

# Chapter 1

Introduction



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## Chapter 1: Introduction

Over the years, the District's numerous air quality plans (State Implementation Plans, or SIPs) have been a primary vehicle for improving air quality in the San Joaquin Valley. Each plan builds upon the work of prior plans while establishing the path for continued air quality improvements. After each plan adoption, the District implements plan strategies through regulatory development, outreach, continued research, and incentive programs. Each attainment plan is just one milestone in this continuing effort to improve San Joaquin Valley air quality.

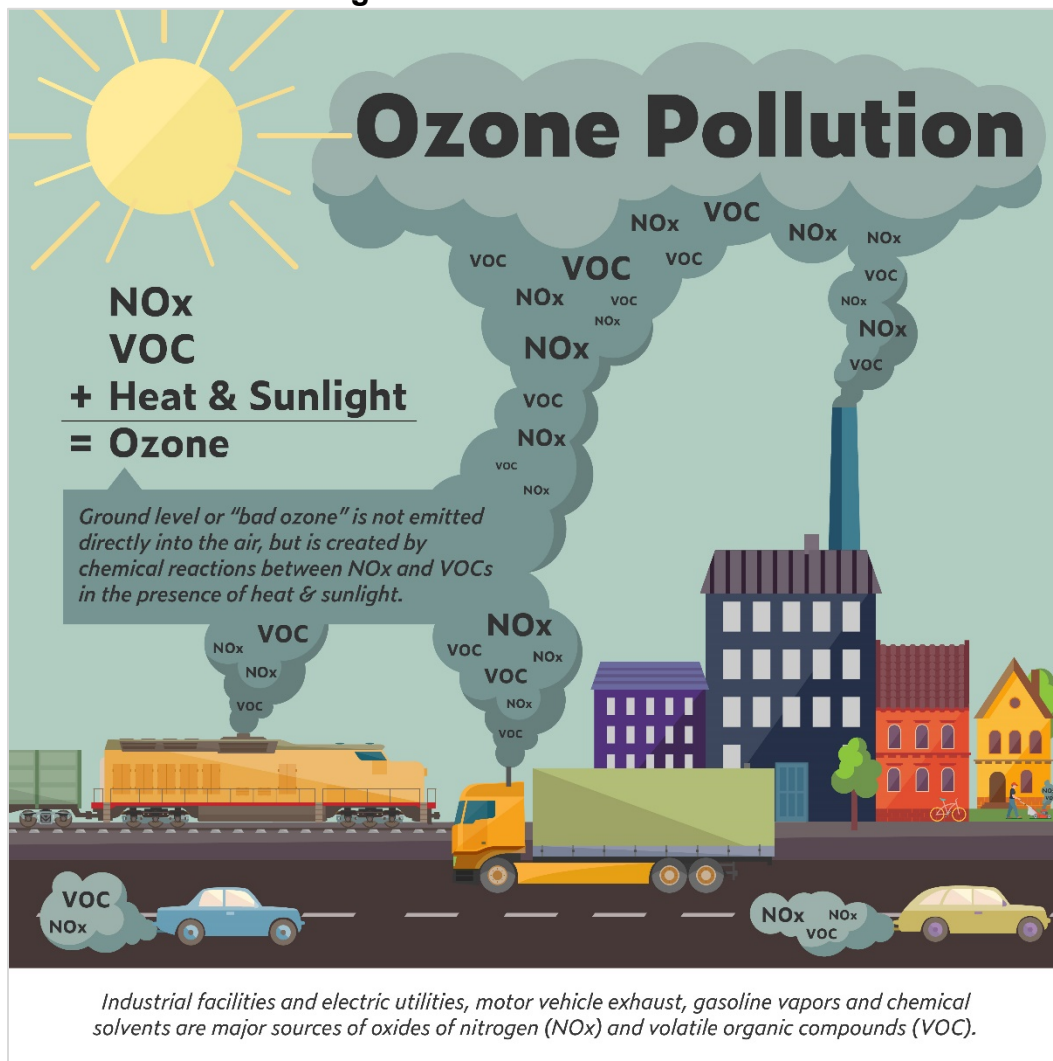
The federal Clean Air Act (CAA) prompts the U.S. Environmental Protection Agency (EPA) to establish health-based ambient air quality standards (national ambient air quality standards, or NAAQS), designate nonattainment areas, and promulgate planning requirements. EPA established 8-hour ozone standards in 1997 (84 ppb), 2008 (75 ppb), and 2015 (70 ppb). The San Joaquin Valley is currently classified as in nonattainment for each of these increasingly stringent standards. The District has adopted plans for the 1997 and 2008 ozone standards, and is on track to meet the attainment deadlines for both. This *2022 Plan for the 2015 8-Hour Ozone Standard (2022 Ozone Plan)* addresses the 2015 NAAQS.

