Chapter 4
ATTAINMENT STRATEGY

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Chapter 4: Attainment Strategy

Over the past decades, under previous San Joaquin Valley Air Pollution Control District (District) attainment plans (*2007 Ozone Plan*, *2008 PM2.5 Plan*, *2012 PM2.5 Plan*, *2013 Plan for the Revoked 1-hour Ozone Standard*, *2015 Plan for the 1997 PM2.5 Standard*, *2016 Plan for the 2008 8-Hour Ozone Standard*, *2018 Plan for the 1997, 2006, and 2012 PM2.5 Standards*, and *2022 Plan for the 2015 8-Hour Ozone Standard*) the District and the California Air Resources Board (CARB) have implemented generations of emissions control measures for stationary, area, and mobile sources in the San Joaquin Valley (Valley). Together, these efforts represent the nation's toughest air pollution emissions controls. In addition to having the toughest air regulations in the nation, the District also operates the most effective and efficient incentive grants program, investing over $6.2 billion in public/private funding towards clean air projects to date that have achieved over 268,000 tons of emissions reductions. Due to the significant investments made by Valley businesses and residents, and stringent regulatory programs by the District and CARB, the Valley's fine particulate matter (PM2.5) and PM2.5 precursor emissions are at historically low levels. Air quality in the Valley has improved significantly, providing Valley residents with associated health benefits. As the District and CARB continue to implement adopted control measures, Valley PM2.5 concentrations will continue to improve.

Despite the progress made to improve the Valley's air quality through implementation of multiple attainment plans adopted by the District and clean air investments by Valley businesses and residents, substantial additional emissions reductions are needed, particularly from mobile sources under CARB and U.S. Environmental Protection Agency (EPA) jurisdiction that make up over 80% of remaining Valley nitrogen oxide (NOx) emissions. The District and CARB must build on decades of effective control strategies and reach beyond regulations alone to expedite air quality improvements. This chapter outlines the new regulatory and incentive-based measures proposed by both the District and CARB, combined with adopted measures achieving new emissions reductions, which collectively will achieve the emissions reductions necessary to attain the 2012 annual PM2.5 standard.

4.1 COMPREHENSIVE CONTROL STRATEGY

This Plan contains a comprehensive suite of regulatory and incentive-based measures to be implemented by the District and CARB to attain the 2012 annual PM2.5 standard as expeditiously as practicable, as evidenced by the photochemical air quality modeling performed by CARB (Appendix J). This Plan demonstrates the District's ongoing efforts to improve air quality in the Valley through a comprehensive strategy that includes:

- ***District regulatory measures*** achieving new emission reductions during this Plan period, as shown in Table 4-2, in addition to new stationary and area source measures to further strengthen requirements to achieve greater emissions reductions from residential wood combustion and agricultural operations.

- ***Incentive-based measures*** that accelerate the deployment of cleaner vehicles and technologies in a variety of sectors, including agricultural equipment and residential wood combustion.

- ***State mobile source strategy*** that reduces emissions from mobile sources under state and federal jurisdiction, including heavy-duty trucks, agricultural equipment, locomotives, and off-road equipment.

- ***Public outreach and education*** that encourages and empowers the public to understand air quality issues, take advantage of District tools to stay informed regarding local air quality, take actions to protect themselves when necessary, understand the Valley's unique air quality challenges, and take actions to reduce emissions and improve the Valley's air quality.

- ***Technology advancement and demonstration*** efforts to accelerate the development and deployment of innovative clean air technologies that can bring about emission reductions as rapidly as practicable.

- ***Transition to zero-emission technologies*** across all sectors where feasible, through close collaboration with federal, state, and local governments, industry, and the public to support the development and rapid deployment of new technologies and needed infrastructure, ensuring equitable transition.

- ***Call for action*** by the federal government to do their part in taking responsibility for regulating, and taking actions, to reduce emissions in the Valley. This includes working together to advocate and secure significant new funding required to achieve the enormous emissions reductions necessary for attainment under this Plan through incentive-based measures.

4.2 DISTRICT CONTROL STRATEGY

The District's regulatory authority is limited to stationary sources and some area-wide sources. Since 1992, the District has adopted over 670 rules to implement an aggressive on-going control strategy to reduce emissions in the Valley from these sources. Many current rules are fourth- or fifth-generation, meaning that they have been revised and emission limits have been lowered, as new emission control technologies become available, technologically feasible, and cost-effective. Additionally, the District has recently adopted many technology-forcing rules, including recent amendments to District rules for agricultural burning and boilers, steam generators, and process heaters. The District has also adopted innovative regulations such as the Indirect Source Review and Employer-based Trip Reduction rules to reduce emissions from mobile sources.

The District's current rules and regulations reflect technologies and methods that extend well beyond required control levels. The stringent regulations already adopted under previous attainment plans serve as the foundation of the control strategy for this Plan. These adopted regulations reduce directly emitted PM2.5 and NOx as they are fully implemented. These rules, along with the numerous adopted rules and regulations that have achieved emissions reductions before 2017, contribute to the Valley's progress toward attainment. **The emissions inventory for this plan shows reductions of approximately 10.1 tons per day (tpd) of directly emitted PM2.5 emissions and 128.5 tpd of NOx from 2017 to the final attainment year of 2030** (Appendix B). These emissions reductions represent a 15.4% reduction in PM2.5 and 56.7% reduction in NOx, based on measures included in the current control strategy. Emission reductions from stationary and area sources under the adopted control program are presented in Table 4-1 below. The District's recently amended regulations achieving reductions in and after 2017 are summarized in Section 4.2.1 below.

Table 4-1 San Joaquin Valley Baseline Stationary and Area Source Emissions[1]

Pollutant	2017 Emissions (tpd)	2030 Emissions (tpd)	Change
PM2.5	57.3	50.4	-12%
NOx	35.3	22.5	-36%

In addition to the significant ongoing reductions achieved and maintained through the District's current adopted air quality regulations, the District is committing in this Plan to achieve additional emissions reductions from new prohibitory and incentive-based measures, as necessary for expeditious attainment demonstrated through modeling conducted by CARB. Notably, the incentive-based measures are based on already received funding. These commitments will ensure that emission reductions will be achieved by the timeframes necessary under this Plan to attain the 2012 standard as expeditiously as practicable.

The District's comprehensive control strategy is summarized in the table below.

Table 4-2 District Control Strategy Measures and Schedule

District Rule		Action Date	Implementation Begins
Adopted Regulations Achieving Reductions on and after 2017			
2201	New Source Review Rule	2023	Ongoing
4103	Open Burning	2021	2021-2025
4308	Boilers, Steam Generators, and Process Heaters - 0.075 MMBtu/hr to Less than 2.0 MMBtu/hr	2013	2015-2034
4311	Flares	2020	2024
4306/ 4320	Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr	2020	2024
4352	Solid Fuel Fired Boilers, Steam Generators, and Process Heaters	2021	2024

[1] Source: 2022 PM2.5 CEPAM v1.00; represents the current baseline emissions with adopted CARB and district measures

District Rule		Action Date	Implementation Begins
4354	Glass Melting Furnaces	2021	2024, 2030
4550	Conservation Management Practices	2004	Ongoing
4702	Internal Combustion Engines	2021	2024, 2030
4901	Wood Burning Fireplaces and Wood Burning Heaters	2023	2019
4902	Residential Water Heaters	2009	2010-2024
4905	Natural Gas-Fired, Fan-Type Central Furnaces	2024	2015-2045
9510	Indirect Source Review	2017	Ongoing
9610	State Implementation Plan Credit for Emission Reductions Generated Through Incentive Programs	2013	Ongoing
Reg. VIII	Fugitive PM10 Prohibitions	2004	Ongoing
New Regulatory and Incentive-Based Commitments			
4550	Conservation Management Practices	2026	2028
4901	Residential Wood Burning	2025	2026
-	Fireplace and Woodstove Change-Out Program	Ongoing	Ongoing
-	Low-Dust Nut Harvester Replacement Program	Ongoing	Ongoing

Table 4-3 Emission Reductions from Control Strategy

Measures		PM2.5 (tpd)	NOx (tpd)
Adopted Control Strategy for Stationary and Area Sources		**6.9**	**12.8**
New Regulatory and Incentive-Based Aggregate Commitments			
4550	Conservation Management Practices	NYQ	NYQ
4901	Residential Wood Burning	0.02	NYQ
-	Fireplace and Woodstove Change-Out Program	NYQ	NYQ
-	Low-Dust Nut Harvester Replacement Program	NYQ	NYQ
	Total Reductions	**6.92**	**12.8**

"NYQ" means not yet quantified

The new proposed commitments will require significant further analysis, and additional investment for the development and deployment of new technology and equipment modifications. The District and CARB are committed to a robust and transparent public rule development process that includes stakeholder, industry, and other-agency input at every step possible to ensure feasibility. After rules are adopted, businesses will need sufficient time to design, finance, and install new controls or modify existing equipment to comply with new requirements.

