

# ***2023 PM2.5 Plan* for Attainment of the Federal 2012 Annual PM2.5 Standard**

## **Public Workshop**

May 11, 2023

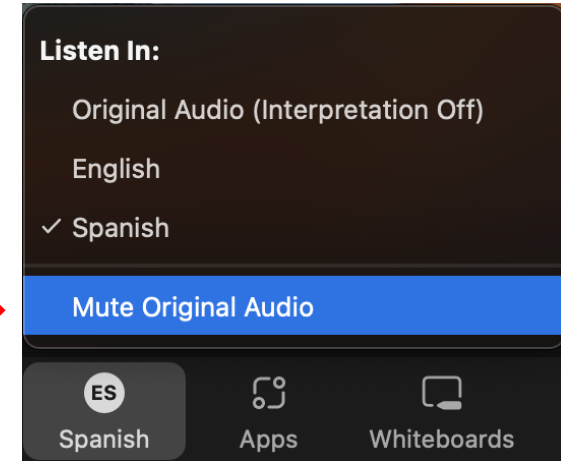
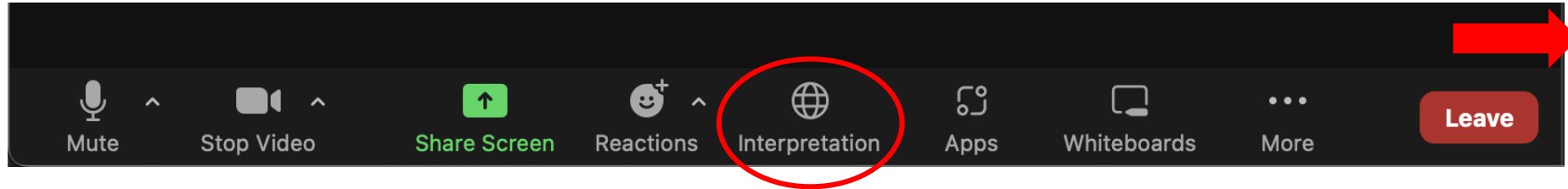
[webcast@valleyair.org](mailto:webcast@valleyair.org)

# How to Listen to the Webinar in Spanish

## Cómo Escuchar la Interpretación Español

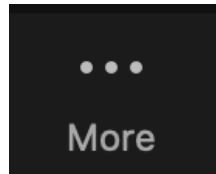
### En Una Computadora

1. En los controles de la reunión o el seminario web, seleccione el **icono de interpretación**, que parece a un mundo en la parte debajo de la pantalla.
2. Seleccione español y silencie el audio original.



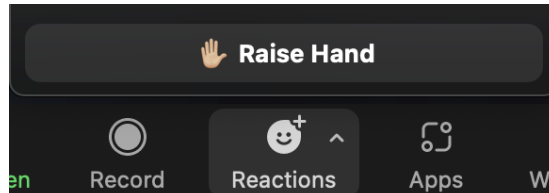
### En Un Teléfono o Tableta

1. Seleccione los tres puntos para ver más opciones, seleccione interpretación y siga las mismas instrucciones de arriba.



### Para Hacer una Pregunta o un Comentario

1. Seleccione el icono de reacciones para levantar su mano



# 2012 PM2.5 Standard

EPA established  
2012 PM2.5  
standard January 15,  
2013 (12 µg/m<sup>3</sup>)

- District designated Moderate nonattainment in 2015
- District submitted *2016 PM2.5 Plan* with request for reclassification to Serious
- EPA approved Moderate Plan and reclassified District to Serious effective Dec. 2021
- Serious Plan due to EPA Dec. 31, 2023

*2018 PM2.5 Plan*  
addressed 1997,  
2006 and 2012  
PM2.5 standards,  
earlier than required  
for 2012 standard

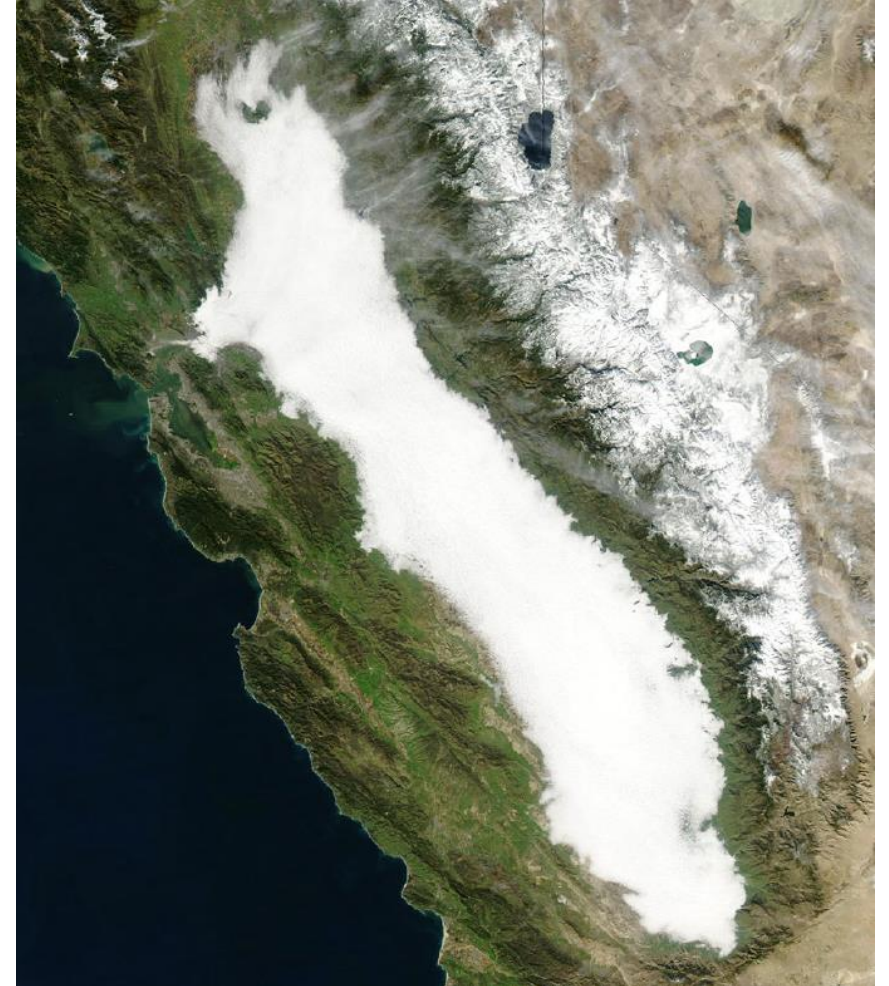
- EPA proposed full approval of Serious Plan for 2012 PM2.5 standard in Dec. 2021
- However, EPA reversed decision and proposed disapproval in Oct. 2022
- In response to EPA reversal, CARB withdrew Plan with District concurrence in Oct. 2022

District/CARB  
updating Plan for  
2012 standard

- Updated Plan will rely on *2018 PM2.5 Plan*, and include revisions as necessary incorporating latest guidance, feedback from EPA in latest proposals, and meet federal Clean Air Act requirements
- Plan may also include additional analyses for 2006 PM2.5 standard to address EPA comments

# Valley's Air Quality Challenges

- Valley's challenges in meeting federal air quality standards unmatched due to unique combination of topography and meteorology
- Valley faced with variety of challenges including role as major goods movement corridor, high population growth, pollution transport from other areas, wildfires, drought
- Conditions require substantially greater emissions reductions in Valley to meet clean air targets than other regions



