised 3/10/1998)

Rule 74.10 reduces ROG emissions from components at crude oil and natural gas production facilities, including pipeline transfer stations and natural gas processing plants. ROG emissions from these facilities are controlled by active leak detection and repair. This rule is set to implement BARCT in 2023 and as such does not qualify for RACM evaluation.

RULE 74.11: NATURAL GAS FIRED WATER HEATERS (Last Revised 1/12/2010)

Rule 74.11 reduces NOx emissions from residential water heaters and applies to residential water heaters, distributers, and installers.

In VCAPCD's 2020 RACT SIP Revision, it was discussed that this rule is essentially the same as SCAQMD Rule 1146.2 (last amended 12/7/2018) and SJVAPCD Rule 4902 (last amended 3/19/2009). Additionally, there are no known major sources of NOx subject to this rule in the District.

SCAQMD is evaluating Rule 1146.2 for RACM emission reductions by proposing incentives for existing unit retrofits and requiring new installations to implement zero-emission technologies. However, VCAPCD does not have the financial resources to implement such incentives at this time. In addition, due to considerations regarding energy resiliency for our wildfire-prone area, with some facilities being subject to frequent Public Safety Power Shutoffs, known as PSPS events, it is not safe or feasible for requiring zero emission technology at this time. VCAPCD will monitor potential emission reductions from this source category but at this time Rule 74.11 does not have any potential emission reductions for the purpose of RACM.

RULE 74.11.1: LARGE WATER HEATERS AND SMALL BOILERS (Last Revised 9/11/2012)

Rule 74.11.1 is a point-of-sale rule that reduces NOx emissions from large water heaters and small boilers that are sold, offered for sale, or installed in Ventura County through certain requirements and limits. Units subject to Rule 74.11.1 are required to not exceed 40 nanograms per joule of heat output.

SCAQMD Rule 1146.2 (last amended 12/7/2018) apply to similar sources as Rule 74.11.1. Rule 1146.2 regulates small boilers and water heaters with a rated heat input rating of between 75,000 BTU/hour and 2,000,000 BTU/hour, while Rule 74.11.1 applies to units 75,000 BTU/hour and 1,000,000 BTU/hour. Rule 1146.2 requires emissions of comparable units to not exceed 14 nanograms per joule of heat output.

SCAQMD is proposing to further reduce emissions with C-CMB-01 through providing incentives for voluntary installation of zero-emission water heaters and by amending regulations to require zero-emission technology or lower-emitting units for new installs. VCAPCD does not have the financial resources to implement such incentives at this time, and the implementation period for new installations would limit the emission reductions realized by the attainment deadline of 2027. Due to considerations regarding energy resiliency for our wildfire-prone area, with some residencies being subject to frequent PSPS events, it is not safe or feasible for requiring zero emission technology at this time. There were 15.334 tpy of NOx in 2018 for from EIC 600-300-1100-000. Emission reductions estimated for Rule 74.11.1 are based on reducing emission limits from 40 to 14 nanograms per joule of head output which could be realized before 2027. Because this equipment has an average lifespan of 10 years, we estimate after rule adoption each year will realize 10% of total emission reductions if the rule was amended in 2023. (ER = 15.334 tpy * (26/40) = 9.97 tpy = 0.0273 tpd at full saturation * (0.30) = 0.008 tpd NOx)

RULE 74.12: SURFACE COATING OF METAL PARTS AND PRODUCTS (Last Revised 4/8/2008)

Rule 74.12 reduces ROG emissions by specifying ROG content limits in coatings used to coat metal parts and products and work practice requirements.

SCAQMD Rule 1107 (amended 2/7/2020) and SJVAPCD Rule 4603 (amended 9/17/2009) apply to similar sources as Rule 74.12. The coating ROG content restrictions are mostly equivalent, with Rule 74.12 including lower limits on a few specialty coatings. While minor differences in work practice requirements and exemptions exist, the differences do not impact the emissions. The most recent amendment to Rule 1107 implemented more stringent work practices and removed multiple exemptions but did not estimate any emission reductions. VCAPCD will monitor potential emission reductions from this source category but at this time Rule 74.12 does not have any potential emission reductions for the purpose of RACM.

RULE 74.13: AEROSPACE ASSEMBLY AND COMPONENT MANUFACTURING OPERATIONS (Last Revised 9/11/2012)

Rule 74.13 reduces ROG emissions from the manufacturing, assembling, coating, masking, bonding, paint stripping, and surface cleaning of aerospace components and the clean-up of equipment associated with these operations.

SCAQMD Rule 1124 (amended 9/21/2001) and SJVAPCD Rule 4605 (amended 6/16/2011) apply to sources similar to those subject to Rule 74.13. Rule 74.13 limits the emissions of ROG from the application of coatings or adhesives on aerospace components. This rule contains limits on the ROG content of coatings, adhesives and cleaners used at aerospace component manufacturing operations. The ROG control requirements of this rule are equivalent to SCAQMD Rule 1124, *Aerospace Assembly and Component Manufacturing Operation*, with a few variations in limits for specialty coatings or adhesives.

The main differences between Rule 74.13 and Rule 1124 are Adhesion Promoters at 850 g/L versus 250 g/L, Adhesive Bond Primer at 780 g/L versus the new commercial aircraft limit of 250 g/L, Long and Short Term Adhesive Bond Primers at 780 g/L versus 250 g/L, and Extrudable, Rollable or Brushable Sealants at 600 g/L versus 280 g/L.

In the base year of 2018, there was 0.02 tpy of ROG emissions from operations regulated by Rule 74.13. For the purpose of RACM, emission reductions are estimated assuming all emissions are from the previously mentioned categories where VCAPCD's ROG limits are higher than neighboring districts.

RULE 74.14: POLYESTER RESIN MATERIAL OPERATIONS (Last Revised 4/12/2005)

Rule 74.14 reduces ROG emissions from operations that manufacture products from or otherwise use polyester resin material. ROG emissions from this manufacturing process are controlled by limiting loss rate, monomer ROG content, application technique, or by requiring emission control equipment. Limits are also placed on the ROG content of cleaning materials.

SCAQMD Rule 1162 (amended 7/8/2005) and SJVAPCD Rule 4684 (amended 8/18/2011) apply to sources similar to those subject to Rule 74.14. The required ROG content limits are equivalent to 74.14, generally not exceeding 35%, excluding specialty resins.

Rule 74.14 currently requires the monomer ROG content of the polyester resin material to be no more than 35 percent by weight, excluding specialty resins, and does not contain limits for the ROG content of non-monomer. The maximum potential emission reductions for Rule 74.14 would require a non-monomer content ROG limit of no more than 5 percent by weight. (0.02 tpd ROG, or 36% reduction)

RULE 74.15: BOILERS, STEAM GENERATORS AND PROCESS HEATERS (Equal to or Greater than 5 MMBTU) (Last Revised 11/10/2020)

This rule reduces NOx emissions from boilers, steam generators and process heaters used in all industrial, institutional and commercial operations, except utility electric power generating units and any auxiliary boiler used with a utility electric power generating unit and water heaters.

Rule 74.15 was recently amended implementing BARCT. No additional cost-effective emission reductions are possible from this source category.

RULE 74.15.1: BOILERS, STEAM GENERATORS AND PROCESS HEATERS (1 TO 5 MMBTU) (Last Revised 6/23/2015)

This rule is a point-of-sale rule that reduces NOx emissions by requiring large water heaters and small boilers that are sold, offered for sale, or installed in Ventura County to meet certain requirements.

The NOx and CO control requirements of this rule are equivalent to SCAQMD Rule 1146.1 (amended 12/7/2018) and SJVAPCD Rule 4307 (amended 4/21/2016) for most categories with some minor differences. For example, SJVAPCD Rule 4307 has only two categories, Atmospheric and Non-atmospheric while Rule 74.15.1 contains additional categories such as Landfill Gas, Biogas and LPG.

Rule 74.15.1 includes tables of NOx limits for different categories of combustion sources. The NOx emission limits range from 9 ppm for Pressurized Natural Gas-fired units to 25 ppm for Landfill Gas-fired units. Both Rule 1146.1 and Rule 4320 include similar limits as baseline limits for all subject units not eligible for a low use exemption. All three rules include a compliance option for units with total annual fuel use less than 1.8×10^9 BTU. Such units may comply with the rule by performing regular tune ups (twice per year, with different specific scheduling requirements) in accordance with rule requirements.

Rule 1146.1 includes a stricter NOx limit on fire-tube category sources. However, the SCAQMD staff report associated with the adoption of that limit indicates the cost effectiveness ranges from $11,000 to $36,000 per ton of NOx emissions reduced, which is close to the VCAPCD BACT threshold of $30,000 per ton of NOx reduced. SCAQMD is proposing to further reduce emissions from this source category through the use of incentives and requiring lower NOx emission limits through L-CMB-02.

Due to considerations regarding energy resiliency for our wildfire-prone area, with some facilities being subject to frequent PSPS events, it is not safe or feasible for requiring zero emission

technology at this time. Emission reductions estimated for Rule 74.15.1 are based on reducing emission limits to current SCAQMD Rule 1146.1 requirements. Baseline emissions were identified as 25.38 tpy of NOx for all equipment subject to Rule 74.15.1, fire-tube boilers represent a small portion of these units, but to conservatively estimate emission reductions all units were assumed to be fire-tube design. Because this equipment has an average lifespan of 10 years, we estimate after rule adoption each year will realize 10% of total emission reductions if the rule was amended in 2023. (ER = 2/9 * fire tube inventory * 0.3) =1.692 tpy=0.005 tpd NOx

RULE 74.16: OILFIELD DRILLING OPERATIONS (Last Revised 1/8/1991)

Rule 74.16 reduces NOx emissions by requiring oilfield drilling rigs to be powered by electric utility grid power. The rule requires the District to grant an exemption from this requirement in cases where the cost of bringing grid power to the drilling site makes electric drilling economically infeasible. In cases where the District grants such an exemption, Rule 74.16 requires the diesel engines used in oilfield drilling rigs to meet NOx limits equivalent to Tier 1 diesel engines. No oil well drilling rigs currently hold a District Permit to Operate. To obtain a Permit to Operate, oil well drilling engines would have to comply with more stringent BACT requirements pursuant to Rule 26, New Source Review. No additional emission reductions are available from equipment regulated by Rule 74.16.

RULE 74.17.1: MUNICIPAL SOLID WASTE LANDFILLS (Last Revised 2/9/1999)

Rule 74.17.1 reduces fugitive ROG emissions from municipal solid waste landfills by means of requiring a landfill gas collection and control system. All municipal solid waste landfills in Ventura County are subject to either the federal New Source Performance Standard (40 CFR part 60 subpart WWW) or Rule 74.17.1, as applicable. SCAQMD Rule 1150.1 (amended 4/1/2011) and SJVAPCD Rule 4642 (amended 4/16/1998) have similar processes and do not contain more stringent requirements; no emission reductions are estimated from amendments to Rule 74.17.1. VCAPCD will monitor potential emission reductions from this source category but at this time, Rule 74.17.1 does not have any potential emission reductions for the purpose of RACM.

RULE 74.18: MOTOR VEHICLE AND MOBILE EQUIPMENT COATING OPERATIONS (Last Revised 11/11/2008)

Rule 74.18 limits ROG emissions from the application of automotive refinish coatings. This rule contains limits on the ROG content of refinish coatings used to coat both repaired auto bodies and entire vehicles in addition to ROG content limits on cleaners used for surface preparation and application equipment cleanup. CARB amended the statewide Suggested Control Measure (SCM) for Automotive Coatings on October 20, 2005. On November 11, 2008, the District adopted the SCM. The vast majority of the emission reductions from this SCM results from auto body shops switching from solvent-based color base coats to new waterborne color base coats. Other provisions of the SCM and Rule 74.18 include new ROG limits of primer sealers, specialty coatings, and cleaning solvents used for cleaning application equipment.

SCAQMD Rule 1151 (last amended 9/2014) applies to similar operations and has similar ROG content limits except that Rule 74.18 has a few more coating categories. In addition, for non-

compliant coatings, Rule 74.18 requires 85% capture and control on all compliant & non-compliant coatings while Rule 1151 requires control on incremental differences between the emissions that would result from the use of compliant and non-compliant coatings. The transfer efficiency, cleanup and cleaning solvents requirements are the same and the rules are functionally equivalent.

SCAQMD is proposing to further reduce ROG emissions from Rule 1151 with CTS-01. The proposed reduction in emissions is through the required use of zero and near-zero ROG materials along with alternative curing technologies. VCAPCD will monitor potential emission reductions from this source category as SCAQMD implements new technology, but at this time no emission reductions are associated with processes regulated by Rule 74.18.

RULE 74.19: GRAPHIC ARTS (Last Revised 6/14/2011)

Rule 74.19 reduces ROG emissions from the use of inks, fountain solutions, coatings, adhesives, and cleaners used at graphic arts operations through limits on the ROG content of inks, coating, adhesives, fountain solutions, and solvent cleaners. On June 14, 2011, the District adopted new lower ROG content limits in Rule 74.19 for some fountain solutions and cleaning solutions used in this source category. The new limits are equivalent to or stricter than limits in SCAQMD Rule 1130 (amended 5/2/2014), SJVAPCD Rule 4607 (amended 12/18/2008) and, for the solvent cleaning aspects of the rule, SCAQMD Rule 1171 (amended 5/1/2009). VCAPCD will monitor potential emission reductions from this source category but at this time no emission reductions are associated with emissions associated with Rule 74.18.

RULE 74.19.1: SCREEN PRINTING OPERATIONS (Last Revised 11/11/2003)

Rule 74.19.1 reduces ROG emissions from the use of inks, coatings, adhesives, and cleaners used at screen printing operations. The rule specifies limits on the ROG content of inks, coating, adhesives and fountain solutions, whereas ROG emissions from cleaning solvents are limited by ROG content and ROG composite vapor pressure requirements.

SCAQMD Rule 1130.1 (last amended 12/13/1996) applies to similar processes in Rule 1171 (last amended 5/1/2009) applying to the use of solvents for the cleaning of equipment. Rule 74.19.1 has as stringent or more ROG content requirements as Rule 1130.1, while Rule 1171 has lower ROG content requirements for certain categories of solvents used for screen printing activities. However, Rule 1171 does provide the ability to use higher ROG content solvents if at least 70 percent vapor capture and 95 percent control is achieved, while Rule 74.19.1 requires a combined 75% capture and control for solvents that exceed required ROG content limits. For the purpose of RACM analysis, all emissions are assumed to be controlled by 75% and emission reductions are calculated if this was increased to 95%. (ER = 0.0273 tpd baseline *.80) = 0.022 tpd ROG

RULE 74.20: ADHESIVES AND SEALANTS (Last Revised 10/09/2018)

Rule 74.20 reduces ROG emissions from the use of adhesives, sealants, adhesive primers, sealant primers, and cleaning solvents used at bonding operations. Rule requirements limit ROG emissions by limiting the ROG content of adhesives, sealants, primers, and cleaners.

In VCAPCD's 2020 RACT SIP Revision, it was discussed that this rule is equivalent to SCAQMD Rule 1168 (amended 10/6/2017) and SJVAPCD Rule 4653 (Amended 9/16/2010) with some minor differences. Furthermore, there are no major sources in this source category in Ventura County.

SCAQMD is evaluating Rule 1168 for RACM emission reductions by requiring zero and near-zero ROG technology which would reduce emissions from this source category, but cost-effectiveness has not been determined. The use of incentives to encourage lower-emitting materials is also being considered by SCAQMD; however, VCAPCD does not have the financial resources to implement similar incentives at this time. VCAPCD will monitor potential emission reductions from this source category but at this time there are no potential emission reductions.

RULE 74.21: SEMICONDUCTOR MANUFACTURING (Last Revised 4/6/1993)

Rule 74.21 reduces ROG emissions from semiconductor manufacturing operations through various operational requirements and solvent concentration limits. Rule requirements limit ROG emissions by limiting ROG content of maskants, developers, or cleaning solvents used as part of a semiconductor manufacturing operation or to anyone who manufactures or supplies such products.

SCAQMD Rule 1164 (last amended 1/13/95) and BAAQMD Rule 8-30 (last amended 10/7/1998) applies to similar processes. Rule 74.21 regulates ROG content for more categories and at a more restrictive level than both Rule 1164 and 8-30, while all require an emission control system with at least 90 percent efficiency. VCAPCD will monitor potential emission reductions from this source category but at this time there are no further potential emission reductions.

RULE 74.22: NATURAL GAS-FIRED, FAN-TYPE CENTRAL FURNACES (Last Revised 11/9/1993)

Rule 74.22 reduces ROG emissions by prohibiting the sale and installation of forced air space heaters that do not meet specified NOx limits. Amendments to Rule 74.22 are already proposed as a Control Measure and therefore, does not qualify for RACM analysis as the maximum emissions reductions from this source category will be implemented.

RULE 74.23: STATIONARY GAS TURBINES (Last Revised 11/12/2019)

Rule 74.23 reduces NOx emissions from stationary turbines with rated output greater than 0.3 MW fueled with gaseous or liquid fuels. This applicability limit is the same as SCAQMD Rule 1134 (amended 2/4/2022) and SJVAPCD Rule 4703 (amended 9/20/2007).

Rule 74.23's 2019 amendments implemented BARCT, achieving all emission reductions from this source category that was considered cost-effective. VCAPCD will monitor potential emission reductions from this source category but at this time there are no further potential emission reductions.

RULE 74.24: MARINE COATINGS OPERATIONS (Last Revised 9/11/2012)

Rule 74.24 reduces ROG emissions from coating and cleaning solvents used to coat marine or freshwater vessels, excluding boatyard repair facilities and marinas. Rule requirements limit ROG emissions by limiting the ROG content of topcoats and primers. Emissions of ROG from cleaners are also controlled by limiting the ROG content of surface prep cleaners and application equipment cleaners.

The ROG control requirements of this rule are equivalent to South Coast AQMD Rule 1106 (last amended 5/3/2019) with some minor differences. Rule 74.24 has additional coating categories that Rule 1106 does not have, while Rule 1106 requires lower ROG limits for baked and air-dried High Gloss Coatings and Pretreatment Wash Primer. Additionally, the following coatings specified in Rule 74.24 would be subject to the default ROG coating limits of 275 g/L for baked and 340 g/L for air dried: Air Flask Coatings, Military Exterior, Rubber Camouflage Coatings, Specialty Interior, and Wood Sealer. For the purpose of RACM evaluation, all emission reductions were estimated for the more restrictive baked limit for Rule 1106's default category. (ER = 0.03570 tpd from category * 65/340 = 0.006825 tpd ROG) 340 to 275 g/l

RULE 74.24.1: PLEASURE CRAFT COATING AND COMMERCIAL BOATYARD OPERATIONS (Last Revised 11/10/2020)

Rule 74.24.1 reduces ROG emissions from the use of coatings and cleaning solvents used to coat marine or freshwater vessels at commercial boatyard repair facilities and marinas. This rule also contains a sales prohibition for non-complying coatings sold at marine stores that sell pleasure craft coatings. Rule requirements limit ROG emissions through ROG content limits on topcoats and primers. Emissions of ROG from cleaners are also controlled by limits on the ROG content of surface prep cleaners, the ROG composite vapor pressure of cleaning solvents, and requiring the use of enclosed spray gun washers. Also, this rule requires use of high transfer efficiency spray equipment such as HVLP spray equipment.

Rule 74.24.1 was most recently amended to reduce ROG limits for Pleasure Craft Antifoulant Coatings, Topcoat categories, and added a Low-Solids Coating category to demonstrate equivalence to RACT. A separate category was created for Commercial Antifoulant Coatings at this time, as there were no products which were able to meet a lower ROG content limit.

SCAQMD Rule 1106 (amended 5/3/2019) applies to similar processes as 74.24.1. Rule 74.1 is as stringent as Rule 1106, and no additional emission reductions were found to be available from this category.

RULE 74.25: RESTAURANT COOKING OPERATIONS (Adopted 10/12/2004)

Rule 24.25 reduces ROG and PM emissions from conveyorized charbroilers that are used to cook 875 pounds of meat or more per week. It is similar to SCAQMD Rule 1138 (last amended 11/14/1997) and SJVAPCD Rule 4692 (last amended 6/21/2018). Rule 4692 has a few provisions that are slightly more restrictive than Rule 74.25. Rule 74.25 requires at least 83% reduction of both ROG and PM10 from applicable units, while Rule 4692 requires at least 83% reduction in

PM10 and 86% reduction in ROG. In addition, SJVAPCD applies to charbroilers used to cook more than 400 pounds of meat per week.

While the additional restrictions in the SVJAPCD rule could be added to Rule 74.25, it would not be likely to help advance attainment of the ozone NAAQS in Ventura County. The rulemaking process takes approximately one year, which would allow for adoption at about 2024. It is necessary to provide time for industry to adjust to the new requirements and either demonstrate compliance or purchase new equipment that meets the requirements of a new rule. Therefore, any new reductions would not likely occur until the ozone season of 2026, which is the attainment year for Ventura County. In addition, the incremental cost effectiveness of increasing the control efficiency from 83% to 86% would likely be astronomical, due to the minimal reduction in emissions. Many of the catalytic oxidizers currently in use likely meet the 86% ROG reduction requirement in Rule 4692, and these changes to Rule 74.25 would not result in actual emission reductions from those units.

RULE 74.26: CRUDE OIL STORAGE TANK DEGASSING (Last Revised 11/8/1994)

Rule 74.26 reduces ROG emissions by prohibiting the venting of ROG vapors to the atmosphere from above-ground tanks with a capacity of 2,000 barrels or greater used to store crude oil or produced water. When such tanks are undergoing maintenance or being decommissioned, the rule requires ROG vapors to be treated rather than released to the air.

SCAQMD Rule 1149 (last amended 5/2/2008) applies to similar process as 74.26. Rule 1149 has a lower threshold of ROG for degassed tanks, 5,000 ppmv versus 10,000 ppmv for Rule 74.26. Rule 1149 also applies to pipeline degassing activities. Rule 1149 also applies to smaller tanks with a storage capacity of 500 gallons or greater.

Rule 74.26 was evaluated for emission reductions by including pipeline degassing activities in 2021. It was estimated that by including pipeline degassing in the requirements of Rule 74.26, it would result in an ROG emission reduction of 542 pounds per year. Cost estimates for similar degassing activities in Santa Barbara County were $16,000 per event, with multiple pipeline degassing events occurring each year. Discussions with pipeline owners in Ventura County informed VCAPCD that there are at least 2 degassing events per year. At 2 events per year, emissions would be reduced at a cost of $118,081 per ton of ROG reduced, exceeding the District's cost threshold for BACT of $30,000 per ton. Of the larger tank emissions, about 97% of VCAPCD tank degassing is attributed to crude oil storage tanks with a capacity of 2,000 barrels or greater.

(ER = 50% * existing inventory + 95% control of tanks >= 500 gallons < 2,000 bbl)
ER = (8.24 tpy * 0.5) + (4.51 tpy * .95) = (4.12 tpy) + (4.28 tpy) = 8.41 tpy = 0.023 tpd

RULE 74.27: GASOLINE AND ROC LIQUID STORAGE TANK DEGASSING OPERATIONS (Last Revised 11/8/1994)

Rule 74.27 reduces ROG emissions by prohibiting the venting of ROG vapors to the atmosphere from any gasoline storage tank that has a storage capacity greater than 5,000 gallons and any storage tank that has a storage capacity greater than 5,000 gallons that stores ROG liquids,

excluding petroleum liquids, having a true vapor pressure equal to or greater than that determined by: TVP @ 68 °F (psia) = 2.3 + 23,000/V, where V is the volume of the tank in gallons. When such tanks are undergoing maintenance or being decommissioned, the rule requires ROG vapors to be treated rather than released to the air.

SCAQMD Rule 1149 (amended 5/2/2008) has a lower ROG threshold, 5,000 ppmv versus 10,000 ppmv for Rule 74.27. SCAQMD also has a lower tank size applicability threshold for Rule 1149, applying to tanks with a volume of 500 gallons or greater.

(ER = existing emissions * 0.5, + comparable control (95%) to tanks >= 500 <= 5000 gal)
ER = (0.282 tpy * 0.5) + (0.175 tpy * 0.950) = 0.141 + 0.166 = 0.307 tpy = 0.00084 tpd

RULE 74.28: ASPHALT ROOFING OPERATIONS (Last Revised 5/10/1994)

Rule 74.28 reduces ROG emissions from asphalt roofing equipment and operations by requiring close fitting container lids and temperature limits. Rule 74.28 applies to equipment used for melting, heating or holding asphalt or coal tar pitch.

MDAQMD Rule 471 (last amended 12/21/1994) applies to similar sources as Rule 74.28. The requirements are identical between these rules and no additional emission reductions were found to be available from this category.

RULE 74.29: SOIL DECONTAMINATION OPERATIONS (Last Revised 4/8/2008)

This rule established procedures by which ROG emissions are minimized during the aeration, treatment or removal of soil contaminated with petroleum fuel. Rule 74.29 applies to soil decontamination equipment and handling of contaminated soil.

SJVAPCD Rule 4651 (last amended 11/20/2007) and SCAQMD Rule 1166 (last amended 5/11/2001) apply to similar processes and have similar work practice requirements to reduce ROG emissions. Both Rule 4651 and Rule 1166 have similar prohibitory requirements with a 95% vapor control for aeration of contaminated soils which is comparable to the flat rate emission limit found in Rule 74.29 of 100 ppm for small aeration projects and 0.08 lbs/hour emission limit for larger projects. Both SJVAPCD and SCAQMD however do not exempt the use of certain contaminated soils for the use of daily cover at Class III Solid Waste Disposal Sites. Rule 74.29 allows the use of soils which contain equal to or less than 100 ppmw gasoline or 1,000 ppmw diesel for daily cover. One landfill within VCAPCD's jurisdiction uses contaminated soils as ADC and has used on average 369,002 tons of contaminated soil as cover per year over the last five years. Due to similar requirements between the three districts, the only emission reductions from amendments to Rule 74.29 would be removal of the contaminated soil exemption for use as a daily cover at landfills. (ER = tons of soil * gasoline ROG content [diesel evaporation from soil will be insignificant overnight] ER = 396,002 tons soil/year * 100 tons ROG/1,000,000 tons soil = 435.6 tpy ROG = 0.12 tpd)

RULE 74.30: WOOD PRODUCTS COATING (Last Revised 6/27/2006)

Rule 74.30 reduces ROG emissions from wood products coatings and cleaning materials by ROG content limits and by requiring certain application methods. Rule 74.30, SCAQMD Rule 1136 (amended 6/4/1996), and SJVAPCD Rule 4606 (amended 10/16/2008) are equivalent in stringency and no additional emission reductions were found to be available from this rule at this time.

RULE 74.31: METALWORKING FLUIDS AND DIRECT CONTACT LUBRICANTS (Last Revised 11/12/2013)

Rule 74.31 applies to the production, sale and use of metalworking fluids and direct contact lubricants and reduces ROG emissions by requiring substitution of high-ROG metalworking fluids with low-ROG fluids, including medium naphthenic oils, paraffinic oils, vegetable oils, synthetic or semi-synthetic oils, or water-reducible fluids.

SCAQMD Rule 1144 (last amended 7/9/2010) applies to similar processes and is effectively identical to Rule 74.31 and no additional emission reductions were found to be available from this rule.

RULE 74.33: LIQUEFIED PETROLEUM GAS TRANSFER OR DISPENSING (Last Revised 1/11/2015)

Ruel 74.33 applies to the transfer or dispensing of liquefied petroleum gas (LPG) and reduces the ROG emissions by requiring the use of proper transfer lines, fittings, gaskets, and gages as specified in the rule. This rule applies to the transfer of LPG to or from any cargo tank, any stationary or portable storage tank, or any cylinder.

SCAQMD Rule 1177 (adopted 6/1/2012) applies to similar processes and was the basis for the adoption of Rule 74.33. Rule 1177 has similar requirements on transfer for bulk transfer, transfer and dispensing facilities. VCAPCD will monitor potential emission reductions from this source category but at this time there are no potential emission reductions.

RULE 74.34: NOX REDUCTIONS FROM MISCELLANEOUS SOURCES (Last Revised 12/13/2016)

Rule 74.34 reduces NOx and CO emissions from dryers, furnaces, heaters, incinerators, kilns, ovens, and duct burners where the total rated heat input for the unit is 5 million BTU per hour or greater.

SCAQMD Rule 1147 (amended 7/7/2017) and SJVAPCD Rule 4309 (adopted 12/15/2005) regulate sources similar to those regulated by Rule 74.34. The emission limits in Rule 1147 and Rule 4309 are similar to those in Rule 74.34, however Rule 1147 regulates emissions from units down to 1 million BTU per hour. Rule 4309 is more similar to Rule 74.34 in that it strictly regulates emissions from sources rated at 5 million BTU per hour or greater. The decision to regulate only the units rated at 5 million BTU per hour or greater was determined on cost-effectiveness. Rule 1147 was recently amended to make changes that provides relief to affected businesses by delaying

compliance dates for specific units, to raise the NOx limit for low temperature units, and adds and clarifies a number of exemptions for a variety of equipment categories.

Rule 74.34 provides exemptions for combustion equipment operating as ROG control devices, such as afterburners, catalytic oxidizers, thermal oxidizers, and vapor incinerators. The emission inventory for the county indicates that there is only one thermal oxidizer used for ROG control rated at 5 million BTU per hour that might be subject to this rule. However, this unit is associated with the destruction of nitrogen-containing compounds and these NOx emissions cannot be controlled by modifying combustion conditions. Additionally, an exemption is provided for gas flares and low-use units.

During the rule development of Rule 74.34, it was calculated that additional emission reductions from requiring lower NOx concentrations through the use of SCR had an incremental cost-effectiveness between $53 and $141 per pound of NOx reduced, which exceeds VCAPCD's BACT threshold of $15 per pound. VCAPCD will monitor potential emission reductions from this source category but at this time there are no potential emission reductions.

VACUUM TRUCK OPERATIONS (BAAQMD Rule 8-53 – No VCAPCD Equivalent Rule)

Rule 8-53 was adopted April 18, 2012, and applies to the following facilities: petroleum refineries, bulk plants, bulk terminals, marine terminals, and organic liquid pipeline facilities. Moreover, on May 2, 2008, SCAQMD revised their Rule 1149, *Storage Tank and Pipeline Cleaning and Degassing*, to, among other provisions, require that until certain other provisions are met, vacuum trucks that remove residual product and sludge from pipeline and storage tanks subject to the rule must exhaust vapors into a control device and the exhaust concentration of control devices must not exceed 500 ppmv, measured as methane. BAAQMD staff estimate that Rule 8-53 will reduce ROG emissions from vacuum truck operations by 1.05 ton per day. This represents an 85 percent reduction in emissions from moving regulated materials and a 70 percent reduction of overall organic emissions from vacuum truck operations.

Opportunities for significant emission reductions from vacuum trucks are more limited in Ventura County than in the Bay Area AQMD and South AQMD regions. Ventura County no longer has any refineries or marine terminals and only a few bulk plants and terminals. It does, however, have numerous oil production, storage, and processing facilities, including storage tanks, sumps, boxes, and pipelines. Moreover, vacuum trucks are often used in Ventura County to transport produced crude oil from small and isolated production locations to storage and processing facilities.

Ventura County annual oil production amounts to 2.8% of the refinery capacity in the Bay Area (ratio of CalGEM 2015 oil production data for Ventura County to California Energy Commission refinery capacity data). Therefore, a conservative estimate of the emission reductions from a vacuum truck control rule in Ventura County is 15% of the BAAQMD rule, or 0.16 tons ROG per day. Note that due to rule development and implementation timelines, the soonest this could be in effect is 2026.

EMISSIONS OF NITROGEN OXIDES FROM COMMERCIAL FOOD OVENS (SCAQMD Rule 1153.1 – No VCAPCD Equivalent Rule)

SCAQMD Rule 1153.1 applies to in-use ovens, dryers, smokers, and dry roasters with NOx emissions from fuel combustion that require SCAQMD permits and are used to prepare food or products for making beverages for human consumption. Preliminary calculations based on population ratio indicate possible NOx reductions of 0.008 tons per day from commercial food ovens in Ventura County. This estimate is based on estimated reductions from SCAQMD Rule 1147 when it was originally adopted in November 2008.

SCAQMD adopted Rule 1153.1 to remove commercial food ovens from Rule 1147 applicability. Control technologies have not matured in a timely manner for commercial food ovens. In response, SCAQMD removed food ovens, including roasters and smokehouses, from Rule 1147 applicability and subjected them to new Rule 1153.1 with different emission limits and compliance dates.

Rule 1153.1 extends the compliance time for most applicable units to three years or more after the adoption date in 2014. In order to provide similar compliance timeframes in Ventura County, the emission reductions would not be required until 2026 or later so they would not affect the attainment date. Therefore, reductions from these sources would not be considered RACM at this time.

FOOD PRODUCTS MANUFACTURING AND PROCESSING OPERATIONS (SCAQMD Rule 1131 – No VCAPCD Equivalent Rule)

Rule 1131 was adopted September 15, 2000 (last amended 6/6/2003) and applies to food manufacturing facilities. Rule 1131 reduced ROG emissions from food manufacturing and processing operations by limiting the ROG content of process solvents and solvents used for sterilization of equipment; or requiring control equipment; or requiring equivalent reductions through reformulation or process modifications. Affected operations include distillation, extraction, reacting, blending, drying, crystallizing, granulation, separation, sterilization, and filtering.

SCAQMD staff estimated that Rule 1131 would reduce ROG emissions from food manufacturing operations by two tons per day. This represents an 81 percent reduction in emissions from subject operations.

During the last RACM analysis, it was determined that Ventura County has a number of food processing facilities, but they do not use the kind of processes cited above that require significant solvent use. None of the food processing facilities in Ventura County have permitted equipment or processes that use solvent as the rule indicates. Therefore, solvent use at the facilities must be below the exemption threshold of 200 pounds of ROG per year. Maximum solvent use at all food processing facilities combined is 2.7 tons of ROG per year, or 0.0074 tons ROG per day. Applying the estimated 81% reduction, a very conservative estimate, the potential emission reductions from this type of rule in Ventura County would be 0.006 tons ROG per day.

EMISSIONS FROM RESIDENTIAL COMBUSTION DEVICES (SCAQMD R-CMB-03, R-CMB-04 – No VCAPCD Equivalent Rule)

Residential combustion devices such as stoves, ovens, griddles, broilers, dryers, and other combustion equipment not regulated by other rules are currently not controlled by VCAPCD. Control of emissions from this equipment would be achieved by requiring new units to install low-NOx or zero-emission technology. SCAQMD estimates 1.7 tons per day of NOx reduced, a 70% reduction of their baseline emissions from this category of equipment.

For the purpose of RACM analysis, adoption of this regulation is estimated no sooner than 2024 and would likely include sell-through provisions for existing inventory, therefore, there are no emission reductions calculated for what can be realized by the 2026 attainment year. VCAPCD will monitor potential emission reductions from this source category but at this time there are no potential emission reductions for the purpose of RACM.

EMISSIONS FROM COMMERCIAL SPACE HEATING (SCAQMD C-CMB-02 – No VCAPCD Equivalent Rule)

Commercial sized space heating furnaces with a heat input rating between 175,000 BTU per hour and 5,000,000 BTU per hour are currently not controlled by VCAPCD. Control of emissions from this equipment would involve requiring installation of low-NOx or zero-emission technology for new and replacement units and incentives to encourage early adoption. SCAQMD estimates 0.17 tons per day of NOx reduced, a 62% reduction from baseline.