In addition, the District is already implementing highly successful incentive programs in the Valley. Through the above incentive-based measures, the District will be obtaining SIP credit for emission reductions achieved through existing programs, as discussed in Section 4.2.2.

4.2.1 Adopted District Regulations

4.2.1.1 Rule 2201 (New and Modified Stationary Source Review Rule)

Rule 2201 applies to all proposals for new or modified sources of pollution that must obtain a permit from the District. The rule requires that the proposed emissions from any such new or modified equipment be controlled with the Best Available Control Technology (BACT), and that large projects offset their increased emissions by surrendering emission reduction credits that have been generated by companies that have voluntarily reduced their emissions. Compliance with this rule must be demonstrated prior to the District issuing a permit and prior to constructing the new or modified source of pollution.

4.2.1.2 Rule 4103 (Open Burning)

The District first adopted Rule 4103 on June 18, 1992, to regulate and coordinate the use of open burning while minimizing smoke impacts on the public. In 2003, California Senate Bill (SB) 705 (Florez, 2003) established a schedule to phase out the open burning of agricultural material, including consideration of technical and economic factors in implementing the phase-out. As approved by the Governing Board on June 17, 2021, and approved by CARB on June 18, 2021, the District developed updated requirements establishing the near-complete phase-out of remaining open burning by January 1, 2025.

4.2.1.3 Rule 4308 (Boilers, Steam Generators, and Process Heaters 0.075 to <2 MMBtu/hr)

Adopted in 2005 and amended in 2009 and 2013 to include more stringent NOx limits, Rule 4308 controls emissions from boilers, steam generators, and process heaters in the size range of 0.075 to less than 2 million British thermal units per hour (MMBtu/hr). This rule has resulted in more than 93% control of emissions from this source category. As a point-of-sale rule, emissions continue to be reduced as consumers replace older units with new, low-NOx units.

4.2.1.4 Rule 4311 (Flares)

Rule 4311 limits emissions of NOx, sulfur dioxide (SOx), and volatile organic compound (VOC) emissions from the operation of flares in the Valley. In December 2020, the District Governing Board amended Rule 4311 to remove exemptions for non-major source facilities and landfill facilities, and to establish requirements for the installation of ultra-low NOx control systems for flares used in oil and gas operations, at landfills, and at wastewater treatment facilities. Operators are required to reduce flaring below applicable thresholds, or to install ultra-low NOx flare technology by 2024. The adopted requirements in Rule 4311 are estimated to achieve emission reductions of 0.19 tpd NOx, 0.03 tpd PM2.5, and 0.39 tpd VOCs by 2024.

4.2.1.5 Rules 4306/4320 (Boilers, Steam Generators, and Process Heaters >5 MMBtu/hr)

Rules 4306 and 4320 control emissions from boilers, steam generators, and process heaters from a wide range of industries, including but not limited to electrical utilities, cogeneration, oil and gas production, petroleum refining, manufacturing and industrial processes, food and agricultural processing, and service and commercial facilities. The District Governing Board adopted amendments to Rules 4306 and 4320 in December 2020 to include lower NOx emissions limits for a variety of unit classes and categories, as well as establish dates for the submission of required emission control plans, authority to construct applications, and final compliance deadlines. Overall, the amendments are estimated to achieve emission reductions of 0.19 tpd NOx in 2024, and additional 0.03 tpd NOx by 2030. The adopted amendments to Rule 4320 are estimated to achieve an additional 0.45 tpd NOx emission reductions in 2024.

4.2.1.6 Rule 4352 (Solid Fuel Fired Boilers, Steam Generators, and Process Heaters)

Rule 4352 controls emissions from boilers, steam generators, and process heaters fired on a variety of solid fuels: coal, petroleum coke, biomass, tire-derived fuel, and municipal solid waste (MSW). On December 16, 2021, the District Governing Board adopted amendments to Rule 4352 to include even more stringent NOx emission limits for solid fuel fired boilers, steam generators, and process heaters operating in the Valley, as well as establish particulate matter (PM) and SOx emission limits. The compliance schedule would take place over two years, with full compliance with the emissions limits required by January 1, 2024. The adopted amendments to Rule 4352 are estimated to result in emissions reductions of 0.28 tpd PM2.5 and 0.71 tpd NOx in 2024.

4.2.1.7 Rule 4354 (Glass Melting Furnaces)

Rule 4354, adopted in 1994 and subsequently amended seven times, is one of the most stringent rules in the nation for controlling emissions from industrial glass manufacturing plants that make flat glass (window and automotive windshields), container glass (bottles and jars), and fiberglass (insulation). On December 16, 2021, the District Governing Board adopted amendments to Rule 4354 to include even more stringent NOx, SOx, and particulate matter 10 micrometers in diameter or smaller (PM10) emission limits for glass melting facilities operating in the Valley. The amended rule includes a phased-in compliance schedule which will result in emissions reductions of 0.13 tpd PM2.5 and 1.67 tpd NOx by 2030.

4.2.1.8 Rule 4550 (Conservation Management Practices)

Rule 4550 is the District's Conservation Management Practices (CMP) rule. Rule 4550 was the first rule of its kind in the nation to reduce fugitive particulate emissions from agricultural operations through the reduction of passes of agricultural equipment and implementation of other conservation practices. Rule 4550 uses a menu approach of

control techniques to accommodate the variability of agricultural industries in the Valley. Agricultural operations are required to maintain detailed records verifying use of the approved CMPs. Approved CMP plans are enforced through onsite inspections and operators are required to submit applications and modify their plans when changing their CMPs.

4.2.1.9 Rule 4702 (Internal Combustion Engines)

Internal combustion (IC) engines are used in a variety of different Valley operations including schools, agriculture, oil and gas production, petroleum refining, and electrical power generation. On August 19, 2021, the District Governing Board adopted amendments to Rule 4702 to lower emission limits for NOx and VOCs for several categories of engines, establish PM requirements for all categories of IC engines affected by the rule, and establish SOx control requirements for agricultural engines. Compliance with these lower emission limits is required by 2024. The amendments result in emission reductions of 0.62 tpd NOx by 2024, and an additional 0.70 tpd NOx by 2030.

4.2.1.10 Rule 4901 (Wood-Burning Fireplaces and Wood-Burning Heaters)

The District takes a multifaceted and proactive approach to reducing emissions from wood burning fireplaces and wood burning heaters in the Valley. Rule 4901 reduces emissions from residential burning through stringent curtailment requirements during the wood-burning season. Through the District Residential Woodsmoke Reduction Program, the District has declared and enforced episodic wood burning curtailments, also called “No Burn” days, since 2003. The Residential Woodsmoke Reduction Program, including regulatory curtailments under District Rule 4901, reduces harmful species of PM2.5 when and where those reductions are most needed, in impacted urbanized areas when the local weather is forecast to hamper particulate matter dispersion. The District amended Rule 4901 in June 2019, establishing the most stringent regulatory curtailments in the nation. Most recently, the District amended Rule 4901 on May 18, 2023, to further strengthen contingency provisions and enhance the stringency of this rule.

4.2.1.11 Rule 4902 (Residential Water Heaters)

Rule 4902 controls NOx emissions from natural gas-fired residential water heaters with heat input rates less than or equal to 75,000 Btu/hr, by enforcing a NOx emissions limit of 40 nanograms of NOx per Joule (ng/J) of heat output. The District amended Rule 4902 in 2009 to further reduce emissions by lowering the limit to 10 ng/J for new or replacement water heaters and to a limit of 14 ng/J for tankless/instantaneous water heaters. As a point-of-sale rule, emissions will continue to be reduced as older units are replaced through attrition. The 2012 requirements were estimated to achieve 1.06 tpd NOx reductions by 2024.