# What is PM2.5?

Particles with a diameter of 2.5 microns and smaller

A mixture of solid particles and liquid droplets in the air

Emitted directly or formed indirectly through chemical reactions between gases

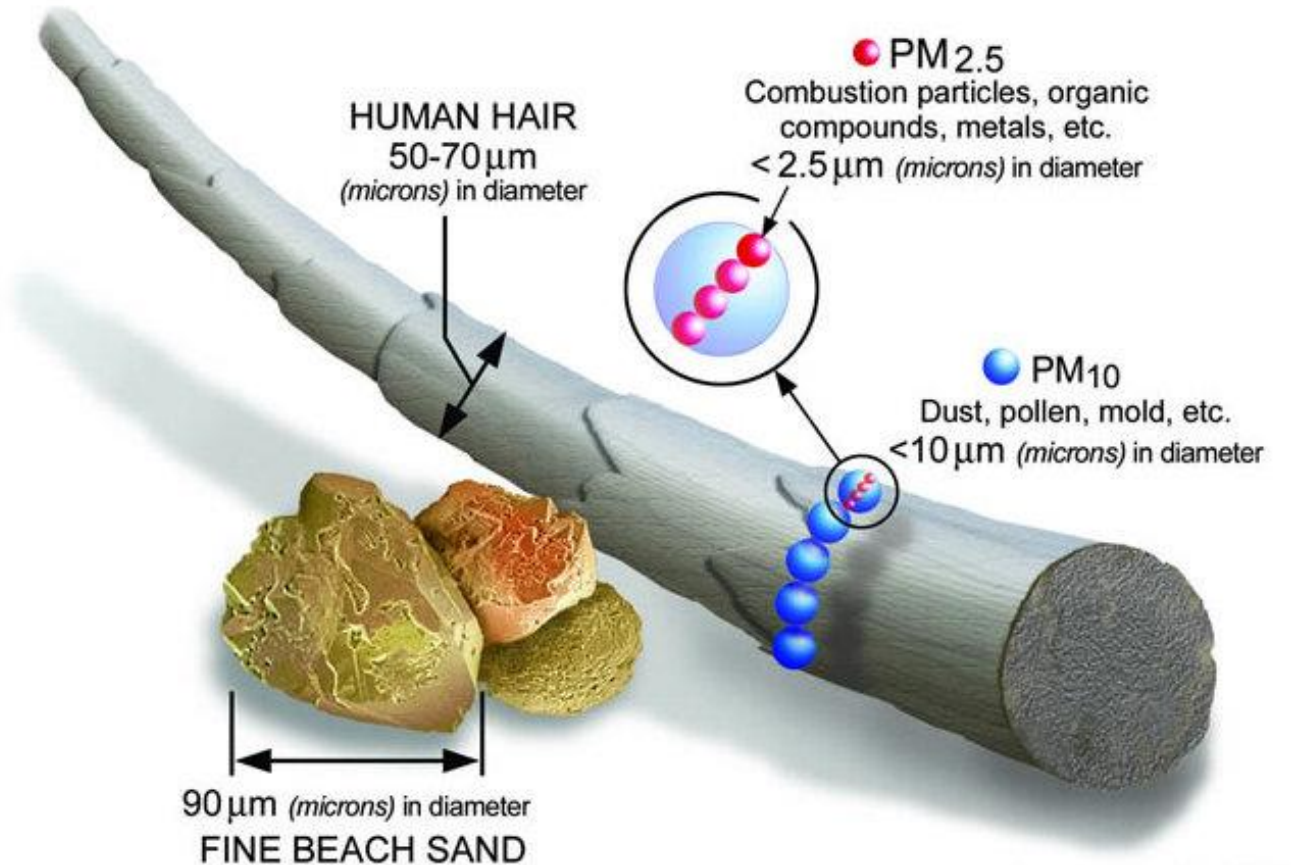
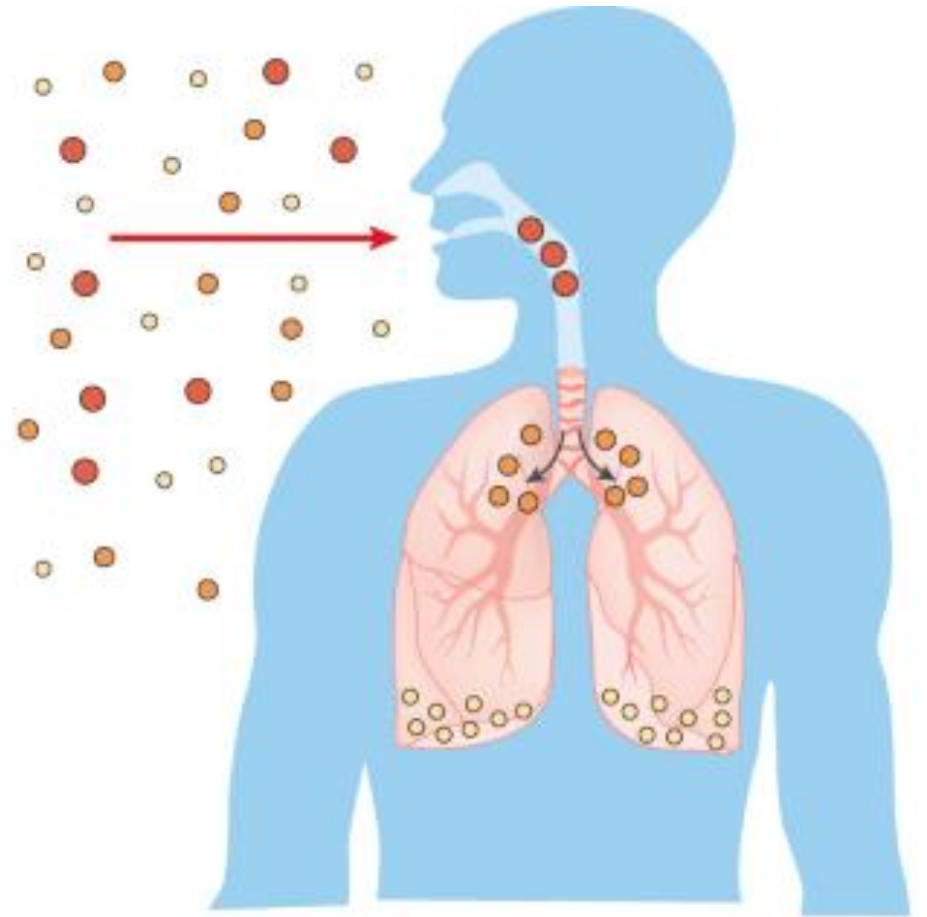


Image courtesy of the U.S. EPA

# Health Effects of PM2.5

- Premature death in people with heart or lung disease
- Aggravated asthma
- Increased respiratory symptoms – irritation of the airways, coughing, difficulty breathing
- Decreased lung function in children
- Irregular heartbeat and nonfatal heart attacks
- Increased respiratory and cardiovascular hospitalizations
- Chronic bronchitis
- Lung cancer

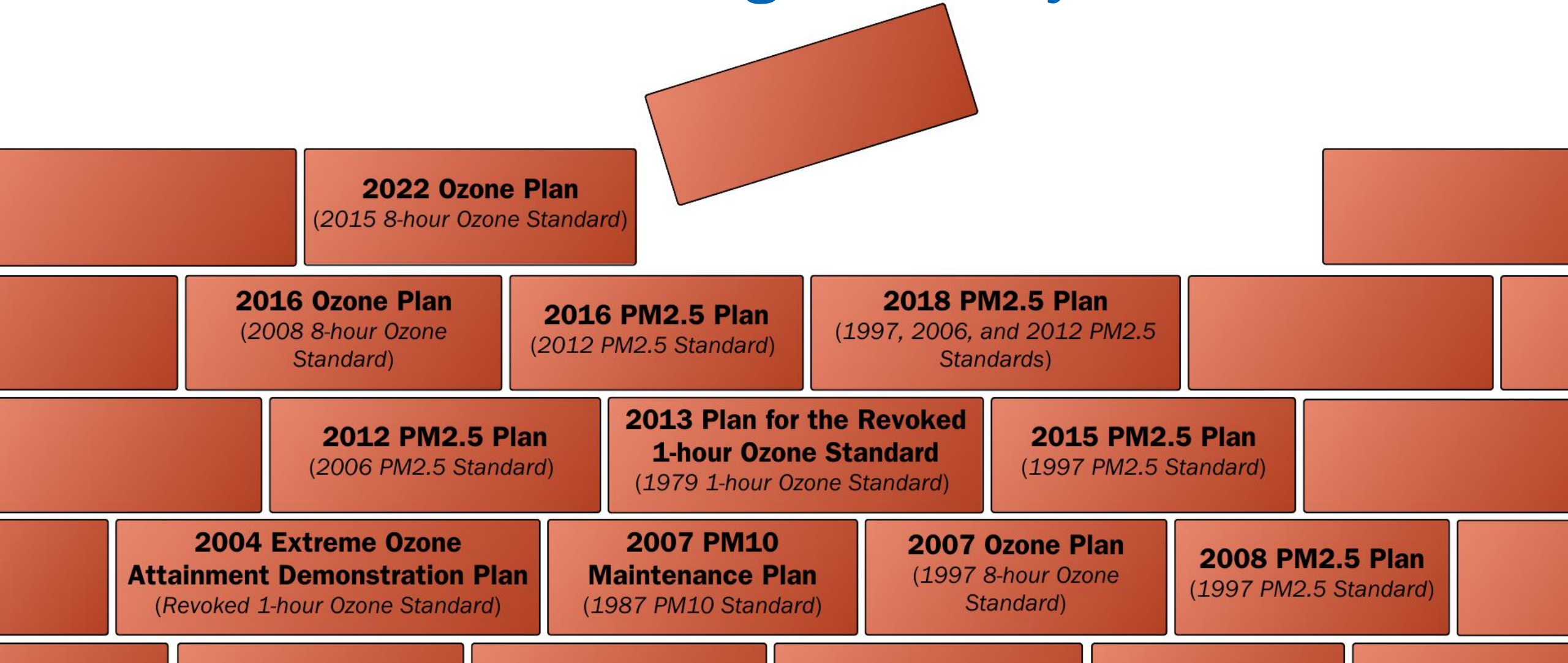


# Protecting Public Health

*The District's mission is to improve health and quality of life for all Valley residents through efficient, effective and entrepreneurial air quality management strategies*

