Scoping Meeting to Discuss Integrated Plan to Address Multiple Federal PM2.5 Standards

December 7, 2016

webcast@valleyair.org

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Scoping Meeting Agenda

- Overview
- PM2.5 and Health Effects
- Valley's Progress Towards Attainment
- Federal Clean Air Act Mandates for PM2.5
- District's Integrated PM2.5 Strategy
- Comprehensive Approach to Reduce Emissions
- Public Engagement Process
- Next Steps

Overview

- Valley at critical juncture in meeting federal Clean Air Act mandates
- New federal air quality standards approach background levels
- District must prepare attainment strategy that addresses multiple PM2.5 standards under the federal Clean Air Act
  - 1997 PM2.5 Standard (24-hour 65 µg/m³ and annual 15 µg/m³)
  - 2006 PM2.5 Standard (24-hour 35 µg/m³)
  - 2012 PM2.5 Standard (annual 12 µg/m³)
- District is preparing a single integrated plan addressing multiple standards instead of three separate plans
  - Provides path for developing a much stronger plan
  - More efficient use of resources
  - More robust public process
- Meeting the new standards requires enormous reductions in emissions, particularly from mobile sources
  - Necessary to avoid costly federal sanctions and Federal Implementation Plan

Overview (cont'd)

- Today's scoping meeting initiates public outreach process for the District's Integrated PM2.5 Plan
- At Valley's request, the Air Resources Board directed ARB staff to initiate a parallel public process to:
  - Identify additional measures to reduce mobile source emissions in pre-2025 timeline critical for Valley
  - Work with District to find additional measures to reduce directly emitted PM2.5 from stationary sources
  - Report to ARB Board in Feb 2017 with recommended actions
  - ARB recommendations/commitments will feed into District plan development process
- District to propose Integrated PM2.5 Plan in August 2017 for District Governing Board consideration and subsequent submittal to EPA through ARB

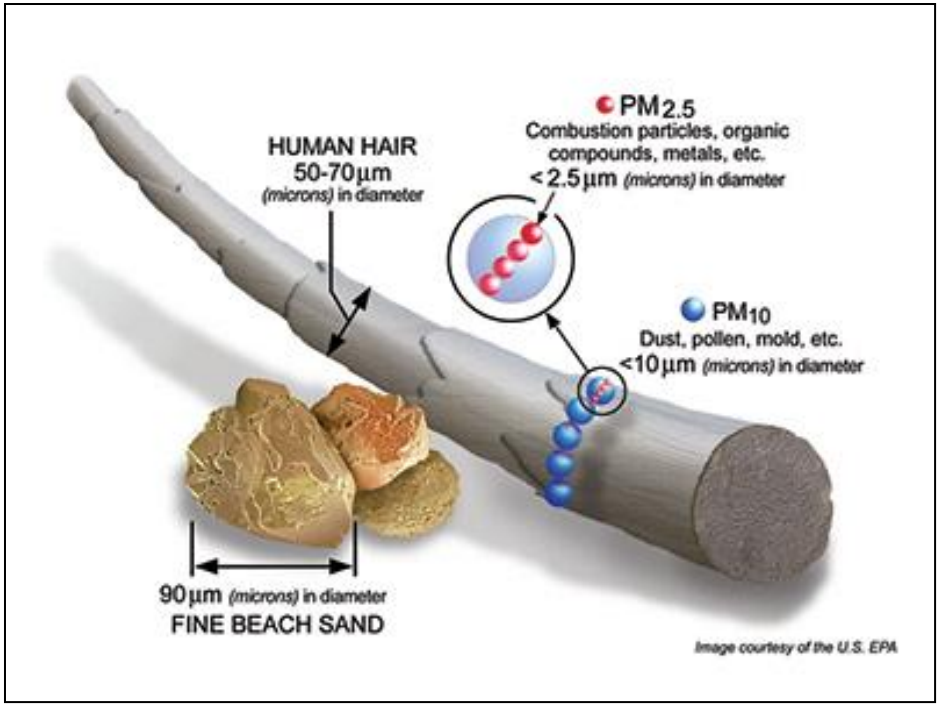
Overview (cont'd)

- Avoid attainment deadline delays unless all available and reasonable mobile and stationary control measures are found to be insufficient to achieve attainment by
  - 2019 for the 2006 PM2.5 Standard
  - 2021 for the 2012 PM2.5 Standard
- District to leave no stone unturned in identifying additional measures for sources under District's jurisdiction that expedite attainment and protect public health
- Work with ARB to ensure that the State provides all possible mobile source control strategies including incentive-based measures that result in additional reductions in emissions beyond those included in current control programs

