

2008 PM2.5 Plan



Revised Proposed -
April 30, 2008

Revised Proposed *2008 PM2.5 Plan*

April 30, 2008

San Joaquin Valley
Air Pollution Control District

Overview

- Health effects of fine particulates
- Progress towards attainment
- What is needed to reach attainment
- Contents of the plan
- Emission reductions through incentives
- Public participation/comments received

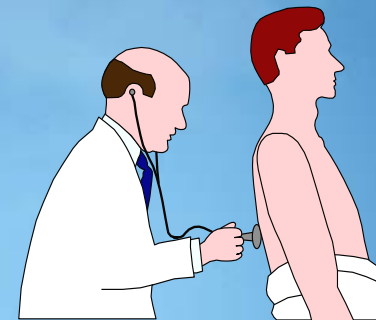
Health Effects of PM_{2.5}

- Cardiovascular disease and increased cardiovascular hospitalizations
 - Each 10 $\mu\text{g}/\text{m}^3$ increase in PM_{2.5} was linked to a 24% increased risk of a cardiovascular event and a 76% increased risk of death from cardiovascular disease in older women
 - Components of fuel combustion and/or wood smoke increased the risk of cardiovascular mortality by 1-2% (all cause mortality increased by 0.5-1.0%) in California Cities Irregular heartbeat and nonfatal heart attacks
- Increased respiratory symptoms – irritation of the airways, coughing, difficulty breathing
- Increased respiratory hospitalizations



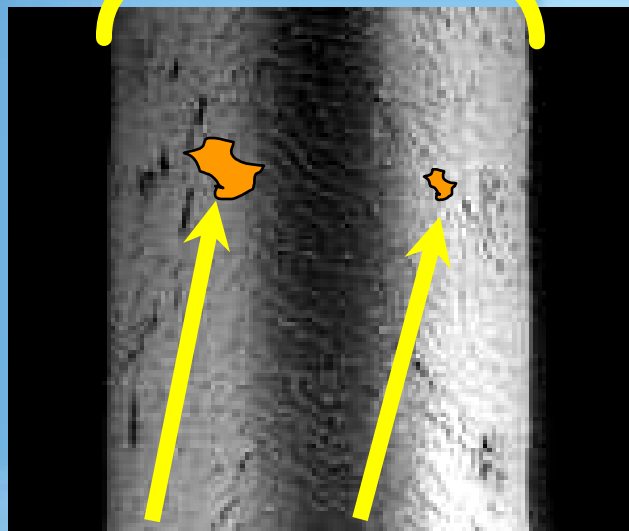
Health Effects of PM_{2.5}

- Bronchitis
 - 325 cases of chronic bronchitis (ages 5-17)
 - 3230 cases of acute bronchitis (ages 27 and older)
- Decreased lung function in children
- Lung cancer
- Aggravated asthma
 - 16,310 upper respiratory symptoms (asthmatic children)
- 17,280 minor restricted activity days
- 3,000 work loss days
- Premature death in people with heart or lung disease
 - Each 10 $\mu\text{g}/\text{m}^3$ decrease in mean PM 2.5 levels was linked to 27% decreased risk of overall premature death
 - Risk for deaths due to heart and lung disease decreased consistently as mean PM 2.5 decreased
 - 460 premature deaths/year in the Valley
- Total cost to the Valley = \$3.2 billion/year



Health-based PM2.5 Standards

Human Hair
(60 μm diameter)