For the purpose of RACM analysis, adoption of this regulation is estimated no sooner than 2024 and would likely include sell-through provisions for existing inventory, therefore, there are no emission reductions calculated for what can be realized by the 2026 attainment year. VCAPCD will monitor potential emission reductions from this source category but at this time there are no potential emission reductions for the purpose of RACM.

EMERGENCY STANDBY ENGINES (SCAQMD L-CMB-04 – No VCAPCD Equivalent Rule)

Emergency standby internal combustion engines are required to obtain a District permit if rated at 50 brake horsepower or greater, but the emissions from this equipment is currently not regulated by VCAPCD. New installations are required to install a BACT equivalent, but many engines which were installed in the past have older technology and higher pollution emissions associated with them. SCAQMD is proposing to reduce emissions from this source category, evaluating the ability to require replacement with low-NOx or zero-emission technology. Due to cost-effectiveness considerations, since these emergency engines are limited to less than 50 hours of operation per year, and the limited access to widely available zero-emission technology, emission reductions are not expected to be realized before VCAPCD's attainment date of 2026.

For the purpose of RACM analysis, adoption of this regulation is estimated no sooner than 2026 which will result in no emission reductions by VCAPCD's attainment year. VCAPCD will monitor potential emission reductions from this source category but at this time there are no potential emission reductions for the purpose of RACM.

APPENDIX E

VENTURA COUNTY

TRANSPORTATION CONTROL MEASURES

REASONABLY AVAILABLE CONTROL MEASURE ASSESSMENT

Introduction

The Clean Air Act (CAA) Section 172(c)(1) requires a review of Reasonably Available Control Measures (RACM) during the Air Quality Management Plan/State Implementation Plan (AQMP/SIP) development process to consider possible Transportation Control Measures (TCMs) that are feasible to implement in Ventura County. For TCMs to be RACM, TCMs must be both technologically and economically feasible and must advance the projected attainment date of the National Ambient Air Quality Standard (NAAQS).

The U.S. Environmental Protection Agency (EPA) left the definitions for technologically and economically feasibility vague so that areas of the country could determine what measures would be feasible or infeasible according to local factors. Factors such as the availability of control measures, ability to achieve emission reductions, and degree of cost effectiveness are the primary considerations on an area-by-area basis. In addition, EPA did not provide a conclusive definition on "advancing attainment," so agencies have based their determination of RACM on whether a measure or group of measures would advance attainment of the NAAQS by at least one year.

The Southern California Area of Governments (SCAG) is the metropolitan planning organization for the Ventura County portion of the South Central Coast Air Basin. Ventura County TCMs are included in both the SCAG Regional Transportation Plan, called Connect SoCal, and the Federal Transportation Improvement Program (FTIP). Emission reductions associated with TCMs are accounted for in the Connect SoCal and FTIP baseline emissions. Thus, the VC AQMP/SIP does not claim TCM emission reductions separately, as an additional benefit, because their reductions are already included in the Connect SoCal and FTIP baseline emissions used for the AQMP/SIP modeling.

In the SCAG region, TCM development and updates are continually conducted through the FTIP process. TCM development, approval, and changes are govern by the FTIP guidelines that establishes procedures for the selection, funding, and completion of TCMs. This "rollover process" was established for Ventura County to replace a process that previously required a SIP update each time a TCM was adopted or replaced. The rollover process continues to regulate the selection and implementation of TCMs through a more comprehensive planning process with local and regional participation.

Methodology

A list of candidate RACM was prepared by the District using TCMs from the Clean Air Act (CAA) Section 108(f)(1)(A), the 2016 Ventura County AQMP and other air district 8-hour ozone plans, such as the 2016 South Coast AQMP, 2016 San Joaquin AQMP, 2017 Sacramento AQMP, and the 2016 San Diego AQMP.

The RACM under consideration were organized according to the sixteen TCM categories listed in CAA Section 108(f), shown below.

i. Programs for improved use of public transit;

ii. Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;

iii. Employer-based transportation management plans, including incentives;

iv. Trip-reduction ordinances;

v. Traffic flow improvement programs that achieve emission reductions;

vi. Fringe and transportation corridor parking facilities, serving multiple occupancy vehicle programs or transit service;

vii. Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration, particularly during periods of peak use;

viii. Programs for the provision of all forms of high-occupancy, shared-ride services, such as the pooled use of vans;

ix. Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;

x. Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;

xi. Programs to control extended idling of vehicles;

xii. Programs to reduce motor vehicle emissions, consistent with Title II of the Clean Air Act, which are caused by extreme cold start conditions;

xiii Employer-sponsored programs to permit flexible work schedules;

xiv. Programs and ordinances to facilitate non-automobile travel, provision, and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;

xv. Programs for new construction and major reconstruction of paths, tracks, or areas solely for the use by pedestrian or other non-motorized means of transportation, when economically feasible and in the public interest; and

xvi. Programs to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.

The District conducted an initial RACM analysis of the candidate list. Each TCM on the list was given a control measure number, title, and a brief description. If a TCM was found feasible for Ventura County, it was recommended as a potential measure for the 2022 AQMP along with the appropriate implementing agency. If a TCM was determined infeasible for Ventura County, it was not recommended as a measure for the 2022 AQMP and a reasoned justification was provided. The RACM list was posted on the VCAPCD website and was presented to the VCTC (Ventura County Transportation Commission) staff and the following committees for their review: Technical Transportation Advisory Committee, Transit Operators Committee, Citizen Transportation Advisory Committee, and Social Services Transportation Advisory Committee, and the SCAG Transportation Conformity Working Group. These groups generally meet on a monthly or quarterly basis and provide opportunities for the public to participate and contribute. The measures are summarized in Table E-1.

Based on this comprehensive analysis and review, the TCMs that were determined to be feasible are already being implemented or have been implemented in Ventura County. Feasible TCMs in the analysis are included in the SCAG Connect SoCal plan and FTIP. Thus, their emission reductions are already included in the baseline emissions used for the AQMP/SIP modeling and may not be claimed again, separately, in the 2022 AQMP. The TCMs that were determined to be infeasible did not meet the criteria for RACM because of the individual reasons provided in the analysis. Moreover, implementing all feasible TCMs in the RACM assessments would not advance Ventura County's 8-hour ozone attainment date by at least one year. This criterion also applies to RACM implementation.

Summary

The CAA Section 172(c)(1) requires a comprehensive review of RACM during the AQMP/SIP development process to ensure the implementation of TCMs in Ventura County as expeditiously as practicable. For TCMs to be considered RACM they must be both economically and technologically feasible and must advance the attainment date of the NAAQS by at least one year. Based on this comprehensive analysis, the TCMs determined to be feasible are either being implemented or have been implemented in Ventura County and are included in the SCAG Connect SoCal and FTIP. The TCMs determined to be infeasible did not meet the criteria for RACM implementation because of the individual reasons provided in the analysis. Moreover, implementing all feasible TCMs in the RACM analysis would not advance Ventura County's 2015 8-hour ozone NAAQS attainment date by at least one year.

Table E-1
2022 Ventura County Reasonably Available Control Measures Analysis

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
Section 108(f) 1. Programs For Improved Public Transit						
1.1	Regional Express Bus Program	Purchase of buses to operate regional express bus services.	yes	yes		Transit Operators, VCTC
1.2	Transit Access to Airports	Operation of transit to airport to serve air passengers.	no	no	Not economically feasible because there are not enough air passengers in Ventura County.	
1.3	Study Benefits of a Particulate Trap Retrofit Program	Examine potential to accelerate application of particulate traps on diesel-powered buses to achieve earlier compliance with State regulations.	yes	yes		Transit Operators, VCAPCD, VCTC
1.4	Major Expansion of Mass Transit	Major change to the scope and service levels.	no	no	Not economically feasible because there is not enough transit demand for order of magnitude increases in spending.	
1.5	Expansion of Public Transportation Systems	Expand and enhance existing public transit services.	yes	yes		Transit Operators, VCTC
1.6	Transit Service Improvements in Combination with Park-and-Ride Lots and Parking Management	Local jurisdictions and transit agency improve the public transit system and add new Park-and-Ride facilities and spaces on an as needed basis.	yes	yes		Cities, County, Transit Operators, VCTC
1.7	Free transit during special events	Offer free transit during selected special events to reduce event-related congestion and associated emission increases.	no	no	No authority to implement, however, individual transit agencies could decide whether this measure would be feasible to implement for them.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
1.8	Require that government employees use transit for home to work trips, expand transit, and encourage large businesses to promote transit use	Require all government employees to use transit a specified number of times per week.	no	no	No authority to implement.	
1.9	Increase parking at transit centers or stops	Encourage transit convenience by providing additional parking at transit centers.	yes	yes		Cities, County, Transit Operators, VCTC
1.10	Expand regional transit connection ticket distribution	Provides interchangeability of transit ticket.	yes	yes		Transit Operators, VCTC
1.11	Provide free public transit during episodes	Provide free transit rides during high level ozone episodes.	no	no	Not economically feasible.	
1.12	Dedicated Bus Lanes	Dedicate or construct lanes for transit bus service.	yes	yes		Cities, County, Transit Operators
1.13	Half Price Fares on Feeder Bus Service	All local transit bus services to rail stations reduce fare by half.	no	yes	Not economically feasible.	
1.14	Real-Time Bus Schedule information	Expand trials of real-time bus schedule information to local transit providers.	yes	yes		Transit Operators, VCTC
1.15	Shorter Distance from Buildings to Bus Stops	For existing buildings, re-route traffic to allow buses to come closer to the building. For new buildings, alter setback requirements to allow closer bus access.	no	no	Not economically feasible, however, some jurisdictions may already have existing requirements for new development.	
1.16	Subscription Services	Free van service to provide transportation for the elderly, handicapped or individuals who have no access to transportation.	no	yes	Not economically feasible, however, some transit agencies provide free bus service w/ ADA or DAR ID.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
1.17	Consolidation of Public Transit Operators	Consolidate all public transit agencies in the County.	no	no	No authority to implement.	
1.18	Transit Voucher Program	Transit vouchers for elderly and low income commuter.	yes	yes		Transit Operators, VCTC
1.19	Bus Signal Priority	Bus signal priority system on bus fleets for increased operation efficiency and travel time savings.	yes	yes		Transit Operators
1.20	Passenger Rail Improvements	Installation of additional platforms, double tracks, concrete ties, bridges, signal relocation.	yes	yes		Cities, Rail Transit Agencies
1.21	Alternative Fuel Buses	Self-explanatory.	yes	yes		Cities, Transit Operators
1.22	Intermodal Centers	Improved transit connection of various travel modes	yes	yes		Cities, Transit Operators
1.23	Maglev	Construct Regional low-speed magnetic levitation transit.	no	no	Not economically feasible.	
1.24	Paratransit Service	Self-explanatory	yes	yes		VCTC, Cities, Transit Operators
Section 108(f) 2. Restriction Of Certain Roads Or Lanes To, Or Construction Of Such Roads Or Lanes For Use By, Passenger Buses Or High Occupancy Vehicles						
2.1	Update High Occupancy Vehicle (HOV) Lane Master Plan	Increase enforcement, increasing occupancy requirements, conversion of existing HOV lanes to bus only lanes, designate new carpool lanes as bus-only lanes, convert mixed flow to HOV to close gaps & extend existing lanes; utilize freeway shoulders for peak-period express bus use; commercial vehicle buy-in to HOV lanes; & appropriateness of HOV lanes for corridors that consider congestion pricing.	yes	yes		Caltrans, SCAG, VCTC

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
2.2	Fixed Lanes for Buses and Carpools on Arterials	Provide fixed lanes for buses and carpools on arterial streets where appropriate.	yes	yes		Caltrans, VCTC
2.3	Expand number of freeway miles available, allow use by alternative fuel vehicles, changes to HOV lane requirements and hours	Various measures evaluated in many ozone nonattainment areas. Specifics vary according to freeway system, use patterns and local characteristics.	yes	yes		ARB, Caltrans
2.4	Express toll lanes/High Occupancy Toll Lanes	Self-explanatory	no	no	Not economically feasible	
Section 108(f) 3. Employer-Based Transportation Management Plans, Including Incentives						
3.1	Commute Solutions	The federal law that complements parking cash-out is called the Commuter Choice Program. It provides benefits that employers can offer to commute to work by methods other than driving alone.	yes	yes		Employers, Transit Operators, VCTC
3.2	Parking Cash-Out	State law requires certain employers who provide subsidized parking for their employees to offer cash allowance in lieu of a parking space.	yes	yes		ARB, Employers
3.3	Employer Rideshare Program Incentives	Employer rideshare incentives and introduction of strategies designed to reduce single occupant vehicle trips. Examples include public awareness campaigns, Transportation Management Associations among employers, alternative work hours, and financial incentives for TCM participants as well as tax breaks for employers.	yes	yes		Employers, VCAPCD, VCTC

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
3.4	Implement Parking Charge Incentive Program	Evaluate feasibility of an incentive program for cities and employers that convert free public parking spaces to paid spaces. Review existing parking polices as they relate to new development approvals.	yes	yes		Cities, County, Employers
3.5	Preferential Parking for Carpools and Vanpools	This measure encourages public and private employers to provide preferential parking spaces for carpools and vanpools to decrease the number of single occupant automobile work trips. The preferential treatment could include covered parking spaces or nearby spaces.	yes	yes		Employers, VCAPCD
3.6	Employee Parking Fees	Encourage public and private employers to charge employees for parking.	no	no	Not technologically feasible because the region is not urbanized enough to make it effective and could have negative effect to public parking areas (curb parking).	
3.7	Merchant Transportation Incentives	Implement "non-work" trip reduction ordinances requiring merchants to offer customers mode shift travel incentives such as free bus passes and requiring owners, managers & developers of large retail establishments to provide facilities for non-motorized modes.	no	no	No authority to implement.	
3.8	Purchase vans for vanpools	Purchase a specified number of vans for use in employee commute travel.	yes	yes		Employers

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
3.9	Encourage merchants and employers to subsidize the cost of transit for employees	Provide outreach and possible financial incentives to encourage local employers to provide transit passes or subsidies to encourage less individual vehicle travel.	yes	yes		VCAPCD, VCTC
3.10	Off-days for ozone alerts just like sick days	On ozone alert days, notify employees through email that there is an ozone alert. Employees are given a pre-specified number of days they can decide not to come in to work on ozone forecast days.	no	no	No authority to implement. Not economically feasible.	
3.11	Pay for in-house meals on ozone action days	Employer pays for meals in-house on ozone alert days so that employees do not travel to off-site locations.	no	no	No authority to implement.	
3.12	Voluntary business closures on ozone action days	A more expensive version of "off-days" for ozone alerts.	no	no	No authority to implement. Not economically feasible.	
3.13	Close government offices on ozone action days to serve as an example	Similar to voluntary business closures.	no	no	No authority to implement.	
3.14	Mandatory compressed work weeks	Self-explanatory.	no	no	No authority to implement. Employer could decide individually if this measure is feasible for them.	
3.15	Adopt a Safe Routes to School Policy	Adopt policy to increase the number of students that walk/bike to school by removing barriers that prevent children and adults from doing so.	yes	yes		Cities, County, School Districts, State, VCAPCD, VCTC
3.16	Increase Walk-to-School Programs	Develop and promote programs that encourage students to walk to school.	yes	yes		Cities, County, School Districts, VCAPCD, VCTC

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
3.17	Showers and Lockers at Work	Provide showers and lockers to encourage walking and biking to work.	yes	yes		Cities, County, State
3.18	Voluntary Employer Parking Cash-out Subsidy	Employers who provide free parking would voluntarily provide the cash equivalent of the parking subsidy to employees who do not drive to work.	yes	yes		Cities, County, Employers, State
3.19	Bike to Workday	Conduct a one-day bike-to-work event. Provide outreach activities, education on the bike-to-work option, and provide assistance in trying bike to work.	yes	yes		Cities, County, VCAPCD, VCTC
3.20	Compressed Work Weeks	Work 80 hours in 9 days, 40 hours in 4 days, or 36 hours in 3 days in lieu of working 40 hours in 5 days.	yes	yes		Employers
3.21	Telecommuting	Goal of specified percentage of employees telecommuting at least one day per week	yes	yes		Employers
3.22	Income Tax Credit to Telecommuters	Provide tax relief to employees who participate in telecommuting programs.	no	no	Requires State legislation	
3.23	Extend parking cash-out rule to more employers	Self-explanatory.	no	no	Requires State legislation	
Section 108(f) 4. Trip Reduction Ordinance						
	In December 1995, Congress changed the Clean Air Act Amendments to make the Employee Commute Option program voluntary (no longer mandatory). California State Law prohibits mandatory employer based trip reduction ordinance programs (Lewis SB 437). Therefore, no mandatory programs can be imposed.					

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
Section 108(f) 5. Traffic Flow Improvement Programs That Achieve Emission Reductions						
5.1	Develop Intelligent Transportation Systems	A variety of technological applications intended to produce more efficient use of existing transportation corridors.	yes	yes		Caltrans, Cities, County, SCAG, Transit Operators, VCTC
5.2	Coordinate Traffic Signal Systems	This measure implements and enhances synchronized traffic signal systems to promote steady traffic flow at moderate speeds.	yes	yes		Cities, County, VCTC
5.3	Reduce Traffic Congestion at Major Intersections	This measure implements a wide range of traffic control techniques designed to facilitate smooth, safe travel through intersections: signalization, turn lanes, median dividers, grade separations.	yes	yes		Cities, County
5.4	Site-Specific Transportation Control Measures	This measure could include geometric or traffic control improvements at specific congested intersections or at other substandard locations. Another example might be programming left turn signals at certain intersections to lag, rather than lead, the green time for through traffic.	yes	yes		Cities, County
5.5	Removal of On-Street Parking	Require all commercial & industrial development to design and implement off-street parking.	no	no	No authority to implement.	
5.6	Reversible Lanes	Implement reversible lanes on arterial streets to improve traffic flow where appropriate.	no	no	Not technologically feasible because there is not sufficient congestion.	
5.7	One-Way Streets	Redesignate streets (or portions of downtown areas) as one-way to improve traffic flow where appropriate.	yes	yes		Cities, County

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
5.8	On-Street Parking Restrictions	Restrict on-street parking where appropriate.	no	no	No authority to implement.	
5.9	Bus Pullouts in Curbs for Passenger Loading	Provide bus pullouts in curbs, or queue jumper lanes for passenger loading and unloading.	yes	yes		Cities, County, Transit Operators, VCTC
5.10	Additional Freeway Service Patrol	Operation of new roving tow truck patrols to clear incidents and reduce delay on freeways during peak periods.	yes	yes		VCTC
5.11	Consider scheduling of arterial and highway maintenance to exclude ozone action days if the maintenance activities require lane reductions on heavily utilized arterials and highways	Self-explanatory.	yes	no		Caltrans, Cities, County, VCAPCD
5.12	Reroute trucks on ozone action days	Self-explanatory.	yes	no		VCAPCD
5.13	Fewer stop signs	Improve flow-through traffic by removing stop signs.	no	no	Not technologically feasible because the safety issue outweighs the potential small air quality benefit.	
5.14	Ban left turns	Banning all left turns would stop the creation of bottlenecks, although slightly increasing travel distances.	no	no	No clear demonstration of air quality benefits.	
5.15	Adaptive traffic signals and signal timing	Self-explanatory.	yes	yes		Caltrans, Cities, County
5.16	Freeway bottleneck improvements (add lanes, construct shoulders, etc.)	Identify key freeway bottlenecks and take accelerated action to mitigate them.	yes	yes		Caltrans, SCAG, VCTC

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
5.17	Minimize impact of construction on traveling public. Have contractors pay when lanes are closed as an incentive to keep lanes open	Prohibit lane closures during peak hours, limit construction to weekends or nights.	yes	yes		Caltrans, Cities, County
5.18	Internet provided road and route information	Reduce travel on highly congested roadways by providing accessible information on congestion and travel.	yes	yes		Caltrans
5.19	Regional route marking systems to encourage underutilized capacity	Encourage travel on local roads and arterials by better route marking to show alternatives.	yes	yes		Caltrans, Cities, County, VCTC
5.20	Congestion management field team to clear incidents	Self-explanatory.	no	no	Not economically feasible. Current and projected congestion levels are too low to warrant measure.	
5.21	Use dynamic message signs to direct/smooth speeds during incidents	Self-explanatory.	yes	yes		Caltrans
5.22	Get real-time traffic information to drivers	Self-explanatory.	yes	yes		Caltrans, VCTC
5.23	55 mph speed limit during ozone season	Self-explanatory.	no	no	No authority to implement. The measure requires state legislative change.	
5.24	Require 40 mph speed limit on all facilities	Self-explanatory.	no	no	No authority to implement. The measure requires state legislative change.	
5.25	Require lower speeds during peak periods	Self-explanatory.	no	no	No authority to implement. The measure requires state legislative change.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
5.26	Street Intersection Realignment	Realign skewed intersections to provide better traffic flow and safety.	yes	yes		Caltrans, Cities, County
5.27	Extend Ramp Metering	Install signals to control flow of vehicles at selected freeway ramp entrances to maintain level of service.	yes	yes		Caltrans
5.28	Road Hazard Reporting	Provide real-time traffic information to help drivers make decisions about when and where to travel.	yes	yes		Caltrans
5.29	On-street Parking Restrictions	Restrict on-street parking where appropriate.	yes	yes		State, County, Cities
5.30	Roundabouts at Low Traffic Intersections	Construct roundabouts and remove stop signs as appropriate.	yes	yes		County, Cities
5.31	Eco-Driving Educational Program	Education program on improve vehicle efficiency by improving driving habits.	no	no	No clear demonstration of emission reduction benefits.	
Section 108(f) 6. Fringe And Transportation Corridor Parking Facilities Serving Multiple Occupancy Vehicle Programs Or Transit Service						
6.1	Park and ride lots	Develop, design, and implement new Park and Ride facilities in locations where they are needed.	yes	yes		Caltrans, Cities, County, Transit Operators, VCTC
6.2	Park and ride lots serving perimeter counties	Specific to a locality.	yes	yes		Cities, County, SCAG, VCTC
6.3	Regional Parking Regulation to Provide Incentives for alternative transportation modes	Regulation to provide parking facilities and designs to encourage carpools, vanpools, and bicycling.	yes	yes		Cities, County, SCAG, VCTC
Section 108(f) 7. Programs To Limit Or Restrict Vehicle Use In Downtown Areas Or Other Areas Of Emission Concentration Particularly During Periods Of Peak Use						
7.1	Off-Peak Goods Movement	Implement an ordinance to restrict truck deliveries by time or place to minimize traffic congestion during peak periods.	no	no	No authority to implement. Cities could decide individually if this measure is feasible for them.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
7.2	Truck Restrictions During Peak Periods	Implement an ordinance to restrict truck travel during peak periods to minimize traffic congestion.	no	no	No authority to implement. Cities could decide individually if this measure is feasible for them.	
7.3	Involve school districts to encourage walking to school	Decrease vehicle emissions due to school trips by reducing these trips through education and out-reach programs.	yes	yes		School Districts, VCAPCD
7.4	Adjust school hours so they do not coincide with peak traffic periods and ozone seasons	Measure to reduce travel during peak periods and ozone-contributing periods in the early morning.	no	no	No authority to implement.	
7.5	Area-wide tax for parking	Reduce driving by limiting parking through pricing measures.	no	no	No authority to implement.	
7.6	Increase parking fees	Same as above.	no	no	No authority to implement.	
7.7	Graduated pricing starting with highest in Central Business District (CBD)	Charge the most for parking in the central business or other high volume areas in a city to discourage vehicle travel in these areas.	no	no	No authority to implement.	
7.8	Buy parking lots and convert to other land use	Limit parking by converting available parking to other land uses to discourage driving.	no	no	Not technologically feasible because the area is too rural to be able to make this effective.	
7.9	Limit the number of parking spaces at commercial airlines to support mass transit	Reduce airport travel by limits on parking at airports.	no	no	Not technologically feasible because it is at the discretion of regional and local airport authority to make land use decisions pertaining to airports.	
7.10	No CBD vehicles unless LEV, alternative fuel, or electric	Define high-use areas and ticket any vehicles present unless they are low emitting, alternative fueled or electric.	no	no	No authority to implement.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
7.11	Auto restricted zones	No vehicles allowed in certain areas where high emissions and, congestion contribute to ozone problems.	no	no	No authority to implement.	
7.12	Incentives to increase density around transit centers	Lower travel by increasing residential and commercial density in areas near transit.	yes	yes		Cities, County
7.13	Land use/air quality guidelines	Guidelines for development that contributes to air quality goals.	yes	yes		VCAPCD
7.14	Incentives for cities with good development practices	Provide financial or other incentives to cities that practice air quality-sensitive development.	yes	yes		ARB, SCAG, State Legislature
7.15	Cash incentives to foster jobs/housing balance	Specific to locality – encouraged by California Clean Air Plan.	yes	yes		ARB, Cities, County, SCAG, VCAPCD
7.16	Trip reduction oriented development	Specific to locality – encouraged by California Clean Air Plan.	yes	yes		ARB, Cities, County, SCAG, VCAPCD
7.17	Transit oriented development	Specific to locality – encouraged by California Clean Air Plan.	yes	yes		ARB, Cities, County, SCAG, VCAPCD
7.18	Sustainable development	Specific to locality – encouraged by California Clean Air Plan.	yes	yes		ARB, Cities, County, SCAG, VCAPCD
7.19	Increase fees for parking garages and meters during ozone episodes	Increase fees for parking garages to deter vehicle use during high ozone level days.	no	no	Not economically feasible.	
7.20	Charge city-owned parking garage pass holders a fee for more than one entrance and exit each day	Extra charges for pass holders to deter additional vehicle use and vehicle trips.	no	no	Not economically feasible.	
7.21	VMT Tax	Charge VMT tax per mile for all vehicles registered or garaged in the region.	no	no	Need state legislation.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
7.22	Smart Parking Detection System	Utilize mobile communication devices to access the parking availability at multiple sites.	yes	yes		Cities
7.23	Programs to Encourage Goods Movement by Rail	Self-explanatory	yes	yes		CARB
7.24	Divert Trucks from Nonattainment Areas	Require H-D trucks passing through the SCAG region to choose routes away from the SCAG region.	no	no	No authority to implement and not feasible because the SCAG region is all in a nonattainment area.	
Section 108(f) 8. Programs For The Provision Of All Forms Of High-Occupancy, Shared-Ride Services						
8.1	Financial Incentives, Including Zero Bus Fares	Provide financial incentives or other benefits, such as free or subsidized bus passes and cash payments for not driving, in lieu of parking spaces for employees who do not drive to the workplace.	yes	yes		Employers
8.2	Internet ride matching services	Provide match-lists, route info, hours, and contact information over the internet to assist individuals in joining or developing carpools.	yes	yes		SCAG, VCTC
8.3	Preferential parking for carpoolers	Provide free, covered, near-building or similar incentives to carpoolers.	yes	yes		Cities, County, Employers, VCTC
8.4	Credits and incentives for carpoolers	Self-explanatory.	yes	yes		Cities, County, Employers, VCTC
8.5	Employers provide vehicles to carpoolers for running errands or emergencies	Having vehicles available for work-day errands makes it easier to go to work without one.	yes	yes		Cities, County, Employers
8.6	School carpools	Self-explanatory.	no	no	No authority to implement.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
8.7	Guaranteed ride home	Provide guaranteed rides via taxi, rental cars, etc. to carpoolers & vanpoolers who are left without a ride home.	yes	yes		Employers, VCTC
8.8	Auto sharing Program	Fund incentives for new auto sharing customers (i.e., Zipcar, etc.).	yes	yes		Cities, County, VCTC
8.9	Subscription Services	Free van services to provide transportation for the elderly handicapped or other individuals who have no access to transportation.	yes	yes		County, VCTC, Employers
8.10	Rideshare and Vanpool Services	Non-employer based rideshare and vanpool option near transit stations.	yes	yes		CTC, Transit Operators, Cities, County
Section 108(f) 9. Programs To Limit Portions Of Road Surfaces Or Certain Sections Of The Metropolitan Area To The Use Of Non-Motorized Vehicles Or Pedestrian Use, Both As To Time And Place						
9.1	Establish Auto Free Zones and Pedestrian Malls	Establish auto free zones and pedestrian malls where appropriate.	yes	yes		Cities, County
9.2	Encouragement of Pedestrian Travel	Encourage the use of pedestrian travel as an alternative to automobile travel. Pedestrian travel is quite feasible for short shopping, business, or school trips. Promotion of pedestrian travel could be included in air pollution public awareness efforts to remind people of this basic alternative.	yes	yes		SCAG, VCTC, VCAPCD
9.3	Bicycle & Pedestrian Program	Fund high priority projects in countywide plans consistent with funding availability.	yes	yes		Cities, County, VCTC
9.4	Close certain roads for use by non-motorized traffic	During special events, weekends, or certain times of the day, close some roads to all but non-motorized traffic.	yes	yes		Cities, County

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
9.5	Encouragement of Bicycle Travel	Promotion of bicycle travel to reduce automobile use and improve air quality. Bikeway system planning, routes for inter-city bike trips to help bicyclists avoid other, less safe facilities. Another area for potential actions is the development and distribution of educational materials regarding bicycle use and safety.	yes	yes		Caltrans, Cities, County, VCAPCD, VCTC
9.6	Free Bicycles	Provide simple utilitarian bikes that can be used throughout the metro area and dropped off at destination for use by anyone desiring use.	no	no	No authority to implement. Evidence suggests that bicycle theft & dumping is a problem in other programs and renders this measure not technically and economically feasible.	
9.7	Cash Rebates for Bicycles	Provide financial incentives to purchase bicycles and thereby encourage use.	no	no	No clear demonstration of air quality benefits.	
9.8	Close streets for special events for use by bikes and pedestrians	Self-explanatory.	yes	yes		Cities, County
9.9	Use condemned dirt roads for bike trails	Self-explanatory.	no	no	Not applicable because there are no condemned dirt roads in the region.	
9.10	Safe Routes to School Programs	Encourage educational and encouragement programs for families and schools and support policies to improve pedestrian and bicycle safety.	yes	yes		State, County, VCTC, Cities

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
Section 108(f) 10. Programs For Secure Bicycle Storage Facilities And Other Facilities, Including Bicycle Lanes, For The Convenience And Protection Of Bicyclists, In Both Public And Private Areas						
10.1	Bike racks at work sites	Self-explanatory.	yes	yes		Cities, County, Employers, VCTC
10.2	Bike Racks on Buses	Bike racks would be placed on a to-be-determined number of buses to increase bicycle travel.	yes	yes		Transit Operators, VCTC
10.3	Regional Bike Parking Ordinance for all new construction	Bike Transit Centers for/at all employment centers 100+ employees: Bike lockers, clothing lockers, showers, cleaners drop-off and pick-up. Bike repair and rental.	no	no	No authority to implement.	
10.4	Bike lockers at Metro stations, park & ride lots, other locations	Expand existing bike lockers at Metrorail stations; install bicycle storage spaces in parking lots.	no	no	Not economically feasible.	
10.5	Development of bicycle travel facilities	Encourages a variety of capital improvements to increase bicycle use. Off-street bikeways where high-speed roadways preclude safe bicycling. Clearly mark travel facilities signs and provide adequate maintenance.	yes	yes		Cities, County, VCTC
10.6	Provide bike pedestrian facilities safety patrols	Self-explanatory.	yes	yes		Cities, County
10.7	Inclusion of bicycle lanes on thoroughfare projects	Self-explanatory.	yes	yes		Cities, County, State
10.8	Bicycle lanes on arterial and frontage roads	Self-explanatory.	yes	yes		Cities, County, State
10.9	Bicycle route lighting	Self-explanatory.	yes	yes		Cities, County, State

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
10.10	Expedite bicycle projects from the RTP/SCS	Create bicycle and pedestrian master plan and build out at an accelerated rate to achieve benefits in time for attainment deadline.	yes	yes		Cities, County, SCAG, VCTC
10.11	Complete Streets	Install bicycle and pedestrian facilities, upgrade traffic control systems, urban design improvements, streetlights, and transit connections.	yes	Yes		Cities, County, VCTC, Transit Operators
10.12	Bike Share	Provide bike-share and neighborhood electric vehicle transit services in downtown areas.	yes	yes		Cities, County, Transit Operators
10.13	Bike Purchase Incentives	Cash incentives to transit riders to purchase collapsible or electric bikes.	yes	yes		Cities
10.14	Longer Bike Racks on Buses	Install or modify bike rack on transit buses to accommodate up to three bikes.	yes	yes		Transit Operators
10.15	Greenway Network	Use riverbeds and other rights-of-way for bike and pedestrian paths to separate them from auto traffic.	yes	yes		Cities, County
10.16	First Mile/Last Mile Program	Variety of strategies to encourage active transportation including wayfinding, sidewalk improvements, pedestrian priority signalization, and bike/pedestrian facilities near transit.	yes	yes		VCTC, Transit Operators

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
Section 108(f) 11. Programs To Control Extended Idling Of Vehicles						
11.1	Limit Excessive Car Dealership Vehicle Starts	Require car dealers to limit the starting of vehicles for sale on their lot(s) to once every two weeks. Presently, a few new and used car dealers start their vehicles daily to avoid battery failure and assure smooth start-ups for customer test drives.	no	no	Not technologically feasible because vehicles in the South Central Coast are started much less frequently than in colder climates.	
11.2	Limitations on Vehicle Idling	Limitations to limit extended idling operations of trucks.	yes	yes		ARB, VCAPCD
11.3	Turn off engines while stalled in traffic	Public outreach or police-enforced program.	no	no	The measure raises safety and congestion concerns and has no clear demonstration of air quality emissions benefits.	
11.4	Restrict idling	Require idle limits for trucks.	yes	yes		ARB, VCAPCD
11.5	Reduced idling at drive-throughs. Close window service	Mandate no idling or do not allow drive-through windows during ozone season.	no	no	No clear demonstration of air quality emissions benefits. This measure is not economically feasible.	
11.6	Promote use of Pony engines	Use special battery engines to keep air conditioning and other truck systems working while truck not in use.	yes	yes		ARB, VCAPCD
11.7	Idle restrictions at airport curbsides	Police enforced.	no	no	No commercial airport in county. This measure is implemented based on security restrictions.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
11.8	Control extended idling of Buses and Trucks	Step-up enforcement of existing regulations to prevent extended vehicle idling.	no	no	Not economically feasible. Enforcement of idle restrictions is a low priority for police relative to their other duties.	
11.9	Reduce idling at schools	Self-explanatory	yes	yes		CARB
11.10	Outlaw idling in parking lots	Self-explanatory and police enforced program.	no	no	Not economically feasible. Enforcement of idle restrictions is a low priority for police relative to their other missions. The cost effectiveness of this measure has not been demonstrated.	
11.11	Truck Stop Electrification	Provide electric charging stations at truck stops to power heating/AC units and other on-board equipment.	yes	yes		ARB, Caltrans, VCTC
Section 108(f) 12. Program To Reduce Motor Vehicle Emissions, Consistent With Title II, Which Are Caused By Extreme Cold Start Conditions						
The definition of an "extreme cold start" specifies temperatures below 20 degrees Fahrenheit. Not applicable in the South Central Coast - no extreme cold start conditions.						
Section 108(f) 13. Employer-Sponsored Programs To Permit Flexible Work Schedules						
13.1	Alternative Work Schedules	Enables workers to choose their own working hours within certain constraints. Flextime provides the opportunity for employees to use public transit, ridesharing, and other nonmotorized transportation. A related strategy, staggered work hours, is designed to reduce peak congestion in the vicinity of the workplace.	yes	yes		Employers, VCAPCD