This chapter summarizes the effects of ozone, ozone air quality standards, applicable federal requirements, the District's Guiding Principles for this plan, and the District's public process for development of this plan.

### 1.1 OZONE AND ITS EFFECTS

Ozone is a gas of three oxygen atoms (O<sub>3</sub>). Ground-level ozone is the main component of smog. Ozone is not directly emitted into the atmosphere, but produced by photochemical reactions between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of sunlight (see Figure 1-1). The Valley generally experiences the highest ozone concentrations on hot, sunny summer days with prolonged periods of stagnation. Ozone affects human health, ecosystems, and materials.

Figure 1-1 Ozone Formation



### 1.1.1 Health Benefits of 2015 8-Hour Ozone Standard

Ozone can trigger a variety of health problems, including chest pain, coughing, throat irritation, congestion, reduced lung function, and inflammation of the linings of the lungs.<sup>1</sup> Repeated exposure may permanently scar lung tissue. People with asthma, children, older adults, people active outdoors, and outdoor workers are at higher risk from ozone. Studies have linked rising hospital admissions and emergency room visits to higher ozone levels.

Efforts to reduce ozone concentrations improve public health. The District has worked with CARB and EPA to reduce ground level ozone concentrations through the implementation of robust emission regulations and incentivizing low emission

<sup>1</sup> See EPA's "Ozone and Your Health" pamphlet, available at [https://www.epa.gov/sites/default/files/2015-06/documents/ozone\\_and\\_your\\_health.pdf](https://www.epa.gov/sites/default/files/2015-06/documents/ozone_and_your_health.pdf)

technology. However, ozone remains a public health issue in several areas throughout the nation.

EPA based the 2015 NAAQS on extensive scientific evidence about ozone's effects on public health and welfare.<sup>2</sup> As part of revising the 8-hour ozone standard in 2015, the Clean Air Scientific Advisory Committee (CASAC) conducted a robust review of risk and exposure<sup>3</sup>, science<sup>4</sup>, and policy<sup>5</sup>, taking into account benefits to public health, particularly for at-risk groups including children, older adults, people with lung diseases such as asthma, and people who are active outdoors.

EPA's *Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards* concluded that, in comparison to the 2008 ozone NAAQS (75 ppb), the 70 ppb standard would have the following benefits nation-wide:

1. Reduce exposure to ozone concentrations that cause respiratory effects in healthy adults by about 45 to 95%;
2. Reduce moderate-to-large ozone-induced lung function decrements by about 15 to 35%;
3. More effectively maintain short- and long-term ozone concentrations below those present in the epidemiologic studies that reported significant ozone health effect associations in locations likely to have met the 2008 8-hour ozone standard; and
4. Reduce the risk of ozone-associated mortality and morbidity.

Based on these findings, the CASAC found that revising the 8-hour ozone standard to 70 ppb would result in important improvements in public protection, and would provide an appropriate degree of public health protection. On the national level, EPA concluded<sup>6</sup> that reducing ozone and particle pollution nationwide (excluding California) in 2025 would provide for public health benefits worth an estimated \$2.9 to \$5.9 billion. For California, EPA concluded that attaining the 70 ppb standard after 2025 would prevent thousands of California residents from experiencing various health issues originating from excess ozone exposure, providing for public health benefits worth \$1.2 to \$2.1 billion. Figure 1-2 below represents the quantitative reduction of ozone-related health impacts.

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<sup>2</sup> National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292-65,468 (October 26, 2015).

<https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf>

<sup>3</sup> EPA. Health Risk and Exposure Assessment for Ozone. (August 2014). Retrieved from

<https://nepis.epa.gov/Exe/ZyPDF.cgi/P100KBUF.PDF?Dockey=P100KBUF.PDF>

<sup>4</sup> EPA. Integrated Science Assessment for Ozone and Related Photochemical Oxidants. (February 2013).