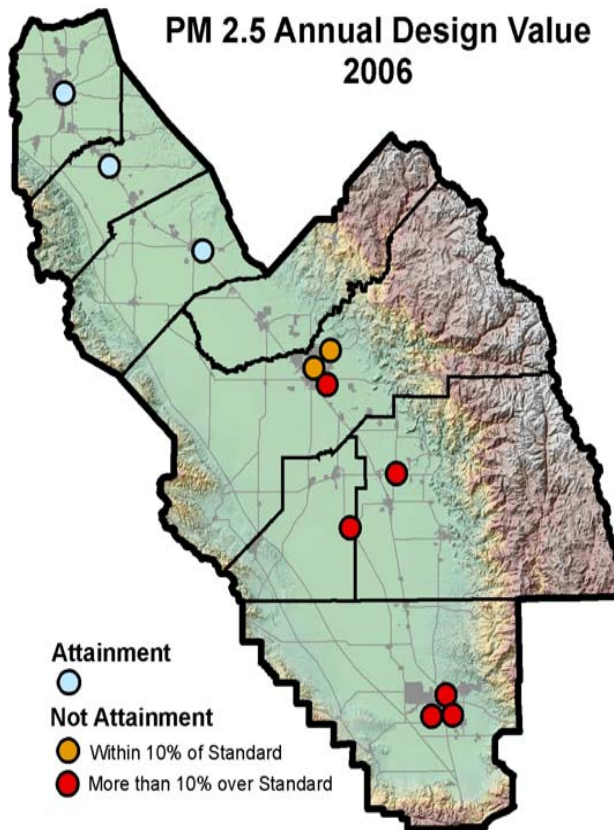
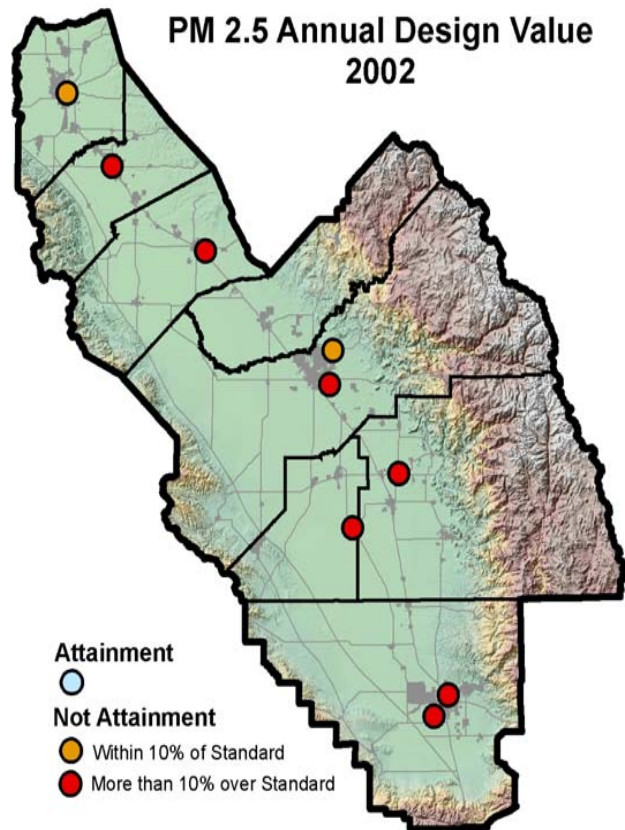
PM10
(10 μm)

PM2.5
(2.5 μm)

- PM2.5 = particles 2.5 microns and smaller
- The *2008 PM2.5 Plan* is the plan required by EPA's current PM2.5 standard, set in 1997
- The new PM2.5 standard, set in 2006, will be formally addressed through a plan in 2012 or 2013, with attainment as late as 2020
- The *2008 PM2.5 Plan* addresses both standards

	Annual	24-hour
Current, 1997 standard	15 $\mu\text{g}/\text{m}^3$	65 $\mu\text{g}/\text{m}^3$
New, 2006 standard	15 $\mu\text{g}/\text{m}^3$	35 $\mu\text{g}/\text{m}^3$

PM2.5 Progress



Highest Annual
Design Values
in the Valley:

2002:

22.6 $\mu\text{g}/\text{m}^3$

2006:

18.9 $\mu\text{g}/\text{m}^3$

PM10 Progress: EPA has
proposed to redesignate the Valley
as attainment for PM10

CRPAQS: Science in the Plan

- Extensive field monitoring at the surface and aloft



- hundreds of monitoring sites
- millions of data records
- numerous teams of experts



- Improved emission inventory
- State-of-the-science air quality modeling
- World class data base

Multiple Models & Weight of Evidence Confirm Attainment projection

Receptor Approach

- Modeled 2000, 2005 observed components at specific sites
- Compared CMB and PMF
- Projections analyze 10 components, detailed carbon analysis
- Used EPA SMAT with monthly CMB
- Projections show 2015 attainment