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
13.2	Modifications of Work Schedules	Implement alternate work schedules that flex the scheduled shift time for employees. Encourage the use of flexible or staggered work hours to promote off-peak driving and accommodate the use of transit and carpooling.	yes	yes		Employers, VCAPCD
13.3	Telecommunication-Telecommuting	Encourage the use of telecommuting in place of motor vehicle use where appropriate.	yes	yes		SCAG, VCAPCD
Section 108(f) 14. Programs And Ordinances To Facilitate Non-Automobile Travel, Provision And Utilization Of Mass Transit, And To Generally Reduce The Need For Single-Occupant Vehicle Travel, As Part Of Transportation Planning And Development Efforts Of A Locality, Including Programs And Ordinances Applicable To New Shopping Centers, Special Events, And Other Centers Of Vehicle Activity						
14.1	Areawide Public Awareness Programs	This measure focuses on conducting ongoing public awareness programs throughout the year to provide the public with information on air pollution and encourage changes in driving behavior and transportation mode use.	yes	yes		VCAPCD, VCTC
14.2	Special Event Controls	This measure would require new and existing owners/operators of the special event centers to reduce mobile source emissions generated by their events. A list of optional strategies would be available that reduce mobile source emissions. The definition of "special event center" could be developed through the rule development process.	yes	yes		VCAPCD

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
14.3	Land Use/Development Alternatives	This measure includes encouraging land use patterns which support public transit and other alternative modes of transportation. In general, this measure would also encourage land use patterns designed to reduce travel distances between related land uses (e.g., residential-commercial). Shorter trip lengths ultimately relieve traffic congestion and improve air quality.	yes	yes		Cities, County, SCAG, VCTC
14.4	Voluntary No Drive Day Programs	Conduct voluntary no drive day programs during the ozone season through media and employer based public awareness activities.	yes	yes		VCAPCD
14.5	Evaluation of the Air Quality Impacts of New Development and Mitigation of Adverse Impacts	Evaluate the air quality impacts of new development and mitigate any adverse impacts.	yes	yes		Cities, County, VCAPCD
14.6	Transportation for Livable Communities /Housing Incentives Program	Program provides planning grants, technical assistance, and capital grants to help cities and nonprofit agencies define and implement transportation projects that support community plans including increased housing near transit.	yes	yes		SCAG, State, VCTC
14.7	Incentives to increase density around transit centers	Lower travel by increasing residential and commercial density in areas near transit.	yes	yes		Cities, County
14.8	Incentives for cities with good development practices	Provide financial or other incentive to local cities that practice air quality sensitive development.	yes	yes		Cities, SCAG, State

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
14.9	Increase state gas tax	Self-explanatory.	no	no	No authority to implement and no clear demonstration of air quality benefits.	
14.10	Notification of Spare the Air	This measure focuses on conducting ongoing public awareness programs throughout the year to provide the public with information on air pollution and encourage changes in driving behavior and transportation mode use.	yes	yes		VCAPCD
14.11	Display air quality data on billboards	Self-explanatory.	no	no	Not economically feasible.	
14.12	Sell clean air license plate to fund air quality programs	Self-explanatory	no	no	Need state legislation. No clear demonstration of air quality benefits.	
14.13	Government Action Days (spare the air day, ozone action day)	Declare a Spare The Air day when ozone levels reach episodic thresholds so that the public is informed and encouraged to scale back activities generating pollutants.	yes	yes		VCAPCD
14.14	Vehicle tax for two or more vehicles per household	Initiate legislation to put a vehicle tax on household with two or more vehicles.	no	no	Need state legislation. No clear demonstration of air quality benefits. Not economically feasible.	
14.15	Pay-As-You-Drive Insurance	Self-explanatory.	no	no	Need state legislation. No clear demonstration of air quality emissions benefits.	
Section 108 (f) 15. Programs For New Construction And Major Reconstructions Of Paths, Tracks Or Areas Solely For The Use By Pedestrian Or Other Non-Motorized Means Of Transportation When Economically Feasible And In The Public Interest. For Purposes Of This Clause, The Administrator Shall Also Consult With The Secretary Of The Interior						
15.1	Encouragement of Pedestrian Travel	Promote public awareness and use of walking as an alternative to the motor vehicle	yes	yes		ARB, SCAG, VCAPCD

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
15.2	Pedestrian and Bicycle Overpasses Where Safety Dictates	Ongoing implementation as development occurs.	yes	yes		Cities, County
15.3	Require inclusion of bicycle lanes on state and federally funded thoroughfare projects	Require bicycle lanes on all state and federally funded road projects.	no	no	No authority to implement. Not economically feasible.	
15.4	Require inclusion of paved shoulders adequate for bicycle use on state or federally funded reconstruction or widening of federal collectors	Require paved shoulders on state and federally funded roads that require reconstruction or widening.	no	no	No authority to implement. Not economically feasible.	
Section 108(f) 16. Program To Encourage The Voluntary Removal From Use And The Marketplace Of Pre-1980 Model Year Light Duty Vehicles And Pre-1980 Model Light Duty Trucks						
16.1	Counties assess $10 license plate fee to fund repair/replacement program for high-emitters	Self-explanatory.	no	no	No authority to implement.	
16.2	Buy vehicles older than 1975	Self-explanatory.	yes	yes		ARB, VCAPCD
16.3	Demolish impounded vehicles that are high emitters	Self-explanatory.	no	no	No authority to implement. Not economically feasible.	
16.4	Do whatever is necessary to allow cities to remove the engines of high emitting vehicles (pre-1980) that are abandoned and to be auctioned	Self-explanatory.	no	no	No authority to implement. Not economically feasible.	
16.5	Accelerated retirement program	Identify high emitting vehicle age groups and develop a program to remove them from use.	yes	yes		ARB, VCAPCD

APPENDIX F
VENTURA COUNTY
OZONE REASONABLY AVAILABLE CONTROL MEASURES ASSESSMENT
STATE SOURCES

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

California Air Resources Board
Planning and Technical Support Division
Sacramento, California

Overview

To fulfill Clean Air Act (the Act) control measure requirements for ozone nonattainment areas an assessment of control measures in the SIP must be performed. For ozone nonattainment areas, the control measures must be shown to be Reasonable Available Control Measures (RACM). Since the California Air Resources Board (CARB) is responsible for measures to reduce emissions from mobile sources needed to attain the national ambient air quality standards (standards), this appendix demonstrates that for the 70 parts per billion (ppb) 8-hour ozone standard, California's mobile source measures meet the RACM requirement in Ventura County.

RACM Requirements

U.S. 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 ozone nonattainment.

To ensure it continue 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.

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 U.S. 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 engines[1] – provided that the 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 the Zero-Emission Vehicle (ZEV) and the Low-Emission Vehicle III (LEV III) regulations); the On-Board

[1] Locomotives and engines less than 175 horsepower (hp) used in farm and construction equipment are exempt from California's waiver authority.

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: the 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 the Portable Equipment Registration Program (PERP).

Additionally, CARB obtained an authorization from U.S. 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.

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 today.

CARB is developing its 2022 State Strategy for the State Implementation Plan (2022 State SIP Strategy)[2] 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 ozone standard, 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

[2] CARB 2022 State Strategy for the State Implementation Plan (2022 State SIP Strategy) https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy

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.

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 proposed measures included in the Draft 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.

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 2 (ACC2), a measure in the 2016 State SIP Strategy, is a significant effort critical to meeting air quality standards and will be finalized this year. ACC2 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.

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 Draft 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 Draft 2022 State SIP Strategy also proposes the Zero-Emission Truck Measure, which would accelerate the number of zero-emission heavy-duty vehicles beyond existing measures and the proposed Advanced Clean Fleets regulation. The Zero-Emission Truck 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 not unduly 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 incentive 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.

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 Draft 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 unit (TRU) 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 Draft 2022 State SIP Strategy includes the proposed 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 U.S. EPA and European Stage V nonroad regulations and would require the use of best available control technologies for both PM and NOx.

CARB is also developing a proposed measure, as described in the Draft 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 Voucher Incentive Project 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.

Marine Sources

Commercial harbor craft include any private, commercial, government, or military marine vessels including, but not limited to ferries, excursion vessels, tugboats (including ocean-going tugboats), barges, and commercial and commercial passenger fishing boats. CARB's Commercial Harbor Craft Regulation (CHC Regulation) was adopted in 2007 to reduce toxic and criteria emissions to protect public health and subsequently amended in 2010. As described in the Draft 2022 State SIP Strategy, the Board also adopted amendments to the CHC Regulation in March 2022, which establish expanded and more stringent in-use requirements to cover more vessel categories and mandate accelerated deployment of zero-emission and advanced technologies in vessel categories where technology feasibility has been demonstrated.

To reduce emissions from Ocean Going Vessels (OGV), CARB has adopted to date the Ocean-Going Vessel Fuel Regulation "Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline" (2008) and the Ocean-Going Vessels At-Berth Regulation (2007). The At-Berth Regulation requires container ships, passenger ships, and refrigerated-cargo ships at six California ports to meet compliance requirements for auxiliary engines while they are docked, including emission or power reduction requirements. Reduced vessel speeds also provide emission reduction benefits, and programs are operated by local air districts along the California coast to incentivize lower speeds. CARB staff received comments during the public process about including a statewide vessel speed reduction program. In the Draft 2022 State SIP Strategy, the CARB measure for 'Future Emissions Reductions from Ocean-Going Vessels' discusses pursuing

options available under CARB authority to achieve further emissions reductions, including developing a statewide vessel speed reduction program.

To control emissions from personal watercraft, CARB staff is also exploring development of Spark-Ignition Marine Engine Standards, as described in the Draft 2022 State SIP Strategy. For this measure, CARB would develop and propose catalyst-based standards for outboard and personal watercraft engines greater than or equal to 40 kW in power that will gradually reduce emission standards to approximately 70 percent below current levels and consider actions that would require a percentage of outboard and personal watercraft vessels to be propelled by zero-emission technologies for certain applications.

Taken together, California's comprehensive suite of emission standards, fuel specifications, and incentive programs for marine 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.

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.

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. U.S. EPA has previously acknowledged the strength of the program through the waiver process, and in their approvals of CARB's regulations and District plans.

In its 2020 approval of Ventura County's 75 ppb 8-hour ozone standard, which included the State's current control program and new measure commitments from the 2016 State SIP Strategy, U.S. EPA found that,

"CARB and the Southern California Association of Governments (SCAG) provide for the implementation of RACM for mobile sources of NOx and VOC; there are no additional RACM that would advance attainment of the 2008 ozone NAAQS in Ventura County by at least one year; and therefore, the 2016 Ventura County AQMP provide for the implementation of all RACM as required by [the] CAA."[3]

In addition to declarations that the mobile source control program meets RACM requirements, U.S. EPA has also provided past determinations that CARB's mobile source control programs meet the more rigorous Best Available Control Measure (BACM) requirements. As BACM requirements are considered a more stringent threshold to meet than RACM, U.S. EPA has stated that a determination that the control program has met BACM requirements also constitutes a conclusion that it meets RACM requirements.[4] U.S. EPA has acknowledged CARB's mobile source control program as meeting BACM in their 2020 approval of the San Joaquin Valley's PM2.5 Serious Area 2018 Plan, [5] and in their 2019 approval of the South Coast's PM2.5 Serious Area Plan.[6] In their 2018 proposal for that approval, U.S. 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."[7]

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 U.S. EPA RACM guidance. Through this process, CARB found that with the current mobile source control program and proposed measures, there are no additional reasonable available control measures that would advance

[3] 85 FR 11814 https://www.govinfo.gov/content/pkg/FR-2020-02-27/pdf/2020-03246.pdf

[4] "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 available''). Consequently, our proposed approval of the… provisions relating to the implementation of BACM also constitutes a proposed finding that the Plan provides for the implementation of RACM."
69 FR 5411 https://www.federalregister.gov/documents/2004/02/04/04-2264/approval-and-promulgation-of-implementation-plans-for-california-san-joaquin-valley-pm-10

[5] 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

[6] 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

[7] 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

attainment of the 70 ppb 8-hour ozone standard in the Ventura County 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.

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 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.

U.S. EPA also regulates consumer products. U.S. EPA's consumer products regulation was promulgated in 1998, however, federal consumer products VOC limits have not been revised since their adoption. U.S. 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 U.S. EPA's requirements. Other jurisdictions, such as the Ozone Transport Commission states, have established VOC limits for consumer products which 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.

RACM for Pesticides

The Department of Pesticide Regulation (DPR) is the State agency responsible for regulating the application of pesticides, which are a source of VOCs in Ventura County. California began including in the SIP controls to reduce VOC emissions from pesticide applications in the 1994 Ozone SIP. The 1994 Ozone SIP included a commitment to reduce VOC emissions from pesticide use 20 percent below the 1990 baseline emission levels by 2005, with flexibility to achieve reductions of less than 20 percent if less pesticidal VOC emissions reductions were needed in a given district. This commitment, known as the 1994 Pesticide Element, governed the application of agricultural and structural pesticides in five California nonattainment areas: South Coast, San Joaquin Valley, Sacramento Metro, Ventura County, and the Southeast Desert.

Under the Pesticide Element of the 1994 Ozone SIP, California's commitment for Ventura County was to adopt and submit to U.S. EPA by 1997, any regulations necessary to reduce VOC emissions resulting from agricultural and structural pesticides in Ventura by 20 percent of the

1990 base year emissions, and by 2.4 tons per day, by 2005.[8] This aligns with the 2007 Revised Pesticide Element for Ventura County, which requires that VOC emissions from agricultural and commercial structural pesticides do not exceed the targeted threshold of 20 percent below 1990 base year emissions.[9]

DPR compiles and publishes annual reports on VOC emissions from pesticides. In its latest report, DPR identified that VOC emissions in the Ventura County nonattainment area were 72 percent lower than the 1990 base year, and remain in compliance with the SIP goal benchmark of 20 percent below 1990 levels.[10] Beyond ensuring that the control measures in Ventura County are maintaining that VOC emissions from pesticides do not exceed the prescribed limits, DPR assessment indicates that no other state, aside from California, is required to adopt into their SIP measures to reduce VOC emissions from pesticides. This requirement suggests that the California pesticide control program exceeds the RACT threshold of 'reasonably available' control technologies, and meet at least the more stringent threshold of "Best available" control technologies (BACT).

Finally, the pesticide control program currently being implemented in Ventura County has been found by U.S. EPA to meet RACT/RACM requirements. In 2012, as part of their final approval of California's 2009 Field Fumigant Regulations and the Revised SIP Commitment for the SJV, U.S. EPA evaluated California's field fumigant regulations for the South Coast, Ventura County, Southeast Desert, San Joaquin Valley, and Sacramento Metropolitan nonattainment areas, and concluded that the controls met RACT requirements:

"[U.S.] EPA believes, based on the information provided in the CDPR's alternatives analysis, and the research cited to support it, that CDPR has demonstrated that the proposed regulations are stringent enough to implement RACT-level controls on the application of pesticides."[11]

U.S. EPA has also approved the RACM demonstration in the 80 ppb 8-hour ozone SIPs for the South Coast and San Joaquin Valley, including the VOC control measures,[12] as well as the RACM demonstration in the PM2.5 SIP for the South Coast.[13] Finally, U.S. EPA has also determined that California's pesticide control program meets the more stringent control level requirements of BACM, as was affirmed in the Technical Support Document for U.S. EPA's action to approve California's 2009 Field Fumigant Regulations and the Revised SIP

[8] 73 FR 21885 Proposed Approval of the Revised Pesticide Element for Ventura County (April 23, 2008).
[9] 62 Federal Register 1169-1170; January 8, 1997
[10] California DPR October 2021 "Annual Report on Volatile Organic Compound Emissions from Pesticides for 1990 – 2019"
https://www.cdpr.ca.gov/docs/emon/vocs/vocproj/2019_voc_annual_report.pdf
[11] U.S. EPA *Technical Support Document for Final Rule* (August 14, 2012)
https://www.regulations.gov/document/EPA-R09-OAR-2012-0194-0023
[12] See 77 FR 12652 (March 1, 2012) (SJV 2007 8-hour Ozone SIP), and 77 FR 12674 (March 1, 2012) (South Coast 8-hour Ozone Plan)
[13] 76 FR 69928 (November 9, 2011)

Commitment, [14] wherein they reference their prior approval of the PM10 SIPs for South Coast and Southeast Desert[15] and other SIPs:

"The approval of the fumigant regulations is consistent with these approved RACM/BACM demonstrations and therefore will not interfere with these SIPs' compliance with the RACM/BACM requirements."

In summary, DPR's pesticide regulations represent all measures that are technologically and reasonably available in the context of Ventura County's 70 ppb 8-hour ozone attainment plan. There are no additional measures that, when considered in aggregate, would advance the attainment date by at least one year.

[14] U.S. EPA *Technical Support Document for Final Rule* (August 14, 2012) https://www.regulations.gov/document/EPA-R09-OAR-2012-0194-0023
[15] 70 FR 69081 (November 14, 2005)

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APPENDIX G

VENTURA COUNTY

LIST OF PRE-BASE EMISSION INVENTORY YEAR BANKED EMISSION REDUCTION CREDITS

Table G-1 provides a list of pre-2018 emission reduction credits (ERCs).

Table G-1
ERCs by Company and Certificate (tons per year)

Company Name	Area of County	ERC	ROC	NOx	PM10	SOx
ABA Energy Corporation	Oxnard	1219	0.49	0	0	0
ABA Energy Corporation	Camarillo	1240	7.41	0	0	0
Aera Energy LLC	Ventura (Ojai)	1036	0	0.39	0.44	0.04
Aera Energy LLC	Ventura (Ojai)	1053	0.02	0.1	0.01	0
Aera Energy LLC	Ventura (Ojai)	1087	2.17	0	0	0
Aera Energy LLC	Ventura (Ojai)	1064	0.34	0	0	0
Aera Energy LLC	Ventura (Ojai)	1063	4.11	2.07	0.12	0.01
Aera Energy LLC	Ventura (Ojai)	1062	0.87	5.38	0.32	0.03
Aera Energy LLC	Ventura (Ojai)	1059	0.31	0.31	0.16	0.01
Aera Energy LLC	Ventura (Ojai)	1058	0.1	0.31	0.02	0
Aera Energy LLC	Ventura (Ojai)	1128	0	0	0	0.01
Aera Energy LLC	Ventura (Ojai)	1130	0	0	0	0.3
Aera Energy LLC	Ventura (Ojai)	1129	0.85	0	0.17	0.03
Aera Energy LLC	Ventura (Ojai)	1127	224.84	0	0	0
Aera Energy LLC	Ventura (Ojai)	1238	0.27	0	0	0
Aera Energy LLC	Santa Paula	1038	1.33	3.34	0.45	0.01
Amgen Inc.	Camarillo	1101	0	4.79	0	0
Amgen Inc.	Thousand Oaks	1141	0.11	0	0.07	0.01
Ample Resources, Inc.	Ventura (Ojai)	1213	0.01	0	0	0
BMW of North America, LLC	Oxnard	1210	0.36	0.23	0.03	0.01
C.D. Lyon Construction, Inc.	Ventura (Ojai)	1188	1	0	0	0
California Resources Production Crp	Ojai	1218	0	0.67	0.18	0.01
California Resources Production Crp	Ventura (Ojai)	1217	4.46	0	0	0

Company Name	Area of County	ERC	ROC	NOx	PM10	SOx
California Resources Production Crp	Ventura (Ojai)	1057	0	1.33	0.04	0
California Resources Production Crp	Ventura (Ojai)	1123	0.04	3.49	0.14	0.02
California Resources Production Crp	Ventura (Ojai)	1056	0	3.17	0.09	0.01
California Resources Production Crp	Ventura (Ojai)	1207	0	1.54	0.82	0
California Resources Production Crp	Ventura (Ojai)	1224	19.87	0	0	0
California Resources Production Crp	Ventura (Ojai)	1054	0	5.93	0.18	0.02
California Resources Production Crp	Santa Paula	1042	0.01	0	0	0
California Resources Production Crp	Santa Paula	1041	1.49	31.09	0.15	0.02
California Resources Production Crp	Fillmore	1017	0.03	22.37	0.09	0
California Resources Production Crp	Piru	1031	0	16.5	0.05	0
California Resources Production Crp	Oxnard	1021	27.13	0	0	0
California Resources Production Crp	Oxnard	1002	0	0	0.04	0
California Resources Production Crp	Oxnard	1027	0	1.75	0.18	0.01
California Resources Production Crp	Oxnard	1001	0	0	0.01	0
California Resources Production Crp	Oxnard	1022	10.82	0	0	0
California Resources Production Crp	Oxnard	1026	6.64	2.4	0.3	0.03
California Resources Production Crp	Camarillo	1229	0	52.87	0	0
California Resources Production Crp	North Zone	1227	3.96	0	0	0
California Resources Production Crp	North Zone	1226	2.4	0	0	0
Carbon California Operating Co.	Ojai	1142	2.29	0	0	0
Carbon California Operating Co.	Ojai	1155	0.32	0.14	0	0
Carbon California Operating Co.	North Zone	1132	0.06	0.02	0	0
Carbon California Operating Co.	North Zone	1135	0.01	0	0	0
Carlton Forge Works	Oxnard	1241	0.06	1.84	2.33	0.04
Chevron Environmental Management Co	Fillmore	1008	1.13	0	0	0
ChevronTexaco	Ventura (Ojai)	1049	0	0	0.08	0
ChevronTexaco	Ventura (Ojai)	1048	0	0.2	0.08	0
ChevronTexaco	Ventura (Ojai)	1051	0	0.08	0.01	0.34
ChevronTexaco	Ventura (Ojai)	1047	125.73	0	0	0
ChevronTexaco	Fillmore	1082	0.44	1.67	0.09	0.03
ChevronTexaco	Piru	1033	0.55	0	0	0
Compositair	Camarillo	1072	0	0.06	0	0

Company Name	Area of County	ERC	ROC	NOx	PM10	SOx
Costco Wholesale Corporation	Ventura (Ojai)	1194	4.12	0	0	0
Costco Wholesale Corporation	Oxnard	1202	0.54	0	0	0
Dos Cuadras Offshore Resources, LLC	Ojai	1018	0	0	0.18	0.02
Dos Cuadras Offshore Resources, LLC	Ventura (Ojai)	1185	0	0.19	0	0
Dos Cuadras Offshore Resources, LLC	Ventura (Ojai)	1204	0	1.32	0.95	0.08
Dos Cuadras Offshore Resources, LLC	Fillmore	1149	1.75	0	0	0
Element Markets LLC	Oxnard	1214	0	0.26	0.36	0
GenOn Emissions, LLC	Ventura (Ojai)	1175	0.24	0	0	0
GenOn Emissions, LLC	Santa Paula	1100	0.03	0.47	0.76	0.01
GenOn Emissions, LLC	Camarillo	1239	3.97	0	0	0
Gilroy Foods Inc.	Oxnard	1020	0	0.09	0.01	0
Haas Automation	Oxnard	1116	0	0.06	0	0
Hanson Aggregates	Ventura (Ojai)	1090	0	0	0.69	0
Houwelings Nurseries Oxnard, Inc.	Camarillo	1236	1.12	2.48	1.55	0.12
Hunter Resources Development	Fillmore	1125	0.09	0.01	0.01	0
KTI Engineers & Constructors	Port Hueneme	1034	0	0	1.5	0
LWFP, LLC	North Zone	1151	0	0	0.33	0
LWFP, LLC	North Zone	1158	0	0	0.16	0
LWFP, LLC	North Zone	1191	0	0	0.08	0
Mirada Petroleum, Inc.	Ventura (Ojai)	1165	0.05	0	0	0
Mirada Petroleum, Inc.	Camarillo	1231	2.78	0	0	0
Naval Base Ventura County	Oxnard	1114	0	0	0.12	0
Naval Base Ventura County	Oxnard	1113	0	0	0	0.04
Naval Base Ventura County	Oxnard	1112	1.27	0	0	0
Naval Base Ventura County	Oxnard	1108	0.01	0	0	0
Naval Base Ventura County	Oxnard	1160	1.23	0	0	0
Naval Base Ventura County	Oxnard	1187	0.04	1.14	0.17	0.46
Naval Base Ventura County	Port Hueneme	1144	0.01	2.68	0.06	0.02
Naval Base Ventura County	Port Hueneme	1154	0.06	0.86	0.1	0.06
Naval Base Ventura County	Port Hueneme	1121	0	0	3.9	0
Naval Base Ventura County	Camarillo	1140	0	0.11	0	0

Company Name	Area of County	ERC	ROC	NOx	PM10	SOx
Nestle Food Company	Oxnard	1137	0.11	1.54	0.12	0.02
Northrop Grumman Corporation	Thousand Oaks	1046	0	0	0.01	0.01
Northrop Grumman Corporation	Thousand Oaks	1146	0	0.01	0	0
Occidental Chemical Corp.	Oxnard	1131	0.07	3.79	1.33	0.02
Oxnard Lemon Co.	Oxnard	1152	0	0.1	0	0
P.W. Gillibrand Company Inc.	Simi Valley	1201	0	5.11	0	0.03
Pacific Operators Offshore LLC	Ventura (Ojai)	1093	0.21	0.89	0.09	0.02
Pacific Operators Offshore LLC	Ventura (Ojai)	1075	0	0.88	0	0
Pacific Recovery Corporation	Oxnard	1212	0.12	0	0	0.03
Parker Hannifin Corporation	Santa Paula	1120	3.43	0	0	0
Parker Hannifin Corporation	Camarillo	1122	0.61	0	0	0
Parker Hannifin Corporation	Thousand Oaks	1174	2.35	0	0	0
Peak Operator LLC	Ventura (Ojai)	1153	1.06	0	0	0
Peak Operator LLC	Oxnard	1203	0.29	0	0	0
Peak Operator LLC	Oxnard	1030	0.19	0	0	0
Peak Operator LLC	Oxnard	1234	0.36	0	0	0
Peak Operator LLC	Oxnard	1124	0.58	0	0	0.02
Peak Operator LLC	Camarillo	1233	3.6	0	0	0
Peak Operator LLC	Camarillo	1221	0.92	0	0	0
Peak Operator LLC	Camarillo	1173	0.21	0	0	0
Peak Operator LLC	Camarillo	1096	0	0.51	0.03	0.01
Peak Operator LLC	Camarillo	1190	0.3	0	0	0
Peak Operator LLC	Camarillo	1206	0.59	0	0	0
Peak Operator LLC	Camarillo	1222	0.58	0	0	0
Peak Operator LLC	Thousand Oaks	1200	0.34	0	0	0
Procter & Gamble Paper Products	Oxnard	1166	0	0	16.9	0
Procter & Gamble Paper Products	Oxnard	1181	0	22.17	0	0
Procter & Gamble Paper Products	Oxnard	1134	0	0	2.81	0
Procter & Gamble Paper Products	Oxnard	1189	0	0	3.44	0
Procter & Gamble Paper Products	Camarillo	1081	32	0	0	0
PTI Technologies Inc.	Thousand Oaks	1162	0.25	0	0	0
Reichhold Chemicals Inc.	Santa Paula	1136	0	0.1	0	0
Royal Coatings	Oxnard	1161	0.06	0	0	0
Santa Fe Energy OperatingPrtnr	Fillmore	1076	0.01	0	0	0
Santa Fe Minerals Inc.	Fillmore	1009	0.55	0	0	0

Company Name	Area of County	ERC	ROC	NOx	PM10	SOx
Skyworks Solutions, Inc.	Oxnard	1220	0.01	0	0	0
Southern California Edison Co.	Ojai	1094	0	5.57	0	0.02
Southern California Edison Co.	Ventura (Ojai)	1097	0	4.97	0	0.03
Southern California Edison Co.	Ventura (Ojai)	1091	0	6.41	0	0.03
Southern California Edison Co.	Santa Paula	1078	0	3.66	0	0.02
Southern California Edison Co.	Santa Paula	1083	0	0.22	0	0.01
Southern California Edison Co.	Fillmore	1079	0	0.72	0	0.01
Southern California Edison Co.	Fillmore	1085	0	0.42	0	0
Southern California Edison Co.	Fillmore	1080	0	0.17	0	0
Southern California Edison Co.	Fillmore	1109	0	1.93	0	0
Southern California Edison Co.	Fillmore	1084	0	0.09	0	0
Southern California Edison Co.	Camarillo	1092	0	23.24	0.22	0.03
Southern California Edison Co.	North Zone	1107	0	3.2	0	0
Southern California Edison Co.	North Zone	1104	0	2.08	0	0.01
St. John's Regional Medical Center	Oxnard	1089	0	0.18	0	0
Sully-Miller Contracting Co.	Oxnard	1183	0	1.51	3.33	0.02
Technicolor Home Entertainment Serv	Ventura (Ojai)	1180	0.01	0	0	0
TEG Oil & Gas USA, Inc.	Oxnard	1177	0.3	0	0	0
The Boeing Company	Santa Paula	1119	0.45	0	0	0
The Boeing Company	Simi Valley	1035	0	0	0.12	0.47
The Boeing Company	Simi Valley	1148	0.24	2.44	0.49	0.1
The Boeing Company	Simi Valley	1211	0.01	0.37	0	0
The Boeing Company	North Zone	1163	0	0.01	0	0
The Termo Company	Santa Paula	1102	0.02	0	0	0
The Termo Company	Oxnard	1230	0.05	0	0	0
Unocal	Santa Paula	1044	0.13	0	0	0
Unocal	Simi Valley	1145	4.32	0	0	0
Vaquero Energy	Fillmore	1013	0.06	0.79	0	0
Venoco, Inc.	Fillmore	1182	0	3.04	0	0
Venoco, Inc.	Oxnard	1147	0.05	0	0	0
Venoco, Inc.	Oxnard	1205	0.17	0	0	0
Venoco, Inc.	Oxnard	1025	0	1.61	0.05	0.01
Venoco, Inc.	OCS Area	1208	0	0.37	0	0
Venoco, Inc.	OCS Area	1184	0	16.5	0	0
Venoco, Inc.	OCS Area	1164	0	0	0.13	0.08
Venoco, Inc.	OCS Area	1139	0	0	0.13	0.01
Ventura County APC Board	Camarillo	1167	55	0	0	0
Vulcan Materials Co.	Oxnard	1235	0	1.56	0	0

Company Name	Area of County	ERC	ROC	NOx	PM10	SOx
Waste Management Energy Solutions	Ventura (Ojai)	1170	0	3.02	0	0
Waste Management of California	Oxnard	1215	0	22.98	0	0
Total			578.95	315.87	46.78	2.81

APPENDIX H
VENTURA COUNTY
WEIGHT OF EVIDENCE ASSESSMENT

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

California Air Resources Board
Planning and Technical Support Division
Sacramento, California

Ventura County Weight of Evidence Assessment

Introduction

Ventura County (County) is currently classified as a serious nonattainment area for the 2015 0.070 parts per million (ppm) federal 8-hour ozone standard (2015 ozone standard). For areas designated as moderate or above nonattainment for the 2015 ozone standard, photochemical modeling is a required element of the State Implementation Plan (SIP) to determine whether existing and planned control strategies provide the reductions needed to meet the 2015 ozone standard by the attainment deadline.

To address the uncertainties inherent to modeling assessments, U.S. Environmental Protection Agency (U.S. EPA) guidance, *Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze,* recommends that supplemental analyses accompany all model attainment demonstrations. Further, U.S. EPA guidance indicates that as an area approaches the target attainment date, ambient air quality and emissions data become an increasingly important element in demonstrating progress toward air quality goals.

To complement regional photochemical modeling analyses included in the Ventura County SIP, the following Weight Of Evidence (WOE) demonstration includes detailed analyses of ambient ozone data, county level precursor emission trends, population exposure trends, and a discussion of conditions that contribute to exceedances of the 2015 ozone standard. Further, the rate of progress toward air quality goals was evaluated by considering trends in ozone design values, precursor emission reductions, the relationship between ozone air quality and past emission reductions, as well as taking into account the impact of wildfire emissions.

Photochemical modeling for Ventura County has demonstrated that all sites will meet the 2015 ozone standard by the 2026 attainment deadline for serious nonattainment areas. Air quality analyses show that measured ozone concentrations and emissions of ozone precursors in Ventura County have declined markedly over the last two decades and consistent with the modeling results, indicating that the County will meet the 2026 attainment date.

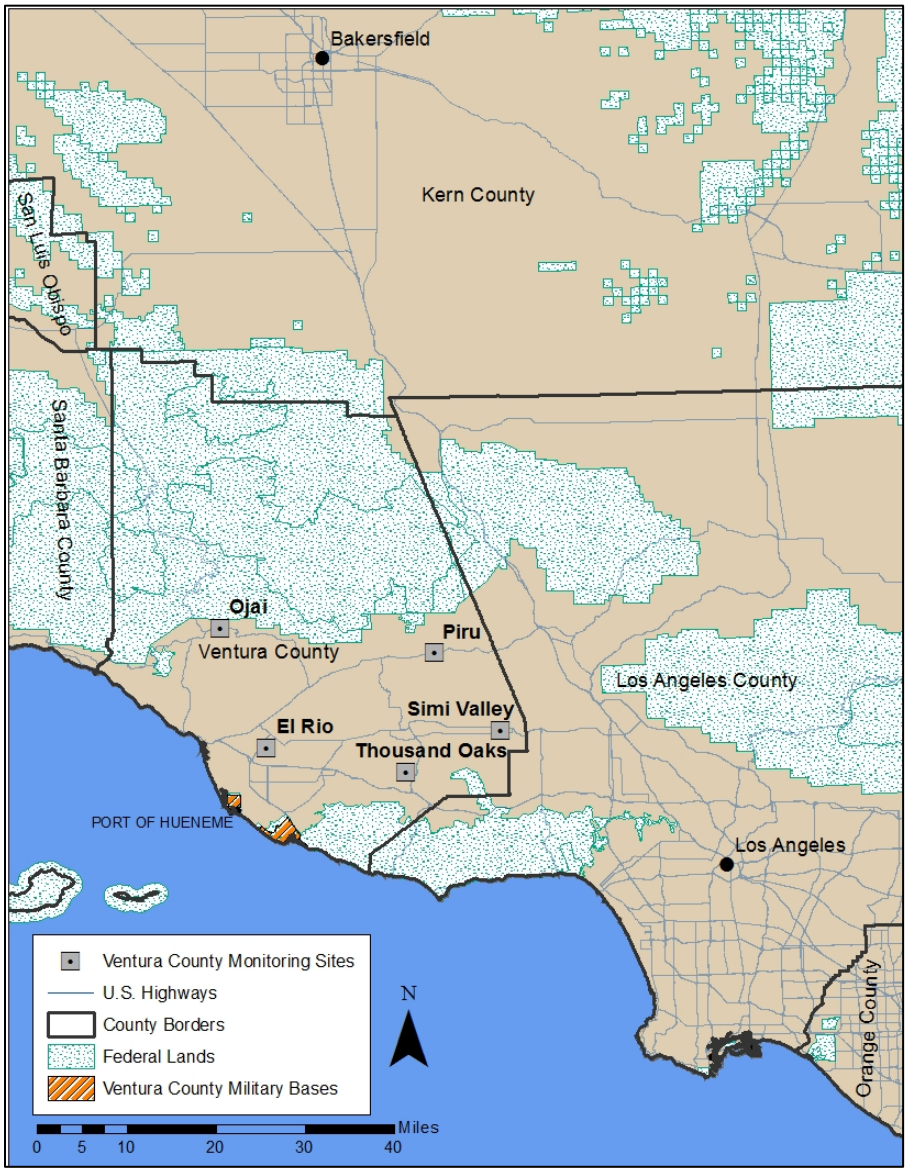
Area Description

Located in the South Central Coast Air Basin, Ventura County is west of Los Angeles County, south of Kern County, and east of Santa Barbara County. Figure H-1 shows the location of Ventura County. Nearly 850,000 people live in the County, making it the thirteenth most populous in California. The largest employer is the U.S. military which hosts three facilities operating as Naval Base Ventura County (NBVC) and one Air National Guard base in Ventura

County. The other major industries are agriculture, biotechnology, oil production, technology, and tourism.