Retrieved from <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=247492>

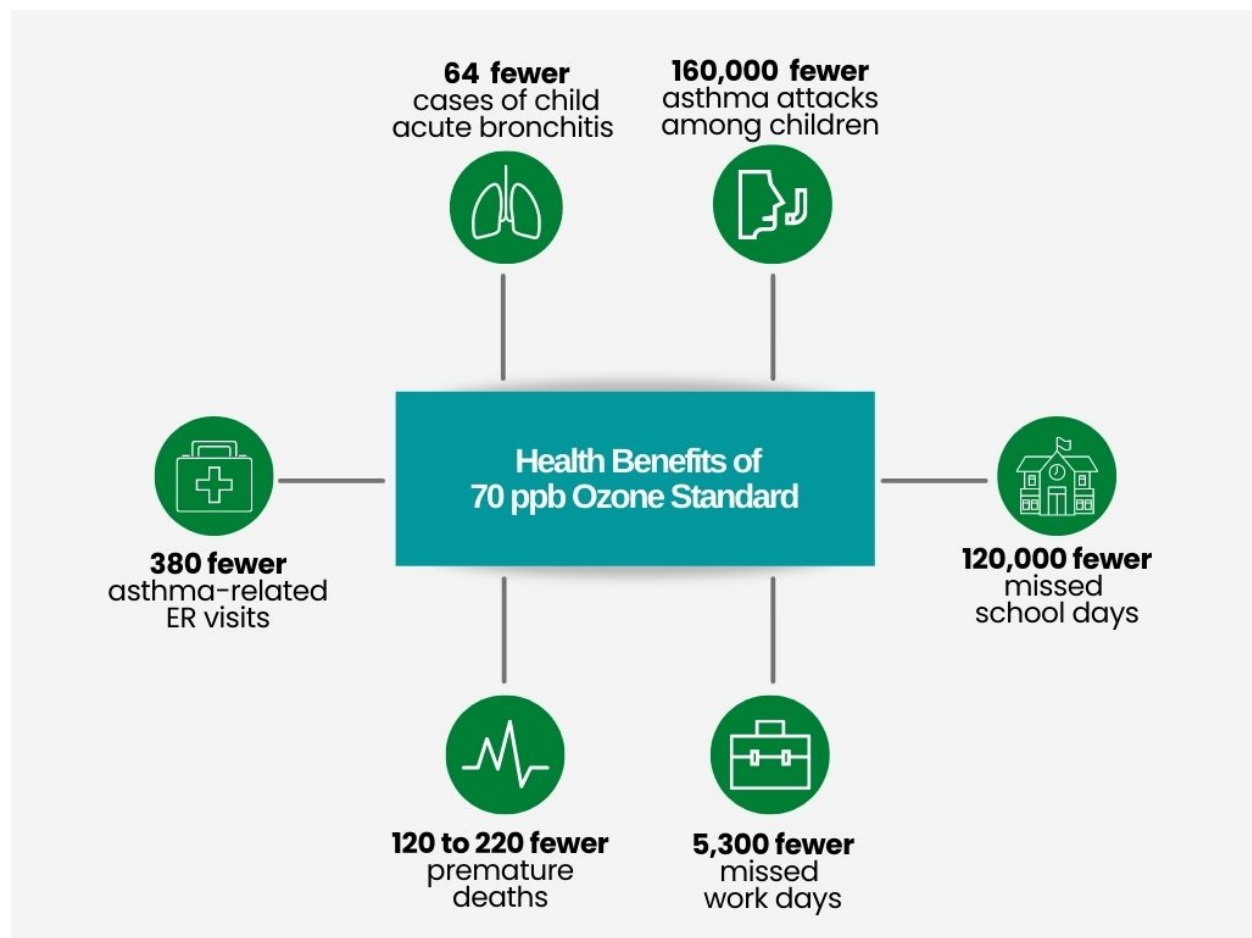
<sup>5</sup> EPA. Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards. (August 2014).