4.2.1.12 Rule 4905 (Natural Gas-Fired, Fan-Type Residential Central Furnaces)

Rule 4905 limits NOx emissions from central furnaces supplied, sold, or installed in the Valley with a rated heat input capacity of less than 175,000 Btu/hour. Amendments in January 2015 lowered the NOx emissions limit from 40 ng/J to 14 ng/J with an associated sell-through period and emissions fee period to allow manufacturers time to develop new compliant furnaces. Due to the limited number of certified compliant units that would have been available by the deadlines set in the 2015 amendment, the rule has been amended to extend the emissions fee periods for certain unit types, with deadlines ranging from 2019-2025, depending on unit size and category. As a point-of-sale rule, emissions will continue to be reduced as older units are replaced through attrition. The 2015 amendments will result in 2.10 tpd NOx reductions by 2045.

4.2.1.13 Rule 9510 (Indirect Source Review)

District Rule 9510 is the only rule of its kind in the state of California and throughout the nation that applies to new development projects, including residential and commercial development projects, and transportation and transit projects. The District's rule is recognized as the benchmark, or best available control, for regulating these indirect sources of emissions. The purpose of this rule is to reduce the growth in emissions from mobile and area sources associated with construction and operation of new development projects in the Valley. This is achieved by encouraging clean air designs to be incorporated into the development project, or, if insufficient emissions reductions can be designed into the project, by paying a mitigation fee used to fund off-site emissions reduction projects.

4.2.1.14 Rule 9610 (State Implementation Plan Credit for Emission Reductions Generated Through Incentive Programs)

Rule 9610, adopted on June 20, 2013, serves as an administrative mechanism for the District to receive credit towards SIP requirements for emission reductions achieved in the Valley through incentive programs administered by the District, the Natural Resources Conservation Service (NRCS), and CARB. Through program implementation and reporting, the goal is to receive credit for incentive-based emission reductions that satisfy EPA requirements.

4.2.1.15 Regulation VIII (Fugitive PM10 Prohibitions)

The Regulation VIII rules were adopted in November 2001, and subsequently amended in 2004 to incorporate more stringent requirements. These rules reduce fugitive dust from construction sites, earthmoving activities, parking and staging areas, open areas, agricultural operations, carryout and trackout, paved and unpaved roads, and material storage sites.

4.2.2 New District Emission Reduction Measures

4.2.2.1 Rule 4550 (Conservation Management Practices)

Rule 4550 was adopted to help bring the Valley into attainment of federal PM10 standards, and applies to on-field farming and agricultural operation sites located within the Valley. Rule 4550 was the first rule of its kind in the nation to target fugitive particulate emissions from agricultural operations, and it has served as a model for other regions. The District worked extensively with numerous stakeholders, growers, and the Agricultural Technical Committee for the San Joaquin Valleywide Air Pollution Study Agency (AgTech) for two years prior to developing the CMP Rule. The District also worked with agricultural stakeholders and other agencies, such as NRCS, following rule adoption to ensure affected sources were assisted as much as possible in understanding and complying with the requirements of Rule 4550. Implementation of Rule 4550 by agricultural operations has resulted in the reduction of PM2.5 emissions through the reduction of passes of agricultural equipment and implementation of other conservation practices. Through this rule, PM emissions have been reduced by 35.3 tpd.

While attainment modeling has demonstrated that additional CMPs will not significantly contribute to our attainment efforts, to further develop the District's understanding of the effectiveness of CMP measures on controlling PM2.5 emissions in the Valley, the District is committing to continue supporting and reviewing scientific research on the PM2.5 content, constituents, and stability during wind events of the many soil types found throughout the Valley. This ongoing evaluation will be conducted in close coordination with NRCS, agricultural sources, researchers through established processes including the San Joaquin Valleywide Air Pollution Study Agency, Policy Committee, and AgTech.

Although Rule 4550 already meets BACM and MSM for this source category, the District will go beyond MSM in this Plan and is committing to evaluate the feasibility and effectiveness of CMPs on fallow lands that are tilled or otherwise worked with implements of husbandry to reduce windblown PM2.5 emissions from disturbed fallowed acreage. This evaluation will rely on ongoing review of research, in coordination with NRCS, agricultural sources, and researchers, which recognizes the Valley's unique soil characteristics and agricultural practices to ensure that Valley-specific solutions are considered in this process. This commitment is being carried over from the District's *2018 PM2.5 Plan.* The District is currently conducting a robust rule development process to evaluate these opportunities, working collaboratively with industry stakeholders, NRCS, and other agencies to develop proposed rule amendments.

4.2.2.2 Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters)

The District's residential wood burning emission reduction strategy includes wood burning curtailments implemented through District Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters), in conjunction with the District's incentive grant program

for fireplace and woodstove change-outs, and robust public education and outreach efforts. This approach is designed to improve public health by reducing toxic wood smoke emissions in Valley neighborhoods during the peak PM2.5 winter season (November through February), and has proven to be extremely effective in advancing the District's objectives to attain the PM2.5 federal standards and protect public health.

While the District meets or exceeds BACM and MSM requirements for this source category, given the enormity of reductions needed to demonstrate attainment with the 2012 annual PM2.5 standard, the District commits to further reduce PM2.5 emissions from wood burning fireplaces and heaters by extending the wood burning season through March 31.

4.2.2.3 Fireplace and Woodstove Change-Out Program

The District currently operates the Fireplace & Woodstove Change-Out Program (formerly known as the Burn Cleaner Program) to reduce emissions from residential wood burning. The Program helps Valley residents replace their current high-polluting wood-burning devices and open hearth fireplaces with cleaner alternatives such as natural gas or EPA-certified wood/pellet devices, and electric heat pumps. Through this Program, residents reduce directly emitted PM2.5 emissions in areas and times where those reductions are needed most. Given the potentially high cost of these new devices, this Program provides a reduced upfront cost to low-income qualified applicants to encourage their participation by applying the incentive at point of purchase. In 2022, the District Governing Board approved the latest enhancements to the Program, which includes increased incentives for the installation of natural gas or electric devices to offset rising prices of device and labor costs due to inflation. In addition to increased incentives, a new component for fireplace decommissioning was incorporated into the Program.

The Program has replaced approximately 30,000 wood burning devices with EPA-certified devices, clean-burning natural gas or electric heat pumps to date. The District encourages Valley residents to transition from older, higher polluting, wood burning fireplaces to cleaner alternatives by decreasing the number of allowable burn days for these types of devices while also increasing the number of burn days allowed for registered clean wood burning devices through the District's Rule 4901 tiered episodic wood burning curtailment program.

On November 28, 2023, EPA finalized approval of the incentive measure into the SIP, making the determination that the program complies with CAA requirements.[2] However, as part of the approval, EPA did not include SIP credit for the quantified emission reductions achieved by the measure. The significant emission reductions achieved through this successful program contribute towards expeditious attainment of the 2012 annual PM2.5 standard and are necessary to demonstrate attainment of the standard by 2030. Therefore, as part of this Plan's attainment strategy, the District is requesting that EPA provide the District SIP credit for the emissions reductions

[2] 88 FR 83034. Retrieved from: https://www.govinfo.gov/content/pkg/FR-2023-11-28/pdf/2023-26013.pdf

achieved by this program. In addition, the District will be quantifying and requesting SIP credit, through the existing quantification methodology approved by EPA, for projects completed through 2026.

4.2.2.4 Low-Dust Nut Harvester Replacement Program

As nut harvesting activities can be the cause of localized air quality impacts due to dust emissions, in 2017, the District Governing Board established the Community-Level Targeted Strategy, which led to the development of the first-in-the-nation Low-Dust Nut Harvester Replacement Program in partnership with Valley Agriculture. Through success in competing for and leveraging local and federal funds, the District has been successful in replacing nut harvesters throughout the Valley with lower-dust alternatives, leading to significant emission reductions from these activities, and reducing dust exposure in nearby communities.

The District Board has long supported efforts to conduct research and evaluate technologies to reduce emissions in the Valley, including dust from nut harvesting operations. In line with this priority, the District, in partnership with other agencies and the agricultural industry, has conducted studies to demonstrate that low-dust harvesting technology can be effective at reducing localized PM emissions associated with harvesting activities, with results showing reductions of localized PM emissions by more than 40%, and in some cases up to nearly 80%. To facilitate the transition to low-dust nut harvesting technology, in April 2024, based on recommendations from the AgTech Committee, the District added Low-Dust Nut Harvesters to the CMP list for Nut Crops as an option that can be selected by growers to comply with District Rule 4550.

The Low-Dust Nut Harvester Replacement Program, to date, has successfully obligated over $16.7 million to replace 202 pieces of nut-harvesting equipment with low-dust nut harvesting equipment, which has resulted in the reduction of more than 11,000 tons of PM10 and 1,400 tons of PM2.5. Most recently in May 2023, the District Governing Board accepted EPA's award under the Targeted Airshed Grant Program which included an additional $10,000,000 in funding to deploy this new equipment, which reflects the District's ongoing commitment and success in working with Valley agriculture to accelerate the deployment of cleaner technologies through innovative locally-developed programs.