PM2.5 and Health Effects

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



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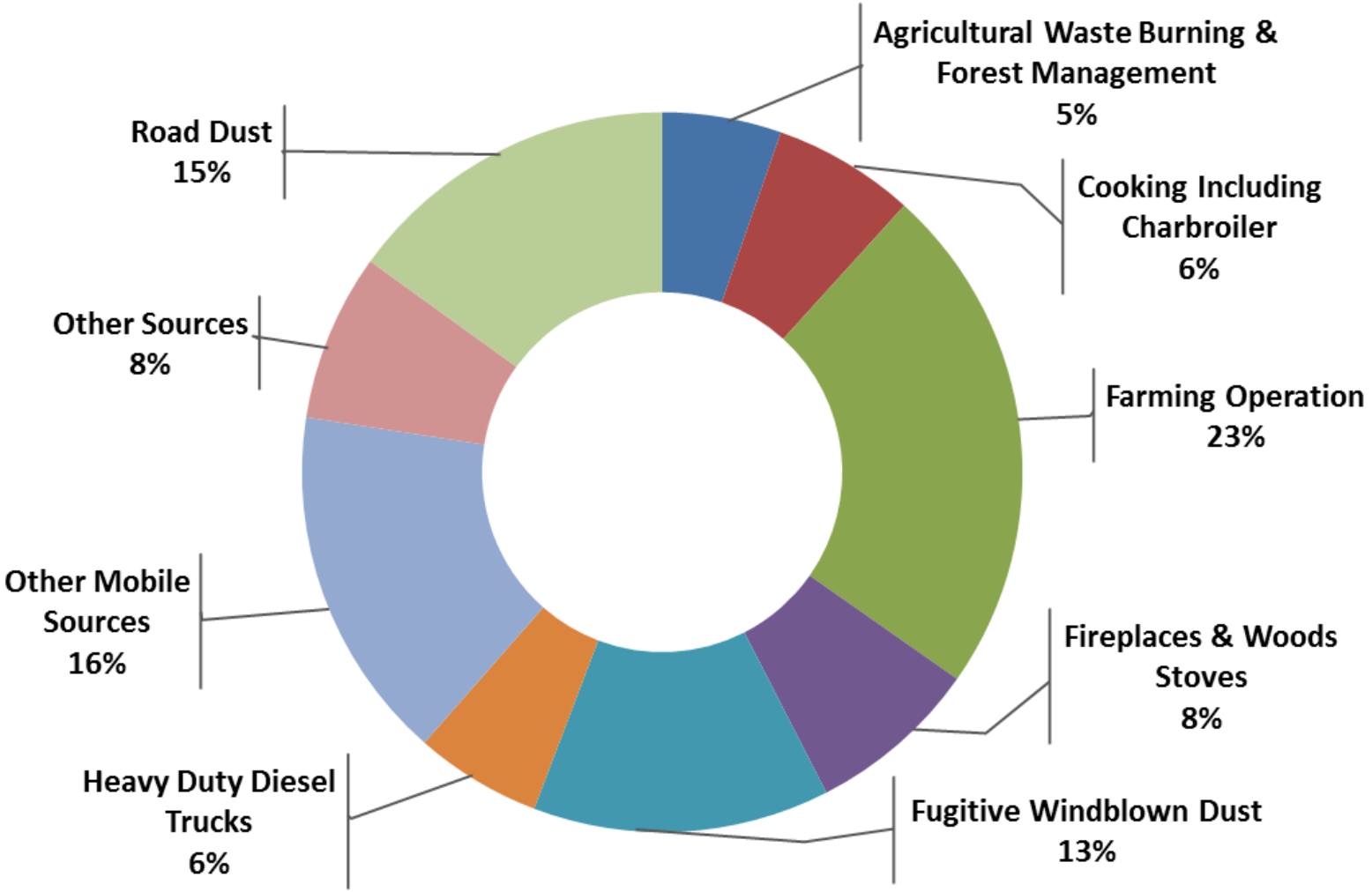
Health Effects of PM2.5