Ventura County encompasses 1,843 square miles. The northern portion of the County is comprised of the rural, mountainous Los Padres National Forest. The southern portion of the County is comprised of 42 miles of coastline that gives way to coastal plain and broad inland valleys. Most of the population resides in the southern portion of the County.

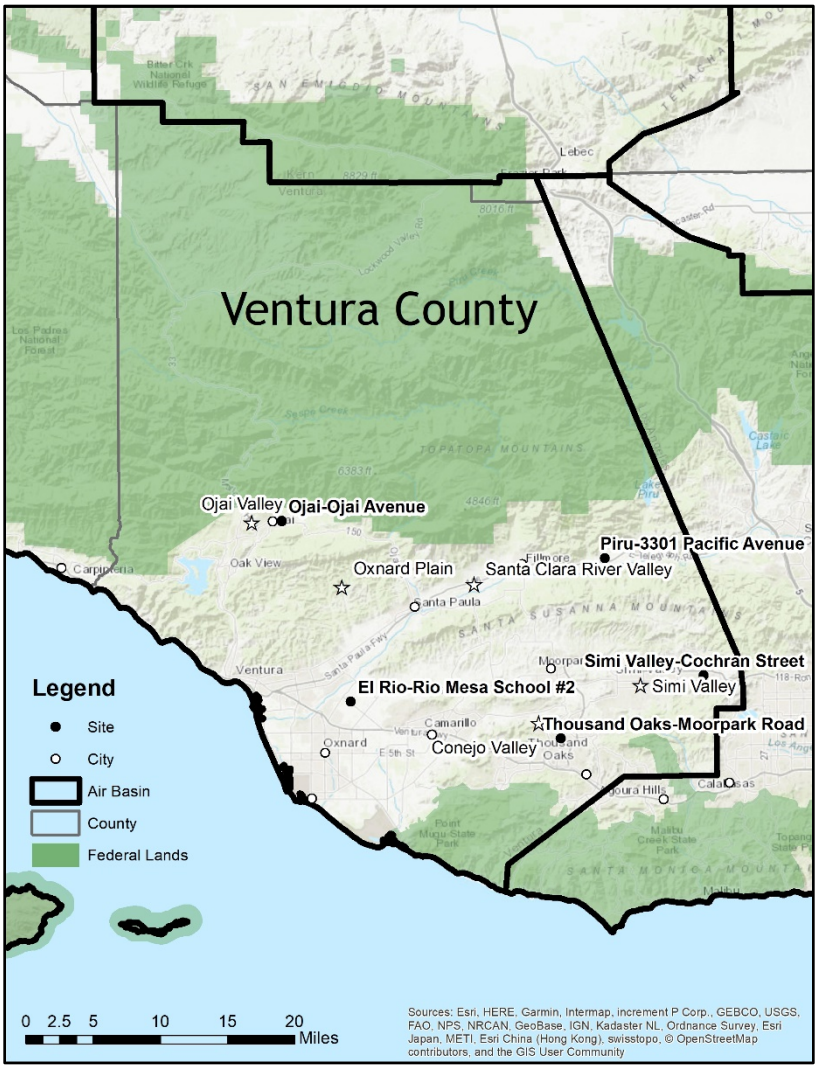
Figure H-1: Area Map of Ventura County and Surrounding Areas



The Ventura County Air Pollution Control District currently operates a network of five ozone monitoring sites, which are sited to represent the five distinct geographical areas of the

southern portion of the County that are shown in Figure H-2. The coastal monitoring sites include El Rio and Thousand Oaks, which measure air quality that is representative of conditions in Ventura and the Oxnard Plain, and Conejo Valley, respectively. The inland monitoring sites include Ojai, Piru, and Simi Valley, which measure air quality that is representative of conditions in Ojai Valley, Santa Clara River Valley, and Simi Valley, respectively.

Figure H-2: Map of Geographical Regions in Ventura County and Locations of Representative Air Monitoring Sites



There is a large gradient in ozone concentrations between the coastal and inland areas due to the difference in prevailing meteorological conditions between these two areas. As shown in Table H-1, higher ozone concentrations measured at the inland monitoring sites drive Ventura

County's serious nonattainment status. The nonattainment area is limited to the mainland portions of the County and does not include the Channel Islands.

Table H-1: Ozone Design Values at Ventura County Monitoring Sites

Site Name	AQS ID	Region	2019 Design Value (ppm)	2020 Design Value (ppm)	Meet 2015 Ozone Standard
Thousand Oaks	061110007	Conejo Valley	0.068	0.069	Yes
Piru	061110009	Santa Clara River Valley	0.071	0.070	Yes
Ojai	061111004	Ojai Valley	0.067	0.067	Yes
Simi Valley	061112002	Simi Valley	0.076	0.075	No
El Rio	061113001	Ventura and Oxnard Plain	0.060	0.061	Yes

Conceptual Model

Local emissions and transport of ozone and ozone precursors from neighboring areas, including the South Coast Air Basin, contribute to elevated ozone in Ventura County. The majority of days with elevated ozone concentrations occur during the late spring, summer, and early fall and, historically, under conditions that are conducive to photochemical production from accumulated local and regional precursor emissions.

In the spring, summer, and early fall, the predominant weather pattern in the coastal area of Ventura County consists of a persistent marine layer of clouds situated at 1,000 to 3,000 feet above sea level. The marine layer extends into the valleys in the southern portion of the County on most days, carried by a daily afternoon breeze that flows from the cooler coastal area into the warmer inland areas. Once the sun sets, air over the land cools faster than air over the ocean, which causes air to flow back toward the coastline at night. The east-to-west downward sloping terrain further promotes the flow of air from the valleys back toward the coastal plain at night. This sea/land breeze circulation pattern moves air masses back and forth over the same populated areas of the County, accumulating emissions with each pass. Ozone exceedances can occur when these recirculated emissions stagnate onshore.

Ventura County can intercept ozone and ozone precursor emissions from neighboring areas, including South Coast, under a variety of scenarios. Due to the terrain and predominant meteorological patterns in southern California, inland emissions will accumulate offshore, typically at night. During periods of offshore accumulation, emissions derived from Ventura

County can intermingle with pollution derived from other regional source areas. When onshore flow resumes, air masses with accumulated, intermingled regional pollution will move inland and potentially impact air quality in Ventura County.

Alternatively, when areas of high pressure build over inland areas and areas of lower pressure persist over the ocean, offshore winds can develop and draw emissions from areas upwind into the County. Under this scenario, conditions are typically breezy along the coast with relatively stagnant conditions inland in the County which can cause ozone exceedances in the inland areas.

Air quality problems may also arise episodically due to regional wildfires. Certain meteorological conditions promote wildfire outbreaks. In the fall through spring, a system of high pressure can form east of Ventura County, over the Great Basin. During these months, temperatures throughout southern California are typically warmer than those in the Great Basin. At times, air flowing clockwise around the Great Basin high will be pushed westward through mountain passes and into southern California. The flow of air accelerates as it moves through mountain passes and into lower elevation areas of southern California. The descent from the mountain passes causes the air to warm and humidity to markedly decline. The resultant strong, warm, and dry easterly downslope flow is termed a Santa Ana wind. Santa Ana winds, although only typically lasting for a few days at a time, significantly increase the risk of wildfire in Ventura County and other areas of southern California. Wildfires, like other combustion sources, produce ozone precursors and can contribute to elevated ozone in adjacent and downwind areas. In the south central coast in particular, easterly winds can cause emissions from regional wildfires to accumulate offshore. When onshore flow resumes, these accumulated wildfire emissions can be recirculated into Ventura County and exacerbate air quality problems.

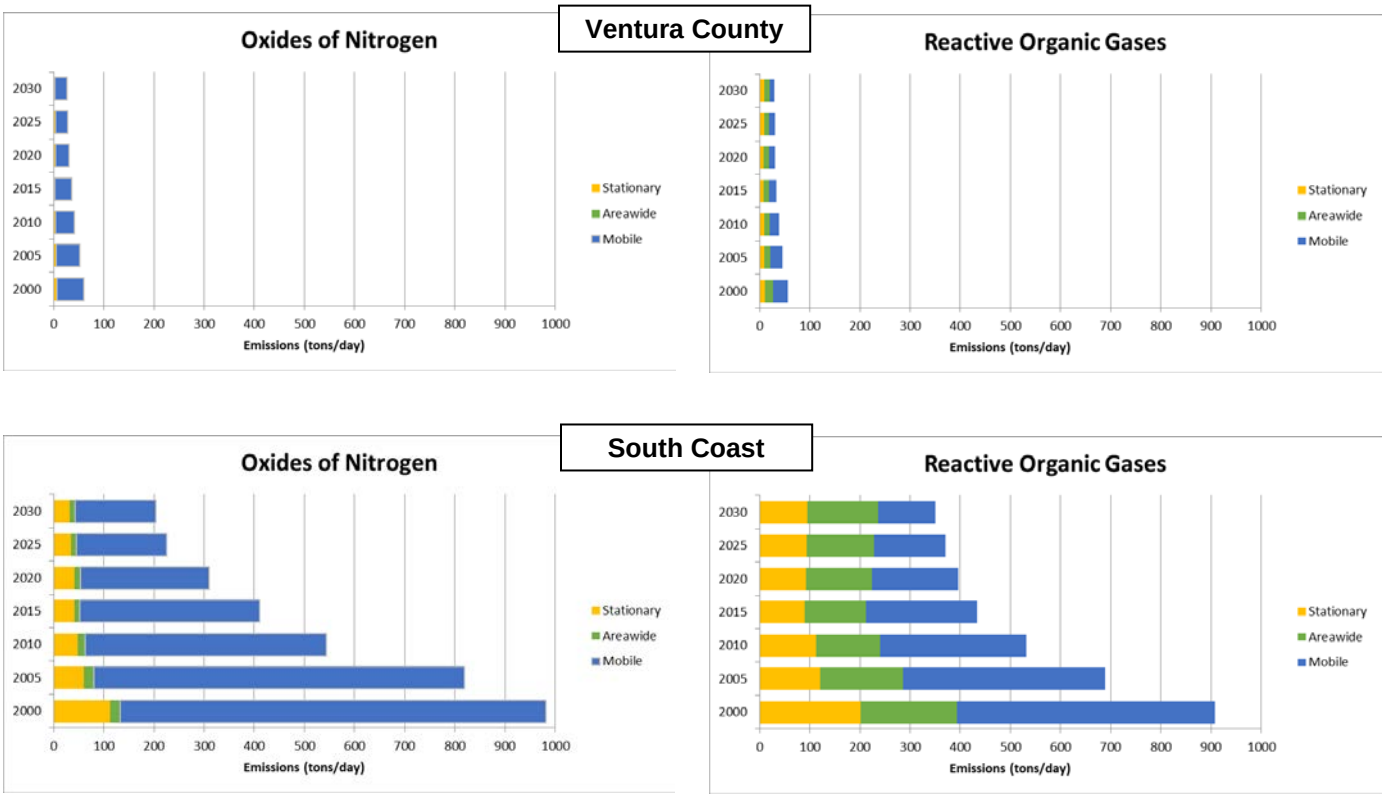
Anthropogenic Emissions

Ozone precursor emissions in Ventura County, which include reactive organic gases (ROG) and oxides of nitrogen (NOx), are predominantly from mobile sources, as shown in Figure H-3. Data from the California Air Resources Board's (CARB) 2022 Ozone SIP Inventory for Summer (Version 1.01 with approved external adjustments and include SCC, OC1, OC2 out to 100 nautical miles) for Ventura County indicate that in 2021 mobile sources accounted for 88 percent of NOx emissions whereas areawide and stationary sources accounted for two percent and ten percent of NOx emissions, respectively. In contrast, mobile, areawide, and stationary sources accounted for 41 percent, 32 percent, and 27 percent of ROG emissions, respectively.

Although mobile sources dominate the emission inventory in Ventura County, emissions from a deep water port, agriculture, natural gas electric generation facilities, naval base operations, oil

production and processing, and other industrial operations can also contribute to ozone formation in the County. Proximity to a much larger source of upwind precursor emission, South Coast, also contributes to the County's ozone formation. South Coast's emissions numbers (which reflect 2022 SIP Inventory v1.01 with external adjustments and include SCAB, OC1, OC2 out to 100 nautical miles) are included at the same scale as Ventura County for comparison purposes of the scale difference between the two areas.

Figure H-3: Inventory of Ventura County and South Coast Emissions



Data source: CARB 2022 Ozone SIP Inventory for summer (Version 1.01 with approved external adjustments)

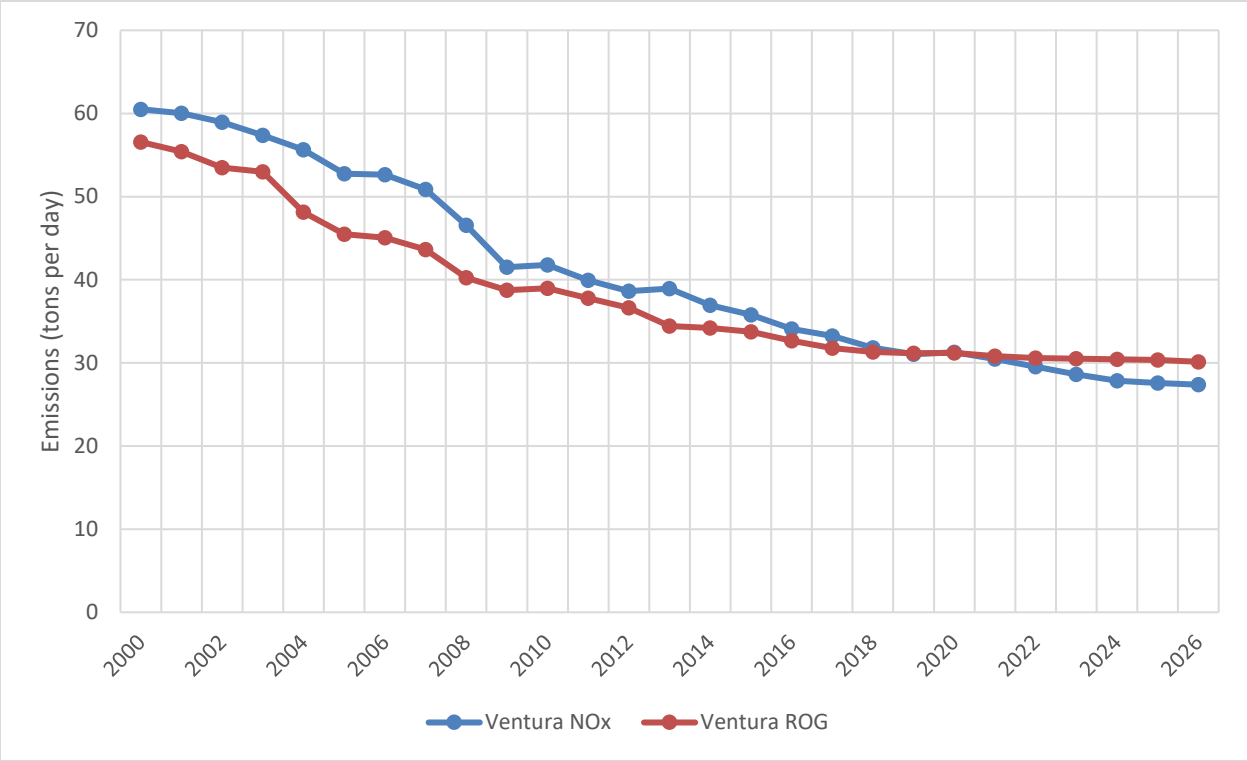
Significant reductions of ozone precursor emissions were achieved in the County between 2000 and 2021.

- Total NOx emissions declined by nearly 50 percent, and
- Total ROG emissions declined by nearly 46 percent.

Emissions from mobile sources, which contribute the largest magnitude of ozone precursors in the County, declined substantially between 2000 and 2021.

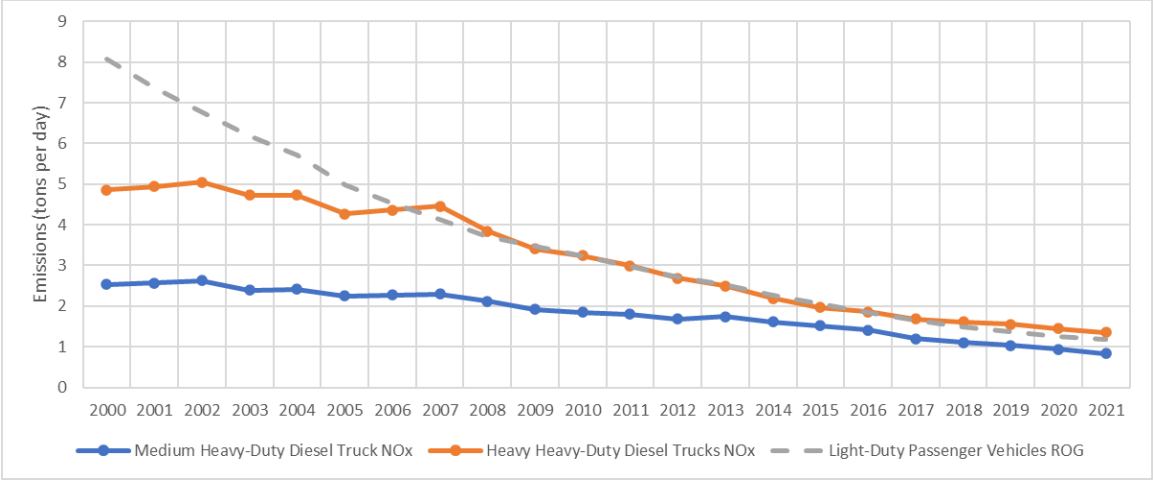
- Mobile source NOx emissions declined by nearly 50 percent, and
- Mobile source ROG emissions declined by nearly 59 percent.

Figure H-4: Inventory of Ventura County



As shown in Figure H-4, emissions have declined considerably in the County for both ROG and NOx and are expected to continue the same trend as additional approved controls and new controls come online. Additionally, in Ventura County the largest on-road mobile source subcategories in the NOx emission inventory are medium heavy-duty trucks and heavy heavy-duty diesel trucks, whereas light-duty passenger vehicles are the largest on-road mobile source subcategory in the ROG emission inventory. Statewide emission control programs targeting mobile sources have yielded substantial reductions in ozone precursor emissions in Ventura County. For example, CARB's adoption of regulations targeting various mobile sources of emissions such as heavy duty trucks and buses and off-road equipment has led to marked progress in reducing NOx emissions As shown in Figure H-5, between 2000 and 2021, NOx emissions from medium and heavy heavy-duty diesel truck subcategories declined 67 percent and 72 percent, respectively. For the same period, ROG emissions from the light-duty passenger vehicle subcategory declined 85 percent.

Figure H-5: Emissions from the Largest Mobile Source Categories in Ventura County for 2000-2021



Emissions inventory projections for Ventura County indicate that ongoing implementation of current emission control programs will continue to yield reductions across many categories in the coming years. Between 2021 and 2026, in Ventura County, NOx emissions are projected to decline an additional 52 percent for medium heavy-duty diesel trucks. Emissions of NOx from heavy heavy-duty trucks are expected to decline an additional 54 percent between 2021 and 2026. Emissions of ROG from light-duty passenger vehicles are expected to decline an additional 25 percent between 2021 and 2026.

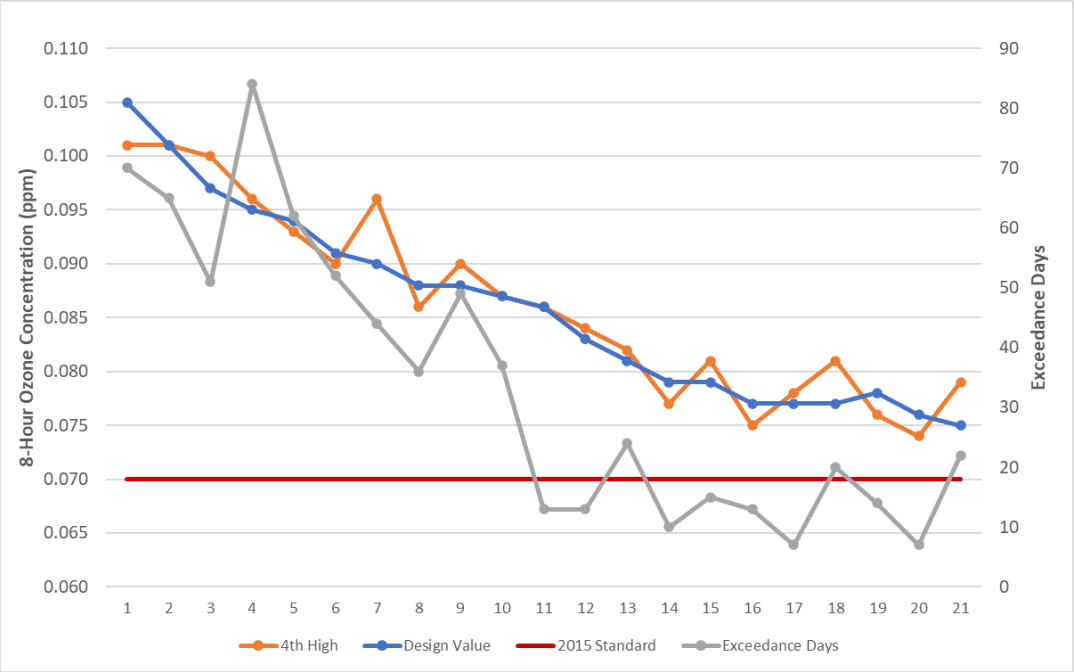
As described above, statewide programs, particularly those targeting emissions from mobile sources, have yielded significant reductions in emissions of ozone precursors in Ventura County. Although mobile sources account for the majority of ozone precursor emissions in Ventura County, marked reductions in emissions from areawide and stationary sources were also achieved between 2000 and 2021. NOx emissions from stationary and areawide sources declined by nearly 45 percent and 62 percent, respectively, between 2000 and 2021. Moreover, ROG emissions from stationary and areawide sources declined by 16 and nearly 39 percent, respectively, during this time period. In response to persistent reductions in ozone precursors, ozone air quality throughout Ventura County has improved markedly.

Ozone Air Quality

In response to declining emissions over the last 20 years, the frequency, magnitude, and spatial extent of ozone exceedances in Ventura County has significantly declined. As shown in Figure H-6, between 2000 and 2020, the number of ozone exceedance days in the County declined by nearly 69 percent, from 70 days to 22 days. Over this same period, the annual fourth highest daily maximum 8-hour concentration decreased from 0.101 to 0.079 ppm, a decrease of nearly

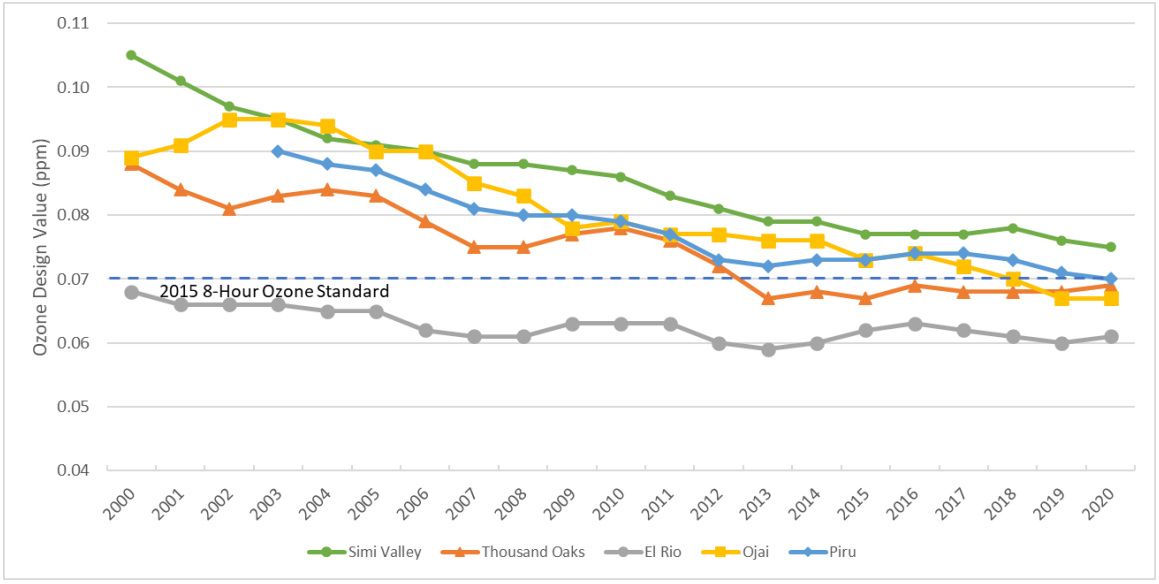
22 percent; and Ventura County's design value decreased by over 28 percent, from 0.105 to 0.075 ppm. Additionally, the decrease in the design value and fourth highest daily maximum have been included to reflect the concurrence by U.S. EPA of the exceptional events outlined by CARB for 2020.

Figure H-6: 2000 – 2020 Ventura County Ozone Statistics



In 2000, all sites in operation, except the El Rio monitoring site, exceeded the 2015 ozone standard but in response to declining precursor emissions, ozone air quality has been steadily

Figure H-7: Ozone Design Values at Ventura County Monitoring Sites

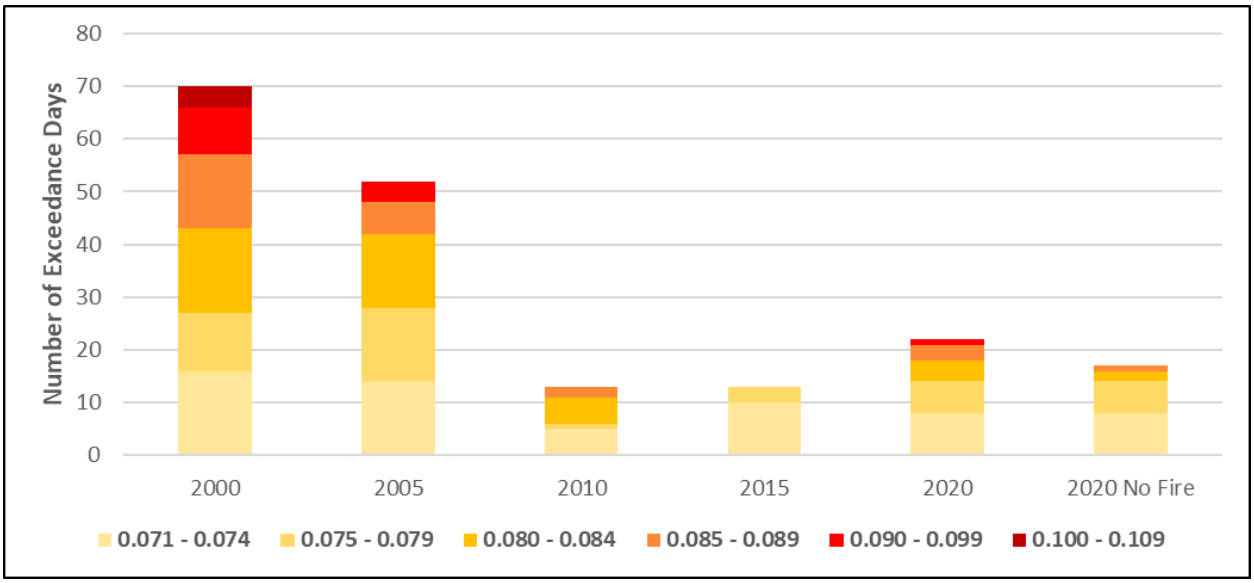


improving over the last 20 years, as shown in Figure H-7. Four out of the five monitoring sites currently meet the 2015 ozone standard. The El Rio monitoring site has been in attainment since 1999. Thousand Oaks has been in attainment since 2013. Ojai attained the 2015 ozone standard in 2019, Piru just dropped below the standard in 2020, and Simi Valley is on track to attain the 2015 ozone standard within the next few years.

The time scale considered in the analyses of ambient measurements, 2000 to 2020, was selected to provide the most complete and representative sample of progress made toward air quality goals throughout Ventura County.

The site level data presented in Figure H-8 demonstrate the ongoing decrease in the frequency and magnitude of ozone exceedance days at Ventura County's design site over the last 20 years. In 2020, exceedances of the 2015 ozone standard occurred on 22 days throughout the county and exceedances occurred at all five sites. This was likely due to the exceptional wildfire emissions blanketing much of the state of California in 2020 and discussed later in this document. Even with the exceptional impact of the wildfire emissions, this is still significantly lower than in 2000, when the 0.070 ppm threshold was routinely exceeded at the three inland sites in operation at that time and saw 70 exceedance days countywide.

Figure H-8: Frequency and Magnitude of Exceedance Days at Ventura County Design Site (Simi Valley) in 2000, 2005, 2010, 2015, and 2020

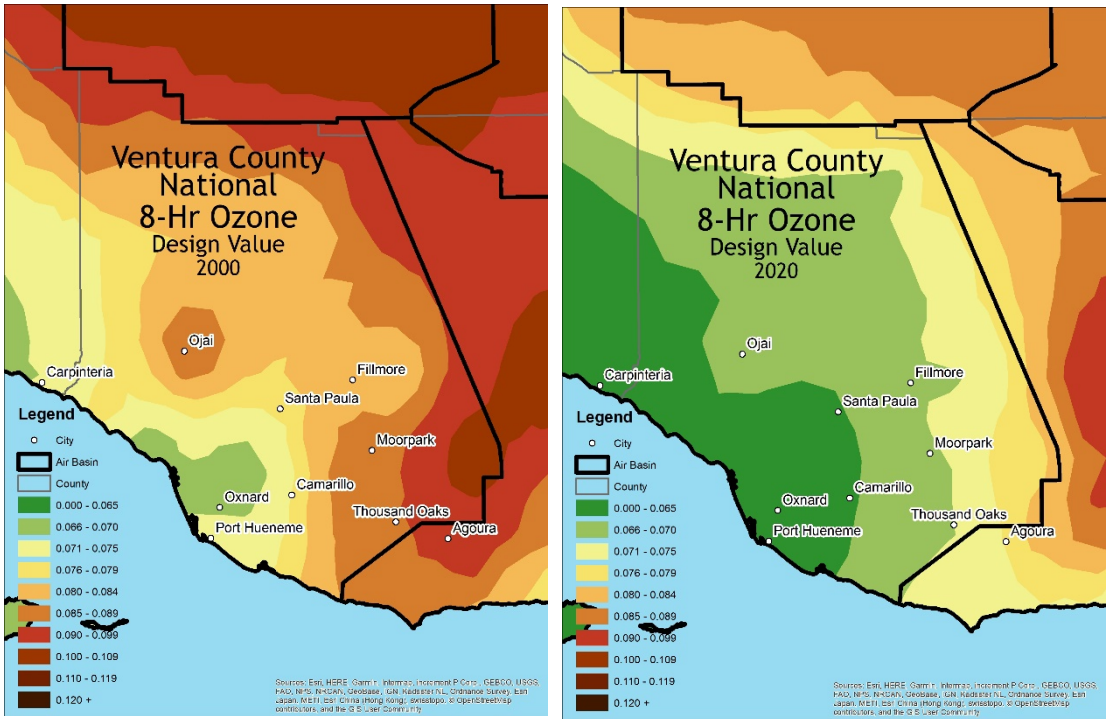


At the Simi Valley monitoring site, which is positioned to capture the highest ozone concentrations in the County, the number of exceedance days declined by nearly 69 percent between 2000 and 2020. On exceedance days in 2000, maximum 8-hour ozone concentrations ranged from 0.071 to 0.108 ppm, up to 54 percent above the 2015 ozone standard. In contrast, maximum 8-hour ozone concentrations on exceedance days in 2020 ranged from 0.071 to

0.095 ppm, at most 36 percent above the 2015 ozone standard, and the highest days were eliminated from consideration based on exceptional event determinations.

As a result of the marked decline in the magnitude, frequency, and spatial extent of exceedances in Ventura County, the number of people exposed to elevated ozone has been reduced substantially. The contour maps in Figure H-9 illustrate the change in population exposure over the last 20 years. In 2000, the areas in Ventura County that met the 2015 ozone standard were limited to portions of the coast and inland areas adjacent to those coastal areas. Areas in the northern and eastern part of the County were more than 0.015 ppm above the 2015 ozone standard. In 2020, all of the coastal areas were in attainment with the 2015 ozone standard as well as a significant portion of the inland areas of the County. The contour maps indicate that the only inland areas yet to meet the 2015 ozone standard are within 0.005 ppm of the 0.070 ppm threshold.

Figure H-9: Contour Maps Representing the Spatial Distribution of Ozone Air Quality in Ventura County for 2000 and 2020

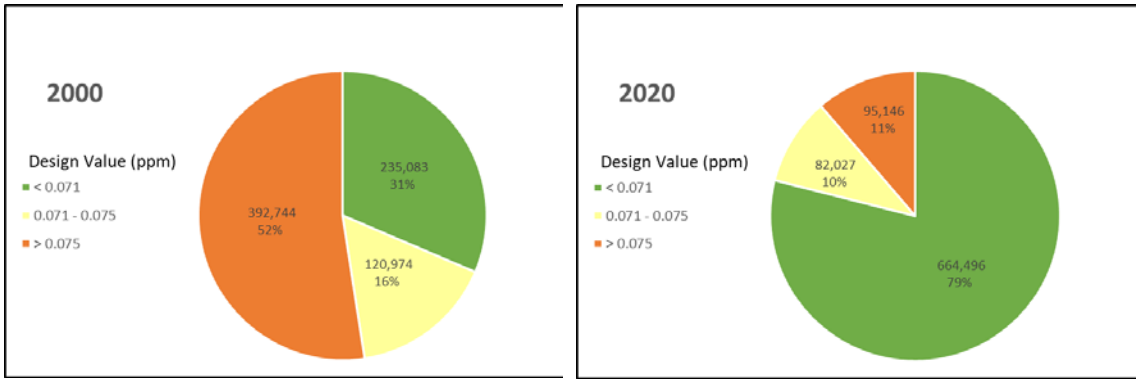


Contour maps were developed using used inverse distance weighting (IDW) to spatially interpolate design values from sites throughout the State.

To evaluate changes in population exposure, spatial analysis tools were used to overlay county level census data with the previous design value contour maps. As shown in Figure H-10, between 2000 and 2020, the number of people residing in areas of the County that exceeded the 2015 ozone standard substantially declined. In 2020, 79 percent of the population resided in areas with air quality that met the 2015 ozone standard compared to 31 percent in 2000.

Furthermore, although 21 percent of the population lives in areas that are above the 0.070 ppm threshold, the ozone levels are just slightly above the current standard.