To continue progress in reducing emissions from nut harvesting, the District will advocate for additional funding, and evaluate potential enhancements to the program to ensure that this program remains effective, and to ensure that small growers have equitable access to available incentive funding. Additionally, the District will support and evaluate potential research opportunities as technology advances, and evaluate potential opportunities to conduct a Valley-wide survey to further understand the number of harvesters operating in the Valley.

As part of this Plan's attainment strategy, the District is committing to continue efforts towards accelerating the deployment of cleaner technologies for nut harvesting with an additional $25 million in funding for the Low-Dust Nut Harvester Replacement Program.

Based on historical program participation, this funding is estimated to facilitate the replacement of approximately 358 units with low-dust nut harvesting equipment.

4.2.3 Evaluating Control Measures for New Control Strategy Opportunities

The District expended extensive efforts to identify and evaluate potential emission reductions opportunities from each control measure source category. As part of the regulatory evaluation, District rules and source categories were compared to federal and state air quality regulations and standards, and the regulations and standards in other air districts. District rules and regulations were compared to federal regulations and guidance documents including Control Techniques Guidelines (CTG), Alternative Control Techniques (ACT),[3] and New Source Performance Standards (NSPS).[4] California state regulations, due to regulatory authority, are primarily applicable to mobile sources and consumer products. State regulations also include the California Health and Safety Code (CH&SC) and CARB Airborne Toxic Control Measures (ATCM) requirements, which are applicable to stationary and area sources.[5] The District's regulatory evaluation includes state guidelines that are applicable to the source category.

All potential best available control measures (BACM) and most stringent measures (MSM) identified through this regulatory evaluation were thoroughly evaluated using the key factors defined in EPA's 2016 *Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*, to determine if potential opportunities qualify as BACM/MSM for the Valley.

In addition to evaluating measures adopted by other air quality agencies, the District looked for any control technologies not already required that might be available to further reduce emissions from sources of air pollution in the Valley. This includes new technologies and technologies that may not have been cost effective in the past. The technologies used in BACT guidelines; permits; and other air districts' rules, regulations, guidelines, and studies were reviewed for their feasibility, including how commercially available the technology currently is and whether the technology has been achieved in practice. Cost effectiveness analyses of various control measures include examining the added cost, in dollars per year, of the control technology or technique, divided by the emissions reductions achieved, in tons per year. The District does not have a pre-determined cost effectiveness threshold, but control options that have extremely high costs per ton of pollutant reduced are generally unreasonable and not feasible for regulation.

Efforts to identify feasible emission reduction opportunities also include the evaluation of additional control technologies or practices, if any, not already included in previously mentioned BACM/MSM evaluations for the area. This evaluation process considers any

[3] EPA. Alternative Control Techniques. Retrieved from: https://www.epa.gov/ground-level-ozone-pollution/control-techniques-guidelines-and-alternative-control-techniques
[4] EPA. 40 CFR 60 – Standards of Performance for New Stationary Sources (NSPS). Retrieved from: https://www.epa.gov/stationary-sources-air-pollution/new-source-performance-standards
[5] CARB. Airborne Toxic Control Measures (ATCMs). Retrieved from: https://ww2.arb.ca.gov/resources/documents/airborne-toxic-control-measures

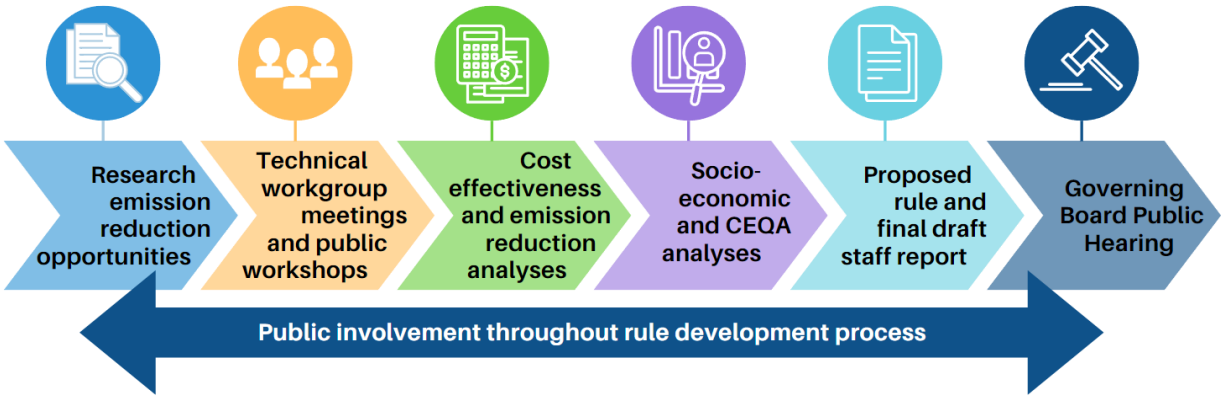
emission reduction opportunities that were previously adopted by the District plans that were determined to be beyond reasonably available control technology (RACT) at that time, and any new emission reduction opportunities adopted in California state implementation plans (SIP), SIPs in other states, or achieved in practice in other areas. Any potential BACM/MSM identified were then thoroughly evaluated for technological and economic feasibility. In evaluating the technological and economic feasibility of potential BACM/MSM, the District reviews staff reports and studies from other air districts, EPA technical guidance documents, and applicable study data from the scientific community. The District has evaluated all sectors and equipment types for additional emission reduction opportunities, as presented in Appendix C.

This Plan demonstrates that all District rules continue to meet or exceed measures identified by the EPA as BACM and MSM as defined above and demonstrated in Appendix C.

4.2.4 Implementation of Regulatory Measures

After plan adoption, the District adopts or amends rules per the plan's regulatory control measure commitments. In these efforts, the District is committed to a transparent public process that includes stakeholder, industry, and other-agency input at every step possible.

Figure 4-1 Rule Development Process



Contrasting the broader plan development effort, the rule development process allows greater focus on a single sector or technology area. Early in the rule development process, prior to preparing a draft rule, staff researches technologies and explores options for emissions reductions, gathering preliminary data and performing literature reviews of relevant studies. Through a series of public workshops and focus group meetings, staff presents draft rule concepts and receives feedback on specific technology costs, technical insight, and general public comments. Staff uses this information gathering and discussion to refine the rule throughout the rule development process. Using this iterative process of gathering the most up-to-date cost and technical information, staff analyzes cost-effectiveness and potential emissions reductions. These analyses are shared with the public throughout the rule development process.

During the ongoing public workshop process, the District enlists the services of an economic consultant to analyze the proposed rule's socioeconomic impact, pursuant to CH&SC Section 40728.5. As with draft versions of the rule, the District gives the public and stakeholders the opportunity to review the analysis and provide further feedback. To the extent possible, the District minimizes significant economic and socioeconomic impacts by evaluating viable alternatives, adjusting proposed limits, or extending compliance schedules.

Staff presents the final draft version of the staff report and proposed rule, including the cost-effectiveness analysis, socioeconomic impact report, emissions reductions analysis, RACT analysis, and California Environmental Quality Assessment (CEQA), to the Governing Board during a public hearing. The Governing Board ultimately determines the balance between air quality improvement and rule impacts when adopting proposed rules.

Once adopted, the District forwards the rule through CARB to EPA for inclusion into the SIP, as appropriate. EPA evaluates the rule, determines if the rule meets federal requirements, and provides an opportunity for further public comment. After this review and comment period, EPA will amend the SIP to include the new rule, as appropriate.

Beyond the rule development and adoption process, District staff will continue to engage the public and affected source operators throughout implementation and compliance. Additionally, District staff continues public outreach and education through notifications to stakeholders of the rule adoption, issuance of compliance assistance bulletins, and assistance through the District's Small Business Assistance program.

4.2.5 Areas for Further Study

While the District and CARB's programs are the most aggressive and innovative in the nation, the District is committing to evaluate the next generation of innovative control technologies and seek additional emission reduction opportunities across a number of stationary and area source sectors, including residential and commercial heating, stationary NOx and PM sources, energy and climate change programs, clean landscaping equipment and practices, and other innovative measures to pursue additional emission reduction opportunities as technologies, practices, and policies evolve in the future. The District identified the following stationary and area source sectors and potential measures for further study, which are discussed in more detail below. The District will be evaluating these further study measures through the Plan's attainment year of 2030.