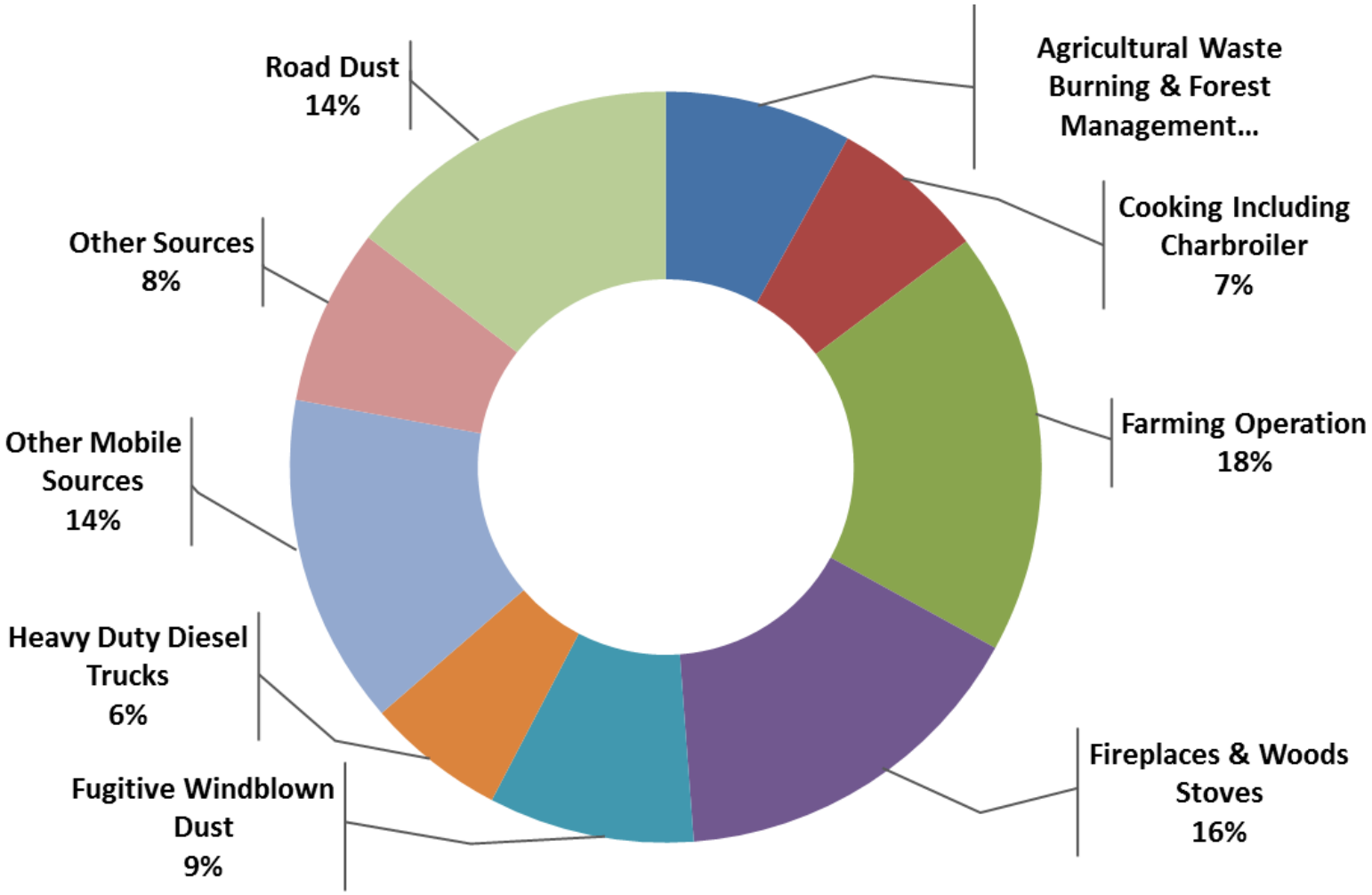
- Premature death in people with heart or lung disease
- Aggravated asthma
- Increased respiratory symptoms – irritation of the airways, coughing, difficulty breathing
- Decreased lung function in children
- Irregular heartbeat and nonfatal heart attacks
- Increased respiratory and cardiovascular hospitalizations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

Annual Direct PM2.5 Emissions

(ARB CEPAM 1.04 Inventory Model)