Retrieved from <https://www3.epa.gov/ttn/naaqs/standards/ozone/data/20140829pa.pdf>

<sup>6</sup> EPA. EPA's Final Air Quality Standards for Ground-Level Ozone: By the Numbers. Retrieved from

[https://www.epa.gov/sites/default/files/2015-10/documents/20151001\\_bynumbers.pdf](https://www.epa.gov/sites/default/files/2015-10/documents/20151001_bynumbers.pdf)

Figure 1-2 Public Health Benefits of 70 ppb Ozone Standard in California



### 1.1.2 Other Effects of Ozone

In addition to health impacts, ozone also affects Valley ecosystems and crops. Ozone damages plant cells and deteriorates leaf tissue, which reduces the plants' ability to photosynthesize and produce their own food. Plants respond by growing more leaves, which depletes carbohydrates stored in roots and stems. This weakens plants and makes them susceptible to disease, pests, cold, and drought. Ozone also reduces agricultural yields for many economically important crops, such as grapes, soybeans and cotton, and damages the leaves of trees and other plants, marring the appearance of cities, national parks, forests, and recreational areas.<sup>7</sup>

Ozone can also cause substantial damage to a variety of materials such as rubber, plastics, fabrics, paint, and metals. Over time, ozone exposure progressively damages both the functional and aesthetic qualities of these types of materials and products. The

<sup>7</sup> Journal of Experimental Botany. (October 2011). *How is Ozone Pollution Reducing Our Food Supply?* Retrieved from: <http://jxb.oxfordjournals.org/content/early/2011/10/17/jxb.err317.full.pdf+html>

resulting increases in maintenance, upkeep, and replacement of materials can accumulate to significant economic losses.

## 1.2 ADDRESSING OZONE THROUGH AMBIENT STANDARDS

### 1.2.1 EPA's Ozone NAAQS

CAA Sections (§) 108 and 109 require EPA to set health-based standards for six criteria pollutants, including ozone. EPA periodically reviews existing standards to consider the most recent health studies. EPA is required to conduct these reviews every five years, though some revisions have taken longer than the five years anticipated by the CAA.

The review process for health-based standards starts as the CASAC analyzes available science. CASAC then suggests to EPA a range of revised standards that would protect public health from the adverse effects of air pollution. The EPA Administrator appoints non-EPA experts in the fields of science, engineering, or the social sciences to the CASAC. The objective of the committee is to provide impartial, independent advice to EPA on the technical basis for the standard. As EPA formulates its proposed standard, thousands of peer-reviewed scientific studies are considered. EPA then proposes a standard and makes it available for public review and comments before promulgating the standard. Federal law prohibits EPA from taking into account economic feasibility while setting the NAAQS.

Once a standard is set, EPA designates an area as *attainment* or *nonattainment* based on the most recent three years of air quality data available. For ozone, EPA classifies nonattainment areas as *marginal*, *moderate*, *serious*, *severe*, or *extreme* based on specified air quality parameters. The classification sets the attainment deadline and other planning requirements. Nonattainment areas can request reclassification with adequate documentation.

EPA set the first ozone NAAQS – for 1-hour average concentrations – in 1979. EPA later shifted its regulatory approach to 8-hour average concentrations, setting 8-hour ozone NAAQS in 1997, 2008, and 2015. Of most importance to this plan, EPA issued the final 2015 8-hour ozone NAAQS on October 26, 2015.<sup>8</sup> EPA is currently reviewing the 8-hour ozone NAAQS again, and expects to complete this review in late 2023.<sup>9</sup>

On June 4, 2018 (effective August 3, 2018), EPA designated the San Joaquin Valley as nonattainment for the 2015 8-hour ozone standard, with an Extreme classification and an attainment deadline of 2037.<sup>10</sup>

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<sup>8</sup> National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292-65,468 (October 26, 2015). <https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf>

<sup>9</sup> <https://www.epa.gov/ground-level-ozone-pollution/epa-reconsider-previous-administrations-decision-retain-2015-ozone>

<sup>10</sup> Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards, 83 Fed. Reg. 25776-25848. (2018, June 4). (to be codified 40 CFR Part 81) <https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf>



Table 1-1 summarizes EPA's ozone standards and the major federal and local milestones under these standards.