Regional Model

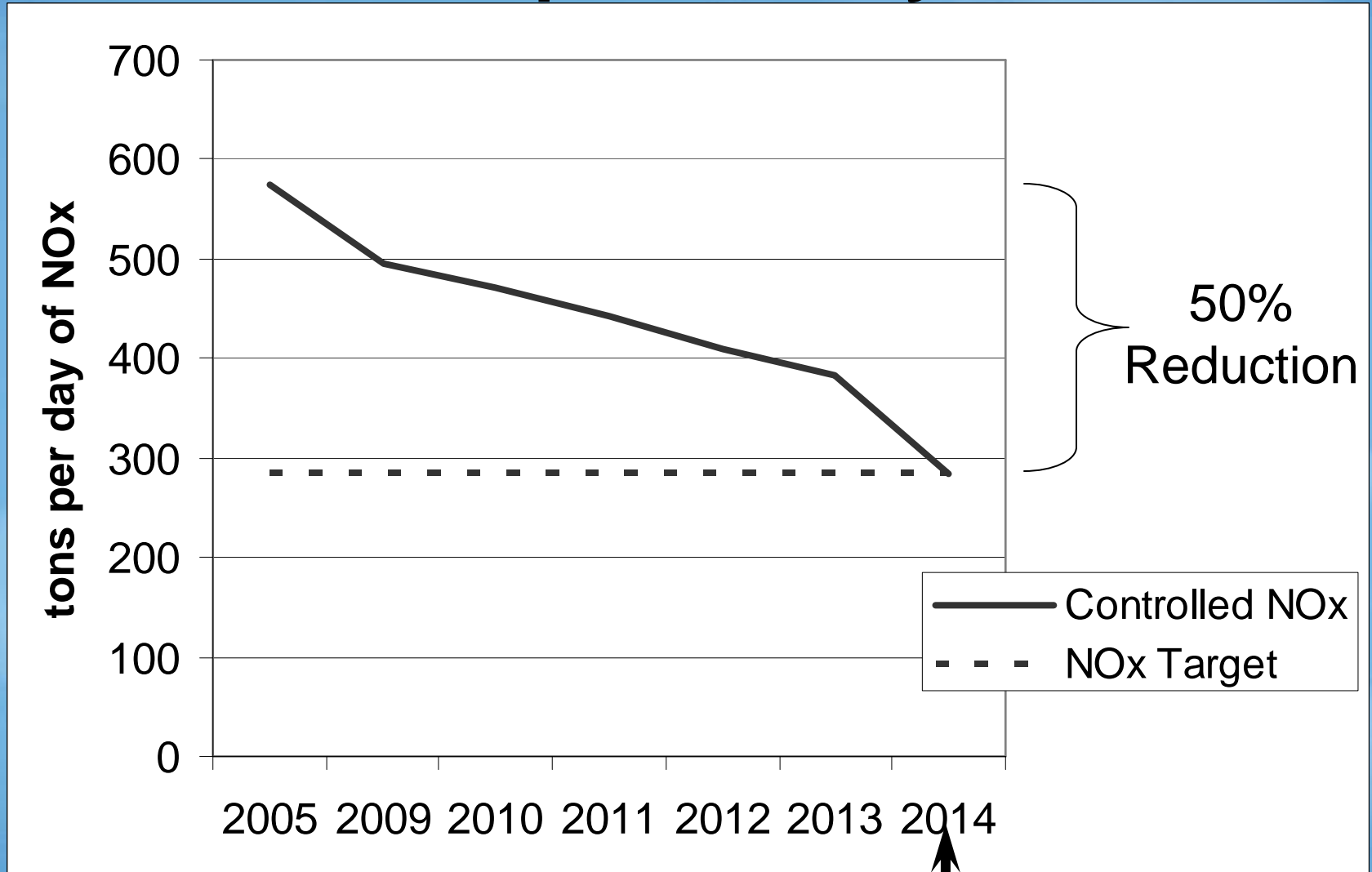
- Complex computer platform, state-of-the-science CMAQ
- Modeled entire Valley daily PM_{2.5} formation for fourteen month CRPAQS data
- Sophisticated nitrate-sulfate particulate chemistry
- Used EPA SANDWICH and SMAT quarterly analysis
- Projections show 2015 monitored and unmonitored area attainment

Using Modeling to Determine the Reductions Needed

- Receptor modeling done by District evaluates attainment for years 2009-2014 and projects attainment by 2015
- ARB's regional modeling evaluates 2014 and confirms the Valley's attainment outlook; also evaluates unmonitored peaks
- Weight of evidence looks at air quality and emissions trends and provides support for projection of attainment by 2015