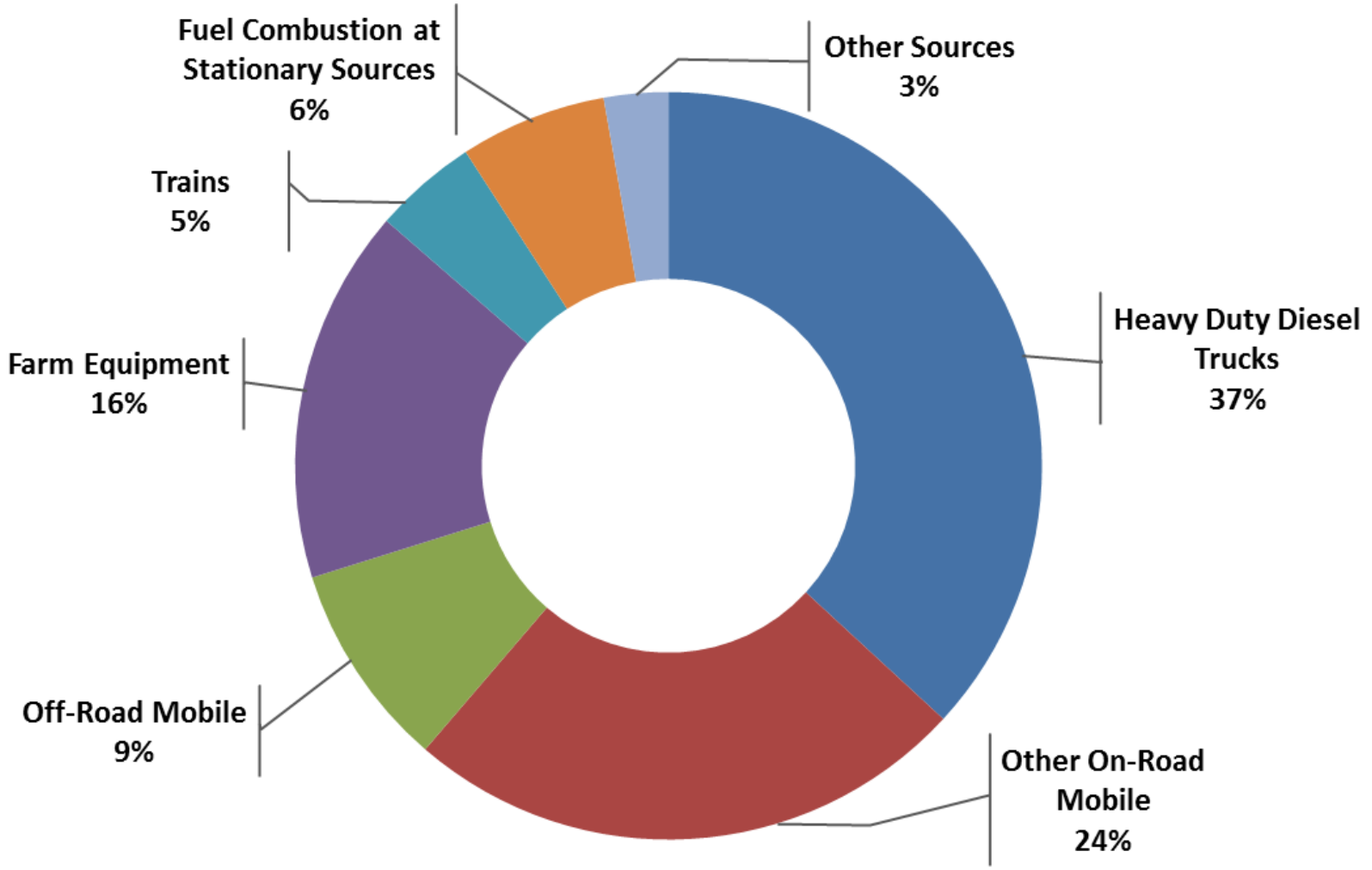


24-hour (Winter) Direct PM2.5 Emissions
(ARB CEPAM 1.04 Inventory Model)