- Residential and Commercial Heating
- Commercial Charbroiling Measures
- Stationary Combustion NOx Measures
- Stationary Source PM Measures
- Energy and Climate Change Programs
- Clean Landscaping Equipment and Practices

- Other Innovative Measures

4.2.5.1 Residential and Commercial Heating

Many appliances and devices, such as water heaters and furnaces, use natural gas or liquefied petroleum gas (fossil fuel) as a fuel source. These appliances have the potential to emit a significant amount of NOx during combustion and VOCs from gas leaks. The District enforces stringent requirements through 4308 (Boilers, Steam Generators, and Process Heaters – 0.075 MMBtu/HR to Less Than 2.0 MMBtu/HR), District Rules 4902 (Residential Water Heaters), and 4905 (Natural Gas-Fired, Fan-Type Central Furnaces), to reduce emissions from these source categories. In addition to reducing emissions from this source category through regulatory requirements, the District offers incentives through the Fireplace and Woodstove Change-Out Program to purchase and install cleaner space-heating devices such as heat pumps.

Zero-NOx alternatives to natural gas-fired appliances are currently available through electric options such as the aforementioned heat pump space heaters, but also heat pump water heaters. However, a number of barriers have prevented widespread electrification throughout the Valley, state, and nation. Important factors that must be considered before implementing zero-NOx appliance standards include technical feasibility, costs and affordability, power supply and grid capacity, and consumer acceptance, adoption, awareness, and readiness. There are considerable economic barriers to adopting a zero-NOx appliance standard that would require electrification, particularly with respect to lower income households, given the significantly higher upfront costs associated with electrical infrastructure upgrades and the devices themselves. Infrastructure upgrades include new electrical panels with increased amperage breakers and heavier, lower gauge, wiring run through the structure to support the devices. Careful equity considerations must be taken into account as new measures are developed, and the District must evaluate the specific economic challenges that exist for Valley residents. Additionally, a concerted effort is needed across all levels of government, utilities, appliance manufacturers, developers, contractors, households, and businesses to achieve this goal successfully and equitably.

Over 70 California cities and counties have adopted local ordinances requiring varying degrees of electrification for new buildings. The first of these ordinances, passed in the City of Berkeley in August 2019, enacted a building code prohibiting natural gas piping into new buildings. However, this ordinance was invalidated when the U.S. Ninth Circuit Court of Appeals held that the ban on natural gas was preempted by federal energy efficiency laws, setting precedent that blocks local government from using similar bans.[6] Following the ruling, a number of cities and counties with adopted natural gas bans have suspended enforcement of their ordinances.

In an effort to identify potential emission reduction opportunities, the District's *2022 Plan for the 2015 8-Hour Ozone Standard* (*2022 Ozone Plan*) included a further study

[6] U.S. Courts for the Ninth Circuit. California Restaurant Association v. City of Berkeley. Retrieved from: https://www.ca9.uscourts.gov/cases-of-interest/california-restaurant-association-v-city-of-berkeley/

commitment to evaluate current and upcoming work from CARB and other agencies related to reducing emissions from residential and commercial combustion sources, and to evaluate the feasibility of implementing a zero-NOx standard for these sources in the Valley. Through this effort, the District will also evaluate opportunities to advocate for funding under the Inflation Reduction Act (IRA), Bipartisan Infrastructure Law, and other funding sources, which are prioritizing funding opportunities for electrification of appliances to reduce greenhouse gas (GHG) emissions. The District will continue to closely track regulations being developed by CARB, South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD), and others.

The District continues to support CARB in the development and implementation of a statewide zero-NOx appliances measure, as it will result in direct air quality and public health benefits for the Valley. Additionally, as part of this Plan, the District commits to further evaluating potential opportunities to reduce NOx emissions from natural gas building appliances in the Valley. As part of this evaluation, the District will consider the implementation of zero-NOx requirements earlier than CARB's statewide measure, to the extent that measures are technologically and economically feasible in the Valley. The District will collaborate with utilities, agencies, and organizations to help leverage funding and coordinate incentives with existing programs.

4.2.5.2 Commercial Charbroiling Measures

District Rule 4692 reduces PM emissions by requiring catalytic oxidizers for chain-driven charbroilers, including those used in many typical fast-food restaurants. Rule 4692 is among the most stringent rules in the nation for controlling emissions from commercial charbroiling operations. The original rule, adopted in March 2002, reduced PM2.5 emissions from chain-driven charbroilers by 84%. The September 2009 rule amendment expanded rule applicability to more chain-driven charbroilers. Rule 4692 has been fully implemented since 2011.

In addition to the existing emissions reductions already achieved through control requirements for chain-driven commercial charbroilers, the District continues to seek to achieve additional emission reductions from commercial underfired charbroilers. While there are ongoing improvements in the technology available for commercial cooking emissions, many technological and economic challenges remain, specifically for underfired charbroilers, as detailed in Appendix C.

The need to reduce PM2.5 from commercial charbroiling continues to grow as EPA promulgates more stringent PM2.5 NAAQS. The lack of commercially available and feasibly demonstrated control technologies has been the primary barrier in moving forward with control strategies for reducing emissions from restaurants equipped with commercial charbroilers. Other air districts in California and other regions have encountered similar difficulties in identifying and requiring emissions control technologies for underfired charbroilers. Based on the importance of underfired charbroiling emissions as it relates to attainment of the federal PM2.5 standards in the future, collaborative work is needed to further understand the emissions from underfired

charbroiling, including potential control strategy opportunities to reduce emissions from this category.

The District has previously collaborated with other agencies including CARB, SCAQMD, and BAAQMD to evaluate and implement control strategies for underfired charbroilers. While significant work has been done, to date, barriers still exist to the commercial deployment of underfired charbroiler technology.

The District has recently formed the Charbroiler Collaborative Workgroup, consisting of the District, SCAQMD, BAAQMD, and CARB, to assist in overcoming all obstacles, including costs and emissions control issues preventing widespread control of underfired charbroilers. Through this collaborative and internally, the District commits to ongoing evaluation of potential controls for underfired charbroilers.

4.2.5.3 Stationary Combustion NOx Measures

The District's current NOx control measures, coupled with the rule-strengthening commitments included in this Plan, represent the most stringent measures feasible for stationary combustion sources in the Valley. The District's regulations have reduced NOx emissions from stationary sources by over 93%, and the commitments included in this Plan to strengthen regulatory measures for stationary gas turbines and boilers, steam generators, and process heaters, will further reduce NOx emissions that contribute to PM2.5 formation in the Valley.

Although the District is currently implementing stringent regulations for stationary combustion sources throughout the Valley, technology continues to evolve and improve, resulting in significant advancements in performance and NOx removal efficiencies. The District will continue to evaluate the feasibility and potential of emerging technologies, including zero-emission technologies, as they become available through the Plan's attainment year of 2030.

4.2.5.4 Stationary Source PM Measures

The District's current stationary source control program, further strengthened by the commitments included in this Plan, represents one of the most stringent stationary source control programs in the nation, including wide-ranging controls for PM. In addition to the commitments to expand control requirements and enhance incentive programs for residential and commercial sources of PM, the District will continue to evaluate the feasibility and potential of emerging technologies, including zero-emission technologies, as they become available through the Plan's attainment year of 2030.

4.2.5.5 Energy and Climate Change Programs

Federal, state, and local mandates and programs aim to reduce GHG emissions and energy usage, and improve energy efficiency. The District's traditional air quality strategies focus on regulatory measures to reduce emissions of criteria air pollutants (NOx, VOC, PM2.5, etc.). However, in an effort to pursue all available opportunities, the

District will continue to identify opportunities to gain co-benefits from existing and future programs related to greenhouse gas reductions, energy efficiency, energy usage, and other climate change initiatives, and seek opportunities to provide incentive funding to promote building decarbonization throughout the Valley. In particular, there are unprecedented funding opportunities through the Bipartisan Infrastructure Law,[7] which provides $550 billion over fiscal years 2022 through 2026 in new federal investment in infrastructure, and the IRA,[8,9] which seeks to reduce GHG emissions and energy usage through tax credits or rebates. The District will collaborate with federal, state, and local air districts and other agencies to identify and evaluate opportunities, including advocating for incentives from state and federal sources.