- District shall continue to strive to protect health of Valley residents through efforts to meet health-based state and federal ambient air-quality standards, based on science and prioritized where possible using health-risk reduction strategies
- *2023 PM2.5 Plan* will demonstrate District/CARB's ongoing efforts to improve air quality in Valley through a comprehensive strategy
- Through this public process, District and CARB will evaluate health benefits of Plan strategy

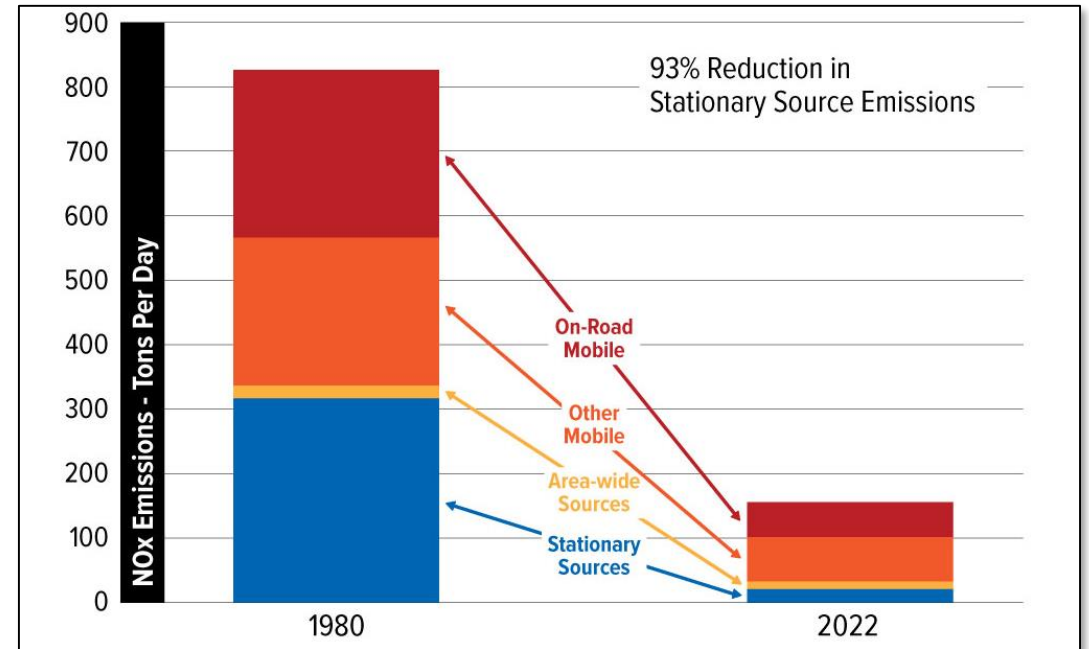
# Foundation for 2023 PM2.5 Plan to Build On Strategies Already in Place



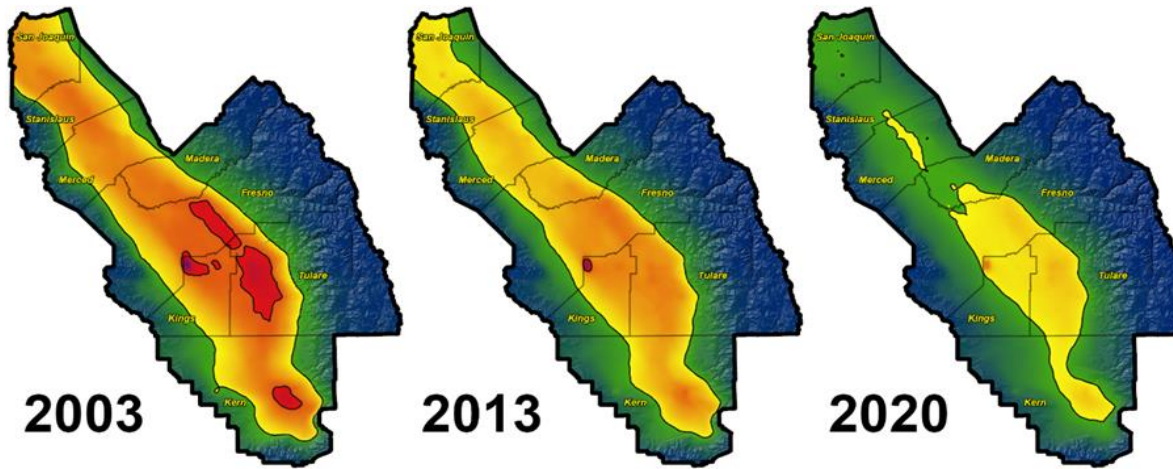


# Adopted Controls Are Improving Air Quality

- District has adopted numerous attainment plans and air quality control strategies to address federal standards
  - Stationary source ozone and PM-forming NOx emissions reduced by over 90% through hundreds of regulatory actions
- CARB has adopted numerous mobile source emissions controls
- District/CARB combined efforts represent nation's toughest emissions control program
- Strong incentive programs (\$5 billion in public/private investment)
- Through significant clean air investments, Valley continues to make major improvements with respect to air quality
- While significant improvements have been made, more reductions needed



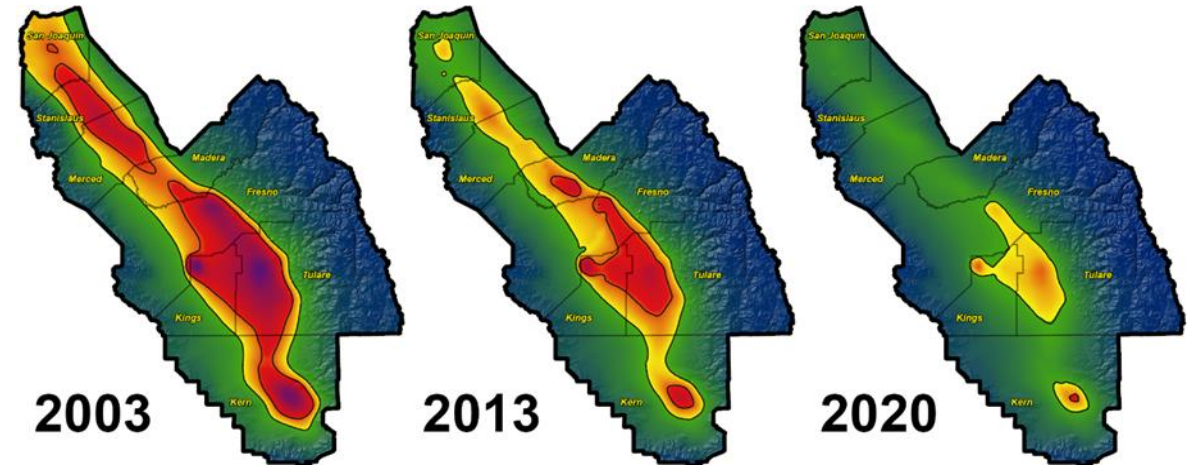
# Progress in Improving Valley PM2.5



24-hour Average Design Value ( $\mu\text{g}/\text{m}^3$ )



Attainment of 2006 and 1997 Standards      Attainment of 1997 Standard Only      Not in Attainment of Either Standard