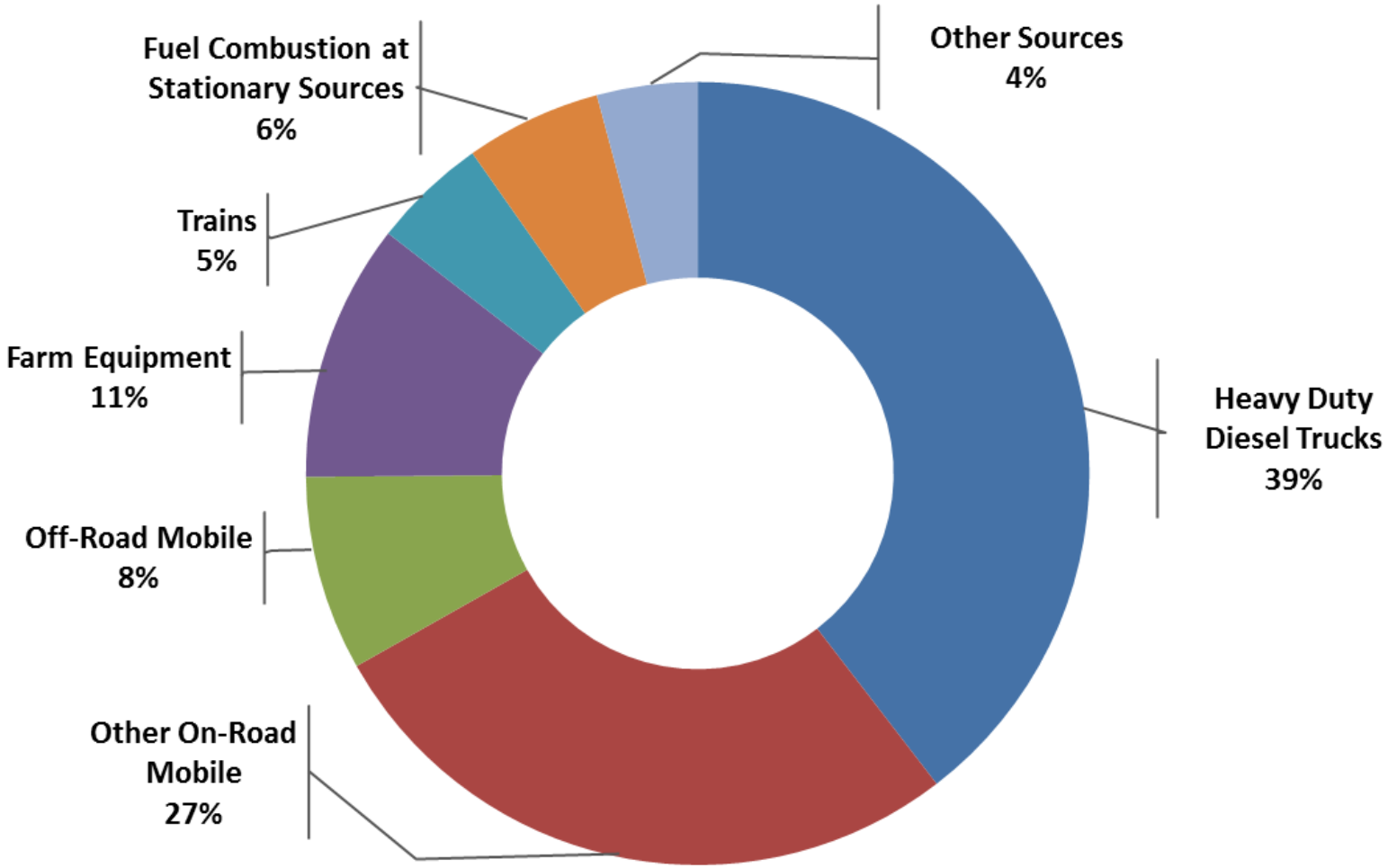
Annual NOx Emissions

(ARB CEPAM 1.04 Inventory Model)



24-hour (Winter) NOx Emissions

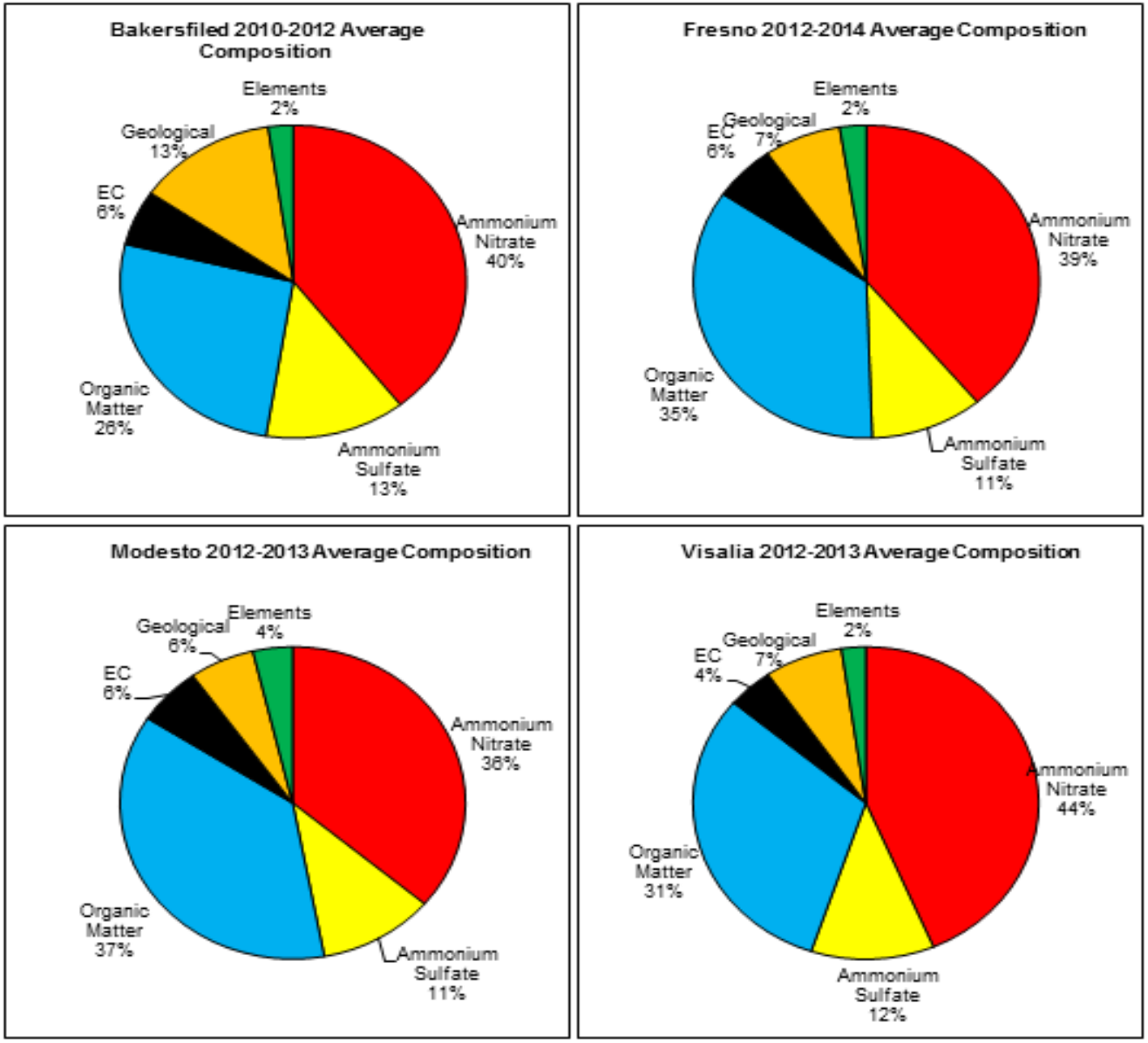
(ARB CEPAM 1.04 Inventory Model)