**Table 1-1 Federal Air Quality Standards and Valley Milestones for Ozone**

Federal Standard	Ozone Standards and Timelines			
	1979 1-hour	1997 8-hour	2008 8-hour	2015 8-hour
	124 ppb (1-hour average)	84 ppb (8-hour average)	75 ppb (8-hour average)	70 ppb (8-hour average)
<b>1979–2003</b>	EPA sets standard (1979)	EPA sets standard (1997)		
<b>2004</b>	SJV adopts attainment plan	EPA finalizes attainment designations and classifications		
<b>2005</b>	<b>EPA revokes standard</b>	EPA issues implementation rule		
<b>2006</b>				
<b>2007</b>	<i>Litigation reinstates portions of implementation requirements under the revoked standard</i>	SJV adopts 2007 Ozone Plan		
<b>2008</b>			EPA sets standard (2008)	
<b>2009</b>				
<b>2010</b>	EPA approves SJV 2004 plan	Midcourse review		EPA proposes to revise standard to 60 or 70 ppb
<b>2011</b>	Ninth Circuit remands plan approval to EPA; EPA finds SJV failed to attain			EPA announces it will not revise the standard
<b>2012</b>	EPA finalizes withdrawal of approval of 2004 1-hour ozone plan.  SJV plan withdrawn	EPA approves SJV's 2007 Ozone Plan	EPA designates SJV as an Extreme nonattainment area	
<b>2013</b>	SJV adopts new 1-hour ozone plan		EPA proposes Implementation Rule	
<b>2014</b>	SJV submits attainment demonstration request based on 2011 – 2013 data	District/CARB revisits 2007 Ozone Plan	RACT Demonstration & Emission Inventory due to EPA	EPA proposes standard at 65-70ppb
<b>2015</b>	SJV submits second attainment demonstration request based on 2012 – 2014 data	<b>EPA revokes standard</b>	EPA finalizes Implementation Rule	EPA sets standard at 70ppb (2015)

Federal Standard	Ozone Standards and Timelines			
	1979 1-hour	1997 8-hour	2008 8-hour	2015 8-hour
	124 ppb (1-hour average)	84 ppb (8-hour average)	75 ppb (8-hour average)	70 ppb (8-hour average)
2016	EPA approves 2013 1-hr Plan, and determines that the Valley has attained the 1-hour standard		SJV adopts 2016 Ozone Plan	
2018				EPA designates SJV as an Extreme nonattainment area  EPA finalizes Implementation Rule
2019			EPA approves portions of 2016 Ozone Plan	
2020				SJV adopts 2020 RACT Demonstration and Emissions Statement Program Certification
2021				
2022		Preliminary 2021 data shows the Valley could meet the 1997 NAAQS early		SJV to adopt 2022 Ozone Plan
2023–2040		Final attainment deadline: 2023	Final attainment deadline: 2031	Final attainment deadline: 2037

Although EPA is prohibited from considering implementation costs when establishing the NAAQS<sup>11</sup>, EPA did provide estimated implementation costs for the 2015 ozone standard, based on illustrative measures. Nationwide (except California), EPA estimates a cost of \$1.4 billion in 2025.<sup>12</sup> In California, EPA estimates a cost of \$800 million post-2025 (although some have suggested EPA's implementation costs are perhaps too low). It is expected that the health benefits of the 2015 ozone standard outweigh the implementation costs.

Reducing ozone to 70 ppb will be a challenging task requiring significant monetary investment, industrial cooperation, and continued work from local air districts and CARB. These efforts and investments will result in incremental public health improvements as the Valley progresses to attainment of the 70 ppb ozone standard by the 2037 deadline.

<sup>11</sup> *Whitman v. American Trucking Associations, Inc.*, 531 US 457 (2001)

<sup>12</sup> EPA. EPA's Final Air Quality Standards for Ground-Level Ozone: By the Numbers. Retrieved from [https://www.epa.gov/sites/default/files/2015-10/documents/20151001\\_bynumbers.pdf](https://www.epa.gov/sites/default/files/2015-10/documents/20151001_bynumbers.pdf)

## 1.2.2 California Ambient Air Quality Standards (CAAQS)

California began setting ambient air quality standards in 1962, before EPA began setting ambient air quality standards in 1971<sup>13</sup>. The California ambient air quality standards are often more stringent and more health-protective than the federal standards. However, California's current 8-hour ozone standard is 70 ppb, which is equivalent to the 2015 8-hour ozone NAAQS. Although SIPs are designed around federal air quality standards rather than the state standards, consistent with California law<sup>14</sup>, these SIPs also contribute to a region's progress towards the state standards.