Figure H-10: Population Distribution by Ozone Design Value in 2000 and 2020

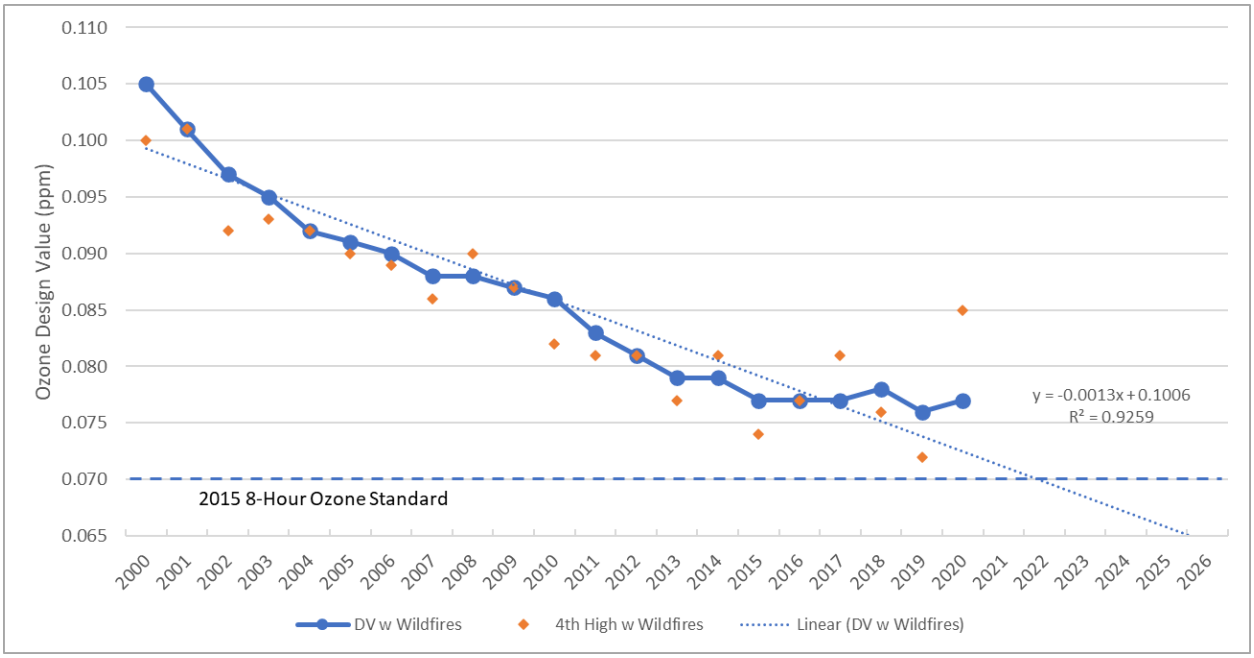


Based on 2000 U.S. Census population and 2000 Design Values

Based on 2020 U.S. Census population and 2020 Design Values

Figure H-11 shows 8-hour ozone design value trends for Simi Valley, with wildfire impacted days, extended to the 2026 attainment deadline. The trends indicate that even while including wildfire impacts the area is anticipated to meet the 2015 ozone standard of 0.070 ppm by 2024 based solely on the design value trendline. While the year of attainment differs between modeling and the design value trendline, both indicate attainment no later than 2026.

Figure H-11: 8-hour Design Value Projections and 4th Highs with Wildfire days included



In summary, ozone air quality has improved throughout Ventura County in response to declining emissions of ozone precursors. The analyses presented above illustrate the extent of improvement over the last 20 years. Currently, four of the five monitoring sites meet the 2015 ozone standard. Simi Valley which has a 2020 design value that is still relatively close to the 2015 ozone standard even with the impact of wildfires, is continuing to make progress toward attainment. The ozone design value, has improved at a consistent rate over the past 20 years indicating that Ventura County is on track to meet the 2026 attainment date.

Attainment Projections

I. Photochemical Modeling Results

In 2022, South Coast Air Quality Management District (AQMD) released results of the regional photochemical modeling assessment conducted for Ventura County, which are shown in Table H-2. Based on the implementation of existing control measures, the regional modeling analyses, and taking into account exceptional events approved by U.S. EPA as well as three additional wildfire-impacted days identified by Ventura County staff; taken together these indicate ozone design values at all sites in Ventura County will meet the 2015 ozone standard in 2026.

Table H-2: Regional Modeling Design Values and Projections of Design Site (Simi Valley) Design Value in 2026 (with 3 additional days, identified below, removed)

Site	2016	2017	2018	2019	2020	2026
Thousand Oaks	0.069	0.068	0.068	0.068	0.069	
Piru	0.074	0.074	0.073	0.071	0.070	
Ojai	0.074	0.072	0.070	0.067	0.067	
Simi Valley (Wildfire-impacted days removed)	0.076	0.076	0.076	0.076	0.075	0.070
El Rio	0.063	0.062	0.061	0.060	0.061	

To complement the regional photochemical modeling assessment, the following analyses were conducted to analyze the impact of additional days removed due to impact from wildfires on the projected future design values and ability to attain the standards.

Wildfire Analysis

I. General Information

A. Introduction

Over recent years from 2015-2020 extreme fuel conditions in California created extreme fire seasons. Almost all of California was affected with smoke and haze lingering for weeks. As expected, numerous monitoring sites in Ventura County recorded elevated particulate matter (PM) concentration levels, with many days above the National Ambient Air Quality Standards

(NAAQS) for both $PM_{2.5}$ and PM_{10}. Ozone concentrations were also impacted. The wildfire smoke impact on air quality was particularly strong in 2018 and 2020 but was also impacted by local fires at times in other years.

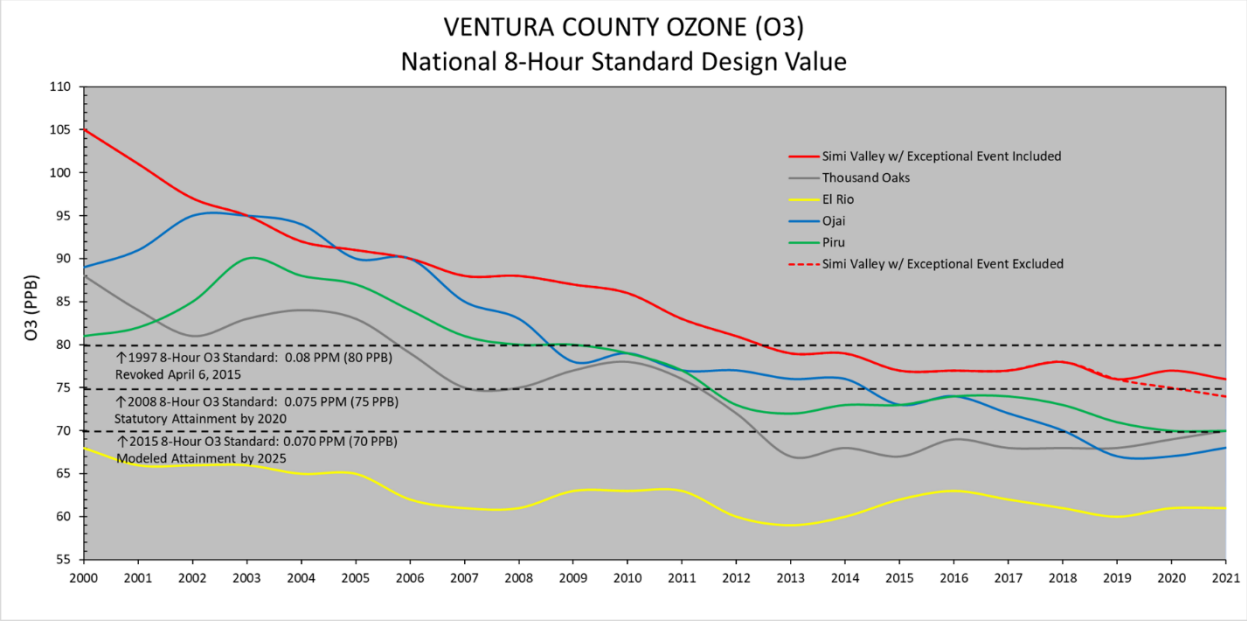
To project the ozone design value and therefore, designation status into the future a baseline eight-hour ozone design value is needed for modeling purposes. In the ideal modeling scenario, the baseline ozone design value would represent the true ozone concentrations in the county without influence from exceptional events such as wildfires.

The baseline design value in this section is calculated using the three NAAQS design value calculation for the period 2016-2020 and averaged. The design value calculations reflect eliminating five days impacted by fires in 2020 that were included in an official exceptional event filing and concurred with by U.S. EPA. Excerpts of that filing are included in Attachment H-1 and reference the wildfires involved, how they impacted the Simi Valley monitor and Ventura County, and the justification for why they should be considered exceptional events and removed from Design Value calculations. This section also focuses on three additional days impacted by wildfire.

Wildfire impacted ozone values on many more than eight days between 2016-2020, however staff included information about three days in this section to suggest these three days were strongly impacted by wildfire smoke. Additionally, these three days have a modeling significance because excluding these three values from the baseline design value suggests Ventura County can meet the 2015 ozone standard by 2026 for the Simi valley monitoring site. Ozone data in Ventura County is showing downward trends and excellent progress towards achieving the 2015 ozone standard by 2026. In fact, in 2020 the County met the 2008 0.075 ppm federal 8-hour ozone standard with a design value of 0.075 ppm after removing the five wildfire-impacted exceptional event days that were concurred by U.S. EPA. Figure H-12 below shows the 8-hour design value by site in Ventura County from 2000 to 2021 and the overall downward trend.

This section utilizes a combination of enhanced imagery, meteorological conditions/discussion, and $PM_{2.5}$ data as an indicator of the potential presence of smoke to support the conclusion that ozone values on these three days had influence from wildfires. Again, we would like to stress that additional days are available that could also be excluded but staff did not find it necessary to include it in this section.

Figure H-12 Ventura County 2015 Ozone Standard Design Value Progress 2001-2021



B. Ozone Exceedances 2016-2020

Table H-3 – 2016-2020 ten highest Eight Hour ozone Values recorded at Simi Valley – Cochran Street (06-111-2002):

Ten Highest Eight Hour Ozone Values by Year

2020	DATE	RANK	2019	DATE	RANK	2018	DATE	RANK	2017	DATE	RANK	2016	DATE	RANK
0.095	3-Oct	①	0.078	5-Oct	①	0.092	7-Aug	①	0.094	8-Jul	①	0.083	27-Jun	①
0.086	18-Aug	②	0.075	6-Oct	②	0.080	7-Jul	②	0.091	30-Aug	②	0.082	3-Jun	②
0.086	2-Oct	③	0.074	14-Sep	③	0.077	9-Sep	③	0.085	2-Sep	③	0.078	23-Jul	③
0.085	4-Sep	④	0.072	14-Aug	④	0.076	10-Apr	④	0.081	2-Aug	④	0.077	4-Jun	④
0.084	15-Oct		0.072	25-Sep		0.076	25-Jul		0.081	29-Aug		0.073	29-Jun	
0.082	21-Aug		0.071	11-Jun		0.075	12-Jun		0.077	2-May		0.072	2-Jun	
0.081	8-May		0.071	6-Aug		0.075	8-Jul		0.077	6-Jul		0.071	29-Jul	
0.080	4-Oct		0.070	10-Jun		0.075	26-Jul		0.077	7-Jul		0.070	18-Apr	
0.079	7-May		0.070	13-Jul		0.073	27-Jul		0.077	1-Aug		0.070	22-Jul	
0.079	18-Sep		0.069	15-Aug		0.073	27-Sep		0.076	26-Aug		0.070	30-Aug	

Table H-4 - 2016-2020 ten highest Eight Hour ozone Values recorded at Simi Valley – Cochran Street (06-111-2002) excluding days impacted by wildfire:

Ten Highest Eight Hour Ozone Values by Year Excluding Days Impacted by Wildfre														
2020	DATE	RANK	2019	DATE	RANK	2018	DATE	RANK	2017	DATE	RANK	2016	DATE	RANK
0.095	3-Oct		0.078	5-Oct	①	0.092	7-Aug		0.094	8-Jul	①	0.083	27-Jun	①
0.086	18-Aug		0.075	6-Oct	②	0.080	7-Jul	①	0.091	30-Aug	②	0.082	3-Jun	②
0.086	2-Oct		0.074	14-Sep	③	0.077	9-Sep	②	0.085	2-Sep	③	0.078	23-Jul	
0.085	4-Sep	①	0.072	14-Aug	④	0.076	10-Apr	③	0.081	2-Aug	④	0.077	4-Jun	③
0.084	15-Oct	②	0.072	25-Sep		0.076	25-Jul		0.081	29-Aug		0.073	29-Jun	④
0.082	21-Aug		0.071	11-Jun		0.075	12-Jun	④	0.077	2-May		0.072	2-Jun	
0.081	8-May	③	0.071	6-Aug		0.075	8-Jul		0.077	6-Jul		0.071	29-Jul	
0.080	4-Oct		0.070	10-Jun		0.075	26-Jul		0.077	7-Jul		0.070	18-Apr	
0.079	7-May	④	0.070	13-Jul		0.073	27-Jul		0.077	1-Aug		0.070	22-Jul	
0.079	18-Sep		0.069	15-Aug		0.073	27-Sep		0.076	26-Aug		0.070	30-Aug	

C. Baseline Design Value 2016-2020

Table H-5 Ozone Baseline Design Value Calculations

4th Highest Adjusted 2016-2020		
2020	0.079	
2019	0.072	
2018	0.075	
D.V.	0.07533	0.07533
2019	0.072	
2018	0.075	
2017	0.081	
D.V.	0.07600	0.07600
2018	0.075	
2017	0.081	
2016	0.073	
D.V.	0.07633	0.07633
Baseline Average		0.07589
RRF	0.934	0.07088
Truncated		0.070

II. July 23, 2016 Weighted Evidence

On July 22, 2016, the Sand Fire started in Los Angeles County. It burned 41,432 acres and was extinguished on August 3, 2016. The 24-Hour concentration of $PM_{2.5}$ was 23 percent higher than the annual mean at the Simi Valley site for the same year.

A. Introduction and Meteorology

Southern California was sitting under a very strong dome of high pressure, at approximately 592 dm. At the surface, there was a mix of light offshore and onshore winds, which allowed for transport of smoke from the Sand Fire to enter Simi Valley. This is evident with the surface winds and $PM_{2.5}$ concentrations recorded at Simi Valley. The satellite image below also shows the rest of Ventura County under the influence of smoke. The onshore winds transported smoke from other parts of the county into Simi Valley as well.

B. National Weather Service Spot Forecast Discussion

FXUS66 KLOX 231813
AFDLOX
AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
1113 AM PDT SAT JUL 23, 2016
.SYNOPSIS...
Weakening high pressure aloft will shift to and persist over the four corners next week. This will lead to one more hot day today with temperatures cooling to near normal Sunday with little change in temperatures for much of next week. High pressure across the four corners area may support an influx of monsoon moisture with showers and thunderstorms possible at times next week.

.SHORT TERM...(TDY-MON)
An unusual high temperature record was set last night at SBA airport. A hot lower atmosphere combined with strong sundowner winds brought record heat to SBA airport before 1 AM PDT (midnight PST). The temperature soared to 94 degrees around 1243 AM PDT (1143 PM PST) which broke the record for the calendar day (standard time) of July 22nd. The record high of 94 exceeded the record of 92 degrees set in 1960.

Clear skies covered much of the forecast area this morning, except for patchy low clouds and dense fog early for the SBA County Central

Coast into the Santa Ynez Valley, and areas of smoke from the Sand Fire which spread out of the Newhall area into the L.A. Basin last night into this morning due to northerly winds. The smoke layer over L.A. will spread off to the northeast and out of the area this afternoon. Otherwise, mostly sunny skies will prevail across the forecast area. There were lingering gusty northerly winds over the foothills and mtns this morning, but will turn onshore this afternoon. Strong upper level high with 500 mb heights around 595 to 596 dm will persist over SoCal today, helping to build the heat to dangerous levels again for the valleys and lower mtns of VTU/L.A. Counties. Highs of 100 to 110 can be expected for the most part for these areas, with heat index values reaching 100 to 105 at times. The Excessive Heat Warning will continue thru 8 PM this evening for the vlys/lower mtns of VTU/L.A. Counties.

.FIRE WEATHER... 23/900 AM.
Red flag warning remains in effect for the mountains in Santa Barbara, Ventura, and Los Angeles Counties, as well as the Santa Barbara County South Coast in the foothill areas through Midnight tonight, due to gusty winds, extremely low relative humidity, and hot temperatures. Widespread humidity's in single digits and teens can be expected.

Winds around the Sand Fire will linger from the north this morning, but is expected to turn southwest by 1 PM this afternoon. Mixing levels are forecast to be up to 12000 feet this afternoon, with good plume development expected.

C. Air Quality Alert Issued for Santa Clarita

The SCAQMD issued an air quality alert for the Santa Clarita which is near Simi Valley to the East. Periods of smoke influence pushed into Simi Valley in the afternoon identified by the highlighted portion of the above NWS discussion and elevated $PM_{2.5}$ values observed at the station in the afternoon. Ozone values increased in the afternoon corresponding with the increase in observed $PM_{2.5}$ values.

Air quality alert for Santa Clarita, San Gabriel Valley

The Sand Fire burns in the Angeles National Forest Sunday July 24th, 2016 under a Red Flag Warning high high winds.
STUART PALLEY FOR KPCC

KPCC Staff | August 1, 2016

D. July 23, 2016 Raw Data

The Table H-6 below shows the hourly values for: Ozone, $PM_{2.5}$, Wind Direction, and Wind Speed from the Simi Valley monitoring site on July 23, 2016 during the Sand Fire. The 24-Hour concentration of $PM_{2.5}$ was 83 percent higher than the annual mean at the Simi Valley site for the same year. Figure H-13 shows a satellite image of the impacts.

Table H-6 Hourly Data: Simi Valley July 23rd, 2016

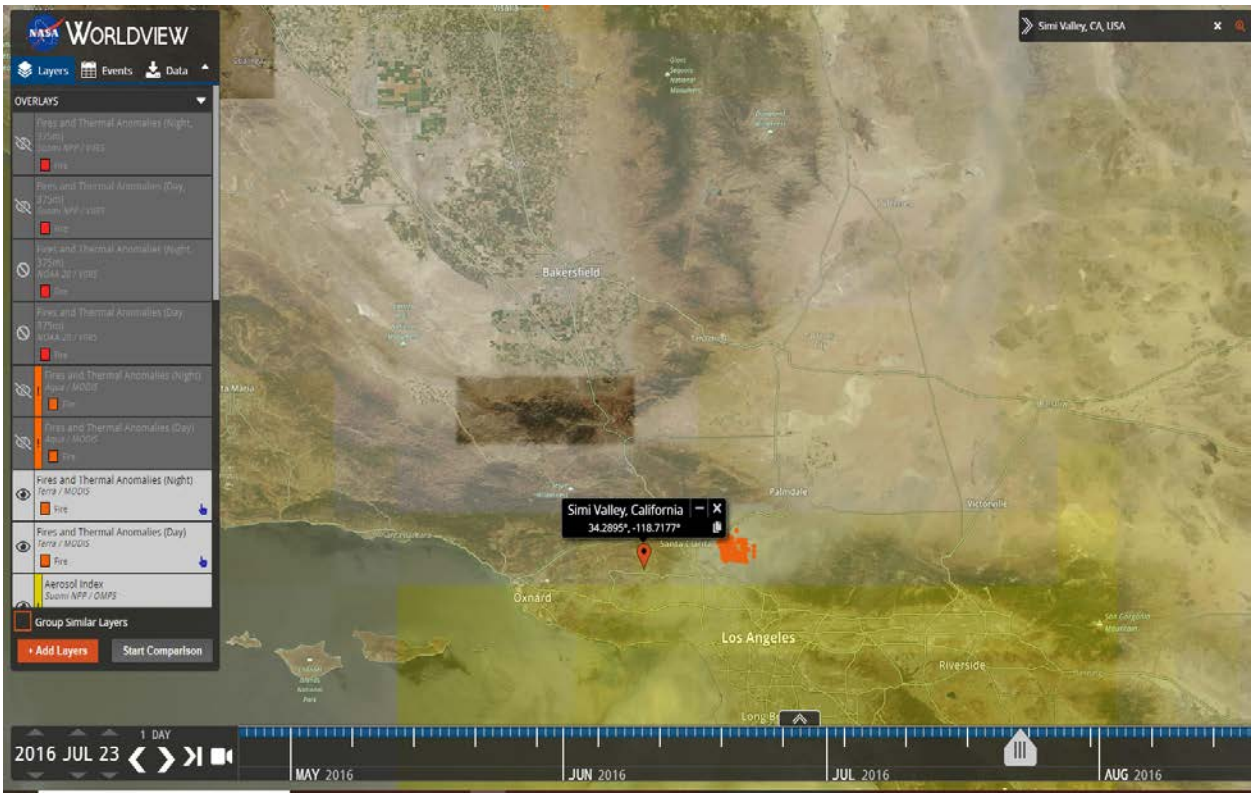
Ventura County Air Pollution Control District

Daily Summary Report - 7/23/2016

Site: Simi Valley-Cochran Street Interval: 001h

	LC25	O3	WD-S	WS-S
Time	UG/M3	PPB	DEG	m/s
00:00	-1.	53.	246.	2.1
01:00	3.	<	284.	2.4
02:00	3.	55.	272.	3.
03:00	2.	47.	233.	1.2
04:00	3.	31.	80.	1.2
05:00	4.	24.	119.	1.1
06:00	5.	27.	133.	.7
07:00	3.	38.	257.	1.5
08:00	2.	47.	276.	1.8
09:00	4.	55.	282.	1.3
10:00	16.	73.	123.	2.
11:00	24.	84.	255.	2.9
12:00	21.	93.	253.	3.8
13:00	19.	88.	269.	4.7
14:00	20.	79.	266.	4.1
15:00	17.	76.	265.	3.9
16:00	10.	73.	218.	3.6
17:00	13.	63.	121.	4.3
18:00	19.	48.	118.	4.7
19:00	16.	41.	117.	4.3
20:00	15.	47.	110.	4.1
21:00	16.	42.	114.	3.8
22:00	21.	39.	118.	2.9
23:00	9.	47.	121.	2.8
Average	11	55	194	2.8
Max	24.	93.	284.	4.7

Figure H-13 Satellite Imagery of Aerosols – MODIS Fire & Thermal Anomalies MOD14 w/ Aerosol Index – July 23, 2016



E. July 23, 2016 Summary

Based on the above discussion, it is clear that July 23, 2016 is a day that was heavily impacted by smoke from a nearby wildfire; as evidenced by the proximity of said fire, wind flow patterns transporting smoke inland to the Simi Valley site, increased $PM_{2.5}$ values out of the norm for the site, and a commensurate increase in ozone values. As such, it should not be included in the calculation of baseline ozone modeling design value from which modeled future design values are calculated.

III. July 25, 2018 Weighted Evidence

In July 2018, many fires were burning throughout California, including the Ferguson Fire and the Cranston Fire. The 24-Hour concentration of $PM_{2.5}$ was 125 percent higher than the annual mean at the Simi Valley site for the same year.

A. Introduction and Meteorology

The Ferguson Fire started on July 13, 2018 in Mariposa County. It burned 96,901 acres and was extinguished on August 18, 2018. The Cranston Fire started on July 25, 2018 in Riverside County. It burned 13,139 acres and was extinguished on August 10, 2018. Southern California was sitting under a very strong dome of high pressure, at approximately 595 dm. At the surface, onshore gradient set up for less late night/early morning offshore flow, resulting in six hours of offshore flow. This allowed for smoke from the Cranston Fire to enter Simi Valley. There were also about three hours late night/early morning of northwesterly flow, allowing for smoke from the Ferguson Fire to enter Simi Valley. This is evident with the surface winds and $PM_{2.5}$ concentrations recorded at Simi Valley.

B. July 25, 2018 Raw Data

Table H-7 below shows the hourly values for: Ozone, $PM_{2.5}$, Wind Direction, and Wind Speed from the Simi Valley monitoring site on July 25, 2018 during multiple California fires. Figure H-14 shows the relationship between PM2.5 and ozone from July 25, 2018, to August 15, 2018. Figure H-15 shows a satellite image of aerosols on July 25, 2018.

Table H-7 Hourly Data: Simi Valley July 25th, 2018

Ventura County Air Pollution Control District

Daily Summary Report - 7/25/2018

Site: Simi Valley-Cochran Street Interval: 001h

	LC25	O3	WD-S	WS-S
Time	UG/M3	PPB	DEG	m/s
00:00	11.	27.	344.	1.1
01:00	14.	<	95.	1.7
02:00	13.	19.	337.	1.4
03:00	17.	11.	292.	1.7
04:00	18.	7.	270.	1.5
05:00	21.	9.	258.	1.
06:00	21.	10.	184.	.6
07:00	18.	24.	233.	.6
08:00	20.	44.	252.	1.4
09:00	15.	65.	272.	2.1
10:00	19.	78.	267.	3.2
11:00	21.	80.	269.	4.1
12:00	17.	76.	261.	4.3
13:00	16.	78.	260.	4.
14:00	20.	78.	275.	4.
15:00	15.	77.	267.	3.6
16:00	14.	74.	265.	3.2
17:00	15.	70.	256.	2.9
18:00	14.	60.	259.	2.6
19:00	17.	48.	257.	1.7
20:00	16.	39.	250.	.7
21:00	17.	29.	90.	1.1
22:00	14.	33.	114.	2.9
23:00	16.	36.	112.	3.4
Average	17	46	239	2.3
Max	21.	80.	344.	4.3

Figure H-14 July 25, 2018 and August 7, 2018 $PM_{2.5}$ and Ozone Relationship

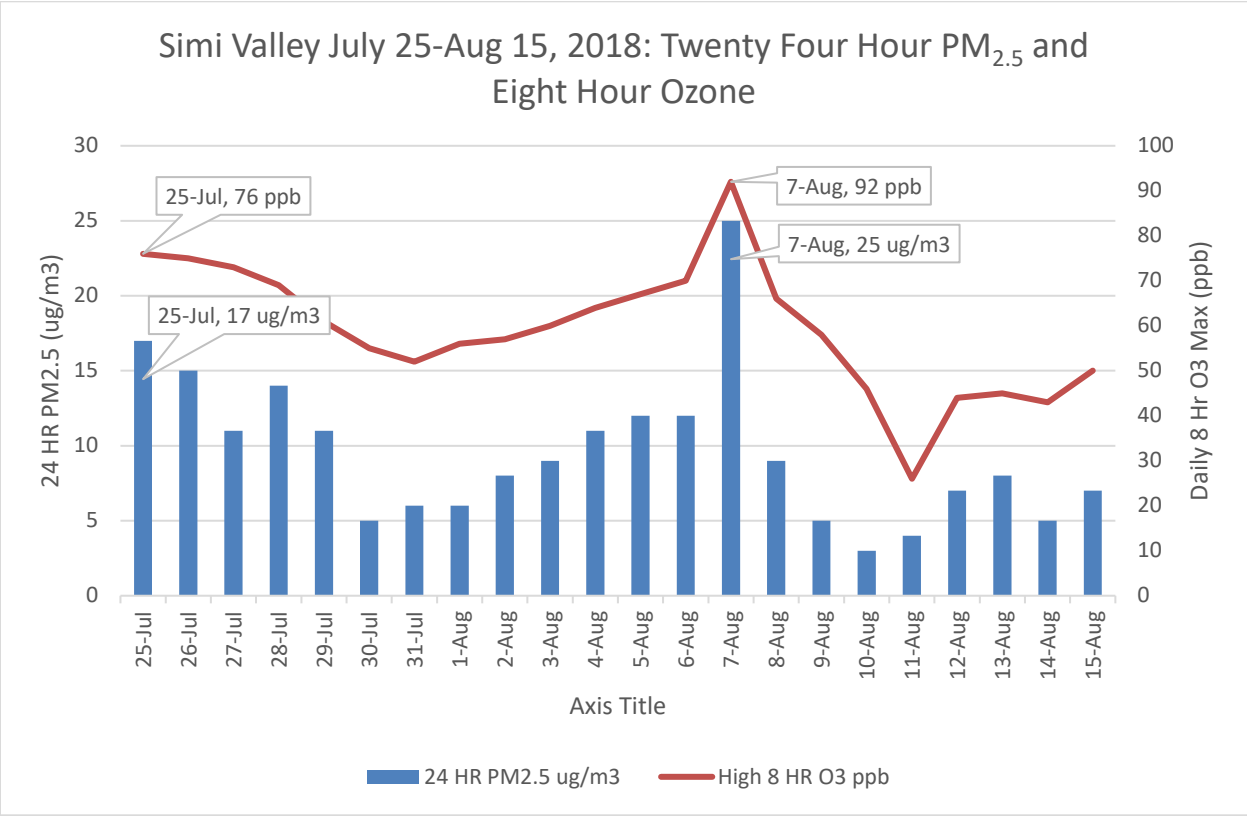
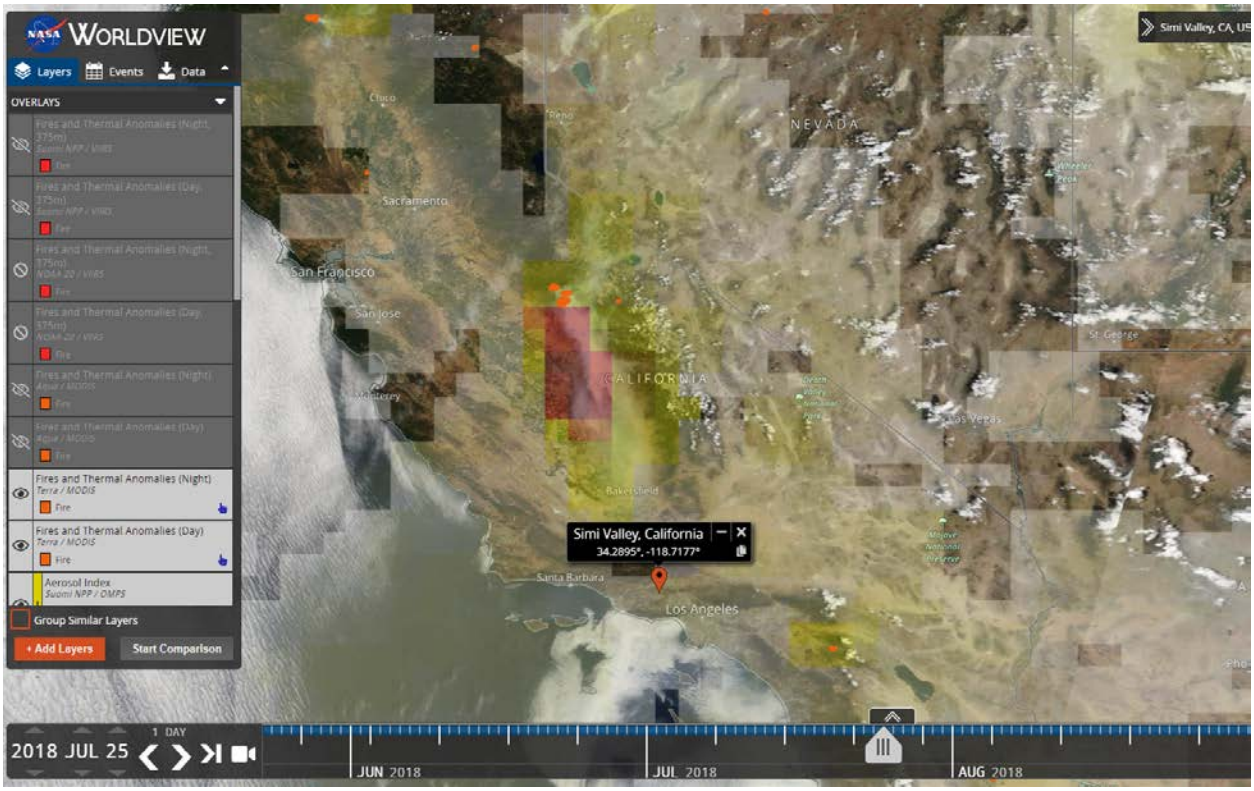


Figure H-15 Satellite Imagery of Aerosols – MODIS Fire & Thermal Anomalies MOD14 w/ Aerosol Index – July 25, 2018



C. July 25, 2018 Summary

Based on the above discussion, it is clear that July 25, 2018 is a day that was heavily impacted by smoke from nearby wildfires; as evidenced by proximity of said fires, wind flow patterns transporting smoke inland to the Simi Valley site, increased $PM_{2.5}$ values out of the norm for the site, and a commensurate increase in ozone values. As such, it should not be included in the calculation of baseline ozone modeling design value from which modeled future design values are calculated.

IV. August 7, 2018 Weighted Evidence

On August 7, 2018, many fires were burning throughout California, including the Mendocino Complex Fire, the Donnell Fire, the Ferguson Fire, and the Cranston Fire as well as others. These fires and the number of acres burned are shown in Table H-8 below.

Table H-8 Summary of Major Active California Wildfires During August 7, 2018

Fire Name	Start Date	Acres Burned	County
Holy	8/6/2018	23,136	Orange, Riverside
Ferguson	7/13/2018	96,901	Mariposa
Donnell	8/1/2018	36,450	Tuolumne
Mendocino Complex	7/27/2018	459,123	Mendocino, Lake, Colusa, Glenn
Cranston	7/25/2018	13,139	Riverside
Total		**628,749**	

A. Introduction and Meteorology

On August 7, 2018, many fires were burning throughout California, including the Mendocino Complex Fire, the Donnell Fire, the Ferguson Fire, and the Cranston Fire. Southern California was sitting under a strong dome of high pressure, at approximately 590 dm. At the surface, a mild offshore wind pattern existed which would allow for late night/early morning offshore winds with a light sea breeze during the afternoon hours. This pattern allowed for smoke to travel through Simi Valley towards the coast during the late night and early morning hours. The afternoon sea breeze allowed for the smoke to return into Simi Valley. This is evident with the surface winds and $PM_{2.5}$ concentrations recorded at Simi Valley.

B. August 7, 2018 Raw Data

Table H-9 shows the hourly values for: Ozone, $PM_{2.5}$, Wind Direction, and Wind Speed from the Simi Valley monitoring site on August 7, 2018 during multiple California fires. Figure H-16 shows a satellite image of aerosols on August 7, 2018.