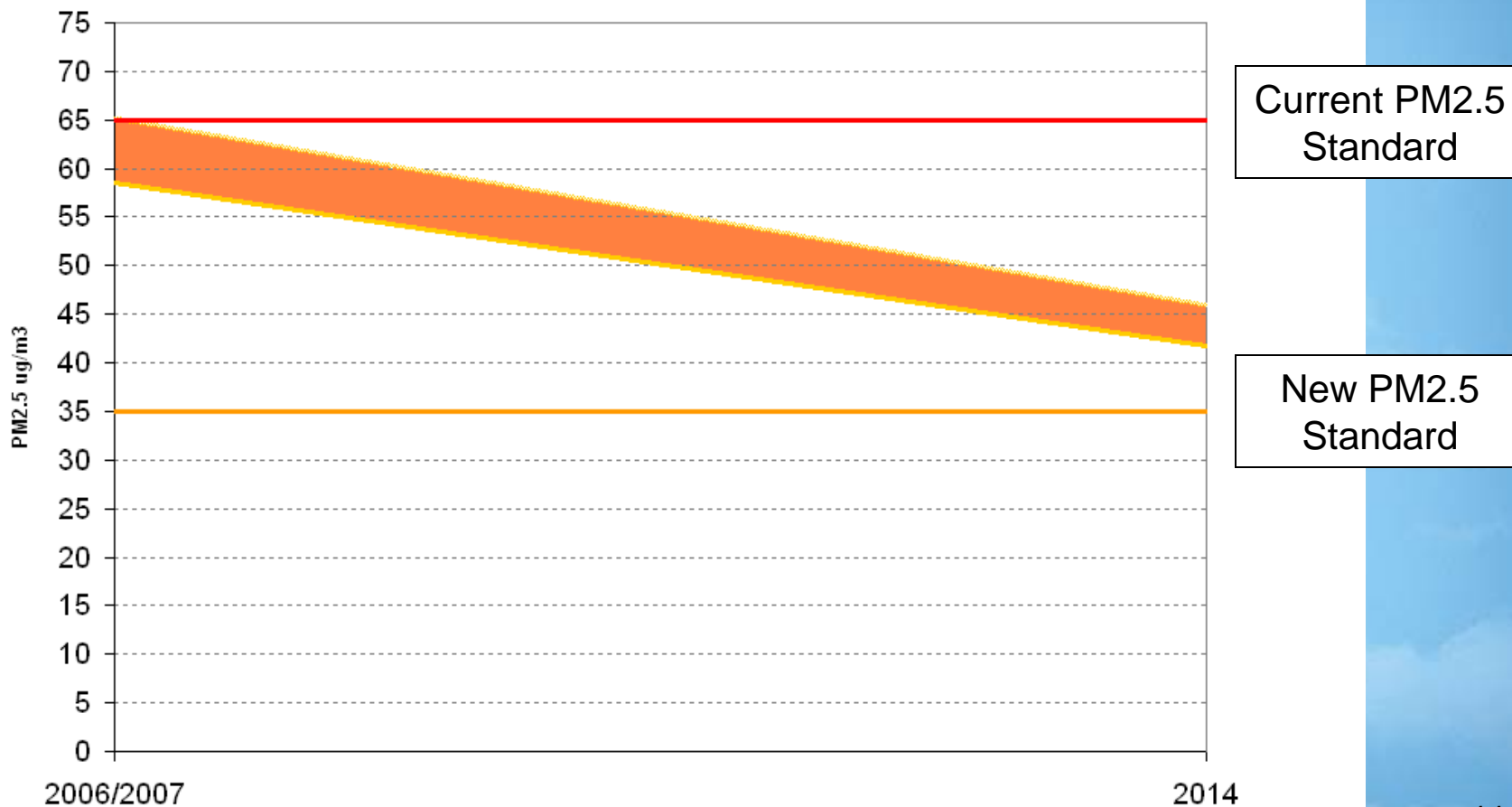


Plan Reaches Target as Expedientiously as Possible



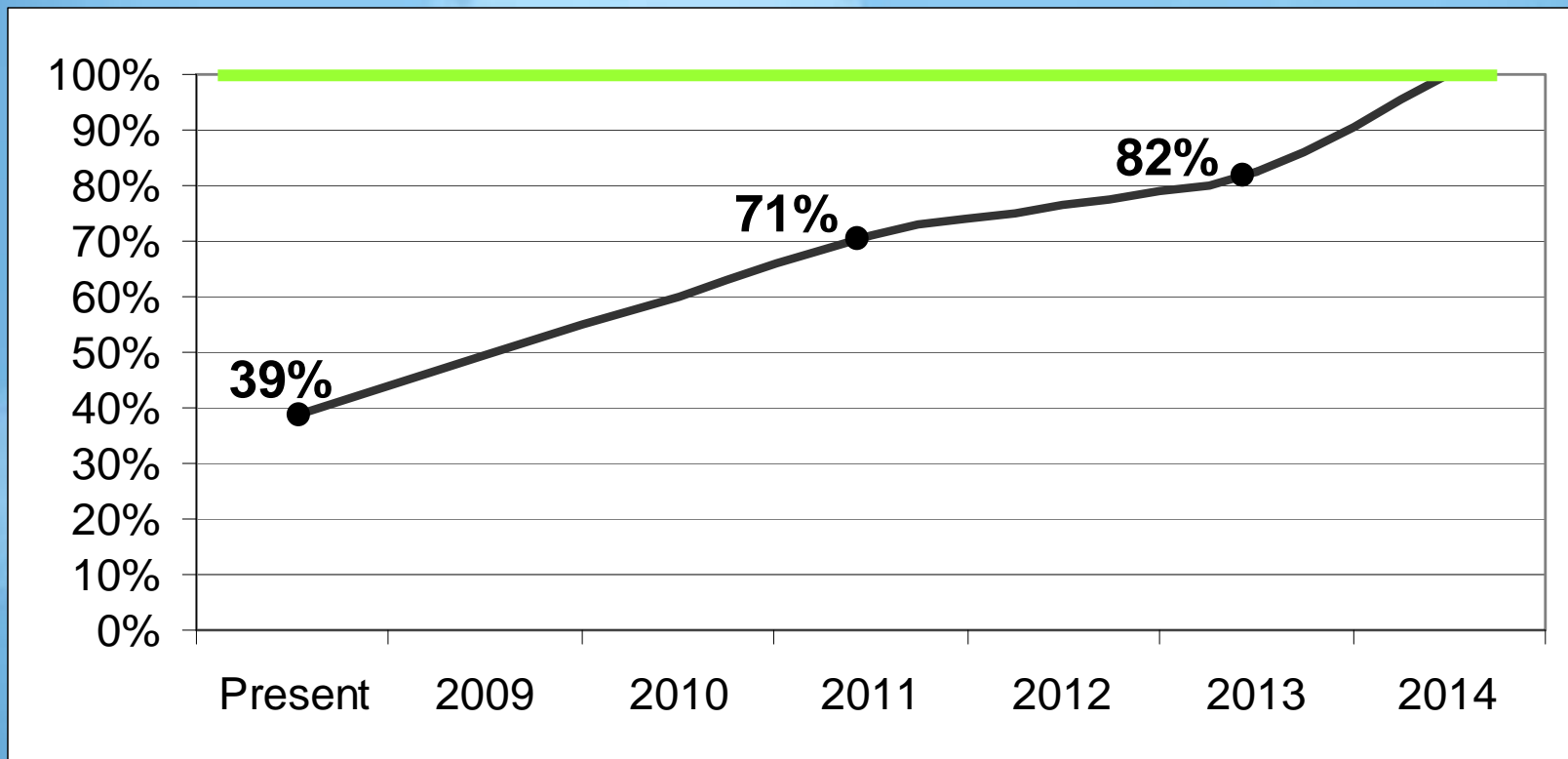
Plan Makes Progress Toward New Standard

PM2.5 Progress - Daily Standard

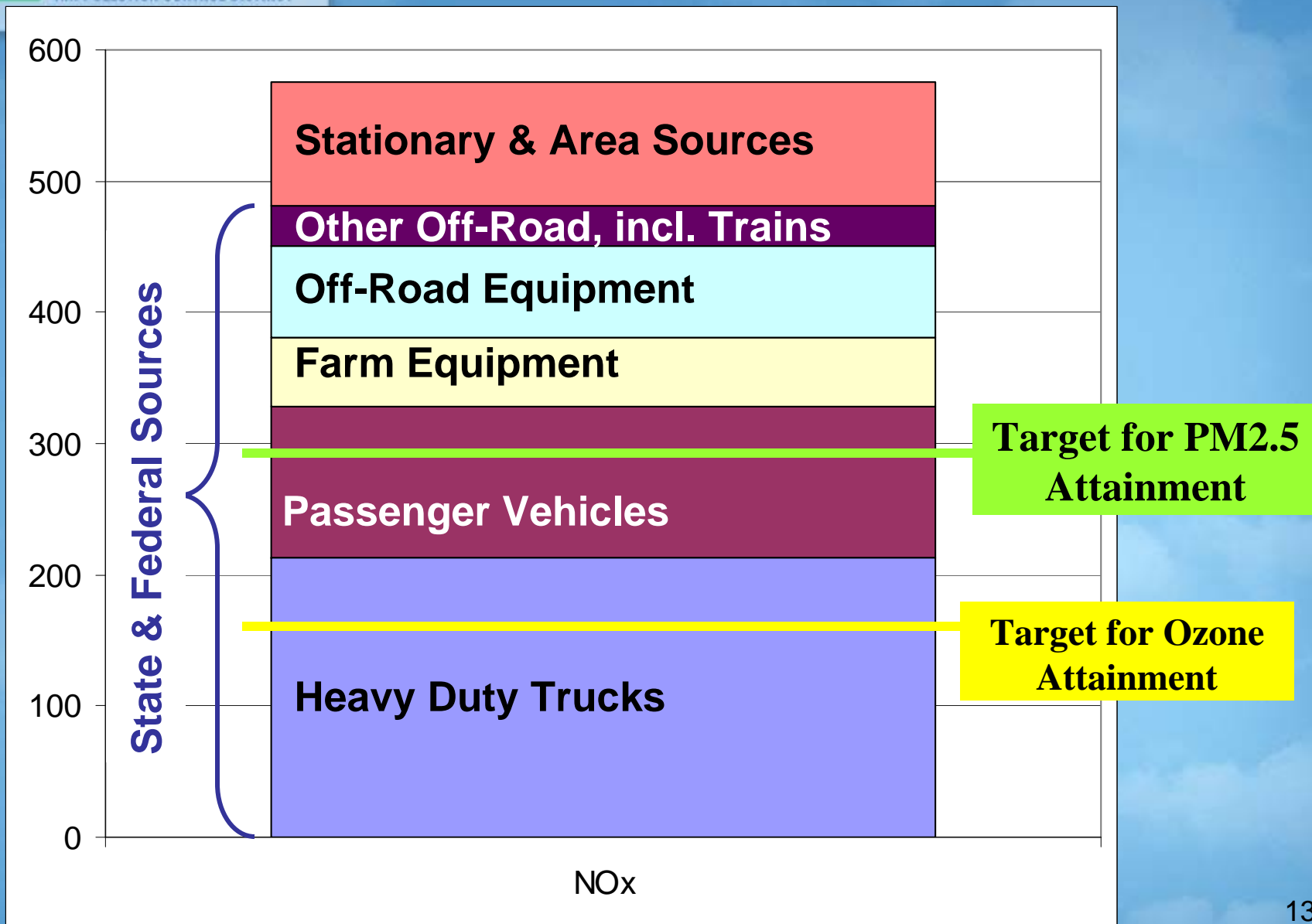


Expeditious Attainment

Percent of Valley Residents Living in Areas that Meet the 1997 PM_{2.5} Standards

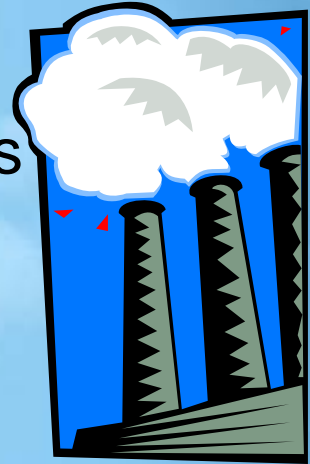


Sources of NOx



Control Strategy

- ARB strategy approved in *Revised State Strategy for California's 2007 SIP*
- The *2008 PM_{2.5} Plan* builds on control measures from the *2007 Ozone Plan*
- The District also evaluated measures to reduce directly emitted PM_{2.5} and SO₂
- Appendix I shows evaluation of source categories for potential controls
- Chapter 6 shows draft control measure commitments, adoption schedule, and projected reductions
- Combined estimated cost of reductions from the *2007 Ozone Plan* and the *2008 PM_{2.5} Plan* is about \$20 billion



Rule Commitments

Boilers, Steam Generators, and Process Heaters (Rules 4306, 4307, & 4308)

Internal Combustion Engines (Rule 4702)

Open Burning (Rule 4103)

Glass Melting Furnaces (Rule 4354)

Flares (Rule 4311)