## 1.3 MEETING FEDERAL SIP REQUIREMENTS

EPA's implementation rules interpret applicable CAA requirements in the context of specific NAAQS, guiding nonattainment areas in their SIP development. Table 1-2 summarizes SIP requirements established by the CAA and EPA's 2018 Ozone Implementation Rule<sup>15</sup>.

**Table 1-2 Summary of Federal Requirements**

General Requirements	Federal CAA	Implementation Rule	Description	2022 Ozone Plan
Modeling and Attainment Demonstration	§182(c)(2)(A)	83 FR 63003	Areas must submit attainment demonstrations within four years of the designation date and be based on photochemical grid modeling or an equivalent effective model.	Chapter 5 Appendix F
Reasonable Further Progress (RFP)	§172(c)(2) §182(c)(2)(B) §182(c)(2)(C)	83 FR 63034-63035	Plans must provide for annual incremental reductions in emissions for ensuring attainment of the NAAQS.	Chapter 6
RACT Demonstration	§172(c)(1)	83 FR 63007-63008	SIP provisions should provide for the implementation of reasonably available control measures (RACM), including, at a minimum, reasonably available control technologies (RACT).	Appendix C
RACM Demonstration	§172(c)(1)	83 FR 63007-63008	The Plan must demonstrate adoption of all reasonably available control measures (RACM) necessary to demonstrate attainment as expeditiously as practicable and to meet any RFP requirements.	Chapter 5 Appendix C

<sup>13</sup> CARB, California Ambient Air Quality Standards, <https://ww2.arb.ca.gov/resources/california-ambient-air-quality-standards>

<sup>14</sup> California Health and Safety Code §39602

<sup>15</sup> 83 FR 62,998, December 6, 2018, available at <https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf>

General Requirements	Federal CAA	Implementation Rule	Description	2022 Ozone Plan
Inspection and Maintenance (I/M) Programs	§182(a)(2)(B)	83 FR 63000-63002	No new Inspection and Maintenance (I/M) programs are currently required for areas designated and classified nonattainment for the 2015 ozone NAAQS.	N/A
Transportation Conformity	§176(c)	83 FR 63024-63025	Transportation conformity is required to ensure that transportation plans, transportation improvement programs (TIPs), and federally supported highway and transit projects are consistent with the purpose of the plan and will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant standard or interim reductions and milestones.	Appendix D
General Conformity	§176(c)	83 FR 63024-63025	Existing General Conformity Regulations remain appropriate for the 2015 ozone NAAQS and became applicable as of August 3, 2019 (one year after the effective date of nonattainment designations for the 2015 NAAQS).	N/A
Contingency Provisions	§172(c)(9) §182(c)(9)	83 FR 63026	Contingency measures must provide for the implementation of specific measures without any further rulemaking action if the area fails to attain or meet a milestone for RFP or attainment.	Chapter 6
New Source Review	§172(c)(4-5)	83 FR 63035 83 FR 63032	The SIP must identify and quantify the emissions of pollutants that will be allowed from the construction and operation of major new or modified stationary sources in the area. The SIP must require permits for new or modified stationary sources.	Appendix I
Emissions Inventory	§172(c)(3) §182(a)(1)	83 FR 63035	The SIP must include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutants in the area.	Appendix B
Ambient Monitoring Requirements	§182(c)(1)	83 FR 63008	The District's 2022 Network Plan demonstrates that the District meets all federal ambient monitoring requirements.	N/A
Clean Fuels	§182(e)(3)	-	Extreme nonattainment areas must impose requirements for new, modified, and existing electric utility and industrial and commercial boilers that emit more than 25 tons per year of NOx. The District already complies with this requirement and there is no need to include additional control measures in this Plan.	N/A
VMT Offsets and Transportation Control Measures	§182(d)(1)(A)	-	Severe and Extreme ozone nonattainment areas must offset growth in emissions due to growth in vehicle miles travelled (VMT) through implementation of transportation control strategies and transportation control measures (TCMs).	Appendix D

General Requirements	Federal CAA	Implementation Rule	Description	2022 Ozone Plan
Other Measures	§172(c)(6)	83 FR 63028	The SIP must include enforceable emission limitations, other control measures and techniques, and compliance schedules to provide for attainment by the applicable deadline.	Chapter 3

## 1.4 GUIDING PRINCIPLES

This *2022 Ozone Plan* follows the following Guiding Principles established by the Governing Board:

1. With public health as our number one priority, meet the national ambient air quality standards as expeditiously as practicable.
2. Use sound science as the plan's foundation. This includes efforts to assess public health impacts, predict future air quality, determine the extent of emissions reductions needed, and evaluate the availability, effectiveness, and feasibility of emission control measures.
3. Consider the Valley's unique challenges and develop cost-effective strategies that provide adequate operational flexibility and minimize costs to Valley businesses.
4. Consider all opportunities for timely, innovative, and cost-effective emission reductions. Consider traditional regulations, but look beyond traditional regulations to incorporate monetary incentives, policy initiatives, guidance documents, and outreach, including working with cities and counties to incorporate attainment plan principles into their general plans.
5. Given that over 80% of the Valley's NO<sub>x</sub> emissions originate from mobile sources, provide a balanced approach to reducing mobile and stationary source emissions.
6. Devise and implement reasonable strategies that involve the public in reducing emissions.
7. Prioritize strategies that contribute to the District's Health-Risk Reduction Strategy by achieving the greatest public health benefits.
8. Prioritize strategies that contribute to attainment of multiple air quality standards.
9. Recognize that there is no "silver bullet" for attainment. In this plan and upcoming attainment plans, every sector—from the public through all levels of government, businesses, and industry—must continue to reduce emissions.
10. Compel state and federal agencies to provide adequate resources and regulatory assistance to reduce emissions from sources under their jurisdiction.
11. Address air pollutant transport issues with air districts neighboring the Valley.

12. Provide ample opportunity for public participation and feedback in the design and implementation of these plans. Utilize the planning process to also inform participants of the Valley's air quality challenges and successes as well as actions that can be taken to improve Valley air quality.
13. Build off of the successes of the District's Technology Advancement Program by identifying further opportunities to continue fostering technology advancement, thus paving the way for new emissions control devices to be increasingly used in the San Joaquin Valley.

## 1.5 PUBLIC PROCESS

This *2022 Ozone Plan* was prepared through an involved public process that provided multiple opportunities for the public and interested stakeholders to offer comments and suggestions, as summarized in Table 1-3. This process also included updates at District Governing Board meetings, Citizen Advisory Committee (CAC) meetings, and Environmental Justice Advisory Group (EJAG) meetings. During these updates, meetings, and workshops, the public could provide comment, ask questions, or request additional information. The District also accepted written comments throughout development of this plan.

**Table 1-3 2022 Ozone Plan Meetings**

Date	Meeting Summary
Mid-2018 through 2022	Monthly updates to the District's Governing Board, Citizen's Advisory Committee, and Environmental Justice Advisory Committee meetings
4/27/2021	Public workshop to present and receive comments on the development of the upcoming plan for the 2015 8-hour ozone standard.
7/13/2021	Technical working group to present and receive comments on the emissions inventory and modeling process in the development of the upcoming plan for the 2015 8-hour ozone standard.
10/12/2021	Technical working group held by the District and CARB to present and receive comments on analyses pertaining to stationary and area sources and their ongoing emissions reduction strategies, reasonably available control measure requirements for the <i>2022 Ozone Plan</i> , and the State SIP Strategy and ongoing mobile source emissions reduction strategies.
3/7/2022	Technical working group held by the District and CARB to present and receive comments on the State SIP Strategy and technical analysis under development for the <i>2022 Ozone Plan</i> .
5/24/2022	Publication of draft chapters and appendices of the <i>2022 Ozone Plan</i> on the District website and paper copies made available upon request for public review and comment, with an associated comment period.
6/1/2022	Public workshop held by the District and CARB to present and receive comments on initial modeling results in addition to initial draft chapters and appendices of the <i>2022 Ozone Plan</i> .
10/14/2022	Publication of Draft <i>2022 Ozone Plan</i> on the District website and paper copies made available upon request for public review and comment, with an associated comment period.
10/27/2022	Public workshop held by the District and CARB to present and receive comments on the Draft <i>2022 Ozone Plan</i> .
11/15/2022	Publication of the Proposed <i>2022 Ozone Plan</i> on the District website and paper copies made available upon request for public review and comment, with a comment period.
12/15/2022	Public hearing for the adoption of the <i>Proposed 2022 Ozone Plan</i> with opportunities for public comment.

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