Table H-9 Hourly Data: Simi Valley August 7th, 2018

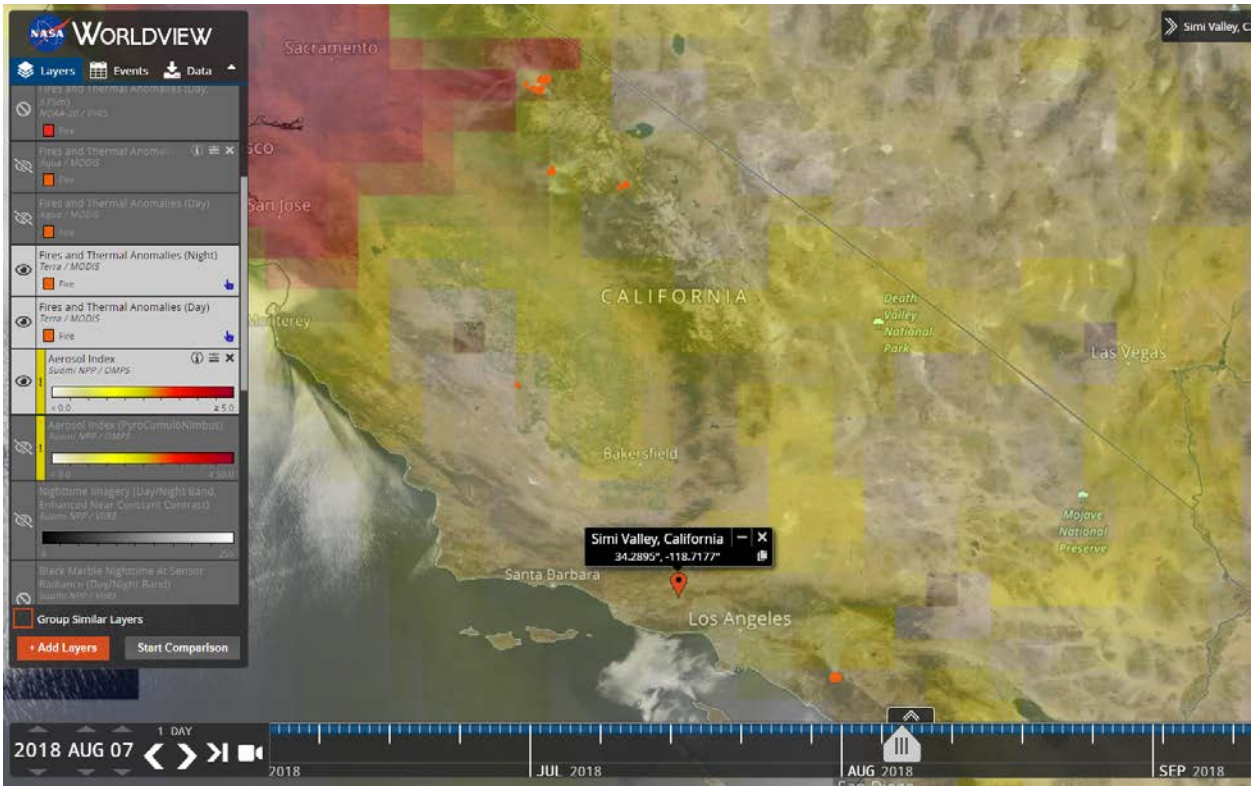
Ventura County Air Pollution Control District

Daily Summary Report - 8/7/2018

Site: Simi Valley-Cochran Street Interval: 001h

	LC25	O3	WD-S	WS-S
Time	UG/M3	PPB	DEG	m/s
00:00	17.	36.	84.	1.
01:00	17.	<	84.	.9
02:00	23.	33.	84.	.9
03:00	25.	28.	76.	.8
04:00	30.	19.	49.	.9
05:00	35.	8.	113.	1.
06:00	28.	13.	102.	.8
07:00	37.	37.	93.	.8
08:00	38.	71.	111.	2.4
09:00	31.	85.	149.	2.9
10:00	33.	94.	268.	3.6
11:00	31.	101.	263.	4.7
12:00	24.	99.	266.	4.5
13:00	24.	97.	268.	5.3
14:00	17.	92.	272.	5.
15:00	26.	88.	275.	3.6
16:00	21.	86.	266.	3.1
17:00	22.	83.	255.	3.6
18:00	20.	78.	256.	2.4
19:00	28.	75.	211.	1.1
20:00	28.	54.	80.	.6
21:00	24.	41.	70.	1.1
22:00	15.	68.	110.	3.5
23:00	13.	66.	114.	4.7
Average	25	63	163	2.5
Max	38.	101.	275.	5.3

Figure H-16 Satellite Imagery of Aerosols - MODIS Fire & Thermal Anomalies MOD14 w/ Aerosol Index – August 7, 2018



C. August 7, 2018 Summary

Based on the above discussion, it is clear that August 7, 2018 is a day that was heavily impacted by smoke from nearby wildfires; as evidenced by proximity and sheer number of said fires and their acreage, wind flow patterns transporting smoke offshore with a return onshore via a sea breeze allowing it to return to the Simi Valley site, increased $PM_{2.5}$ values well out of the norm for the site, and a commensurate increase in ozone values. As such, it should not be included in the calculation of baseline ozone modeling design value from which modeled future design values are calculated.

Summary

This WOE demonstration evaluated ambient air quality and emission trends to complement the regional photochemical modeling analyses conducted to evaluate Ventura County's progress toward meeting the 2026 attainment date. Control measures implemented in the County through federal, State, and local programs have led to a substantial decline in emissions of ozone precursors and a substantial improvement in ozone air quality. Between 2000 and 2021, total NOx emissions in Ventura County declined by nearly 50 percent and total ROG emissions declined by 45 percent. Moreover, between 2000 and 2020, the number of exceedance days in the County declined by nearly 69 percent and the design value decreased by over 28 percent, from 0.105 ppm to 0.075 ppm. In 2020, four out of five monitoring sites in the County met the 2015 ozone standard.

Ventura County is currently classified as a serious nonattainment area, for the 2015 8hour Ozone Standard of 0.070 ppm, with a 2026 attainment date. Downward trends among nearly all emission categories, as well as historical ozone metrics trending downward, and wildfire impact analysis which when combined with regional photochemical modeling results, conducted by South Coast AQMD, produce adjusted design value projections indicating that the area is on track to attain the 2015 ozone standard by 2026.

References

U.S. EPA *Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze*, December 2014.

Appendix H Attachment 1: Submitted Exceptional Event Analysis

The following discussion, data, tables, and figures are excerpted from the "Exceptional Events Demonstration for Ozone Exceedances: Southern California 2020 Wildfire Events" submittal sent to U.S. EPA in support of removing five wildfire impacted days in Ventura County. These exceptional event dates were subsequently approved by the U.S. EPA on May 4, 2022. Relevant Table, Figure, and other numbering have been kept for reference. Original report may be accessed on the CARB website at *https://ww2.arb.ca.gov/our-work/programs/state-and-federal-area-designations/exceptional-events* for additional detail.

I. Overview/Introduction

C. Actions Requested

Although a significant number of ozone nonattainment areas were impacted by the historic 2020 wildfires, not all areas have upcoming regulatory determinations applicable under the revised EER. The California Air Resources Board (CARB) is submitting this Exceptional Event demonstration to U.S. EPA for days in the summer and fall of 2020 that impacted the entirety of the ozone nonattainment area of Ventura County. In accordance with the U.S. EPA interpretation of the Exceptional Event Rule only the dates necessary to reach attainment are submitted in this demonstration, although other days could also qualify. The submitted days will affect the upcoming attainment year determinations for the pertinent 2008 and 2015 ozone NAAQS for areas which have otherwise met the level of the standards (Figure I-1, Table I-1). The specific exceedances of the standards requested for concurrence at monitors in Ventura County are listed in Table I-2.

Figure I-1: 8-hour Ozone Design Values at Simi Valley

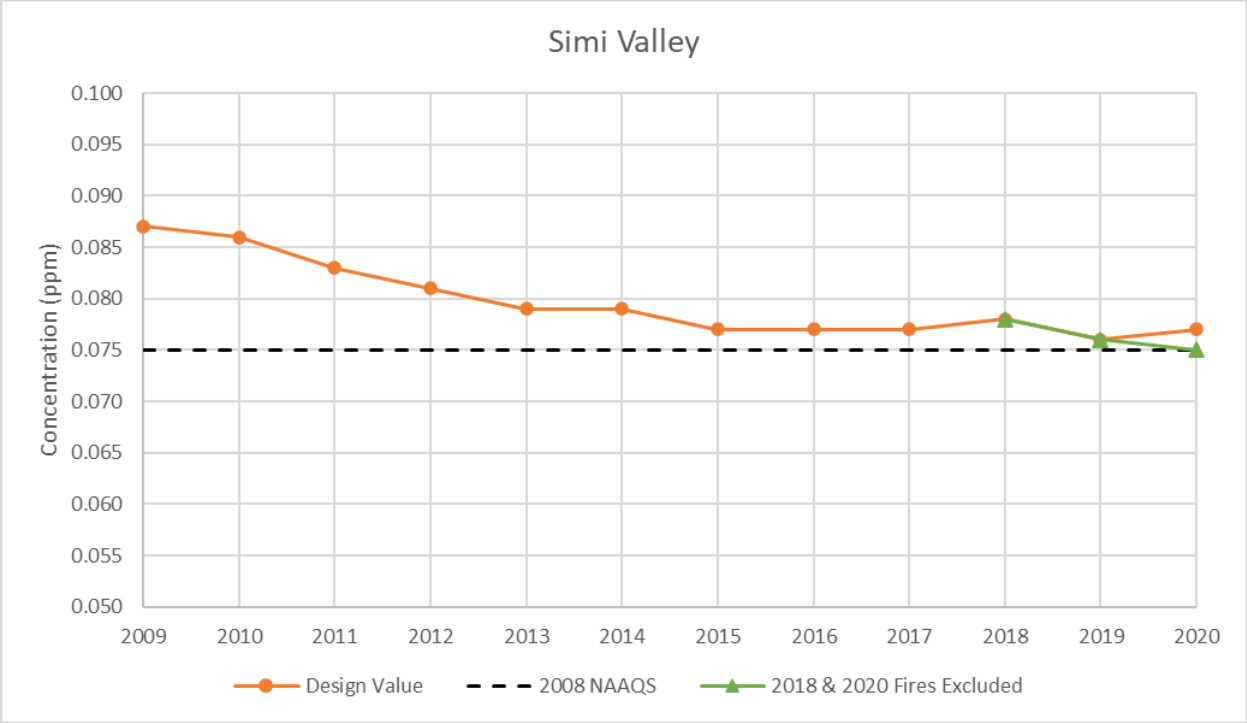


Table I-1: 8-hour Ozone Design Values with and without U.S. EPA Concurrence (2018 and 2020 Events)

Design Value without Concurrence of 2018 nor 2020 Demonstrations

Site	2018	2019	2020
Simi Valley*	0.078	0.076	0.077

Design Values with Concurrence of both 2018 and 2020 Demonstrations

Site	2018	2019	2020
Simi Valley*	0.078	0.076	0.075

* 8-hour design value for 2008 (0.075 ppm) NAAQS

Table I-2: Summary of 2020 8-Hour Ozone Exceedances Influenced by Wildland Fires

Air District	Monitoring Site	AQS ID	POC	Date	8-Hour Concentration (ppm)
Ventura	Simi Valley	06-111-2002	1	8/18/2020	0.086
Ventura	Simi Valley	06-111-2002	1	8/21/2020	0.082
Ventura	Simi Valley	06-111-2002	1	10/2/2020	0.086
Ventura	Simi Valley	06-111-2002	1	10/3/2020	0.095
Ventura	Simi Valley	06-111-2002	1	10/4/2020	0.080

II. Background

A. Characteristics of Non-Event Ozone Formation

Ground-level ozone is formed by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (ROG or VOC) in the presence of heat and sunlight. A more detailed discussion for each of the areas is provided below.

1. Ventura County (Simi Valley)

Based on historic, non-event ozone monitoring data for the previous 5 years, below are the characteristics of ozone levels throughout the year in Simi Valley.

- January through March: Generally lowest ozone concentrations during the year because of cooler temperatures, shorter days, and unsettled weather patterns.
- April through June: Transitional period between spring and summer when elevated 8-hour ozone concentrations are unusual but can occur at times when meteorological conditions are favorable for ozone formation, especially when a Pacific ridge of high pressure settles in the area.
- June through August: Typically, highest ozone concentrations caused by a ridge of high pressure over the southwestern United States influencing the area. Smoke from an early wildfire season can impact ozone concentrations as well.
- September through October: Ozone concentrations typically begin to decrease as temperatures and solar radiation decrease. Santa Ana wind events (offshore winds) begin to dominate the region, which leads to elevated ozone levels with the return of onshore winds (post Santa Ana's).
- November through December: Ozone concentrations are typically low during these months because of cooler temperatures, shorter days, and unsettled weather patterns.

The highest ozone values at Simi Valley occur during the ozone season from April through October, with exceedances during the remainder of the year extremely rare. Ozone concentrations at Simi Valley typically peak midday (Figure II-1) and are lowest in the mid-morning. Daily calibration checks frequently occurred in the overnight hours during 2015-2019,

so data for hour 1 was excluded from the calculation of percentiles. 1-hour ozone concentrations for the event days (Figure II-2) indicate that ozone concentrations were significantly above the 95 percentile during peak hours.

Figure II-1: Typical April-October 1-Hour Ozone Diurnal Pattern at Simi Valley (2015-2019)

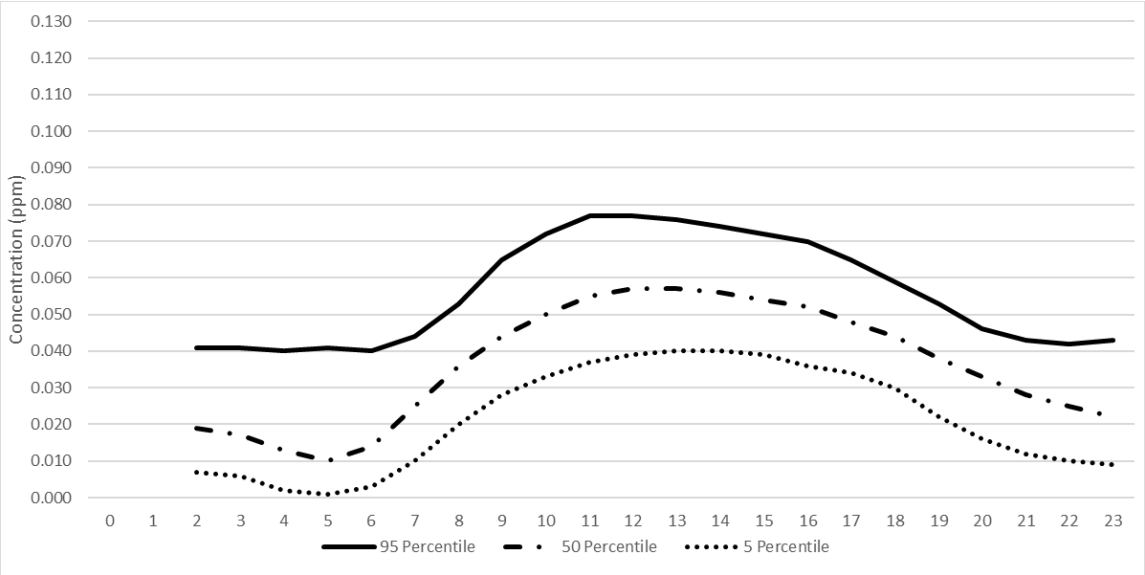
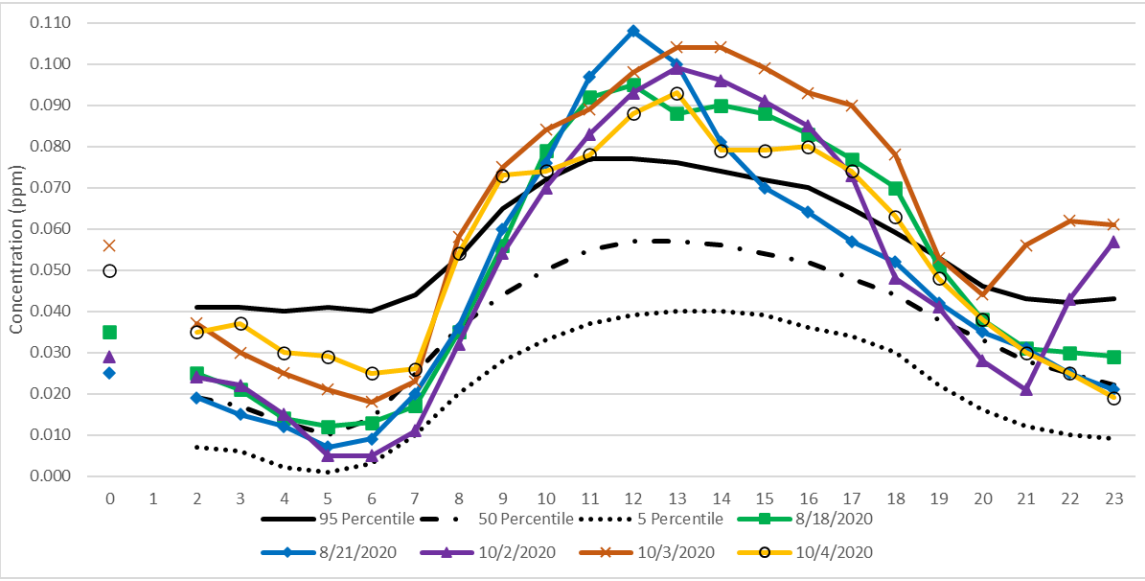


Figure II-2: 1-Hour Ozone Concentrations during Event Days compared to May-November 2015-2019 Percentiles at Simi Valley



B. Characteristics of Event Ozone Formation

Although wildfires occur in California every year, the number of wildfires and the amount of acreage burned has increased substantially, from a 5-year average of less than 5,000 fires

burning 200,000 acres as of 2017,[1] to the prior record 7,948 incidents and 1,975,086 acres burned in 2018,[2] to the new record 9,917 incidents and 4,257,863 acres burned in 2020.[3] The impact of these wildfires on air quality has been dramatic. Smoke from large fires has caused high concentrations of PM and ozone, especially in the western United States.[4] Wildfires generate large amount of ozone precursors including NOx and ROG which can contribute to elevated ozone levels in California. However, there are large variations in the amount of emissions (depending on the fuel type and combustion temperature), plume heights, smoke density, and meteorological conditions during different wildfires, and all these factors can significantly impact subsequent ozone production.[5] In addition, the amount of ozone within a smoke plume also varies with distance from the fire.[6] Due to the titration by NO from fire emissions and the blocking of sunlight by PM emissions, which hinders photochemical reactions, ozone concentrations near active fires are sometimes even lower relative to baseline concentrations. As the ozone precursors transport downwind along with the other air pollutants such as PM, ozone is produced within the smoke plume which could result in ozone exceedances at the surface in downwind areas. Research studies found that distant wildfires can raise ground-level ozone concentrations to unhealthy levels even at large distances from the fire location.[7]

III. Narrative Conceptual Model

The Narrative Conceptual Model describes the events causing the exceedances or violations seen at the monitor and includes a discussion of how the events led to concentrations above the NAAQS during August 18 to 21 and September 30 to October 4 of 2020.

A. Wildfire Information

2020 was another extreme year for wildfires, with numerous wildfires active during the time of the exceedances discussed in this demonstration (Figure III-1, Table III-1); although not all wildfires impacted each monitor on any given day. Hot and dry conditions at the surface combined with mid-level moisture resulted in elevated instability during parts of August and early September. The ensuing thunderstorms ignited multiple wildfires, resulting in smoke that accumulated throughout California. The accumulating smoke layers made identification of the

[1] CalFire, *2017 Statistics and Events (5 year average)*, last accessed 8/20/21. *https://www.fire.ca.gov/stats-events/*
[2] CalFire, 2018 Incident Archive, last accessed 11/17/21. *https://www.fire.ca.gov/incidents/2018/*
[3] CalFire, 2020 Statistics and Events, last accessed 11/17/21. *https://www.fire.ca.gov/stats-events/*
[4] Gong et al., 2017; Laing and Jaffe, 2019; Mass and Ovens, 2019; Jaffe et al., 2020
[5] Jaffe and Wigder, 2012; Faloona et al., 2020
[6] Faloona et al., 2020
[7] Pfister et al., 2008

impact of individual wildfires difficult. The majority of these fires, and all of the megafires, occurred on wildland or in the urban/wildland interface.

Figure III-1: Impacted Monitors and Active Major Wildfires, August 18-October 4, 2020

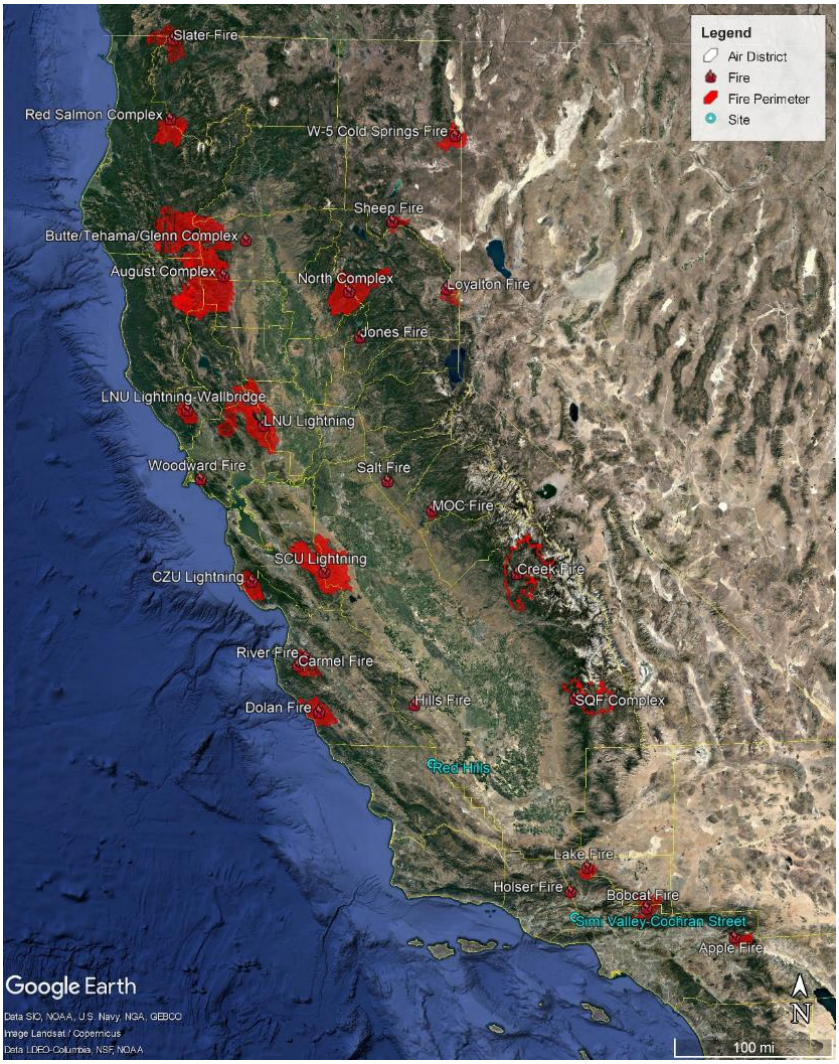


Table III-1: Major wildfires active during August 18-October 4, 2020 events

Fire	Source	Start Date	Containment	Latitude	Longitude	Total Acres
Red Salmon Complex	Lightning	7/27/2020	11/23/2020	41.16800	-123.40700	144,698
Lake Fire	Lightning	8/12/2020	9/28/2020	34.67900	-118.45200	31,089
Hills Fire	Lightning	8/15/2020	8/24/2020	36.09876	-120.42734	2,121

Fire	Source	Start Date	Containment	Latitude	Longitude	Total Acres
CZU Lightning Complex (Including Warnella Fire)	Lightning	8/16/2020	9/22/2020	37.17162	-122.22275	86,509
August Complex (includes Doe Fire)	Lightning	8/16/2020	11/11/2020	39.77600	-122.67300	1,032,648
River Fire	Lightning	8/16/2020	9/4/2020	36.60239	-121.62161	48,088
LNU Lightning Complex (includes Hennessey, Gamble, 15-10, Spanish, Markley, 13-4, 11-16, Walbridge)	Lightning	8/17/2020	10/2/2020	38.48193	-122.14864	363,220
Holser Fire	Investigating	8/17/2020	9/6/2020	34.43876	-118.75897	3,000
North Complex Fire	Lightning	8/18/2020	12/3/2020	39.69072	-121.22718	318,935
Salt Fire	Investigating	8/18/2020	8/24/2020	38.02792	-120.76326	1,789
Woodward Fire	Investigating	8/18/2020	10/2/2020	38.01809	-122.83670	4,929
Carmel Fire	Vehicle	8/18/2020	9/4/2020	36.44630	-121.68181	6,905
SCU Lightning Complex	Lightning	8/18/2020	10/1/2020	37.43944	-121.30435	396,624
Dolan Fire	Unknown	8/19/2020	12/31/2020	36.12300	-121.60200	124,924
SQF Complex Fire (Includes Castle Fire and Shotgun Fire)	Lightning	8/19/2020	1/6/2021	36.25500	-118.49700	174,178
Creek Fire	Investigating	9/4/2020	12/24/2020	37.19147	-119.26118	379,895
Bobcat Fire	Investigating	9/6/2020	11/8/2020	39.24465	-117.96484	115,796

The August Complex[8] fire started as 38 separate fires, most of which were small (Figures/Tables removed for brevity). The four main fires were the Doe, Tatham, Glade and Hull fires, which merged by August 30. The fires began from lightning strikes on August 16 and 17, 2020 and actively burned in Mendocino, Shasta-Trinity, and Six Rivers National Forests. The fires burned 1,032,648 acres, 935 structures, and caused one death before full containment on November 15, 2020. The August Complex fire is the largest fire complex in recorded California history[9].

The Butte/Tehama/Glenn Lightning Complex[10] fire included the Elkhorn and Hopkins fires and began on August 19, 2020 due to lighting and actively burned in Tehama and Glenn counties. By September 9, the Elkhorn and Hopkins fires had merged with the August Complex, forming the North Zone of the August Complex, and dropping the Butte/Tehama/Glenn Fire from 66,959 acres to 19,069 acres. The Butte/Tehama/Glenn Lightning Complex was fully contained on October 9, 2020.

The LNU Lightning Complex[11] fire (Figures/Tables removed for brevity) started as many small separate fires. The main fires were the Hennessey fire, which merged with the Gamble Green, Markley, Spanish, and Morgan fires burning 305,651 acres, as well as the Walbridge, and Meyers fires. These fires began due to lightning on August 16 and 17, 2020 and actively burned in six counties: Solano, Napa, Sonoma, Yolo, Lake, and Colusa. The fires burned on the hills surrounding several large cities including Napa, Fairfield, and Vacaville and burned 363,220 acres, 1,491 structures, and lead to six confirmed fatalities before full containment on October 2, 2020. The LNU lighting complex is the 6th largest California wildfire in recorded history[12].

CZU Lightning Complex[13] fire (Figures/Tables removed for brevity) started as many small fires including the Warnella fire and three fires that would become the northern edge of the CZU complex. The Northern edge fires merged, a few days after they began, due to changing wind patterns and quickly grew to over 40,000 acres. These fires began due to a lightning strike on August 16, 2020 and actively burned in Butano and Big Basin Redwoods state parks in San Mateo and Santa Cruz counties. The fires burned 86,509 acres, destroyed 1,490 structures, damaged an additional 140 structures, and lead to one confirmed fatality before being fully contained on September 22, 2020.

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[8]August Complex, accessed 10/11/2021. *https://inciweb.nwcg.gov/incident/6983/*

[9]Top 20 Largest California Wildfires, accessed 10/11/2021. *https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf*

[10] Butte/Tehama/Glenn Lightning Complex. *https://data.statesmanjournal.com/fires/ca-fire/f6aba342-3b28-460b-a88a-96ccbdcb3c14/buttetehamaglenn-lightning-complex-tehamaglenn-zone/*

[11] Solano County 2020 LN Lightning Complex Fire. Accessed 10/11/2021. *https://www.solanocounty.com/depts/rm/lnu_fire_cleanup_n_rebuilding/default.asp*

[12] *https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf*

[13] CZU Lightning Complex (Including Warnella Fire). *https://www.fire.ca.gov/incidents/2020/8/16/czu-lightning-complex-including-warnella-fire/*

River Fire[14] (Figures/Tables removed for brevity) began due to a lightning strike on August 16, 2020 and actively burned in a wildland urban interface zone within Monterey County. The fire burned 48,088 acres, destroyed 30 structures, and damaged 13 before full containment on September 4, 2020.

Carmel Fire[15] (Figures/Tables removed for brevity) began on August 18, 2020 due to a vehicle malfunction and actively burned in a wildland urban interface zone within Monterey County. The fire burned 6,905 acres, destroyed 73 structures, and damaged 7 before full containment on September 4, 2020.

SCU Lightning Complex[16] (Figures/Tables removed for brevity) began as the Deer, Canyon, and Santa Clara fires, by August 26 the Deer fire was fully contained and the Canyon and Santa Clara fires merged. These fires began from lightning strikes on August 18, 2020 and actively burned in the Diablo mountain range in Santa Clara, Alameda, Contra Costa, San Joaquín, and Stanislaus counties. The fires burned 396,624 acres, destroyed 222 structures, and damaged 26 before full containment on October 1, 2020. The SCU Lighting complex is the 4th largest California wildfire in recorded history[17].

Creek Fire[18] (Figures/Tables removed for brevity) began on September 4, 2020 with the source currently under investigation. Within the first four days of starting the Creek Fire grew anywhere between 20,000 to 50,000 acres due to the strong winds in the area. The fire activity burned in the Sierra National Forest in Fresno and Madera counties, burning 379,895 acres and destroying 853 structures, including many homes in Big Creek, before full containment on December 24, 2020. The creek fire is the 5th largest California wildfire and the 2nd largest single California wildfire in recorded history[19].

North Complex Fire[20] (Figures/Tables removed for brevity) began during a lightning strike on August 17, 2020 and actively burned in Plumas National Forest in Plumas, Butte, and Yuba counties. By September 5, 2020 all the individual fires had been contained except for the Claremont and Bear fires. These two fires merged on September 5, 2020 and due to strong winds rapidly grew spreading to the Southwest and leveling the towns of Berry Creek and Feather Falls. The fires burned 318,935 acres, damaging or destroying 2,352 structures, and causing 15 fatalities before full containment on December 3, 2020. The North Complex Fire is the 7th largest California wildfire in recorded history[21].

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[14] River Fire. *https://www.fire.ca.gov/incidents/2020/8/16/river-fire/*
[15] Carmel Fire. *https://www.fire.ca.gov/incidents/2020/8/18/carmel-fire/*
[16] SCU Lightning Complex. *https://www.fire.ca.gov/incidents/2020/8/18/scu-lightning-complex/*
[17] *https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf*
[18] Creek Fire. *https://inciweb.nwcg.gov/incident/7147/*
[19] *https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf*
[20] North Complex Fire. *https://inciweb.nwcg.gov/incident/6997/*
[21] *https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf*

Woodward Fire[22] (Figures/Tables removed for brevity) began during a lightning strike on August 17, 2020 and was initially named the 4-5 Fire and on August 18, 2020 a second fire initially named the 4-6 Fire was found nearby, these were later renamed to the Woodward Fire[23]. These fires quickly grew due to winds and actively burned in the Point Reyes National Seashore. The fires burned 4,929 before full containment on October 1, 2020.

SQF Complex Fire[24] (Figures/Tables removed for brevity) began as the Castle and Shotgun fires during a lightning strike on August 19, 2020. The Castle fire actively burned in Sequoia National Forest and Giant Sequoia National Monument, Inyo National Forest, Sequoia National Park, lands managed by the Bureau of Land Management, State, County, and private lands with the Shotgun fire actively burning in the Golden Trout Wilderness and Sequoia National Forest. The fires burned 174,178 acres and destroyed 228 structures before full containment on January 5, 2021.

Hills Fire[25] (Figures/Tables removed for brevity) began on August 15, 2020 during a lightning strike. The fire actively burned in the wildland urban interface zone within Fresno County. The Hills fire burned 2,121 acres and caused one fatality before being fully contained on August 24, 2020.

Holser Fire[26] (Figures/Tables removed for brevity) began on August 17, 2020 as a bush fire with the source of the fire still unknown. The fire actively burned in Piru Canyon in Ventura County, approximately 12 miles north of the Simi Valley monitor, and burned 3,000 acres before being fully contained on September 9, 2020.

Lake Fire[27] (Figures/Tables removed for brevity) began on August 12, 2020 during a lightning strike. The fire actively burned in the Angeles National Forest in Los Angeles County. The Lake Fire burned 31,089 acres, destroyed 33 structures, damaged 6 structures, and destroyed 21 outbuildings before being fully contained on September 29, 2020.

Bobcat Fire[28] (Figures/Tables removed for brevity) began on September 6, 2020 with the source of the fire still unknown. The fire actively burned chaparral, brush, and timber near Cogswell Dam in Angeles National Forest in Los Angeles County. The Bobcat Fire burned 115,796 acres, destroyed 171 structures before being last updated at 92% contained on October 19, 2020.

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[22] Woodward Fire. *https://inciweb.nwcg.gov/incident/maps/7062/*

[23] National Park Service. Point Reyes – National Seashore California. *https://www.nps.gov/pore/learn/management/firemanagement_woodwardfire.htm*

[24] SQF Complex Fire. *https://inciweb.nwcg.gov/incident/7048/*

[25] Cal Fire – Hills Fire. *https://www.fire.ca.gov/incidents/2020/8/15/hills-fire/*

[26] Cal Fire – Holser Fire. *https://www.fire.ca.gov/incidents/2020/8/17/holser-fire/*

[27] Cal Fire – Lake Fire. *https://fire.ca.gov/incidents/2020/8/12/lake-fire/*

[28] Inciweb – Bobcat Fire. *https://inciweb.nwcg.gov/incident/7152/*

Dolan Fire[29] (Figures/Tables removed for brevity) began on August 19, 2020 with the source of the fire still unknown. The fire actively burned in state parks and animal sanctuaries in Monterey County and burned 124,924 acres before being fully contained on December 31, 2020.

Salt Fire[30] (Figures/Tables removed for brevity) began on August 18, 2020 due to a source that is under investigation and actively burned near the Salt Springs Valley Reservoir in a wildland urban interface zone within Calaveras County. The fire burned 1,789 acres before full containment on August 24, 2020.

Red Salmon Complex[31] (Figures/Tables removed for brevity) began during a lightning strike on July 27, 2020 and was comprised of the Red and Salmon fires. These fires actively burned in Six Rivers National Forest, Shasta Trinity National Forest, Klamath National Forest, and Hoopa Valley Reservation. The fires burned 144,698 acres before full containment on November 17, 2020.

These fires occurred in areas that meet the definition of wildland which is "an area in which human activity and development is essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered." Wildlands can include forestland, shrubland, grassland, and wetlands and includes lands that are predominantly wildland, such as land in the wildland-urban interface, as specified in the preamble of the Exceptional Events Rule.[32] (Figures removed for brevity) indicate these areas with the fire perimeters outlined in red.

B. Summary of Event

A series of large wildfires were ignited across California from mid-August to early October 2020. The majority of these fires occurred in the northern and central portions of the State, including the August Complex, which burned 1,032,648 acres and resulted in one fatality; the SCU Lightning Complex, which burned 396,624 acres; and the North Complex Fire, which burned 318,935 acres and resulted in fifteen fatalities. On August 22, 2020, a national disaster was first declared for the State of California,[33] due to the extensive wildfires burning there.[34]

The following section provides evidence of the impact of these exceptional events on the Simi Valley ozone monitors from August 18 to August 21, and September 30 to October 4, 2020.

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[29] Dolan Fire. *https://inciweb.nwcg.gov/incident/7018/*

[30] Salt Fire. *https://www.fire.ca.gov/incidents/2020/8/18/salt-fire/*

[31] Red Salmon Complex - *https://inciweb.nwcg.gov/incident/6891/*

[32] 81 FR 68248

[33] 85 FR 53428, *Presidential Declaration of a Major Disaster for the State of California*, dated 8/22/20

[34] FEMA, *California Wildfires and High Winds, DR-4558-CA. https://www.fema.gov/disaster/4558*

Presented as phases of the event, the evidence shows the source wildfires that collectively contributed emissions impacting these sites in the South Central Coast Air Basin.

NOAA's HYSPLIT[35] model was used to determine simple back-trajectories showing the path that an air parcel took for a specified period of time (here, 36 hours), starting at each monitor at times of peak concentrations on each day. Three height levels (red: 100 meters (m); blue: 500m; green: 1000m) were used to indicate transport near the surface and in the upper atmosphere.

The HYSPLIT model was also used to indicate how emissions from the wildfires were transported toward the monitor (forward trajectory). Trajectories in this section are shown from the fire(s) estimated to have the highest contribution. The trajectories were initiated from each major fire at 12z (04PST). These model runs provide insight into the most likely center path a parcel of air (and smoke) from each fire would take in the 36 hours after the 12z start time. This provides a simplified understanding of smoke transport from a fire across the region, connecting these wildfires with smoke seen in satellite imagery, and indicating potential correlations at a site through analysis of parcel transport timing and backwards trajectories when they overlap. These forward trajectories, overlaid on satellite images from the SUOMI NPP / VIIRS[36] platform using Google Earth, provide a visual analysis of the smoke emitting from the fires and impacting the monitors.