4.2.5.6 Clean Landscaping Equipment and Practices

The District has long supported efforts to address emissions from the use of landscaping equipment, including through the deployment of clean zero-emissions equipment under the Clean Green Yard Machines (CGYM) Residential Rebate Program and Zero-Emission Landscaping Equipment (ZELE) Voucher Program, which provide funding for the replacement of old gas-powered lawn and garden equipment with new electric equipment. The Residential CGYM program, launched in 2001, provides rebates to San Joaquin Valley residents through the below two options. This program has issued over 15,000 rebates for electric lawn care equipment for a total of over $2.7 million in funding.

- Option 1: Replacing an old gas-powered lawn mower with a new electric lawn mower, and requiring the permanent destruction/dismantling of the old lawn mower.
- Option 2: Purchasing eligible new electric lawn and garden equipment such as lawn mowers, hedge trimmers, edgers, string trimmers, pole saws and chainsaws. Applicants are not required to destroy/dismantle an old piece of equipment under this option.

In May 2019, the District launched the Commercial CGYM Program to assist commercial operators with the purchase of new electric landscaping equipment. To further support the program, the District applied for and was awarded over $6 million in state funding in 2022. With this additional funding, the Commercial CGYM program was relaunched as the ZELE Voucher program in May 2023 to streamline the administration of the program and align its implementation with state guidelines.

Through the ZELE Voucher program, funding is provided to commercial landscaping equipment operators through a voucher process. As part of the program requirements, applicants must replace their existing, in-use gas-powered landscaping equipment with

[7] Congress. *H.R.3684 - Infrastructure Investment and Jobs Act (IIJA)*. (November 15, 2021). Retrieved from: https://www.congress.gov/117/bills/hr3684/BILLS-117hr3684enr.pdf
[8] Congress. *H.R.5376 - Inflation Reduction Act of 2022.* (August 16, 2022). Retrieved from: https://www.congress.gov/bill/117th-congress/house-bill/5376/text
[9] The White House. *By the Numbers: The Inflation Reduction Act*. (August 15, 2022). Retrieved from: https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/15/by-the-numbers-the-inflation-reduction-act/

zero-emission electric options, and the old equipment must be rendered permanently inoperable by a licensed dismantling facility. In addition to new equipment, ZELE vouchers can be used to purchase batteries and/or chargers necessary to ensure that the equipment is capable of operating a full day of work. Since the launch of the ZELE Voucher Program, the District has awarded 924 vouchers for a total of over $2.3 million in funding (as of March 31, 2024).

Existing CARB and EPA emission standards for small off-road engines (SORE), which primarily includes lawn and garden equipment, have led to substantial emission reductions in California. Since 2000, emissions of pollutants that contribute to ozone and PM2.5 formation from SORE have decreased by 50 percent. Even so, in California, SORE emit more NOx and reactive organic gases (ROG) than light-duty passenger cars, both in summer and annually.[10] However, recently amended SORE regulations approved by CARB in December 2021 require most newly manufactured SORE engines be zero-emission starting in 2024, which will help achieve further emission reductions from lawn and garden equipment.[11]

In light of new opportunities, the District will work with landscaping services and local jurisdictions to pursue options for accelerating the deployment of newly available commercial zero-emissions equipment, promoting landscaper training and green certification programs, and promoting best practices to reduce exposure through episodic and zoning recommendations (e.g. limiting leaf blower use around children during school hours, “green zones”).

4.2.5.7 Other Innovative Measures

The District will continue to evaluate innovative, out of the box measures to pursue additional emission reduction opportunities as technologies, practices, and policies evolve in the future. These measures could include enhancements to the District’s public outreach and communication strategy and continued support of enhanced forest management strategies for wildfire prevention in the context of unprecedented funding at the state and federal level and State/Federal Roadmap to a Million Acres (RMA).

4.3 CARB COMMITMENT FOR THE SAN JOAQUIN VALLEY

[S*ection provided by the California Air Resources Board*]

4.3.1 Overview of Commitment

SIPs may contain enforceable commitments to achieve the level of emissions necessary to meet federal air quality standards, as defined by the attainment demonstration. CARB’s *2022 State Strategy for the State Implementation Plan* (2022

[10] CARB. *Staff Report: Initial Statement of Reasons for the Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions.* (October 12, 2021). Retrieved from: https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2021/sore21/isor.pdf

[11] CARB. *CARB approves updated regulations requiring most new small off-road engines be zero emission by 2024.* (December 9, 2021). Retrieved from: https://ww2.arb.ca.gov/news/carb-approves-updated-regulations-requiring-most-new-small-road-engines-be-zero-emission-2024

State SIP Strategy) lists new SIP measures for which potential emissions reduction SIP commitments for the San Joaquin Valley in 2030 are now estimated based on the measures identified and quantified to date. Adoption of the 2022 State SIP Strategy and the measure schedule by the CARB Board on September 22, 2022 formed the basis of the commitments for emission reductions by the 2030 attainment deadline for the San Joaquin Valley that will be proposed for CARB Board consideration alongside the 2024 San Joaquin Valley PM2.5 Plan. The commitments consist of two components:

1. A commitment to bring an item to the CARB Board for defined new measures or take other specified actions within CARB's authority; and
2. A commitment to achieve aggregate emission reductions by specific dates.

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

4.3.1.1 Commitment to Act on Measures

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

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

Table 4-4 2022 State SIP Strategy Measures and Schedule

Measure	Action	Implementation Begins
On-Road Heavy-Duty		
Advanced Clean Fleets Regulation	2023	2024
Zero-Emissions Trucks Measure	2028	2030

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

4.3.1.2 Commitment to Achieve Emission Reductions

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

While CARB includes estimates of the emission reductions in 2030 from each of the individual new measures, CARB's overall commitment is to achieve the total emission reductions necessary from State-regulated sources to attain the federal air quality standards, reflecting the combined reductions from the existing control strategy and new measures. Therefore, if a particular measure does not get its expected emission reductions, the State's overall commitment to achieving the total aggregate emission reductions still exists. If actual emission decreases occur that exceed the projections reflected in the current emission inventory, CARB will submit an updated emissions inventory to U.S. EPA as part of a SIP revision. The SIP revision would outline the changes that have occurred and provide appropriate tracking to demonstrate that aggregate emission reductions sufficient for attainment are being achieved through enforceable emission reduction measures. CARB's emission reduction commitments may be achieved through a combination of actions including but not limited to the implementation of control measures; the expenditure of local, State or federal incentive funds; or through other enforceable measures.

4.3.2 Emissions Reductions

CARB's control programs, including the measures in the 2022 State SIP Strategy provide emission reduction benefits throughout the State. Although the existing control program will provide mobile source emission reductions necessary to meet the attainment needs of many areas of the State, the remaining measures from CARB's

2016 State Strategy for the State Implementation Plan (2016 State SIP Strategy) and new measures in the 2022 State SIP Strategy are needed to provide further reductions to achieve the 12 ug/m^3 PM2.5 annual standard in the San Joaquin Valley and enhance statewide air quality progress towards the 9 ug/m^3 annual PM2.5 standard promulgated in 2024.

4.3.2.1 Emission Reductions from Current Programs

Table 4-5 provides the mobile source emissions under CARB and district current programs for the San Joaquin Valley. Ongoing implementation of current control programs is projected to reduce mobile source emissions of direct PM2.5 and NOx by 3.3 tpd and 115.7 tpd, in San Joaquin Valley in 2030 compared to 2018 levels, respectively. Achieving the benefits projected from the current control program will continue to require significant efforts for implementation and enforcement and thus represents an important element of the overall strategy.

Table 4-5 San Joaquin Valley Baseline Mobile Source Emissions[12]

Pollutant	2017 Emissions (tpd)	2030 Emissions (tpd)	Change
PM2.5	8.4	5.2	-38%
NOx	191.4	75.7	-60%

4.3.2.2 Emission Reductions from 2022 State SIP Strategy Measures

In addition to controlling direct PM2.5, air quality modeling has determined that NOx is a significant precursor for the 12 ug/m3 annual PM2.5 standard in the San Joaquin Valley. Air quality modeling indicates that both direct PM2.5 and NOx emissions from all sources in San Joaquin Valley will need to decrease in order to attain the 12 ug/m^3 annual PM2.5 standard in 2030. A significant fraction of the needed reductions will come from the existing control program already in the baseline emission inventory. In addition, as described below, one measure commitment included in the 2016 State SIP Strategy has not yet been acted upon, and a number of measure commitments included in both the 2016 and 2022 State SIP Strategies were very recently adopted and are thus not yet in the baseline emissions inventory, as outlined in Table 4-7 and Table 4-8 below.