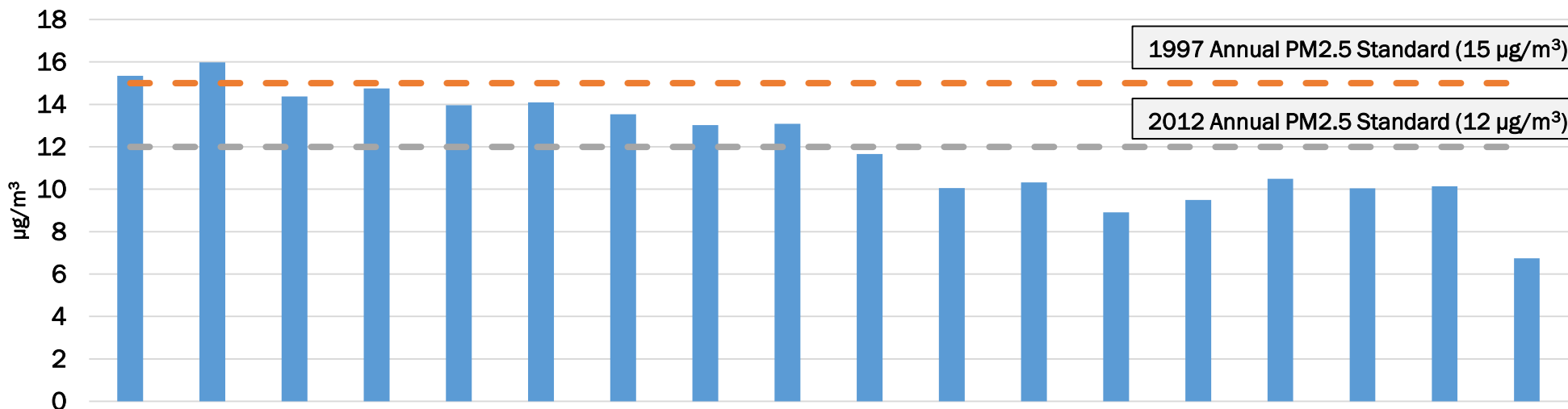
Annual Average Design Value ( $\mu\text{g}/\text{m}^3$ )



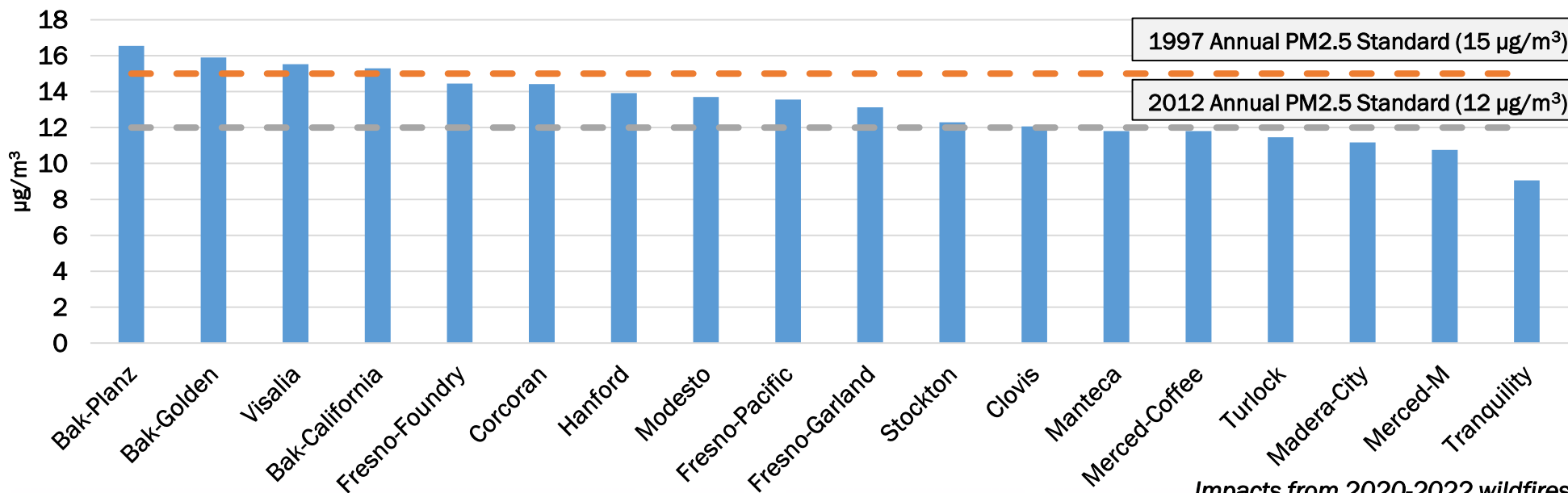
Attainment of 2012 and 1997 Standards      Attainment of 1997 Standard Only      Not in Attainment of Either Standard

# Progress Toward Attainment of 2012 Standard

2022 PM2.5 Annual Average by Site



2020-22 PM2.5 Design Value by Site

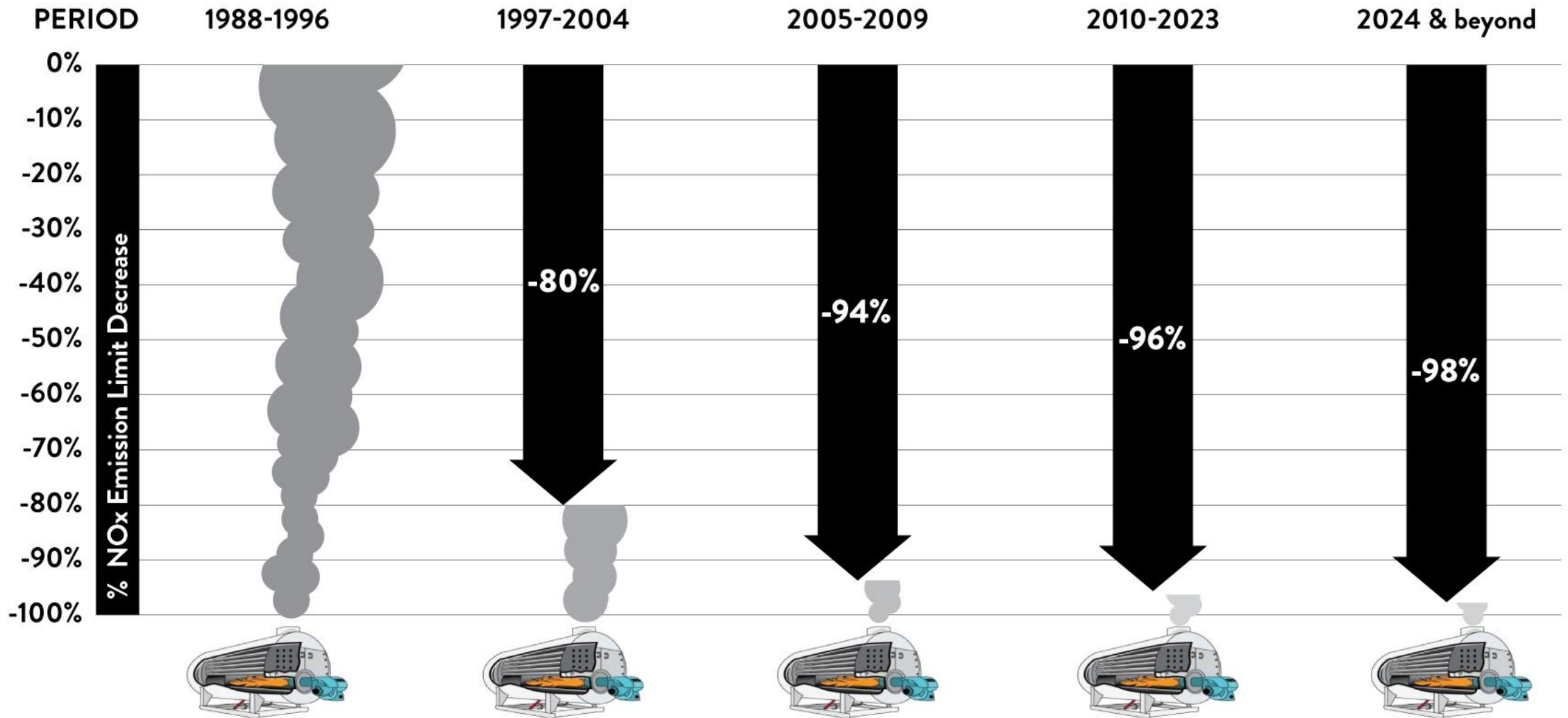


Impacts from 2020-2022 wildfires removed

# Recent Regulatory Actions Under Plan Commitments

Measure	Status
Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters)	Adopted Jun. 2019
Rule 4311 (Flares)	Adopted Dec. 2020
Rules 4306/4320 (Boilers, Steam Generators, Process Heaters)	Adopted Dec. 2020
Rule 4692 (Commercial Underfired Charbroiling)	Strategy Adopted Dec. 2020
Rule 4103 (Ag Burn Phase-out)	Adopted Jun. 2021
Rule 4702 (Internal Combustion Engines)	Adopted Aug. 2021
Burn Cleaner Incentive SIP Measure	Adopted Nov. 2021
Rule 4354 (Glass Melting Furnaces)	Adopted Dec. 2021
Rule 4352 (Solid Fuel Boilers, Steam Generators, Process Heaters)	Adopted Dec. 2021
Rule 4550 (Conservation Management Practices)	Rule development ongoing
Rule 4401 (Steam-Enhanced Crude Oil Production Wells)	Rule development ongoing
Rule 4409 (Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities)	Rule development ongoing
Rule 4455 (Components at Petroleum Refineries, Gas Liquids, Processing Facilities, and Chemical Plants)	Rule development ongoing
Rule 4623 (Storage of Organic Liquids)	Rule development ongoing
Rule 4624 (Transfer of Organic Liquid)	Rule development ongoing
Rule 4402 (Crude Oil Production Sumps)	Rule development ongoing