Google Earth was used as a platform to combine the HYSPLIT back-trajectories and the NOAA Hazard and Mapping System (HMS) Fire and Smoke Product[37] smoke layers and fire locations. The back-trajectories for each monitor shown in the following sections traced back from the time of the maximum ozone concentration in the exceeding 8-hour period. Since different monitors will have maximum concentrations at different times, a table of the monitoring sites presented in the back-trajectory figures is included, indicating in both PST and UTC, the hours each trajectory began. Back-trajectories from the hour of the maximum ozone concentration in the exceeding 8-hour period for all exceptional event dates that are requested in this document are included in Appendix D.

The HYSPLIT trajectory model results, as well as Suomi satellite layers from the NASA Worldview application, and HMS smoke plume analyses, show impacts from multiple California wildfires dispersed throughout the northern and central portions of the State. Although the model results can show potential influence from specific fires, they do not always show the cumulative effect of continuing wildfire emissions that impacted California from August to early November.

[35] HYbrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT)

[36] NASA Worldview, *https://worldview.earthdata.nasa.gov/. Last accessed 11/16/21*

[37] NOAA Satellite Smoke Text Product, *https://www.ssd.noaa.gov/PS/FIRE/smoke.html. Last accessed 11/17/21*

1. August 18-21, 2020

Strong 500 mb high pressure centered over the Great Basin area of Nevada and Utah and southwestern United States (Figure removed for brevity) provided for very hot temperatures across California, including the inland portions of Ventura County. Some monsoonal moisture moved into interior California with strong atmospheric dynamics favorable for convection, generated thunderstorms that initiated several wildfires in very dry vegetation during August 16-18. These wildfires rapidly spread and grew due to strong winds and low surface humidity across much of the region, causing increased smoke coverage and thickness while impacting surface locations across the State. Upper-level low pressure off the coast of Canada slowly pushes into the northwestern United States with a series of weak troughs moving onshore. This gradually erodes high pressure influence in the northwest United States but leaves southern California hot with above normal temperatures. Near Simi Valley, the Holser Fire (started August 12) and Lake Fire (started August 17) both rapidly grew in size by over 3,000 acres each during the evening August 17 through August 18, eschewing smoke in and near Ventura County and impacting Simi Valley on August 18. The Lake Fire contributed to smoke at Simi Valley when the wind shifted during morning August 18 and brought smoke southward from the Lake Fire, which mixed down into the valley during early August 18, as indicated by trajectory (Figure removed for brevity).

2. September 30-October 4, 2020

Strong 500mb high pressure influence extended from Mexico to the Canadian border, which provided for hot and dry surface conditions across much of the western United States, including California, as shown in (Figure removed for brevity). These weather conditions promoted high ozone concentrations which were further elevated by transported smoke emissions with associated ozone and precursors from multiple wildfires across the state. During late September, conditions were also favorable for Santa Ana winds which stimulated the spread of any nearby wildfires, further increased wildfire emissions, and broadly spread wildfire smoke across California. The National Weather Service advised of wildfire smoke and haze which impacted the forecast area, including Simi Valley, during this period (NWS Area Forecast Discussions in Appendix C). Along the south-central California coastline, a weak prevailing offshore/onshore diurnal pattern set up and provided for light offshore breezes that pulled air from the San Joaquin Valley and South Coast through Ventura County with warm overnight temperatures during the night. Then during the day, light onshore breezes brought this air back onshore causing a buildup of pollutants near the coast.

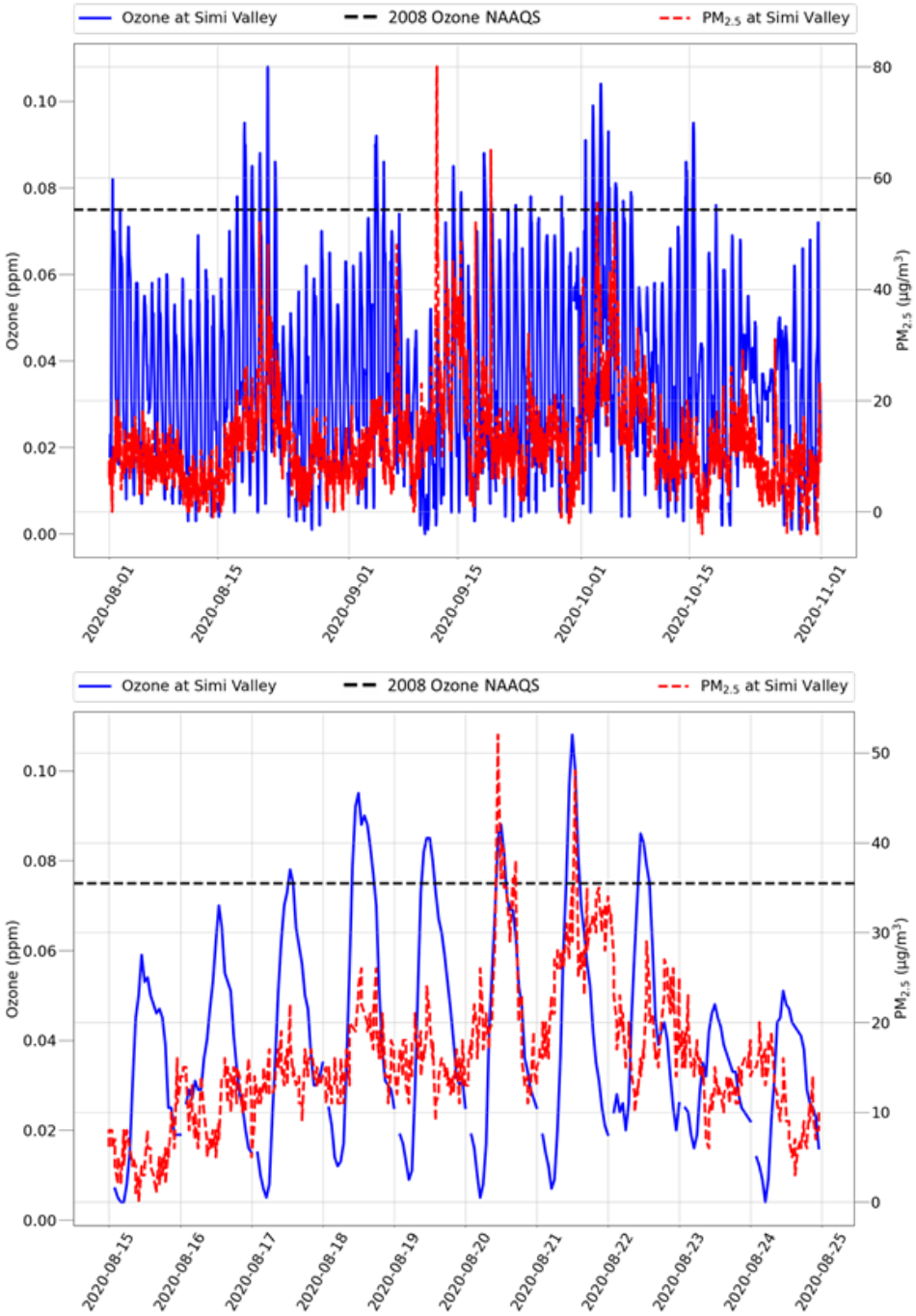
C. Event Related Concentrations and Long Term Trends

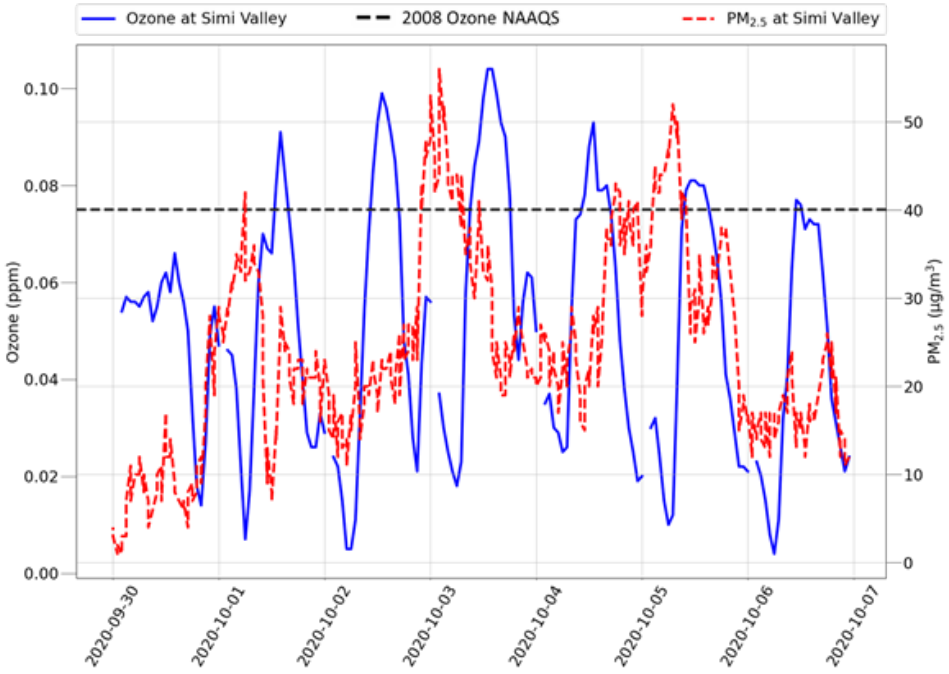
2. Ventura County (Simi Valley)

Multiple wildfires impacted the City of Simi Valley during the periods of concern, where winds generally transported wildfire smoke and ozone precursors from the Lake, Holser, CZU Lightning Complex, River, LNU Lightning Complex, Salt, Woodward, Carmel, SCU Lightning Complex, Dolan, Bobcat, SQF Complex, and Creek wildfires in California. These wildfire emissions caused elevated ozone concentrations at the Simi Valley monitoring site. Additionally, the smoke from the August Complex, Butte/Tehama/Glenn Complex, Red Salmon, North Complex, and Jones fires from northern California may have been transported to the area and contributed to ozone concentrations during some days. Elevated $PM_{2.5}$ concentrations and associated timing support the presence of wildfire smoke in the City of Simi Valley.

Figure III-2 shows the ozone and $PM_{2.5}$ concentration encompassing August, September, and October (top), a zoomed in range of August 15 to August 25 (center) and a zoomed in range of September 30 to October 7, 2020 (bottom), which includes the requested exceptional events listed in (Table removed for brevity). The timing of relative $PM_{2.5}$ elevated concentrations show strong connections with ozone increases and prolonged elevated concentrations. All the event periods show a consistent relationship between high $PM_{2.5}$ and elevated ozone values which is supportive of a strong influence by wildfire smoke.

Figure III-2: 1-hour Ozone and 1-hour PM2.5 Concentrations





Recent trends show a general decrease in 8-hour ozone design values at the Simi Valley monitoring site as shown in Figure III-3 while the annual 4th highs (Figure III-4) have shown a downwards trend during the past twelve years. The trend fit for design values is very strong. The 2020 8-hour ozone design value did not follow this trend, being above the standard. Concurrence of the requested exceptional event dates would bring the area into attainment of the 2008 ozone standard based on the adjusted 2020 8-hour ozone design value, as anticipated with the historical trend line.

Figure III-3: 8-hour Ozone Design Values with Trend at Simi Valley

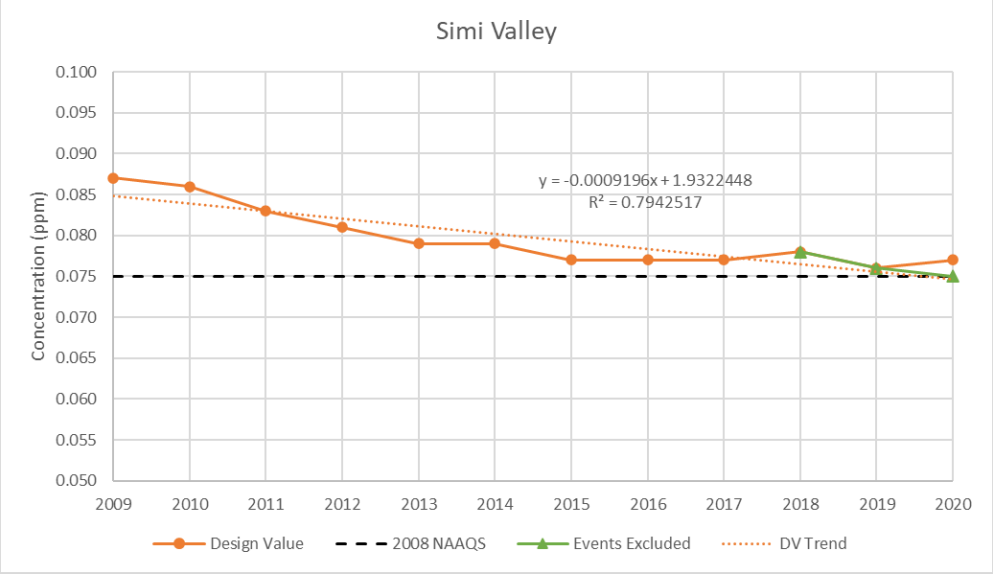
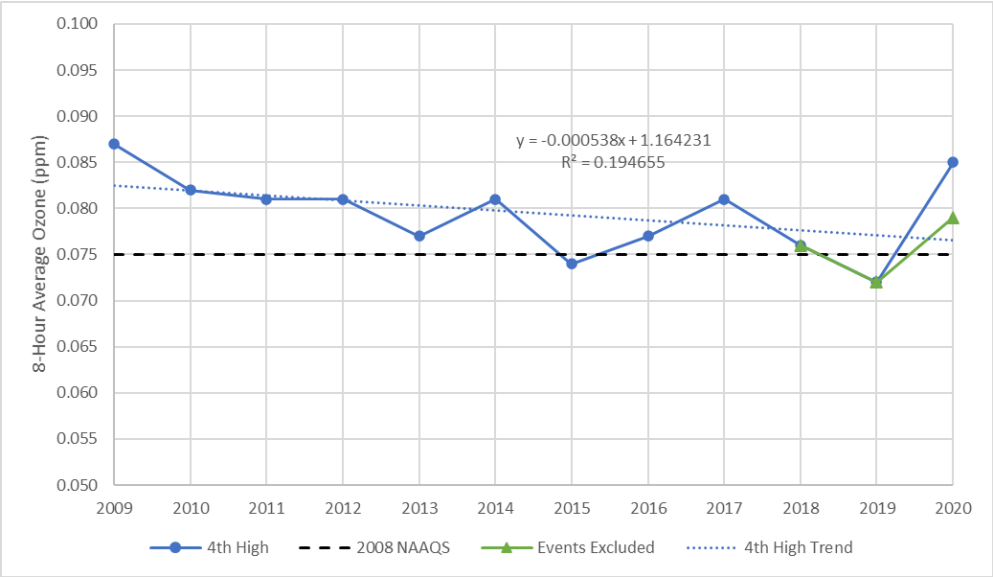


Figure III-4: Annual 4th High 8-Hour Average Ozone with Trend at Simi Valley



D. Meteorological Conditions

2. Simi Valley / Ventura County

Table III-2: Maximum Daily Values of Ozone, Temperature, and Wind Speed on Exceptional Event and Surrounding Days, 8/15-8/24/2020, at Simi Valley Monitoring Site

Date	8/15	8/16	8/17	8/18*	8/19	8/20	8/21*	8/22	8/23	8/24
1hr Ozone (ppm)	0.060	0.067	0.069	0.082	0.073	0.083	0.126	0.082	0.062	0.050
8hr Ozone (ppm)	0.050	0.057	0.067	0.086	0.076	0.074	0.082	0.070	0.041	0.045
Temperature (°F)	102.6	96.8	93.6	103.8	97.9	97.0	97.0	95.5	90.9	84.7
Wind Speed (mph)	10.3	13.0	9.8	10.5	10.1	9.4	8.5	11.2	11.4	9.8

* Denotes Exceptional Event Dates Requested for Data Exclusion

Table III-3: Maximum Daily Values of Ozone, Temperature, and Wind Speed on Exceptional Event and Surrounding Days, 9/30-10/6/2020, at Simi Valley Monitoring Site

Date	9/30	10/1	10/2*	10/3*	10/4*	10/5	10/6
1hr Ozone (ppm)	0.066	0.091	0.099	0.104	0.093	0.081	0.077
8hr Ozone (ppm)	0.058	0.074	0.086	0.095	0.080	0.077	0.070
Temperature (°F)	103.8	104.0	98.4	95.9	95.9	93.7	91.0
Wind Speed (mph)	11.6	10.5	9.6	8.9	9.4	9.6	10.3

* Denotes Exceptional Event Dates Requested for Data Exclusion

Table III-2 shows the daily values for the event period of August 15 to August 24, 2020. Maximum temperatures were generally in the 90s throughout most of the event with August 15 being over 100°F and temperatures cooling off into the 80s on August 24, 2020. Maximum daily resultant wind speeds were generally light to moderate with ranging from 8-13 mph. Maximum ozone concentration varied significantly with a range of 76 ppb and 45 ppb for the 1-hour and 8-hour ozone, respectively. Comparing August 21 with August 15, ozone concentrations were much higher while temperature was lower and wind speed slightly lower on August 21, indicating the day was likely complicated but unlikely to lead to such an extreme ozone concentration under normal conditions. Comparing August 18 with August 15, ozone concentrations were much higher while the high temperature was slightly warmer and exhibited similar wind speeds during August 18 which would be expected to lead to higher ozone concentrations but probably not as high as was measured.

Table III-3 shows the daily values for the event period of September 30 to October 6, 2020. Maximum temperatures were generally in the 90s throughout the event, with September 30 and October 1 being over 100°F. Maximum daily resultant wind speeds were generally light to moderate with ranging from 8-11 mph. Maximum ozone concentration varied significantly with a range of 38 ppb and 37 ppb for the 1-hour and 8-hour averaged ozone, respectively. Comparing October 2 through 4 with preceding days September 30 and October 1, maximum temperatures decrease with relatively small decrease in wind speeds which would not be expected to lead to such high ozone concentrations.

The weather data, for both event periods, supports that ozone directly related to wildfire smoke from the wildfires in California affected the Simi Valley monitor and increased ozone concentrations. Unusual weather, other than the transport of ozone and related wildfire smoke, was not a factor contributing to the exceptional event.

IV. Clear Causal Relationship

A. Tier 1 Key Factor Analysis

This section provides the documentation requested for a Tier 1 analysis per the *Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations*.[38] The Tier 1 analysis is for wildfires that clearly influence monitored ozone exceedances or violations when they occur in an area that typically experiences lower ozone concentrations. This includes establishing the seasonality and/or distinctive level of the monitored ozone concentration as well as providing evidence that the wildfire emissions were transported to the monitors. Analyses presented in this document include 2015-2020 8-hour maximums (Figure removed for brevity) to show seasonality and non-event related concentrations, proximity of wildfires (Section B of the Narrative Conceptual Model chapter), and transport of emissions from wildfires to the exceeding monitors (Section B of the Narrative Conceptual Model chapter and Section C of this chapter).

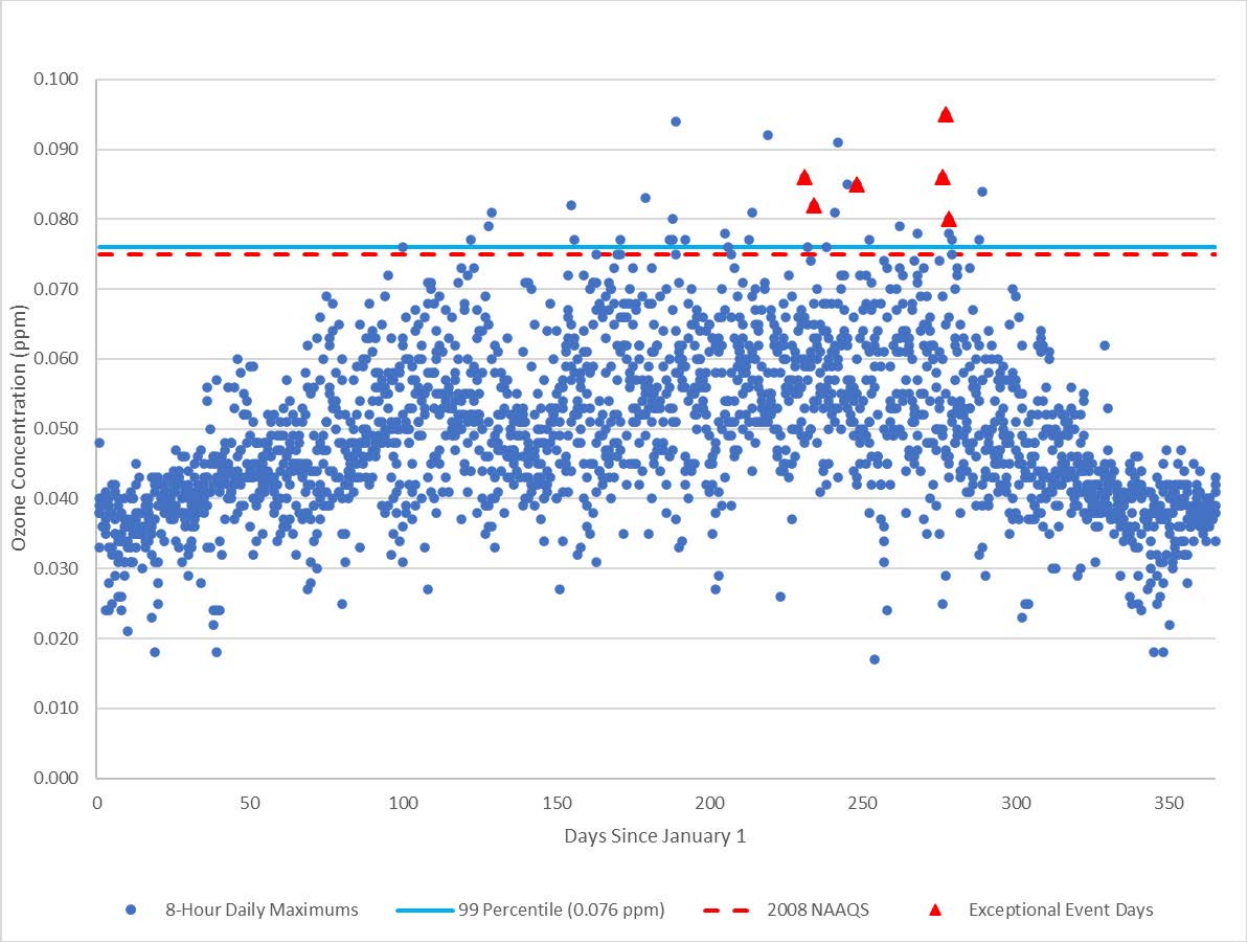
The key factor for Tier 1 requires establishing the seasonality and/or distinctive level of the monitored ozone concentration. The event-related exceedance occurs during a time of year that typically has no exceedances or is clearly distinguishable (at least 0.005 ppm higher) from non-event exceedances. Additionally, ozone impacts should be accompanied by clear evidence that the wildfire's emissions were transported to the location of the monitor.

(Figure removed for brevity) and Figure IV-1 shows that the exceedances occurred during the time of year where ozone concentrations tend to be higher for both monitoring sites, and that most of these exceedances are not clearly distinguishable from non-event exceedances as defined by guidance.

The Simi Valley (Ventura County) exceedance on October 3, 2020 of 0.095 ppm was the greatest concentration during 2015-2020 but was only 1 ppb higher than the second greatest concentration on July 8, 2017 of 0.094 ppm, which does not qualify for a Tier 1 analysis. The remainder of the exceedances were high for the season at Simi Valley, they do not qualify for a Tier 1 analysis.

[38] U.S. EPA, *Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations*, p. 13, last accessed 7/26/21.

Figure IV-1: Simi Valley 8-Hour Daily Ozone Maximums by Day of the Year for 2015-2020



As most exceedances do not qualify for Tier 1, additional evidence that the wildfire emissions were transported to the monitors is needed for further Tier 2 analyses. Transport evidence is provided in Section B of the Narrative Conceptual Model chapter and Section C of this chapter as part of the Tier 3 – Weight of Evidence.

B. Tier 2 Key Factor Analysis

This section provides the documentation requested for a Tier 2 analysis, where ozone concentrations are not clearly higher than non-event related concentrations nor do they occur outside of the area's normal ozone season, in effect not meeting Tier 1 requirements. Tier 2 requires a demonstration that the impacts of the wildfire event on ozone are higher than a non-event related concentration and that fire emissions compared to the fire's distance from the monitor indicate a clear causal relationship. Analyses include those indicated in Section A of this chapter for Tier 1 as well as Q/D estimations, a more detailed comparison of the event-related ozone concentrations with non-event-related high ozone concentrations, and evidence that the

emissions affected the monitor. The following sections provide the documentation requested for a Tier 2 analysis per U.S. EPA guidance.[39]

> Key Factor #1 - Fire emissions and distance of fire(s) to affected monitoring site location(s), and
>
> Key Factor #2 - Comparison of the event-related ozone concentrations with non-event related high ozone concentrations.

Evidence that the fire emissions impacted the exceeding monitor are also required. This evidence is provided with satellite evidence of smoke at the monitor (Narrative Conceptual Model chapter and Section C of this chapter), graphs of $PM_{2.5}$ concentrations nearby and in the same airshed (Section C of this chapter), and $PM_{2.5}$ speciation data near the wildfires impacting the monitor (Section C of this chapter), and differences in spatial and temporal patterns (Section C of this chapter).

1. Key Factor #1 (Q/D)

Key factor 1 requires determining the fire emissions (Q) and the distance (D) between the wildfires to the affected monitor. CARB staff worked with U.S. EPA staff, and provided shapefiles delineating perimeters, start dates, and end dates of all California wildfires in 2020 retrieved from the National Interagency Fire Center. U.S. EPA modeled the wildfires and emissions, produced emissions estimates for the fires for each date, and calculated the summed aggregate of emissions divided by the distance (Q/D) for each day for each monitoring site.

2. Key Factor #2 (Event vs Non-Event Ozone Concentrations)

Key factor #2 in a Tier 2 demonstration requires a comparison of the event related ozone concentration with non-event related high ozone concentrations. Statistical analyses of the exceedances must either demonstrate that exceedance concentrations are in the 99th percentile of the 5-year distribution of ozone monitoring data, or one of the 4 highest ozone concentrations within the year.

Due to the large number of dates impacted by the multiple large wildfires burning historically large amount of acreage producing massive amounts of emissions, CARB believes it reasonable to include all dates whereby wildfire emissions caused exceedances of the appropriate ozone NAAQS up to the adjusted 4th high, as noted in the tables below. Dates that are impacted by exceptional events should not count against the tally of “the 4 highest ozone concentrations within the year” as they were exceedances caused by contributions from wildfire emissions. This list also does not preclude the non-exceptional event requested dates from future

[39] Ibid, p. 15

consideration as wildfire related exceptional events, only that they are not being demonstrated as such as part of this exceptional events demonstration.

The 99th percentile value for the 5-year (2015-2019) distribution of ozone monitoring data at Simi Valley is 0.076 ppm. All dates being requested for exclusion due to wildfire exceptional events are in the top 8 concentrations in 2020 and in the 99th percentile or higher for concentrations during the prior 5-year distribution of data as shown below in (Table removed for brevity). After accounting for the exceptional event dates being requested the adjusted 4th high is 0.079 ppm, below all requested exceptional event dates. All requested dates qualify under the requirements for Tier 2 – Key factor #2.

C. Tier 3 – Weight of Evidence

The following sections provide additional evidence as required to support a Tier 3 analysis per U.S. EPA guidance[40] where the requested dates do not qualify for either a Tier 1 or a Tier 2 analysis. All dates requested for exclusion will be included in this Tier 3 analysis. The Tier 3 analysis utilizes a more complicated "weight of evidence" approach with additional complex analyses to show a clear causal relationship between wildfire emissions and the ozone concentrations at a site. Additional required elements in a Tier 3 analysis must provide:

1. Evidence that the emissions from the wildfire affected the exceeding monitor.

This requirement is met through evidence shown in Sections B and C of the Narrative Conceptual Model chapter and Section C of this chapter, and particularly in the evidence of an ozone/$PM_{2.5}$ correlation (Figure removed for brevity and Figure III-36), unusual ozone diurnal patterns seen in many of the (Figures removed for brevity), and unusual $PM_{2.5}$ patterns seen in many of the (Figures removed for brevity). Social media reports of smoke in the vicinity can also be found in Appendix F.

2. Evidence that the emissions were transported to the monitor.

This requirement is met through evidence given in the Narrative Conceptual Model chapter and this chapter using both backward trajectory analysis from the monitor as well as forward trajectory modeling from individual wildfires, satellite imagery and HMS satellite-derived smoke layers, NAAPS modeled aerosol optical depth, and meteorological analyses.

3. Additional evidence that the emissions caused the exceedance by reaching the ground and affecting the monitors.

[40] U.S. EPA, *Final Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations*, p.25, last accessed 7/29/21

This requirement is met through the analysis of $PM_{2.5}$, black carbon, NAAPS modeled smoke surface concentration, and NWS Area Forecast Discussions in the following section as well as media reports of smoke at ground level.

1. 1-Hour Ozone (Diurnal Comparison)

The following figures (Figures removed for brevity) compare the daily diurnal pattern for each exceedance day with the hourly diurnal percentiles for ozone from 2015-2019. For the Simi Valley site, data is missing for the 0100 PST hour due to running daily quality check routines during the 0100-0200 PST hour and the seasonal ozone season is defined as April through October. Calculations of the 8-hour averages for the 2015 NAAQS are limited to the starting hours between 0700-2300 (hours 0000-0600 are excluded) while the 2008 NAAQS includes all starting hours of the day. These figures show that during many of the days for each site the pattern was unusual compared to the percentiles of each site's typical diurnal pattern with unusually timed peaks or spikes. Some days were extremely high throughout the day due to the ongoing presence of wildfire emissions with ozone precursors and ozone impacting these sites. These diurnal ozone figures support that the ozone exceedance days were unusual compared to historical patterns and act as supporting evidence that wildfire emissions directly impacted ozone concentrations at each site.

2. $PM_{2.5}$

Evidence of ground-level impacts of smoke on the monitor can also be indicated through analysis of particulate matter, as well as other speciated components.

The following figures show elevated $PM_{2.5}$ concentrations at multiple sites along California's central coast and on the western side of the San Joaquin Valley during the time of the exceptional event, which was a direct result of smoke and emissions from the wildfires in northern and central California. This supports that the wildfire smoke and emissions were widespread across the region and directly impacted monitors at the surface during the period.

3. Additional Supporting Ground-Level Evidence

a) Area Forecast Discussions

In the days prior to the smoke impacts in southern California, Area Forecast Discussions issued by the National Weather Service (NWS) Los Angeles/Oxnard (LOX) office focused on high temperatures and the potential for thunderstorms. On August 17, the AFD only mentioned the pyrocumulous plumes from the Lake and Ranch2 Fires. Smoke impacts were not noted until August 18 with an initial mention of impacts for flight regulations at the San Luis Obispo Airport (KSBP). Later, LOX noted the presence of a thick layer of smoke from the fires over Monterey

County covering San Luis Obispo and Santa Barbara Counties.[41] AFDs from that point, though October, frequently noted the presence of smoke and the impacts on air quality, temperature forecasting, and aviation. Air Quality Alerts were issued by LOX for Ventura County (Appendix C).

A sampling of Area Forecast Discussions from the NWS Los Angeles/Oxnard forecast office are included in Appendix C.

b) Satellite Smoke Indications

The smoke that enhanced the ozone reaching the exceeding monitors from mid-August through early November 2020 was primarily from the wildfires in the northern and central portions of the State, along with the River and Dolan Fires in Monterey County, just to the north, the Creek Fire and the SQF Complex on the eastern side of the San Joaquin Valley, and the Apple and Bobcat Fires in the South Coast Air Basin. A smaller fire just 12 miles north of Simi Valley, the Holser Fire, contributed to smoke impacts in mid-August. The combined smoke from these fires increasingly impacted sites throughout California, including monitors in the South Central Coast Air Basin. Several tools are available to look at smoke in the areas that impacted the monitors.

The NOAA Hazard and Mapping System (HMS) Fire and Smoke Product is an analysis of various satellite imagery to map out the scope and even to some extent thickness of smoke layers. These products were extensively utilized in the Narrative Conceptual Model and Clear Causal Relationship chapters of this document.

NOAA Smoke Text Product[42] is a text-based analysis of satellite imagery. These products are used to give an overall view of smoke origins, current locations, and potential transport. Unfortunately, Smoke Text Products were unavailable for the August 2020 events. Relevant Smoke Text Products issued from September 30 through October 4 are in Appendix E, with an example shown here.

4. NAAPS Global Aerosol Model

The NAAPS (Navy Aerosol Analysis and Prediction System) Global Aerosol Model is used to predict the distribution of tropospheric aerosols using global meteorological fields.[43] The model can provide smoke simulations in near-real-time with up to 120-hour forecasts. Of particular interest are the total optical depth and smoke surface concentration outputs. Aerosol optical depth (AOD) can indicate how much aerosol is in the atmosphere, with higher AOD values corresponding with increasing levels of particulate matter. The model can also give a simulation

[41] Iowa State University, Mesonet, *Area Forecast Discussions, AFDLOX 2020-08-19 05:25 UTC*, last accessed 11/5/21

[42] NOAA Hazard and Mapping System (HMS), *Fire and Smoke Text Product*, last accessed 11/8/21

[43] Naval Research Laboratory, *Navy Aerosol Analysis and Prediction System (NAAPS) Global Aerosol Model*, last accessed 11/16/21

of AOD further broken down into sulfates, dust, and smoke. In addition, the model can also simulate concentrations of smoke at the surface, with darker colors indicating thicker smoke. (Figure removed for brevity) shows the high smoke AOD levels and smoke surface concentrations at the Simi Valley monitors during August 21. Additional AOD and smoke surface concentration model outputs covering the requested event dates are shown in Appendix E and show the presence of smoke in the Ventura County area.

5. Conclusion

Beginning in mid-August 2020, smoke from several large wildfires throughout California generated emissions that directly resulted in elevated concentrations at the Simi Valley ozone monitor in the Ventura County ozone nonattainment area. Inspection of $PM_{2.5}$ concentrations, satellite-derived smoke layers, and modeled trajectories indicate pathways for the transport of smoke and associated precursors from the wildfires in California to move downrange and into the surface boundary layer. This supports the transport of smoke, ozone precursors, and generated ozone that mixed down to the surface at the exceeding monitoring sites.

All requested dates for exceptional events were in the 99th percentile of the prior 5-year distribution of 8-hour ozone data and fall in the adjusted top 4 rank for 2020 when excluding the requested exceptional events days. Area forecast discussions, satellite smoke products, black carbon analyses, and NAAPS Global Aerosol Model all indicated periods of wildfire smoke aloft and at the surface during the requested event dates. Daily diurnal comparison graphs show many days with abnormal patterns and unusually timed peaks due to the impacts of wildfire emissions.

The comparisons and analyses provided in the Narrative Conceptual Model and Clear Causal Relationship chapters of this demonstration support our conclusion that the numerous wildfire events affected air quality in such a way that there exists a clear causal relationship between the monitoring exceedances or violations as listed in Table I-4 and thus satisfies the clear causal relationship criteria.

V. Natural Event/Human Activity Unlikely to Recur

The Background and Narrative Conceptual Model chapters of this document provide evidence that the event qualifies as a “Natural Event” as defined in 40 CFR 50.1(k). The fires that impacted the exceeding ozone monitors occurred on wildlands that meet the definition in 40 CFR 50.1(n) and (o). When considering fire cause, "wildfires on wildland initiated by accident or arson are considered natural events, and on a case-by-case basis this treatment for wildfires may bear on the appropriate treatment of accidental and arson-set structural fires.[44]”

[44] 81 FR 68233, Footnote 35

U.S. EPA generally considers the emissions of ozone precursors from wildfires on wildland to meet the regulatory definition of a natural event at 40 CFR 50.1(k), and accordingly, CARB has shown that this event is a natural event and may be considered for treatment as an exceptional event.