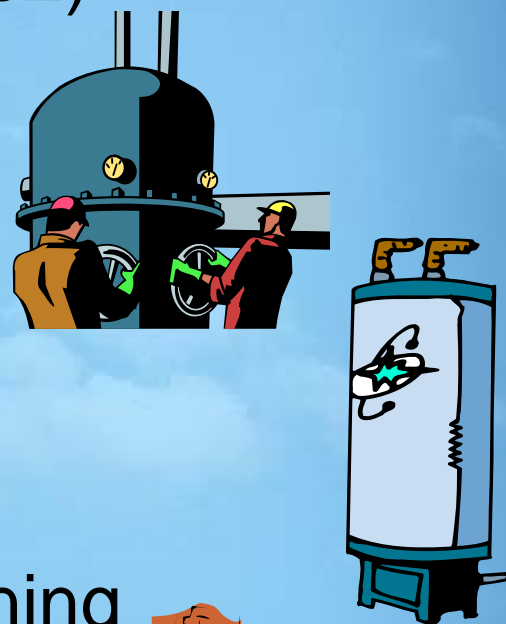
Commercial Charbroiling (Rule 4692)

Residential Water Heaters (Rule 4902)

Residential Furnaces (Rule 4905)

Wood Burning Fireplaces & Wood Burning Heaters (Rule 4901)

Employer-based Trip Reduction



Other Plan Commitments

Feasibility Studies:

Conservation Management Practices (Rule 4550)

Solid Fuel-Fired Boilers, Steam Generators and Process Heaters (Rule 4452)

Small Spark-Ignited Engines and Agricultural Spark-Ignited Engines (Rule 4702)

Prescribed Burning (Rule 4106)

Cotton Gins (Rule 4204)

Fugitive PM10 Prohibitions (Reg VIII)

Fireworks

Feasibility Studies help determine the best control strategy for future plans

Healthy Air Living

Incentive Programs

Fast Track Measures



Other Plan Requirements

- Reasonable Further Progress (RFP)
 - Federal requirement to show generally linear progress in reducing emissions
 - SJV's emission reductions, from ongoing programs plus new commitments, more than meet the requirements
 - Excess reductions used to help meet contingency measure requirement
- Contingency measures
 - Accelerated adoption/implementation of state measures
 - Incentive-based reductions
 - Excess reductions from adopted measures not needed for RFP
 - Adopted rules not used in RFP or attainment demonstration (federally-mandated ozone nonattainment fees)

CEQA Compliance

- The 2008 PM2.5 Plan underwent CEQA review
- Proposed Negative Declaration was prepared and issued for public comment
- Two comment letters were received, each stating no comment

Emission Reduction Incentives

- Consistent w/ *2007 Ozone Plan*, this plan calls for \$188 million/year in incentive funds until attainment is reached
- This level of funding achieves 18-45 tpd of NO_x reductions and 0.5-2.0 tpd of diesel PM reductions
- Over the course of the plan, this translates to 625 fewer deaths due to PM cardiovascular effects and 424 fewer cases of PM-related cancer
- District has increased incentive funding from \$40 million/yr (2007-2008) to over \$110 million/yr (2008/2009)

Expeditious Attainment

The District has several reasons to expect attainment before 2014:

- Rule development process can sometimes reveal additional reduction potential
- The District incentive programs, Fast Track, and Healthy Air Living achieve additional reductions not quantified for attainment projections
- ARB measures could achieve some pre-2014 reductions that could contribute to expeditious attainment



The Process

- Public process began in 2005 and 2006 in conjunction with the *2007 Ozone Plan*
- Workshops were held December 18-19, 2007 and February 25-26, 2008
- 30-day comment period on the Proposed Plan held March 13-April 14, 2008
- Public hearing on April 30, 2008
- ARB hearing May 22-23, 2008, in Fresno

Comments Received

NOx Control Only

Comment: Control measures in the PM_{2.5} plan should align exactly with those in the 2007 Ozone Plan, and control NOx only.

- Modeling shows that reductions in SO₂ and direct PM_{2.5} emissions are needed to demonstrate attainment.
- EPA assumes that SO₂ and direct PM_{2.5} will be controlled unless evidence is submitted that control will not help PM_{2.5} attainment.

Add VOC Measures to Emission Control Strategy

Comment: Previous analysis shows VOC emissions are a significant part of the PM_{2.5} problem; District should commit to additional VOC measures

- Modeling accounted for planned VOC measures
- Except for organic carbon from vegetative burning and wood burning, modeling shows that non-mobile VOC reductions would have little benefit for SJV PM_{2.5} air quality.
- *2007 Ozone Plan* contains 14 VOC control measures and 15 feasibility studies

Reliance on ARB Truck Rule, RFP, Contingency Measures

Comment: The plan relies too heavily on the ARB truck rule, doesn't meet RFP, and has insufficient contingency measures.