# Example: Significant Emissions Reductions from Industrial Boilers



# Federal Clean Air Act Requirements

Attainment  
Demonstration

Reasonable Further  
Progress (RFP)

Quantitative  
milestones

Contingency  
Measures

Precursor  
Demonstration

Requirements for  
Major Sources

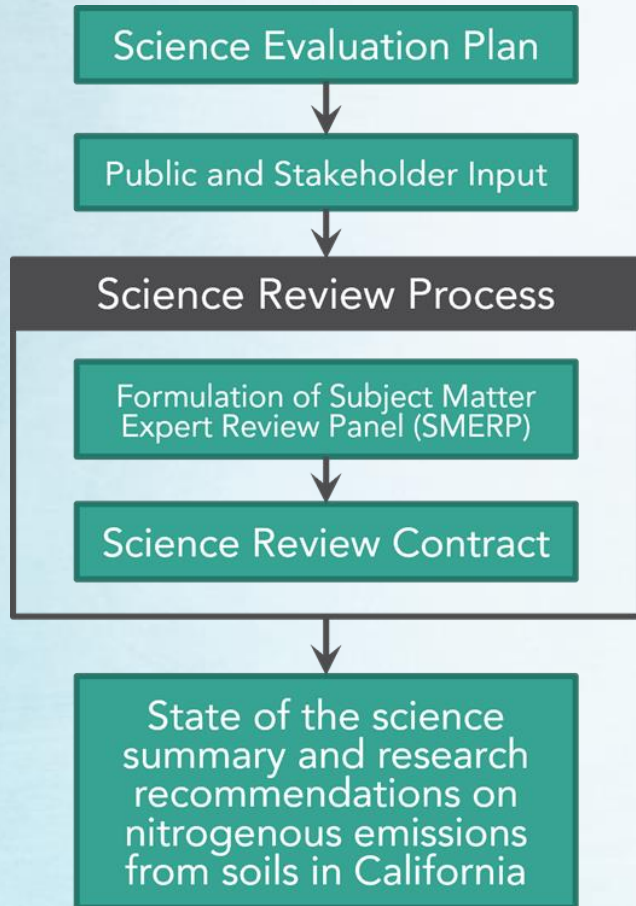
Emissions Inventory

Best Available Control  
Measures (BACM)/  
Most Stringent  
Measures (MSM)



# CARB SIP Elements

# Soil NOx Emission Estimate Update



- CARB plans to update the category ensuring specificity to California agriculture
- Process to be kicked off shortly
- Goal for independent Peer-Review contract by end of 2023
  - State of the science on nitrogenous emissions from soils
  - Future research recommendations
- Updated emissions available for new PM standard SIPs