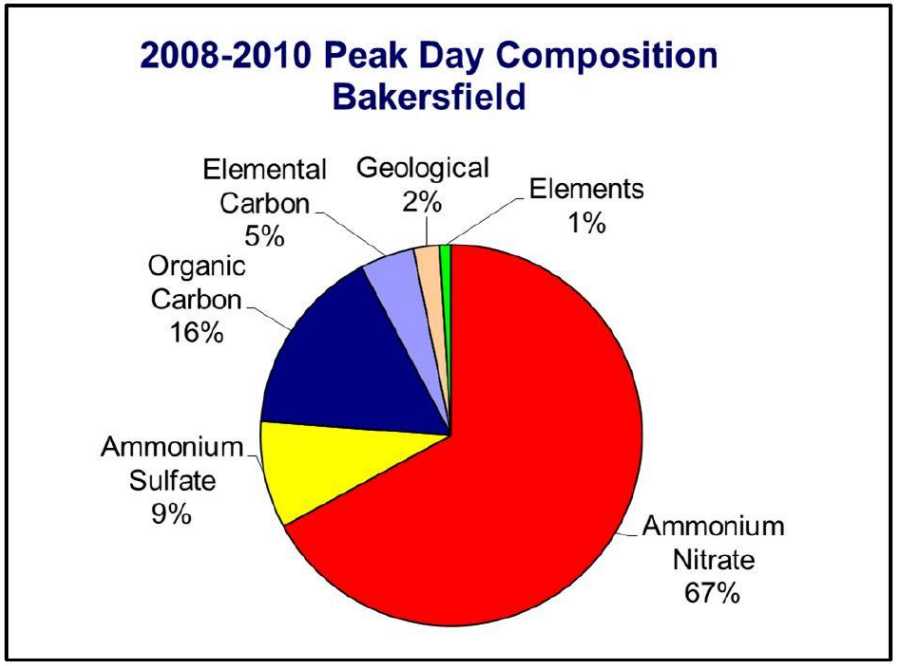
Composition of PM2.5 in the Valley

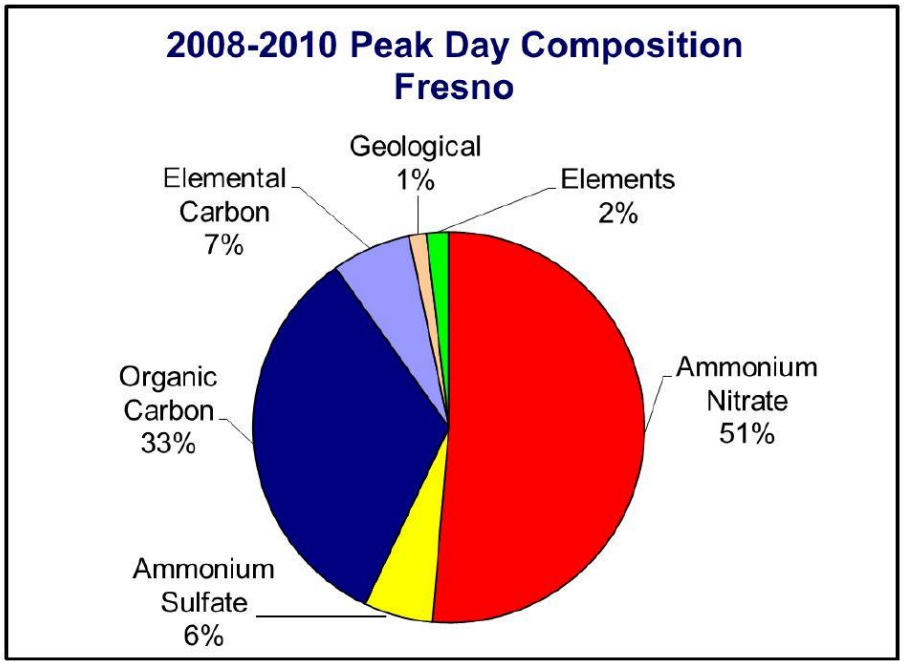
- **Organic Carbon:** combustion (ex: residential wood, agricultural burning, cooking, direct tailpipe)
- **Elemental Carbon:** also called soot or black carbon; incomplete combustion (ex: diesel engines)
- **Geologic:** road dust and soil dust
- **Trace metals:** brake wear, fireworks, etc.
- **Ammonium Nitrate:** reaction of ammonia and nitric acid
- **Ammonium Sulfate:** reaction of ammonia and sulfuric acid