- ARB's commitment for emission reductions is binding.
- Over 80% of the SJV NO_x comes from mobile sources, and 37% of NO_x comes from heavy duty diesel trucks.
- Given the complexity of achieving the reductions, EPA can accept the RFP in the Plan.
- The District's contingency strategy counts sizeable reductions from incentives that will be in-place.

Residential Wood Burning

Comment: Numerous comments opposing and supporting rule strengthening.

- Residential wood burning is key to SJV PM_{2.5}.
- Emission reductions can be very cost effective
- Staff proposes reopening the rule to consider how it could be strengthened.
- The public will have more opportunities to comment during the rule amendment process.

2006 PM_{2.5} Standard

Comment: The Plan does not include progress toward the new federal PM_{2.5} standard or the state PM standard.

- The Plan is designed to attain the annual portion of the PM_{2.5} standard, which was reaffirmed in 2006
- Plan makes significant progress toward the new 24-hour standard. By 2014, peak 24-hour average levels are expected to decrease to about 45 µg/m³
- No federal planning requirements exist for the new federal standard or state standard. The District must comply with state requirements for state implementation plans.

Strengthen Control Measures

Comment: Stronger stationary source controls and faster ARB reductions could accelerate attainment

- Some specific suggestions for strengthening controls were incorporated in District strategy. District staff will consider all suggestions during rulemaking.
- Many suggestions for control technologies and the corresponding emission reductions were based on broad assumptions of feasibility.
- ARB has committed to reductions in 2014, but not before.

Feasibility Studies for Primary PM_{2.5}

Comment: Remove the feasibility studies for fugitive dust sources, since fugitive dust does not contribute significantly to PM_{2.5}

- The current PM_{2.5} emission inventory for fugitive dust sources is very significant.
- Current literature shows wide range of PM_{2.5} estimates in fugitive dust emissions.
- District proposes feasibility studies to improve the PM_{2.5} emission inventory for fugitive dust.

Internal Combustion Engines

Comment: NOx emission limits for internal combustion engines should be strengthened to match those of South Coast.

- District staff will carefully consider the commenter's suggestions during control measure implementation.
- Measures that work in South Coast (e.g., rapid, wide-scale electrification) may not be feasible for the SJV due to lack of electrical distribution infrastructure.

NOx Reductions for Glass Furnaces

Comment: The Plan should commit to the NOx emission reduction in the current draft of the glass melting rule amendment.

- The current draft glass melting rule postulates a 42% reduction in NOx emissions; socioeconomic studies show this reduction could lead to closure of all Valley container glass plants (3,000 job losses).
- Staff will continue to work to maximize emission reductions without devastating socioeconomic impacts.

Boilers, Steam Generators, & Process Heaters

Comment: Strengthen emission limits in rules for boilers, steam generators and process heaters.

- The District will consider these comments during rule amendment processes.
- Some of the commenter's specific suggestions (e.g., 2 ppm NO_x) may not be technologically and economically feasible as retrofits.

Operational Controls

Comment: Operational controls should be imposed as contingency measures. On high pollution days, limit industrial equipment use & ban use of pre-Tier 3 off-road and agricultural engines.

- Federal laws limit the District's ability to legally impose such restrictions. These restrictions could also devastate the Valley's economy.
- EPA considers source shutdowns as economically disruptive; such measures are not required by the federal Clean Air Act.

Conclusions

- Both short-term and long-term downward trends in PM_{2.5} levels have occurred
- Directly emitted PM_{2.5} and NO_x are key to control strategy; SO₂ reductions are also beneficial
- Valley attains annual PM_{2.5} standard in 2014
- Valley continues to attain the 24-hour PM_{2.5} standard
- Valley is making significant progress towards upcoming 24-hour PM_{2.5} standard
- Suite of computer models and assessment tools agree in predictions of the above

Recommendations

1. Adopt the Negative Declaration
2. Adopt the Revised Proposed *2008 PM2.5 Plan*
3. Authorize the Chair to sign the resolution adopting the Revised Proposed *2008 PM2.5 Plan*
4. Authorize the Chair to sign the Notice of Determination and direct staff to file the Notice of Determination within 5 days
5. Direct staff to forward the adopted *2008 PM2.5 Plan* and the attached resolution to the California Air Resources Board (ARB) for approval and submittal to the U.S. Environmental Protection Agency (EPA)