# CARB Precursor Modeling

# Bakersfield – California Ave Base Year PM<sub>2.5</sub> Composition

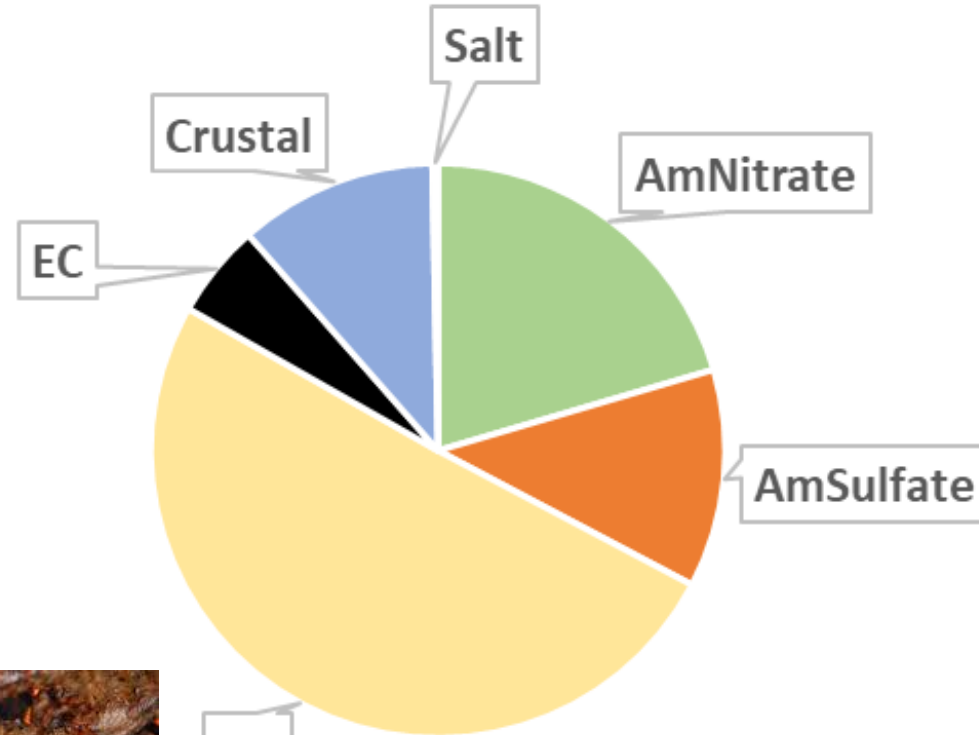
Dust



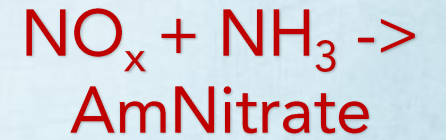
EC



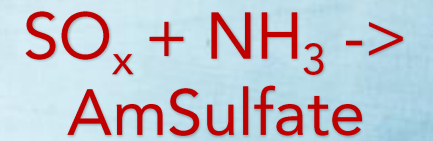
OC



NO<sub>x</sub>



NH<sub>3</sub>



SO<sub>x</sub>



# Air Quality Modeling

Chemistry

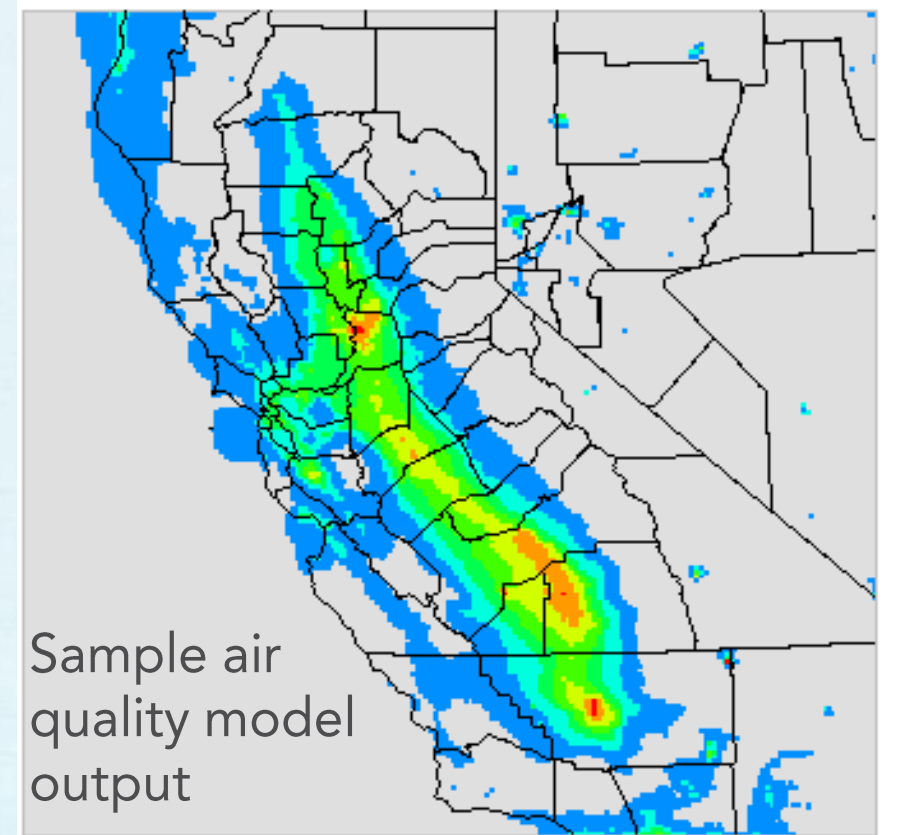
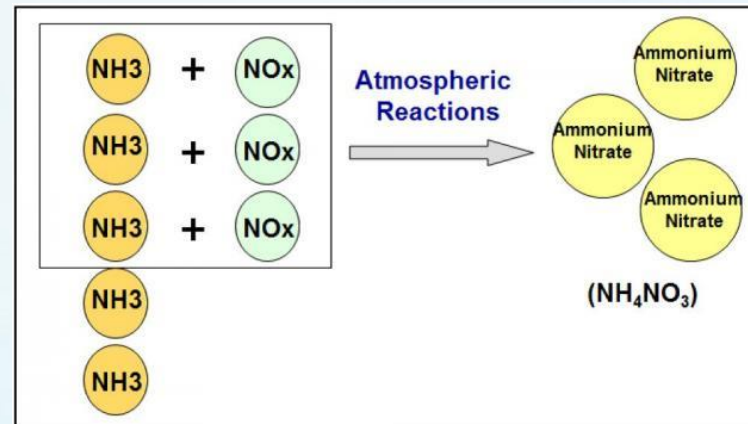
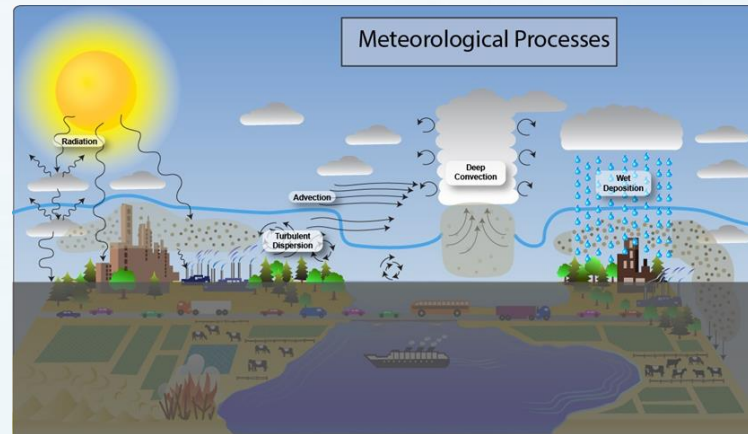
Meteorology/  
Transport

Air Quality  
(PM<sub>2.5</sub>)

Emissions/  
Boundary  
Conditions

## Precursor Sensitivity Analysis:

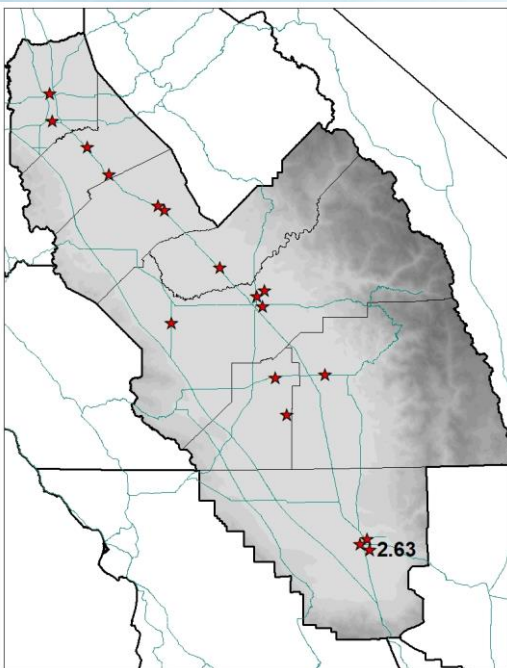
- Reduce precursor emissions in the SJV by 30%
- Calculate how PM<sub>2.5</sub> changes from emission reductions



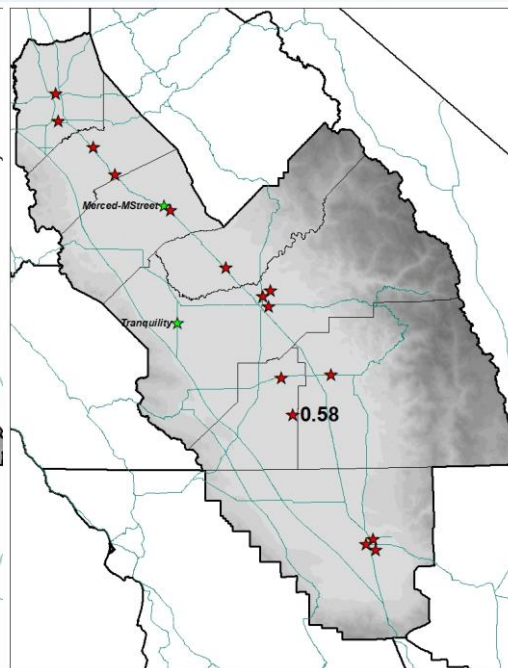
Sample air quality model output

# Preliminary sensitivity analysis results based on 30% anthropogenic emission reductions in SJV

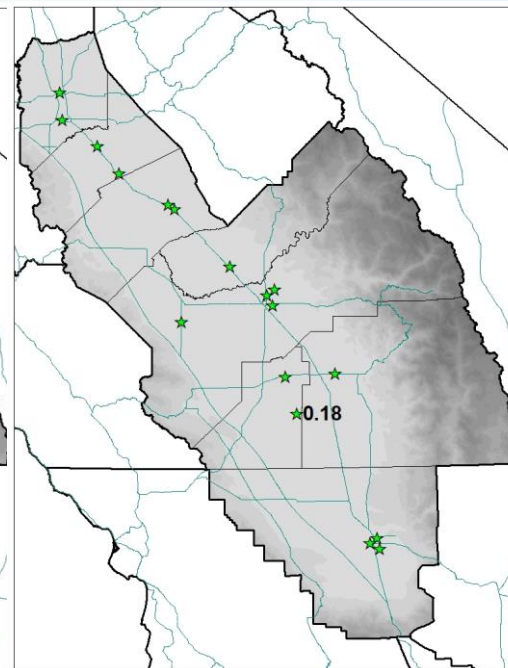
PM<sub>2.5</sub>



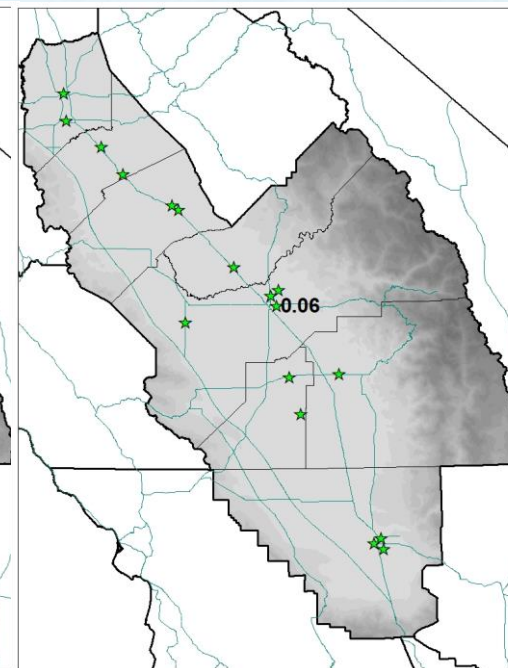
NO<sub>x</sub>



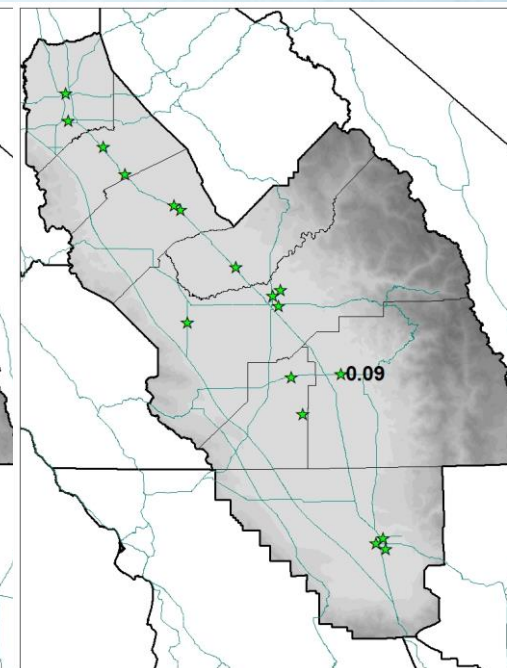
NH<sub>3</sub>



ROG



SO<sub>x</sub>



- ★ Sites with change of DV ≥ 0.2 ug/m<sup>3</sup>
- ★ Sites with change of DV < 0.2 ug/m<sup>3</sup>

- The biggest change of DV in each case is labeled next to the site

# CARB MSM Analysis

# Shared Responsibility

## FEDERAL



### US EPA

Sets & enforces national air quality standards.  
Regulates interstate transportation.