The measures contained in the 2022 State SIP Strategy commitment reflect a variety of State actions across on-road and off-road vehicle and appliance sectors. Collectively, emissions reductions from CARB's current control program, reductions from the 2016 and 2022 State SIP Strategy measures adopted but not yet in the baseline, reductions from the remaining 2016 State SIP Strategy measures, and reductions estimated from the future measures identified in the 2022 State SIP Strategy and quantified below will provide the reductions needed from State sources to support attainment of the 12 ug/m^3 annual PM2.5 standard in the San Joaquin Valley. Table 4-6, Table 4-7, Table 4-8, and Table 4-9 summarize the reductions from the identified and quantified measures. In

[12] Source: 2022 PM2.5 CEPAM v1.00; represents the current baseline emissions with adopted CARB and district measures

Table 4-6, the reductions estimated from the remaining 2016 State SIP Strategy measure and future measures identified in the 2022 State SIP Strategy are included as CARB's aggregate emissions reductions commitment for the year 2030.

Table 4-6 2030 San Joaquin Valley Emissions Reductions from CARB Programs[13]

CARB Programs in San Joaquin Valley	2030 NOx (tpd)	2030 PM2.5 (tpd)
Current Mobile Source Control Program[14]	115.6	3.2
2016 and 2022 State SIP Strategy Measures Adopted (Not yet in baseline inventory)	12.9	0.5
CARB Aggregate Emissions Reductions Commitment	7.3	0.2
2016 State SIP Strategy Measure Remaining	3.0	<0.1
2022 State SIP Strategy Measures Remaining	4.3	0.2
Total Reductions	**136.0**	**3.9**

Table 4-7 reflects the 2016 and 2022 State SIP Strategy measure commitments that the CARB Board has recently adopted. The associated emissions reductions from these recently adopted measures are not yet all accounted for in the baseline emissions inventory. Nonetheless, CARB measure commitments are achieving emissions reductions and will contribute towards attainment of the 12 ug/m^3 annual PM2.5 standard in San Joaquin Valley in 2030.

[13] Numbers may not add up due to rounding.
[14] Current Control Program represents the current baseline emissions with adopted CARB and district measures (Source 2022 PM2.5 CEPAM v1.00)

Table 4-7 San Joaquin Valley Expected Emissions Reductions from 2016 and 2022 State SIP Strategy Recently Adopted Measures[15]

Adopted 2016 and 2022 State SIP Strategy Measures	2030 NOx (tpd)	2030 PM2.5 (tpd)
On-Road Heavy-Duty		
Advanced Clean Fleets Regulation	1.6	<0.1
Total On-Road Heavy-Duty Reductions	1.6	<0.1
On-Road Light-Duty		
Advanced Clean Cars II	0.3	0.1
Clean Miles Standard	<0.1	<0.1
Total On-Road Light-Duty Reductions	0.3	0.1
Off-Road Equipment		
Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation	1.4	0.1
Commercial Harbor Craft Amendments	<0.1	<0.1
Transport Refrigeration Unit Part I	0.2	<0.1
Total Off-Road Equipment Reductions	1.6	0.1
Primarily-Federally and Internationally Regulated Sources – CARB Measures		
In-Use Locomotive Regulation	9.2	0.2
Total Primarily-Federally and Internationally Regulated Sources – CARB Measures Reductions	9.2	0.2
Emissions Reductions	**12.9**	**0.5**

Although most of the CARB measure commitments from the 2016 State SIP Strategy have been adopted, there remains the Zero-Emission Forklift measure which will be acted upon by the CARB Board in 2024. In addition, there is one other measure commitment from the *San Joaquin Valley Supplement to the 2016 State Strategy to the State Implementation Plan*, the Accelerated Turnover of Agricultural Equipment measure, for which CARB has estimated reductions in 2030. While CARB adopted a SIP-creditable incentive measure to fulfill this commitment in 2019, CARB staff proposes to develop another SIP-creditable incentive measure to fully document the incentive projects from this Accelerated Turnover of Agricultural Equipment measure that provide for SIP credible emissions reductions in the 2030 attainment year. The 2030 quantification of these projects will be brought to the CARB Board for consideration in 2030. Table 4-8 below shows the timeline and anticipated emission reductions for these measures.

[15] Numbers may not add up due to rounding.

Table 4-8 San Joaquin Valley Reductions from Remaining 2016 State SIP Strategy Measures[16]

Remaining 2016 State SIP Strategy Measure	Action	Implementation Begins	2030 NOx (tpd)	2030 PM2.5 (tpd)
Zero-Emission Forklift	2024	2026	<0.1	<0.1
Accelerated Turnover of Agricultural Equipment	2030	Ongoing	3.0	NYQ
Total			**3.0**	**<0.1**

Finally, Table 4-9 reflects the CARB measures from the 2022 State SIP Strategy still to be brought to the CARB Board for consideration that will provide the final 4.3 tpd of NOx and 0.2 tpd of direct PM2.5 emissions reductions needed from State measures to support attainment of the 12 ug/m^3 annual PM2.5 standard in San Joaquin Valley in 2030.

Table 4-9 San Joaquin Valley Expected Emissions Reductions from the Remaining 2022 State SIP Strategy Measures[17]

Remaining 2022 State SIP Strategy Measures	2030 NOx (tpd)	2030 PM2.5 (tpd)
On-Road Heavy-Duty		
Zero-Emissions Trucks Measure	1.1	<0.1
Total On-Road Heavy-Duty Reductions	1.1	<0.1
Off-Road Equipment		
Tier 5 Off-Road Vehicles and Equipment	0.6	<0.1
Transport Refrigeration Unit Part 2	1.3	<0.1
Cargo Handling Equipment Amendments	<0.1	<0.1
Total Off-Road Equipment Reductions	2.0	<0.1
Other		
Zero-Emission Standard for Space and Water Heaters	1.1	0.1
Total Other Reductions	1.1	0.1
Emissions Reductions	**4.3**	**0.2**

4.3.3 CARB Measures

4.3.3.1 On-Road Heavy-Duty

4.3.3.1.1 Advanced Clean Fleets Regulation

The Advanced Clean Fleets Regulation was adopted by CARB on April 27, 2023. This measure accelerates zero-emission vehicle (ZEV) adoption in the medium- and heavy-duty sectors by setting zero-emission requirements for fleets and a 100% ZEV sales requirement in California for manufacturers of Class 2b through 8 vehicles starting

[17] Numbers may not add up due to rounding.

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

4.3.3.1.2 Zero-Emission Trucks Measure

This measure would increase the number of ZEVs and require cleaner engines to achieve emissions reductions from fleets that are not affected by the Advanced Clean Fleets Regulation. This would include potential zero-emissions zone concepts around warehouses and sensitive communities if CARB is given new authority to enact indirect source rules in combination with strategies to upgrade older trucks to newer and cleaner engines. This would be a transitional strategy to achieve zero-emissions medium- and heavy-duty vehicles everywhere feasible by 2045.

4.3.3.2 On-Road Light-Duty

4.3.3.2.1 Clean Miles Standard

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

4.3.3.3 Off-Road Equipment

4.3.3.3.1 Tier 5 Off-Road Vehicles and Equipment

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

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

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

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

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

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

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

4.3.3.3.4 Commercial Harbor Craft Amendments

The amendments to the Commercial Harbor Craft Regulation were adopted by CARB on March 24, 2022. The amended regulation requires that starting in 2023 and phasing in through 2031, most commercial harbor crafts (CHCs) (except for commercial fishing

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

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

4.3.3.3.5 Cargo Handling Equipment Amendments

This measure would start transitioning Cargo Handling Equipment (CHE) to full zero-emission by 2030, with over 90% penetration of ZE equipment by 2036. Based on the current state of zero-emission CHE technological developments, the transition to zero-emission would most likely be achieved largely through the electrification of CHE. This assumption about aggressive electrification is supported by the fact that currently some electric rubber-tired gantry cranes, electric forklifts, and electric yard tractors are already commercially available. The zero-emission phase-in schedule will be determined by technology feasibility determinations and discussions with public stakeholders during the rulemaking process.