VI. Not Reasonably Controllable and/or Not Reasonably Preventable

The Background and Narrative Conceptual Model chapters of this document provide evidence the wildfires impacting the ozone monitors at Simi Valley in Ventura County were natural events predominantly occurring on wildland in California. CARB is not aware of any evidence clearly demonstrating that prevention or control efforts beyond those actually made would have been reasonable. Therefore, emissions from the wildfires were not reasonably controllable or preventable.

VII. Public Notification

As presented in Sections E and F of the Narrative Conceptual Model chapter, all affected districts maintain public alert systems as well as publicly available information via their websites to keep residents informed of potential wildfire smoke impacts. Examples of the information released to the public is included in Appendix B and Appendix F.

The CARB will hold a 30-day public comment period to solicit public input regarding this demonstration. Notification of the public comment period will be posted on the CARB website and emailed to interested stakeholders. Any comments received, and CARB's responses, will be submitted to U.S. EPA at the end of the 30-day public comment period.

VIII. Summary/Conclusion

Seven major wildfire complexes (including the August, SCU Lightning, LNU Lightning, and North Complex fires which each exceeded 300,000 acres burned) and ten individual fires (including the Creek, Dolan, and Bobcat wildfires which each exceeded 100,000 acres burned) were the primary focus of these retroactive analyses and discussions but is likely not inclusive of all wildfires that were active and contributed emissions during these events. These massive fires were all active producers of vast amounts of wildfire smoke and emissions, which ultimately consumed over four million acres of wildlands in California during 2020.

During the event timeframe of August 18 to October 4, wildfires were particularly active, producing enormous amounts of wildfire smoke and emissions, including ozone precursors, which blew downwind blanketing vast portions of northern California and often settling into valleys and foothills when conditions allowed. Air quality monitors showed elevated $PM_{2.5}$ throughout the South Central Coast Air Basin and in surrounding regions, indicating smoke impacts at the surface. Black carbon and NAAPS Global Aerosol Model products further

identified the wildfires as sources of the emissions impacting surface sites. Elevated ozone concentrations correlated well with the elevated $PM_{2.5}$ concentrations at collocated or nearby monitors (as available) during the event at each of the impacted sites.

This 2020 Southern California Ozone Exceptional Events Demonstration supports the criteria for an exceptional event as detailed in the 2016 Exceptional Events Rule[45] and Wildfire Ozone Guidance.[46] This documentation used the following evidence to demonstrate the exceptional event:

- Ambient air monitoring data
- HYSPLIT forward and backward trajectory analyses
- Satellite imagery and narratives
- Wildfire smoke emissions estimates
- Statistical historical concentration comparisons
- Meteorological conditions
- Air Quality District alerts and advisories
- NOAA and HMS smoke products
- Aerosol modeling

This Exceptional Events Demonstration clearly demonstrates justification for exclusion of data as listed in Table I-4 due to an exceptional event under 40 CFR 50.14(c)(3)(iv). The 2020 Southern California Ozone Exceptional Events Demonstration has provided evidence that:

- Describes the events causing the exceedance and a discussion of how emissions from the event led to the exceedance at each monitor;
- Demonstrates a clear causal relationship between the wildfire emissions and the ozone exceedances at each monitor for their respective requested dates;
- Shows that event-influenced concentrations were unusual and above normal historical concentrations;
- Demonstrates the event was neither reasonably controllable nor reasonably preventable; and
- Verifies the event was multiple wildfires, all-natural events or human activity that is unlikely to recur at a particular location, all occurring predominantly on wildlands.

[45] 81 FR 68216

[46] U.S. EPA, *Final Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations*, p.25, last accessed 7/29/21

APPENDIX I
PHOTOCHEMICAL MODELING PROTOCOL

Excerpted from:

South Coast AQMD 2022 Draft Air Quality Management Plan
Appendix V – Modeling and Attainment Demonstrations

Prepared by:

South Coast Air Quality Management District
Diamond Bar, California

Background

One of the basic requirements of a modeling attainment demonstration is the development of a comprehensive modeling protocol that defines the scope of the regional modeling analyses. This includes the attainment demonstration methodology, meteorological and chemical transport platforms, gridded and speciated emission inventories, and geographical characteristics of the modeling domains. The protocol also defines the methodology to assess model performance and the selection of the simulation periods. The 2016 AQMP provided a comprehensive discussion of the modeling protocol used for the development of the PM2.5 and ozone attainment demonstrations. The 2016 AQMP Modeling Protocol served as the prototype of the 2022 AQMP modeling protocol. This AQMP demonstrates attainment of the 2015 federal 8-hour ozone standard with 2018 as the base year and 2037 as the attainment year. Future attainment years (See Table V-2-1) are identified based on nonattainment designation, pollutant standards, and geographical area.

TABLE V-2-1

UPCOMING ATTAINMENT YEARS FOR THE 2015 8-HOUR OZONE NAAQS

Attainment Year	NAAQS	NAAQS level	Areas
2018	Base Year	Modeling Base Year	
2026	2015 ozone	70 ppb	Ventura
2032	2015 ozone	70 ppb	Coachella, W. Mojave Desert
2037	2015 ozone	70 ppb	South Coast

Attainment Demonstration

8-hour Ozone

The 8-hour attainment demonstration was performed based on the U.S. EPA guidance document, “Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze”, issued on November 29, 2018. The guidance requires that a maximum concentration be determined among 9 grid cells around a monitoring station and that the specific grid location be preserved in the future year modeling scenario when calculating relative response factors (RRF). The RRF calculation is limited to the top 10 days of simulated concentrations which are higher than 60 ppb. Focusing on the top 10 days produces future-year design values that are more responsive to emission reductions.

Numerical Models

Table V-2-2 provides a side-by-side comparison of the 2012, 2016 and the current 2022 AQMP modeling protocols. In general, changes have occurred in the following categories: emissions inventories, future-year simulations, the level of the non-attainment designation and the attainment demonstration methodology. As such, these changes are expected to occur with each subsequent modeling update. Table V-2-3 highlights the main differences in CMAQ setup since the 2016 AQMP.

TABLE V-2-2

NUMERICAL MODELING PLATFORMS AND DOMAINS FOR 2022 AND PREVIOUS AQMPS

	2012 AQMP	2016 AQMP	2022 AQMP
Modeling Base Year	2008 Ozone: June – Aug PM: Annual	2012 Ozone: May – Sep PM: Annual	2018 Ozone: May - Sep
Chemical Transport Model	CMAQ as primary tool CAMx as weight of evidence	CMAQ	CMAQ
Meteorological Model	WRF version 3.3 with Updated Land Use	WRF version 3.6 with Updated Land Use	WRF version 4.0.3 Unified Noah
Emission: On-Road Off-Road	EMFAC 2011 EMFAC-LDV EMFAC-HD EMFAC-SG Category Specific Calculation	EMFAC 2014 Single package Category Specific Calculation	EMFAC 2017 Single package Category Specific Calculation
Modeling Domain	624 km by 408 km	624 km by 408 km	624 km by 408 km
Grid Resolution	4km by 4 km grid	4km by 4km grid	4km by 4km grid
Vertical Layer	18 layers with 14 layer below 2000 m Above Ground Level (AGL) and 50 hPa as top boundary	18 layers with 14 layer below 2000 m AGL and 50 hPa as top boundary	30 layers with 14 layer below 2000 m AGL and 50 hPa as top boundary

TABLE V-2-3

CHEMICAL TRANSPORT MODELING PLATFORM FOR THE 2016 AND 2012 AQMPS

Options	2016 AQMP	2022 AQMP
Numerical Model	CMAQ version 5.0.2	CMAQ version 5.2.1
Modeling Grid	156 by 102 grids with 4 km grid distance	Same
Vertical Layers	18 layers	30 layers
Gas Phase Chemical Mechanism	SAPRC07 with version "c" toluene updates	Same
Aerosol Mechanism	AERO6	Same
Chemical Solver	Euler Backward Iterative solver (EBI)	Same
Horizontal Advection	Yamo	Same
Vertical Advection	WRF	Same
Horizontal Diffusion	Multiscale CMAQ scheme	Same
Vertical Diffusion	ACM2	Same
Photolysis	In-line Calculation	Same
Initial Values	Clean Homogeneous Condition	Same
Boundary Values	Model for OZone and Related chemical Tracers (MOZART)	Nested modeling with 12km statewide CMAQ The Outer CMAQ domain used boundaries from the global model of Community Atmosphere Model with Chemistry (CAM-chem)

The Weather Research and Forecast (WRF) model remains the primary tool for meteorological modeling. WRF was updated with the most recent version (version 4.0.3) available at the time of protocol preparation and was evaluated with a set of observation data. Later WRF version 4.3 was conducted and evaluated to ensure the accuracy and reliability of meteorological predictions, while version 4.0.3 served as the primary WRF for this AQMP. WRF simulations were conducted with three nested domains with grid resolutions of 36, 12 and 4 km. The innermost domain spans 652 km by 460 km in the east–west and

north–south directions, respectively, which includes the greater Los Angeles area, its surrounding mountains, and ocean waters off the coast of the Basin (Figure V-2-1). A Lambert conformal map projection was used with reference latitudes of 30° and 60° N and the center of the modeling domain positioned at 37° N and 120° 30’ W. Details on the WRF model configuration are provided in Chapter 3.

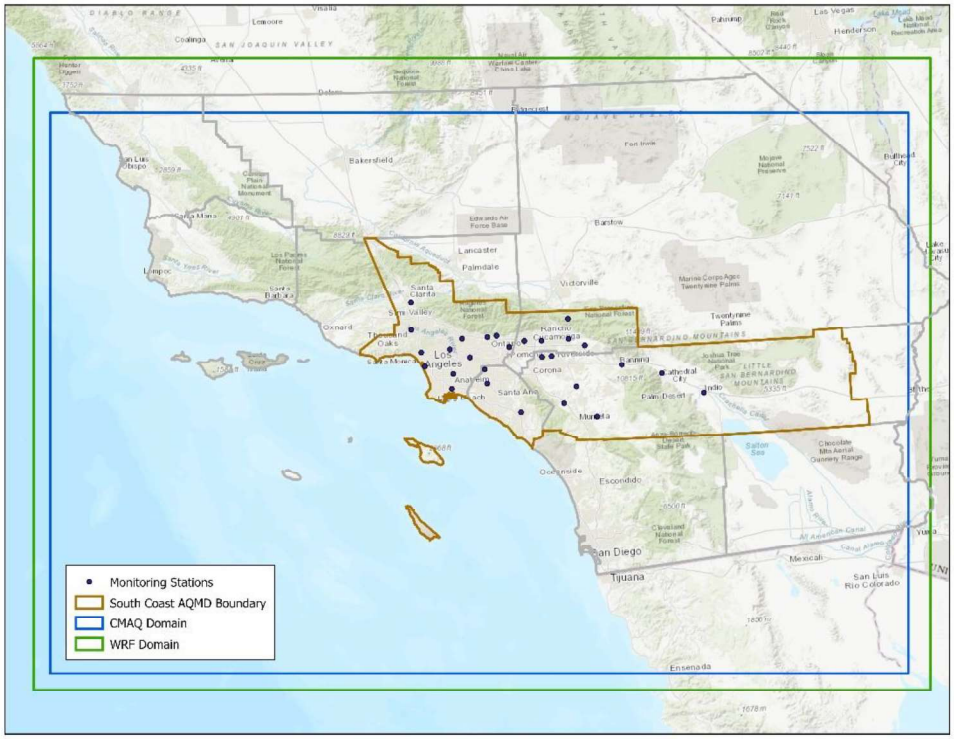


FIGURE V-2-1

THE RELATIVE LOCATIONS OF THE INNER MOST WRF DOMAIN COMPARED TO THE CMAQ DOMAIN. THE BOUNDARY OF SOUTH COAST AQMD JURISDICTION BOUNDARY AND AIR MONITORING LOCATIONS ARE OVERLAID BY A THICK SOLID LINE AND BLACK DOTS, RESPECTIVELY.

Emissions Processing

Emissions inventories are often developed on an annual basis for large geographic areas and a process must be developed to allocate the emissions to a time-dependent grid for use in chemical transport modeling. Traditionally, emissions were allocated to the modeling grid using generic or average activity patterns and profiles. These approaches did not sufficiently reflect the real-world characteristics of emissions sources. Shortcomings of previous emissions allocation methods included an inability to account for traffic flows responding to changes in weather, vessels transiting outside of well-known shipping lanes, or aircraft following airport-specific landing and takeoff trajectories. For these reasons,

new approaches were developed to spatially and temporally allocate emissions from on-road mobile sources, Ocean-Going Vessels (OGV), and aircraft. Each method used information from sensor or transponder-based datasets, which accurately reflected where and when emissions were occurring. Further details on the updated allocation methods are presented in Chapter 4 of this appendix.

TABLE V-2-4

SUMMARY OF EMISSION PROCESSING FOR 2016 AND 2022 AQMPS

Options	2016 AQMP	2022 AQMP
On-Road Emissions	EMFAC 2014 ○ Emissions mode to get total amount of emissions in Tons per Day ○ Emissions rate to estimate grams per emissions of specific vehicle category, activity, etc. Temporal allocation using Caltrans real-time Performance Measurement System (PeMS) traffic data for light and medium duty vehicles, and Weight in Motion (WIM) for heavy duty vehicles	EMFAC 2017 Temporal allocation using Caltrans real-time PeMS single loop detector-based traffic data for light, medium, and heavy-duty vehicles
Aircraft Emissions	Treated as point sources with inline emissions calculation	ACARS/GATE[1] spatial allocation
OGV Emissions	Prescribed spatial allocation following major shipping channels	AIS-based[2] spatial allocation
Vehicle Miles Traveled	2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)	2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)
Off-Road Emissions	Category Specific Calculation	Same
Mexico Emissions	CARB's Mexican emissions profile	Same

[1] Aircraft Communication Addressing and Reporting System (ACARS)/Gridded Aircraft Trajectory Emissions (GATE)

[2] Automated Identification System

TABLE V-2-5

LIST OF EMISSIONS CATEGORIES WITH AND TEMPORAL PROFILE USED

Day-Specific Profile	Generic Profile
• Wildfires[1] • Prescribed burns[1] • Biogenic and On-Road motor vehicle emissions are adjusted using day/hour-specific meteorological data.	• Agricultural burning • Residential wood combustion • Facilities • Paved road dust • Unpaved road dust • Windblown dust • Livestock dust

[1] Wildfires and prescribed burns were modeled using day-specific profiles for the model performance evaluation only. For the attainment demonstration, wildfire emissions were excluded, and prescribed burns were modeled using a generic profile.

V-2-Biogenic Emissions

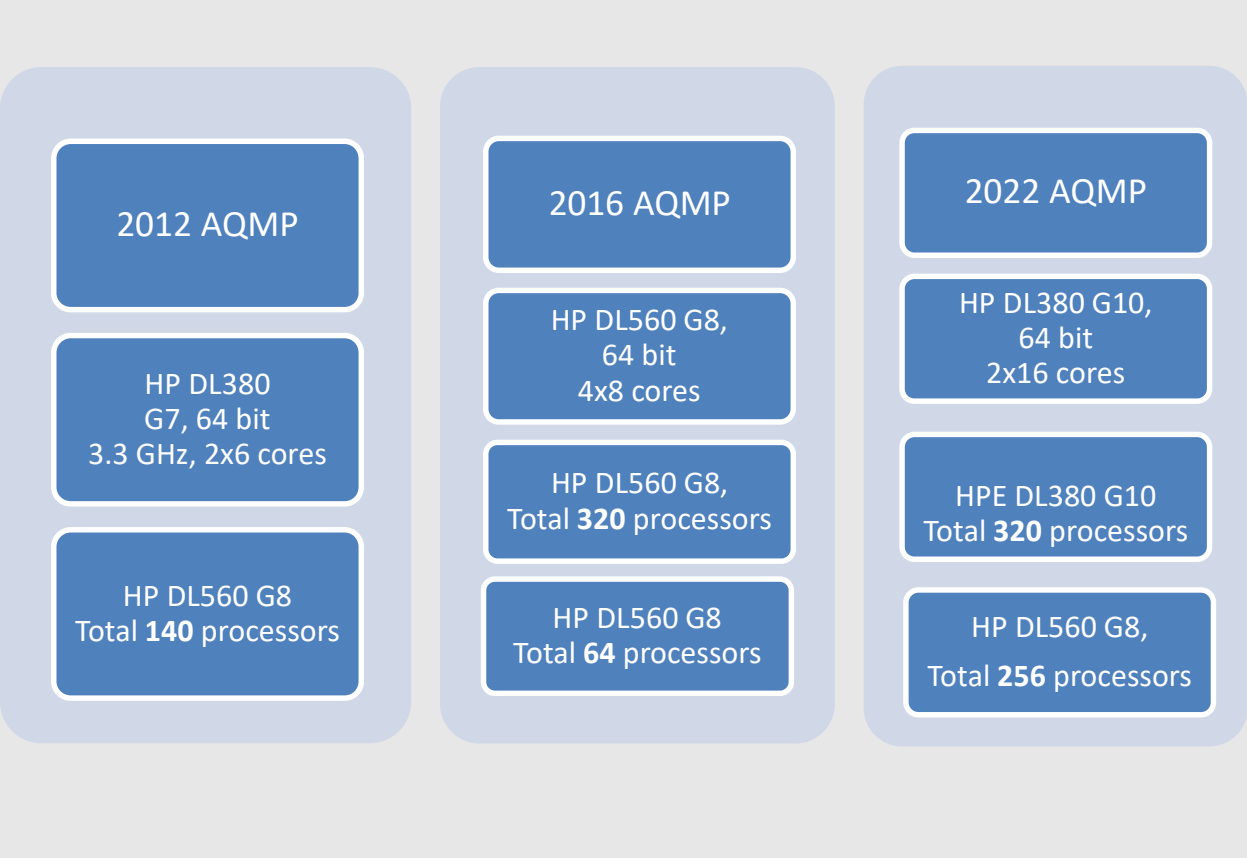
Daily biogenic VOC emissions were calculated using the Model of Emissions of Gases and Aerosols from Nature version 3.0 (MEGAN3.0) using 2018 meteorology as input. MEGAN was executed in its default configuration, except for the normalized Leaf Area Index (LAIv) input. LAIv was developed by the California Air Resources Board using 2018 data from the Moderate Resolution Imaging Spectroradiometer (MODIS) on the National Aeronautical Space Administration's Terra and Aqua satellites. Because MODIS does not provide data in urban areas, LAIv in these areas was based on tree survey data from the US Forest Service. A detailed description of the biogenic inventory is provided in Chapter 4.

Computational Resources

The main computation platform employs high performance nodes. New servers, compiled to enhance computational capability, were configured with Red-Hat Enterprise Linux 7 and 64-bit operating systems. Details of the computing resources are summarized in Table V-2-6.

TABLE V-2-6

DETAILS OF COMPUTATIONAL RESOURCES USED IN THE 2012, 2016 AND 2022 AQMPS.



References

US EPA (2018) Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze

APPENDIX J

VENTURA COUNTY

MODEL PERFORMANCE ANALYSIS
Prepared by SCAQMD for VCAPCD

STATISTICAL EVALUATION

The statistics used to evaluate 8-hour average CMAQ ozone performance include the following:

Statistic for O_3	Definition
Daily-Max Bias Error Unpaired	Average of the differences in observed and predicted daily maximum values. Negative values indicate under-prediction. $BiasError = \frac{1}{N}\sum(Obs - Pred)$
Daily-Max Bias Error Paired	Average of the differences in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached. Negative values indicate under-prediction. $BiasError = \frac{1}{N}\sum(Obs - Pred)$
Daily-Max Gross Error Unpaired	Average of the absolute differences in observed and predicted daily maximum values $GrossError = \frac{1}{N}\sum\|Obs - Pred\|$
Daily-Max Gross Error Paired	Average of the absolute differences in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached. $GrossError = \frac{1}{N}\sum\|Obs - Pred\|$
Normalized Daily-Max Bias Error Unpaired	Average of the quantity: difference in observed and predicted daily maximum values normalized by the observed daily maximum values. Negative values indicate under-prediction.

$$NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$$

Normalized Daily-Max Bias Error Paired

Average of the quantity: difference in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached normalized by the observed daily maximum concentration. Negative values indicate under-prediction.

$$NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$$

Normalized Daily-Max Gross Error Unpaired

Average of the quantity: absolute difference in observed and predicted daily maximum values normalized by the observed daily maximum concentration

$$NormGrossError = \frac{1}{N}\sum\left|\frac{Obs-Pred}{Obs}\right|\cdot 100$$

Normalized Daily-Max Gross Error Paired

Average of the quantity: absolute difference in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached normalized by the observed daily maximum concentration

$$NormGrossError = \frac{1}{N}\sum\left|\frac{Obs-Pred}{Obs}\right|\cdot 100$$

Peak Prediction Accuracy Unpaired

Difference in the maximum of the observed daily maximum and the maximum of the predicted daily maximum normalized by the maximum of the observed daily maximum

$$PPA = \frac{(maximum(Pred)-\text{maximum }(Obs))}{\text{maximum}(Pred)}$$

Predicted concentrations are extracted from model output in the grid cell that each monitoring station resides.

The modeling results for Ventura County are based on modeling performed by the South Coast AQMD as part of its 2022 Air Quality Management Plan.[1] Modeling protocol and detailed modeling approach are available in Appendix V of the 2022 AQMP. We evaluated the base year average regional model performance for maximum daily average 8-hour (MDA8) ozone during May through September 2018 for days when Ventura County

[1] http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan

maximum 8-hour ozone levels were at least 60 ppb. Ozone performance criteria are presented in Table J-1. Only stations with more than 74.5% of the hourly measurements during each month of the ozone season were included in the analysis based on EPA's data completeness requirement. These stations include Thousand Oaks, Piru, Ojai, Simi Valley, and El Rio.

TABLE J-1

2018 BASE YEAR MDA8 OZONE PERFORMANCE FOR DAYS WHEN REGIONAL 8-HOUR MAXIMUM ≥ 60 PPB

Month	Number of Days with regional MDA8 >= 60 ppb	Number of Data Points	MDA8 Mean Pred. Unpaired [ppb]	MDA8 Mean Pred. Paired [ppb]	MDA8 Mean Obs. [ppb]	MDA8 Bias Err. Unpaired [ppb]	MDA8 Bias Err. Paired [ppb]	MDA8 Gross Err. Unpaired [ppb]	MDA8 Gross Err. Paired [ppb]	Norm MDA8 Bias Err. Unpaired [%]	Norm MDA8 Bias Err. Paired [%]	Norm MDA8 Gross Err. Unpaired [%]	Norm MDA8 Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [%]
May	4	25	60.3	59.8	56.4	3.9	3.4	5.4	5.4	7.7	6.9	10.4	10.4	15.4
Jun	11	58	62.0	61.7	55.9	6.1	5.7	7.6	7.6	11.9	11.4	14.4	14.3	6.3
Jul	11	59	60.0	59.4	57.2	2.8	2.2	7.2	6.9	7.7	6.6	14.2	13.4	1.2
Aug	9	65	55.8	55.4	55.8	-0.1	-0.5	5.9	5.8	2.1	1.4	10.7	10.5	-21.1
Sep	14	74	61.6	61.2	57.1	4.4	4.1	6.9	6.9	9.0	8.4	12.9	12.9	1.3

Since ozone standards are based on the daily maximum ozone values, model prediction of higher concentrations is more consequential. Figure J-1 illustrates the model performance of MDA8 ozone. MDA8 ozone values are slightly over-predicted, but most of the data lie within 10 percent of the measured values. The "unpaired" MDA8 bias error metric indicates that the model is positively biased (i.e., over-predicts ozone) with bias error values of 3.9 ppb, 6.1 ppb, 2.8 ppb, and 4.4 ppb during May, June, July, and September, respectively. In August, however, the model had a slight negative bias (i.e., under-prediction of ozone) of 0.1 ppb. The same trend was observed for the "paired" bias error metric with bias error values of 3.4, 5.7 ppb, 2.2 ppb, -0.5 ppb, and 4.1 ppb during May, June, July, August, and September, respectively.

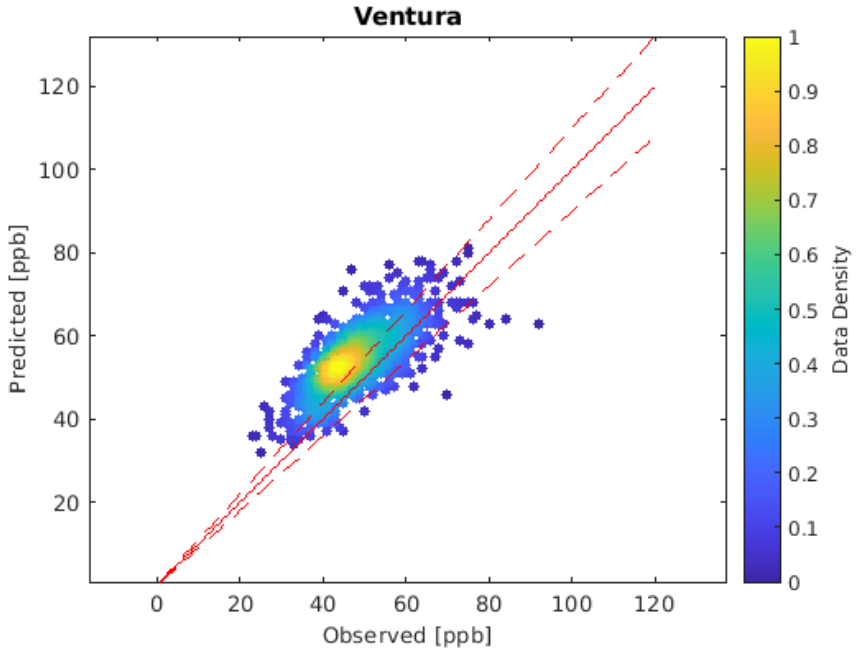


Figure J-1: Density scatter plot of 8-hour maximum daily 8-hour (MDA8) ozone values in Ventura County. Dashed lines indicate the bounds of 10% agreement.

Figures J-2 through J-6 include model performance scatter plots of 2018 MDA8 ozone predictions versus observations color-coded by weekends versus weekdays; both the MDA8 data points and a generalized linear model fit (blue and green lines) with 95 percent confidence interval (shaded area) along with 1:1 line (red line) are shown in the scatter plots. Although emissions on weekdays and weekends differ, observed and modeled ozone levels do not show marked differences between weekdays and weekends. The weekday/weekend emission differences can be exploited to perform a dynamic evaluation, which assesses the model's ability to respond to emission changes. The similar, albeit slightly higher slope on weekends suggests that the model responds well to changes in emissions.

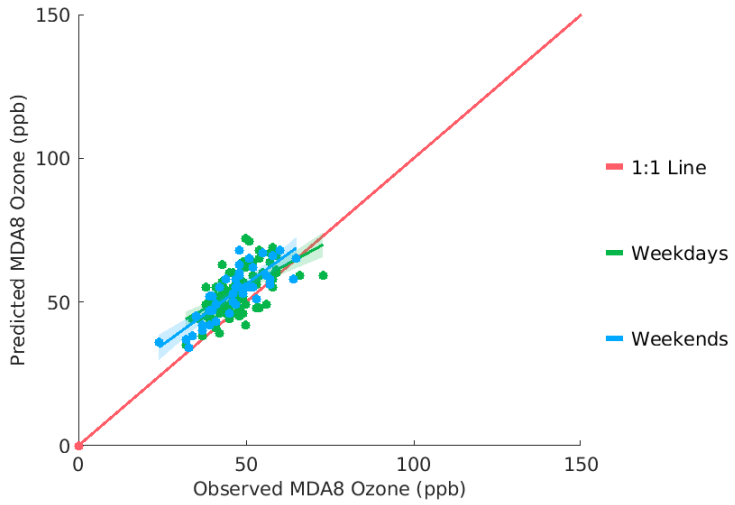


Figure J-2: Eight-hour ozone daily maxima model performance at Thousand Oaks (s7).

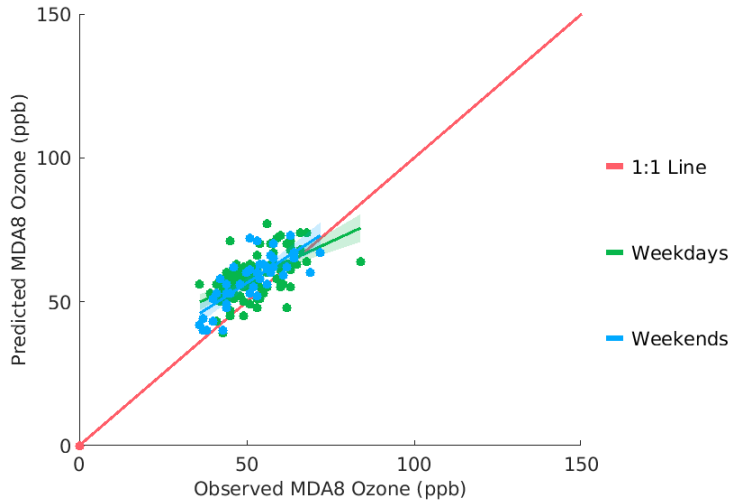


Figure J-3: Eight-hour ozone daily maxima model performance at Piru (s9).

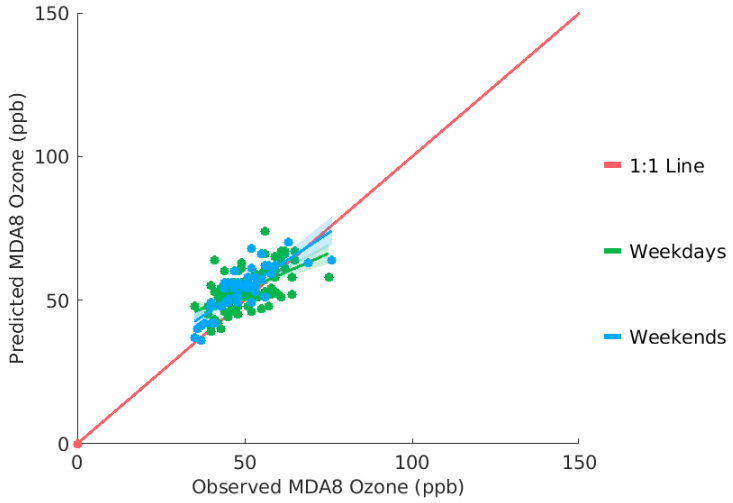


Figure J-4: Eight-hour daily maxima model performance at Ojai (s1004).

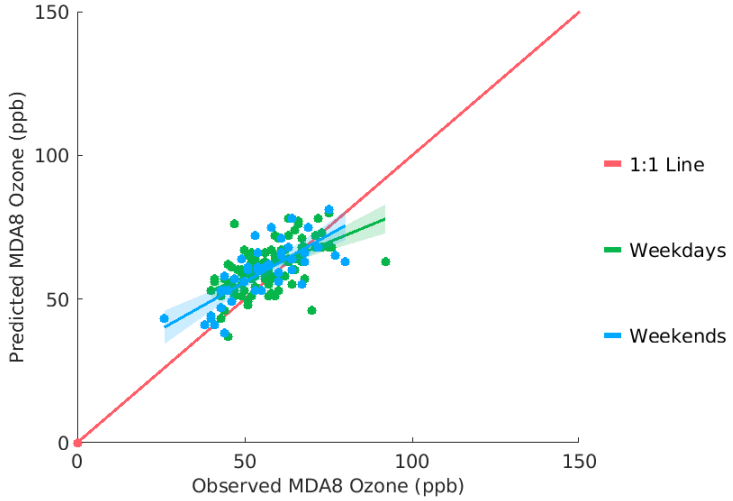


Figure J-5: Eight-hour daily maxima model performance at Simi Valley (s2002).

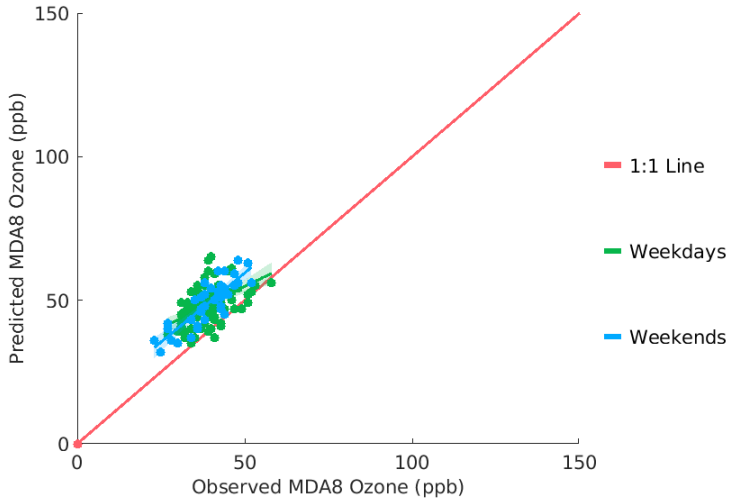


Figure J-6: Eight-hour daily maxima model performance at El Rio (s3001).

BASE AND FUTURE YEAR DESIGN VALUES

Table 2 details the base and future year design values for all stations with design values that meet the data completeness criteria. The base design value represents the 5-year weighted 8-hour ozone design value for 2018 (average of the 8-hour ozone design values for 2018, 2019 and 2020, excluding the days affected by wildfires[2]). Future design values were determined using comprehensive meteorological and chemical transport modeling and spatially resolved emissions projections following the U.S. EPA guidance.

To bridge the gap between air quality model predictions and measurements, the U.S. EPA recommends the use of relative response factors (RRFs).[3] In this approach, future year concentration predictions require two elements: base year design values and RRFs. The RRF is simply a ratio of the future year predicted air quality to the simulated air quality in the base year, representing the model-predicted change in air quality in response to projected emissions changes. Future year concentrations are estimated by multiplying the non-dimensional RRF by the base year design value, thus applying the model-predicted change in air quality directly to the measured concentrations in the base year. Assuming any potential modeling biases are similar in the base and future years, the RRF approach acts to minimize their impact on predictions. Details are documented in Appendix V of South Coast AQMD's Draft 2022 AQMP.[4]

Based on the South Coast AQMD's modeling, the baseline 2026 design value in Ventura County is expected to be 71.7 ppb, exceeding the 70-ppb national ambient air quality standard. The baseline is an emission

[2] See Appendix H
[3] https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf
[4] http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/combined-appendix-v.pdf?sfvrsn=8

scenario that reflects adopted federal, state, and local regulations. The control scenario reflects emissions reduction strategy included in the CARB's 2022 State SIP Strategy in addition to the on-going emission reductions reflected in the baseline. The 2026 design value with the control strategy would lead to 70.5 ppb and Ventura County would be in attainment.

TABLE 2
BASE YEAR AND FUTURE YEAR DESIGN VALUES

Station Name	AQS Station Number	5-year weighted 2018 Design Value	Baseline 2026 Design Value	Control 2026 Design Value
Thousand Oaks-Moorpark Road	061110007	68.3	65.8	65.0
Piru-3301 Pacific Avenue	061110009	71.3	67.6	66.5
Ojai-Ojai Avenue	061111004	68.0	65.5	64.9
Simi Valley-Cochran Street	061112002	75.7	71.7	70.5
El Rio-Rio Mesa School	061113001	60.7	59.4	59.0