Trains



Planes



Ships

Approves State Implementation Plans.

## STATE



### CALIFORNIA AIR RESOURCES BOARD

Regulates mobile sources of air pollution,  
greenhouse gases & consumer products.



Cars



Trucks



Buses

Develops State SIP Strategy,  
and works with local air districts to  
develop & adopt SIPs  
for all nonattainment areas.

## LOCAL



### Local Air Districts

Regulates stationary & local  
sources of air pollution.



Fireplaces



Factories



Refineries



Power plants

Develops & adopts State Implementation  
Plans for nonattainment areas  
within their District.

# State Control Measure Analysis

- Analysis of CARB's measures for the Most Stringent Measure (MSM) requirements
  - Currently being implemented in other States
  - Includes measure suggestions during public process
  - Assesses stringency and feasibility of control measures
- CARB has previously demonstrated MSM
- Complements District MSM Analysis

# California's Unique Authority

- The Clean Air Act gives CARB unique authority to regulate mobile sources beyond EPA
- Other states can elect to adopt California standards
- CARB continues to adopt more stringent rules
- California's mobile emissions standards and overall mobile source program are MSM



# MSM Requirements

Step  
1

- Identify the sources of direct PM2.5 emissions and PM2.5 precursor emissions (emissions inventory)

Step  
2

- Identify all potential control measures for the sources identified in Step 1 (CARB current/proposed measures & measures in other States)

Step  
3

- Assess the stringency and feasibility of the potential control measures identified in Step 2, and public measure suggestions

Step  
4

- Adopt and implement feasible control measures identified in Step 3 to satisfy MSM requirements

# Step 1: Identify Sources

Mobile Source Emissions Inventory	2017		2030	
	NO <sub>x</sub>	Direct PM <sub>2.5</sub>	NO <sub>x</sub>	Direct PM <sub>2.5</sub>
On-Road Light-Duty Vehicles	13.7	1.2	4.1	1.3
On-Road Heavy-Duty Vehicles	84.4	3.7	16.6	2.3
Off-Road Equipment	83.9	4.8	38.0	2.2
Primarily Federal and International	15.7	1.6	21.2	2.1
Aircraft	2.5	1.3	4.6	1.8
Railroad	13.1	0.3	16.5	0.4
<b>Mobile Source Total</b>	<b>197.7</b>	<b>11.3</b>	<b>79.8</b>	<b>7.9</b>

# Step 2: Identify Control Measures

Example: On-Road Heavy-Duty Vehicles

	Most Stringent Program	Summary of Findings	Other Jurisdictions Analyzed
In-Use Controls - Fleet Rules	CARB Truck & Bus	MSM: Most comprehensive and stringent mandatory heavy-duty fleet turnover rule in the nation	No other state requires diesel particulate filters (DPF) and MY 2010+ equivalent engines
	CARB Advanced Clean Fleets	MSM: Accelerates ZEV adoption by setting zero-emission requirements for fleets	No other state has zero-emission requirements for HD vehicle fleets
	CARB Zero-Emission Trucks	MSM: Would accelerate the number of ZE trucks beyond existing measures (including the ACF regulation)	No other state has zero-emission requirements for HD vehicle fleets
	CARB Solid Waste Collection Vehicle	MSM: Limits PM emissions at appx the same level of stringency. CARB is overall more stringent because SWCV's with 2007-2009 engines were also subject to 2010 engine requirements under Truck and Bus	NYC requires that at least 90% of the ~8,300 SWCVs meet EPA's 2007 diesel <sub>27</sub> standard for PM

# Step 3(a): Evaluate Stringency

Example: On-Road Heavy-Duty Vehicles

	Measure	Implementation Begins	Conclusion
In-Use Controls - Fleet Rules	CARB Truck & Bus	Ongoing	MSM
	CARB Advanced Clean Fleets	2024	MSM
	CARB Zero-Emissions Truck (Future measure)	2030	MSM
	CARB Solid Waste Collection Vehicle	Ongoing	MSM
	CARB Public Agency/Utility	Ongoing	MSM
	CARB Innovative Clean Transit	2023	MSM
	CARB ZE Airport Shuttle	2027	MSM

# Step 3(b): Evaluate Feasibility

## Example: On-Road Heavy-Duty Vehicles

Measure	Summary of Feasibility
On-Road Heavy-Duty Vehicle Useful Life Regulation (Public Measure Suggestion)	Developed into Zero Emission Trucks measure, which would similarly target the increase in the number of heavy-duty ZEVs and cleaner engines as soon as possible, and reduce emissions from fleets not affected by ACF
Additional Incentive Programs: Zero-Emissions Trucks (Public Measure Suggestion)	Developed into a potential element of the Zero Emission Trucks measure (incentive programs such as supporting local zero-emission zones and/or differentiated registration fees)
Indirect Source Rule (Public Measure Suggestion)	CARB staff have included as a potential element of the Zero Emission Trucks measure, but due to feasibility and approvability issues, this suggestion has not yet been formally organized into a SIP control measure

# Step 4: Adopt & Implement Controls

CARB's control program includes all measures identified as MSM

- Most measures are adopted and being implemented, or will soon begin implementation
- Remaining measures were included in the 2022 State SIP Strategy with commitments to propose to CARB Board for consideration prior to 2030

# Preliminary Conclusion

CARB control program meets MSM requirements for the Valley

Category	Type of Controls	Conclusion
On-road Light-Duty	New Vehicle/Engine Standard	MSM
	In-use Emissions Control (fleet/testing/idling)	MSM
	Fuels	MSM
On-road Medium & Heavy-Duty	New Vehicle/Engine Standard	MSM
	In-use Emissions Control (fleet/testing/idling)	MSM
	Fuels	MSM
Off-Road	New Vehicle/Engine Standard	MSM
	In-use Emissions Control (fleet/testing/idling)	MSM
	Fuels	MSM
Space/Water Heaters	Emissions Standard	MSM