4.3.3.3.6 Accelerated Turnover of Agricultural Equipment

This measure would quantify the emission reduction benefits in 2030 from the Accelerated Turnover of Agricultural Equipment measure in the *San Joaquin Valley Supplement to the 2016 State Strategy to the State Implementation Plan*. The first SIP-creditable measure for the Accelerated Turnover of Agricultural Equipment measure was adopted by the CARB Board in December 2019 as the *San Joaquin Valley Agricultural Equipment Incentive Measure* and approved by U.S. EPA in December 2021.[18] The Accelerated Turnover of Agricultural Equipment measure uses incentive funds to achieve emissions reductions through accelerated turnover of older agricultural equipment to cleaner agricultural equipment. This measure builds upon the previous success of the agricultural community using incentives to turnover agricultural equipment. The Accelerated Turnover of Agricultural Equipment measure committed to achieving emissions reductions in 2024 and 2025, but many of the projects for which emissions reductions were quantified will continue to provide benefits in 2030 in the San

[18] 86 FR 73106

Joaquin Valley. In a SIP-creditable incentive measure to be brought to the CARB Board in 2030, CARB staff would fully quantify the emissions reductions benefits and document the relevant and previously completed projects from the Accelerated Turnover of Agricultural Equipment measure that are creditable through the 2030 attainment year.

Some of the most significant sources of mobile source emissions in the SJV are heavy-duty diesel engines, like those used in heavy duty trucks, locomotives, and agricultural engines. Incentive funds, like Carl Moyer and FARMER, have also been an important mechanism to accelerate emission reductions from these heavy-duty diesel engines. The State is working to provide additional incentives to the San Joaquin Valley Air Pollution Control District to help replace the dirtiest diesel engines with zero-emissions equipment where feasible. This new equipment will significantly reduce emissions of oxides of nitrogen and directly emitted diesel PM2.5, both critical to reducing PM2.5 levels and reaching attainment of the PM2.5 ambient air quality standard in the San Joaquin Valley. Moving diesel equipment to zero emissions where feasible is essential for the area, both for reaching attainment of the standard and reducing nearby risk for communities. Funding cleaner locomotives, zero emission trucks, zero and near zero emission off-road equipment and zero emission infrastructure will improve PM2.5 air quality and the health of San Joaquin Valley residents. The State and the San Joaquin Valley Air Pollution Control District continue to work diligently and together on solutions to the PM2.5 and other complex air quality challenges in the region.

4.3.3.4 Other

4.3.3.4.1 Zero-Emission Standard for Space and Water Heaters

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

4.3.3.5 Primarily-Federally and Internationally Regulated Sources – CARB Measures

In addition to reducing emissions from the above sources, it is critical to achieve emissions reductions from sources that are primarily regulated at the federal and international level. It is imperative that the federal government and other relevant regulatory entities act decisively to reduce emissions from these primarily-federally and internationally regulated sources of air pollution. CARB and the air districts in California have taken actions to not only petition federal agencies for action, but also to directly

reduce emissions using programmatic mechanisms within our respective authorities. CARB continues to explore additional actions, many of which may require a waiver or authorization under the Clean Air Act, as described below.

4.3.3.5.1 In-Use Locomotive Regulation

The In-Use Locomotive Regulation was adopted by CARB April 27, 2023. This measure uses mechanisms available under CARB's regulatory authority to accelerate the adoption of advanced, cleaner technologies, and include zero-emission technologies for locomotive operations. The In-Use Locomotive Regulation applies to all locomotives operating in the State of California with engines that have a total rated power of greater than 1,006 horsepower, excluding locomotive engines used in training of mechanics, equipment designed to operate both on roads and rails, and military locomotives. The measure reduces emissions by increasing use of cleaner diesel locomotives and zero-emission locomotives through a spending account, in-use operational requirements, and by an idling limit. By July 1, 2024, a spending account is established for each locomotive operator. Funds in the account are only to be used toward Tier 4 or cleaner locomotives until 2030, and at any time toward zero-emission locomotives, zero-emission pilot or demonstration projects, or zero-emission infrastructure.

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

4.4 FEDERAL CALL FOR ACTION

The CAA is a system of "cooperative federalism," where regions, states, and federal agencies work together to improve air quality and public health. As described above, for decades, the District has promulgated and implemented measures to reduce emissions from sources of air pollution under its regulatory authority. The District has also deployed innovative measures to reduce emissions from mobile and indirect sources of air pollution that fall outside its traditional regulatory authority with stationary sources. The District continues to seek additional local emissions reductions, but the Valley has reached a point where attainment of the health-based standards established under the CAA is not viable without significant quantifiable and enforceable reductions in emissions from mobile sources that fall exclusively under federal jurisdiction, such as interstate heavy-duty trucks, locomotives, aircraft, and other mobile sources. The South Coast air basin and other nonattainment areas find themselves in similar situations, and

with ever-tightening federal air quality standards, many other regions throughout the nation will also face similar difficulties.

The District has jurisdiction over stationary and area sources, which make up less than 15% of the total NOx emissions inventory. With over 80% of the Valley's remaining ozone and PM2.5 precursor emissions now coming from mobile sources, of which 39% are under the federal government's jurisdiction, additional reductions from heavy-duty trucks and other mobile sources are needed for the Valley to reach federal air quality standards. The District has previously submitted petitions to the federal government requesting that they reduce their fair share of emissions in an equitable manner through more stringent national standards for heavy-duty trucks and locomotives. Similarly, in April 2017, CARB petitioned EPA to adopt more stringent emission standards for locomotives, in order to provide critical NOx and PM2.5 reductions specifically for disadvantaged communities surrounding railyards.[19] CARB asked EPA to update standards, to take effect for remanufactured locomotives in 2023 and for newly built locomotives in 2025. In response to the District and similar petitions submitted by CARB and SCAQMD, on January 24, 2023, EPA finalized a rule to reduce emissions from new heavy-duty trucks nationwide.[20] Additionally on November 9, 2022, EPA committed to evaluating and identifying potential regulatory actions to address emissions from locomotives.[21]

On November 8, 2023, EPA finalized changes to locomotive preemption regulations,[22] preserving the ability of California to adopt and enforce certain emission standards regulating non-new locomotives and engines if EPA has authorized such standards, and allowing other states to adopt those same California standards. EPA must continue to work towards addressing harmful emissions from new locomotives and new locomotive engines, which remain exclusively under federal authority. Most recently, on March 20, 2024, EPA announced a final rule for multi-pollutant emission standards for light-duty and medium-duty vehicles, to be phased in over model years 2027 through 2032.[23] Soon after, on March 29, 2024, EPA announced a final rule for GHG emissions standards for heavy-duty vehicles, also phased in over model years 2027 through 2032.[24] The District closely followed and participated in these rulemaking processes to advocate for the Valley's need for emissions reductions from this sector, and will continue to do so for future actions.

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[19] CARB. *Petition for Rulemaking: Seeking the Amendment of the Locomotive Emission Standards.* (April 13, 2017). Retrieved from: https://ww2.arb.ca.gov/sites/default/files/2020-07/final_locomotive_petition_and_cover_letter_4_3_17.pdf

[20] 88 FR 4296 https://www.govinfo.gov/content/pkg/FR-2023-01-24/pdf/2022-27957.pdf

[21] EPA. *Regulations for Emissions from Vehicles and Engines – Petitions to Address Harmful Emissions from Locomotives.* Retrieved from: https://www.epa.gov/regulations-emissions-vehicles-and-engines/petitions-address-harmful-emissions-locomotives

[22] 88 FR 77004 https://www.govinfo.gov/content/pkg/FR-2023-11-08/pdf/2023-24513.pdf

[23] EPA. *Final Rule: Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles.* (March 20, 2024). Retrieved from: https://www.epa.gov/system/files/documents/2024-03/lmdv-veh-standrds-ghg-emission-frm-2024-03.pdf

[24] EPA. *Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles—Phase 3; Final Rule*. 89 Fed. Reg. 78, pp. 29440-29831. (April 22, 2024). Retrieved from: https://www.govinfo.gov/content/pkg/FR-2024-04-22/pdf/2024-06809.pdf

CARB's primary regulatory authority is the regulation of mobile sources of emissions. Mobile sources are the largest contributor to criteria pollutant and air toxic emissions in the San Joaquin Valley and throughout the State. In recent Valley attainment plans for PM2.5 and ozone, a large piece of the overall emissions reduction commitment has come from mobile source measures under the jurisdiction of CARB. CARB's progress in developing and implementing these measures has contributed to the substantial improvements in Valley air quality, and will continue to do so in the future. Although CARB has promulgated stringent mobile source measures for vehicles and fleets in California, emissions from interstate heavy-duty trucks, locomotives, and other federal mobile sources have not been reduced as significantly. Considering the continuing emissions reductions from sources regulated by the District and CARB, and the remaining challenges under federal air quality standards, it is increasingly critical that the federal government take action to reduce emissions from sources under federal regulatory control.

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