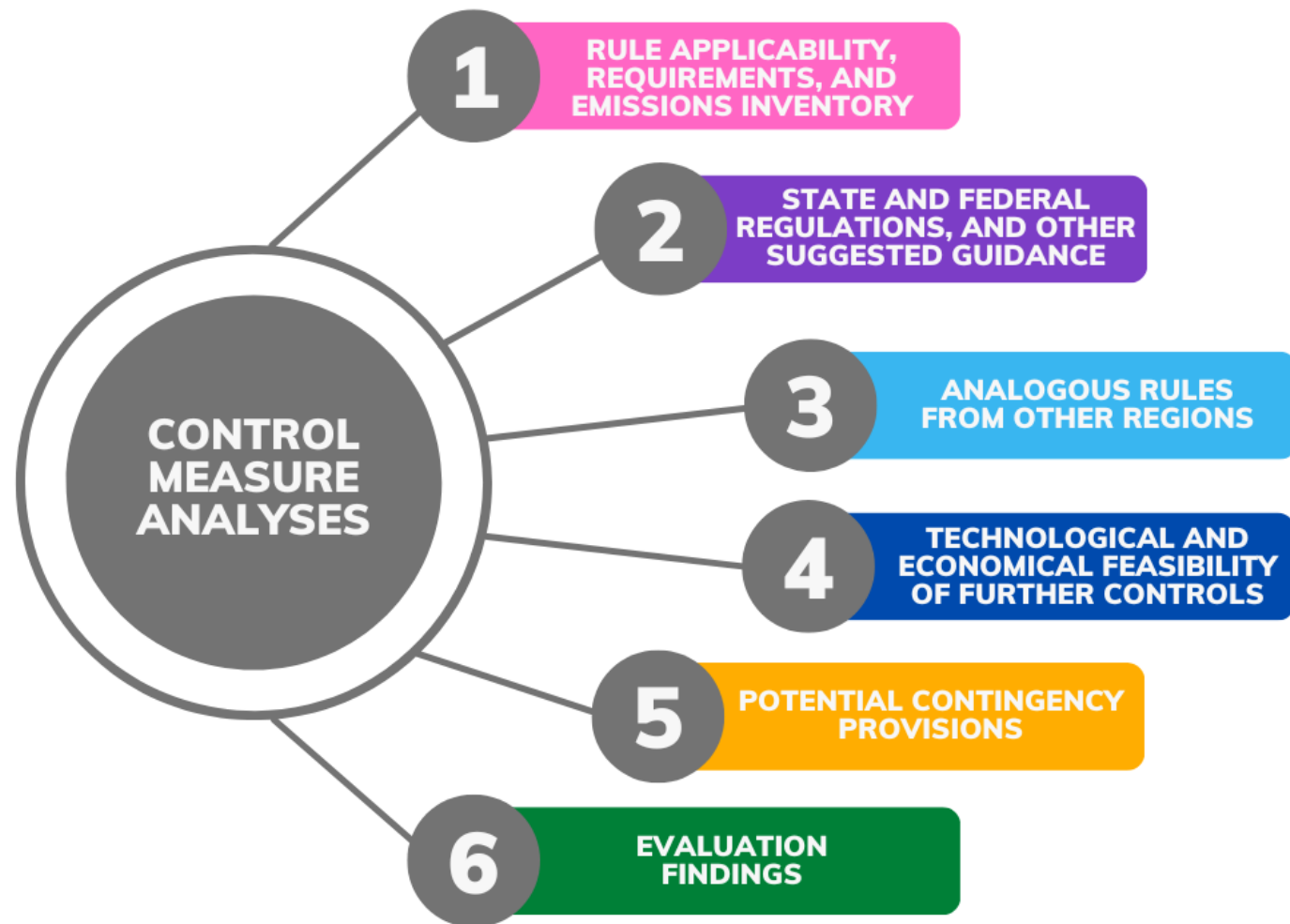
# Next Steps on State Analysis

- CARB continues to seek comments
  - Contact information: [SIPPlanning@arb.ca.gov](mailto:SIPPlanning@arb.ca.gov)
- Incorporate comments received
- Release draft MSM analysis for review



# District BACM/MSM Control Measure Analyses

- Plan must provide for implementation of all BACM, including best available control technologies (BACT), plus MSM included in attainment plan of any state that can be feasibly implemented in the area
- District conducting robust analyses for all PM2.5 and NOx rules
- Ensures implementation of maximum degree of emissions reductions achievable, considering technological and economic feasibility
- EPA has previously approved that District measures meet MSM
- Preliminary analysis shows that District measures continue to meet MSM



# Step 1: District Rules Under BACM/MSM Evaluation

District Rule	PM	NOx	Adopted/ Last Amended
<b>4103</b> Open Burning	x	x	6/17/2021
<b>4104</b> Reduction of Animal Matter	x		12/17/1992
<b>4106</b> Prescribed Burning and Hazard Reduction Burning	x	x	6/21/2001
<b>4203</b> PM Emissions from Incineration of Combustible Refuse	x		12/17/1992
<b>4204</b> Cotton Gins	x		2/17/2005
<b>4301</b> Fuel Burning Equipment	x	x	12/17/1992
<b>4306</b> Boilers, Steam Generators, and Process Heaters – Phase 3	x	x	12/17/2020
<b>4307</b> Boilers, Steam Generators, and Process Heaters 2.0 to 5.0 MMBtu/hr	x	x	4/21/2016
<b>4308</b> Boilers, Steam Generators, and Process Heaters 0.075 to <2.0 MMBtu/hr	x	x	11/14/2013
<b>4309</b> Dryers, Dehydrators, and Ovens	x	x	12/15/2005
<b>4311</b> Flares	x	x	12/17/2020

# Step 1: District Rules Under BACM/MSM Evaluation (cont'd)

District Rule	PM	NOx	Adopted/ Last Amended
<b>4313</b> Lime Kilns		x	3/27/2003
<b>4320</b> Boilers, Steam Generators, and Process Heaters >5.0 MMBtu/hr	x	x	12/17/2020
<b>4352</b> Solid Fuel Fired Boilers, Steam Generators, and Process Heaters	x	x	12/16/2021
<b>4354</b> Glass Melting Furnaces	x	x	12/16/2021
<b>4550</b> Conservation Management Practices	x		8/19/2004
<b>4692</b> Commercial Charbroiling	x		6/21/2018
<b>4702</b> Internal Combustion Engines	x	x	8/19/2021
<b>4703</b> Stationary Gas Turbines	x	x	9/20/2007
<b>4901</b> Wood Burning Fireplaces and Wood Burning Heaters	x	x	6/20/2019
<b>4902</b> Residential Water Heaters	x	x	3/19/2009
<b>4905</b> Natural Gas-Fired, Fan-Type Central Furnaces	x	x	12/16/2021

# Step 1: District Rules Under BACM/MSM Evaluation (cont'd)

District Rule	PM NOx	Adopted/ Last Amended
<b>8011</b> General Requirements	x	8/19/2004
<b>8021</b> Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities	x	8/19/2004
<b>8031</b> Bulk Materials	x	8/19/2004
<b>8041</b> Carryout and Trackout	x	8/19/2004
<b>8051</b> Open Areas	x	8/19/2004
<b>8061</b> Paved and Unpaved Roads	x	8/19/2004
<b>8071</b> Unpaved Vehicle/Equipment Traffic Areas	x	9/16/2004
<b>8081</b> Agricultural Sources	x	9/16/2004
<b>9510</b> Indirect Source Review	x	x
		12/21/2017

# Step 2: State and Federal Regulations

- As part of the BACM/MSM Analysis, District rules and source categories are compared to federal and state air quality regulations and standards

## Federal Regulations

- Control Techniques Guidelines (CTG)
- Alternative Control Techniques (ACT)
- New Source Performance Standards (NSPS)

## State Regulations

- California Health and Safety Code (CH&SC) requirements
- CARB Airborne Toxic Control Measures (ATCM)

# Step 3: Rules from Other Regions

- District compares control measures to analogous regulations adopted by agencies across nation/in California, including, but not limited to:
  - Bay Area Air Quality Management District (BAAQMD)
  - South Coast Air Quality Management District (SCAQMD)
  - Sacramento Metropolitan Air Quality Management District (SMAQMD)
  - Ventura County Air Pollution Control District (VCAPCD)
- District carefully reviews differences between rules with focus on requirements as a whole, while acknowledging differences in regional situations
- All potential BACM/MSM identified thoroughly evaluated using key factors identified in EPA's 2016 Implementation Rule, to determine if potential opportunities qualify as BACM/MSM for the Valley

# Step 4: Technological and Economic Feasibility

## Technological Feasibility

Analysis determines if a potential opportunity to reduce emissions is viable for existing facilities and operators in the Valley, given operating needs and restrictions

*Review of BACT guidelines; District permits; environmental and technological studies; EPA and CARB guideline documents; and other air districts' rules, regulations, and guidelines*



## Economic Feasibility

Cost effectiveness analysis conducted to evaluate the economic reasonableness of an air pollution control measure or technology as it applies to operators in the Valley

*Examines added cost, in dollars per year, of control technology or technique, divided by the emissions reductions achieved, in tons per year*

# Step 5: Potential Contingency Provisions

- District considers whether a contingency measure component would be feasible for each control measure
- This requirement will be addressed in upcoming 2023 PM2.5 plan workshops
  - District currently working on contingency package to address multiple PM standards
- A contingency measure must be:
  - (1) Economically and technologically feasible
  - (2) Feasible for a contingency trigger, and
  - (3) Beyond what is needed to achieve attainment



# Next Steps

Spring/Summer 2023

Summer 2023



Public Participation and Comment Invited throughout Process

3<sup>rd</sup> Quarter 2023

4<sup>th</sup> Quarter 2023



## KEY QUESTIONS

As District conducts this BACM/MSM evaluation of sources identified, seeking input on the following:

- Sources of interest
- Potential emission reduction opportunities
- Identification of cutting edge technologies

# Contact

**Contact:** Molly Boyett  
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[airqualityplanning@valleyair.org](mailto:airqualityplanning@valleyair.org)

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