Annual PM2.5 Chemical Composition in Valley

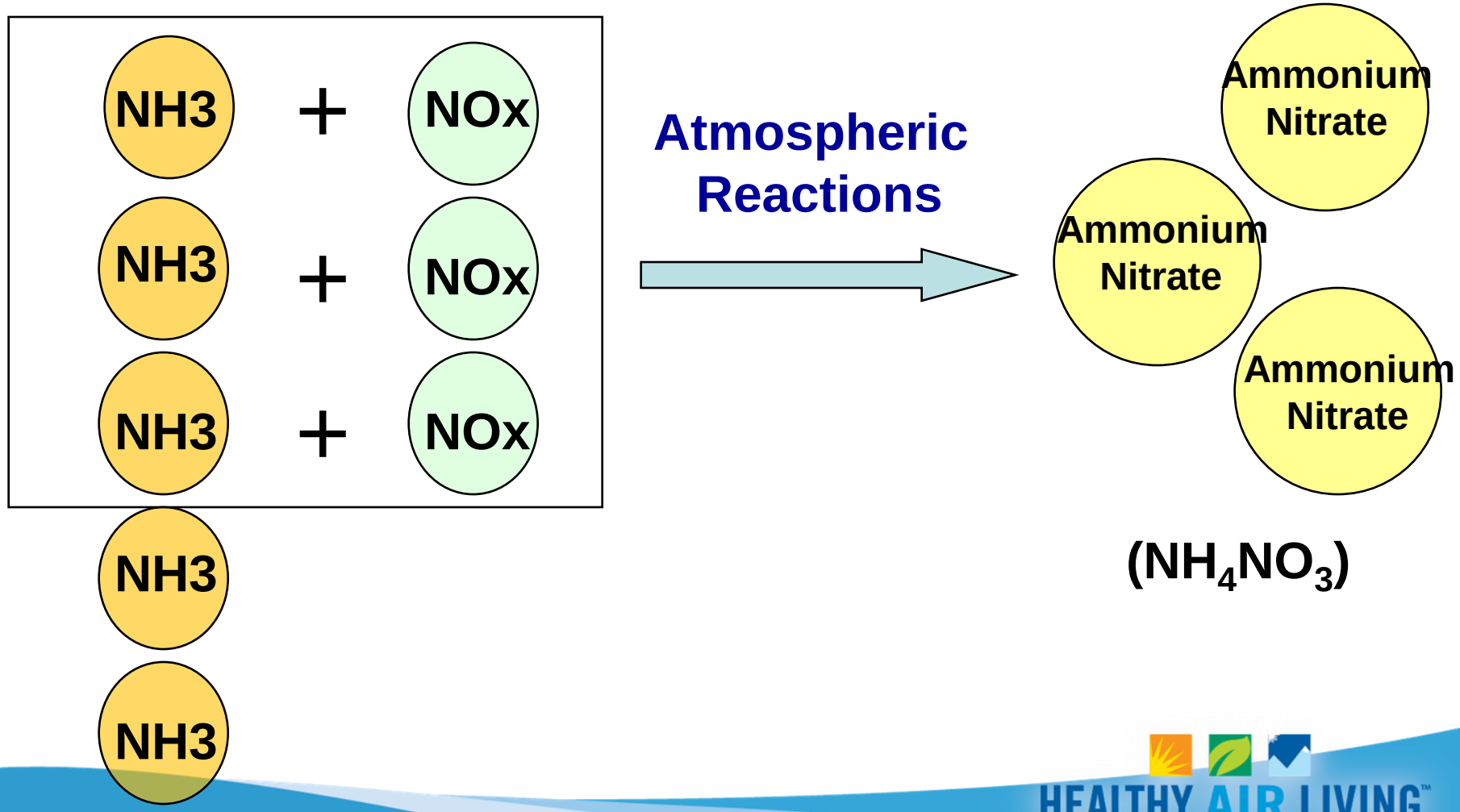


24-hr (Winter) PM2.5 Chemical Composition in Valley

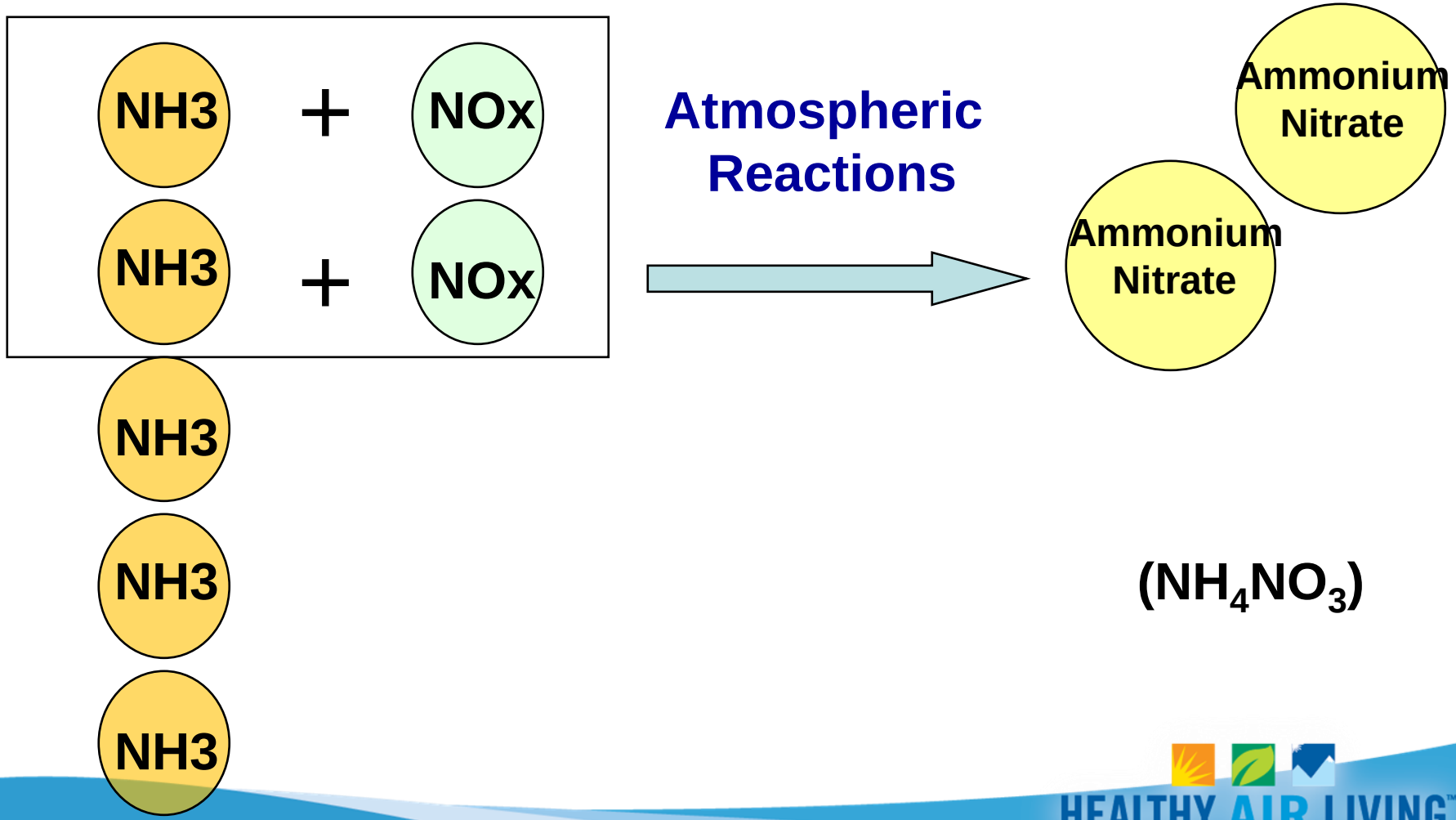




Ammonium Nitrate Formation (Excess Ammonia)



Ammonium Nitrate Formation (NOx Control)



(NH_4NO_3)

PM2.5 Scientific Findings

- PM2.5 formation in the Valley is highly complex
- Direct PM2.5, NOx, and SOx are primary contributors to the Valley's PM2.5 levels
  - NOx emissions primarily from mobile sources (85% of emissions)
  - Reductions in directly emitted PM2.5 emissions from various sources do not provide equal benefit in reducing PM2.5 concentrations at the Valley's design value monitoring stations
  - Neighborhood-level direct PM2.5 emissions contribute to PM2.5 levels and have adverse health impacts
- Modeling and studies have demonstrated that ammonia reductions do not achieve significant PM2.5 benefits
  - NOx and directly emitted PM2.5 emissions reductions much more effective in reducing PM2.5 concentrations
  - EPA recently proposed new guidance on November 17, 2016 outlining requirements for evaluating precursor significance

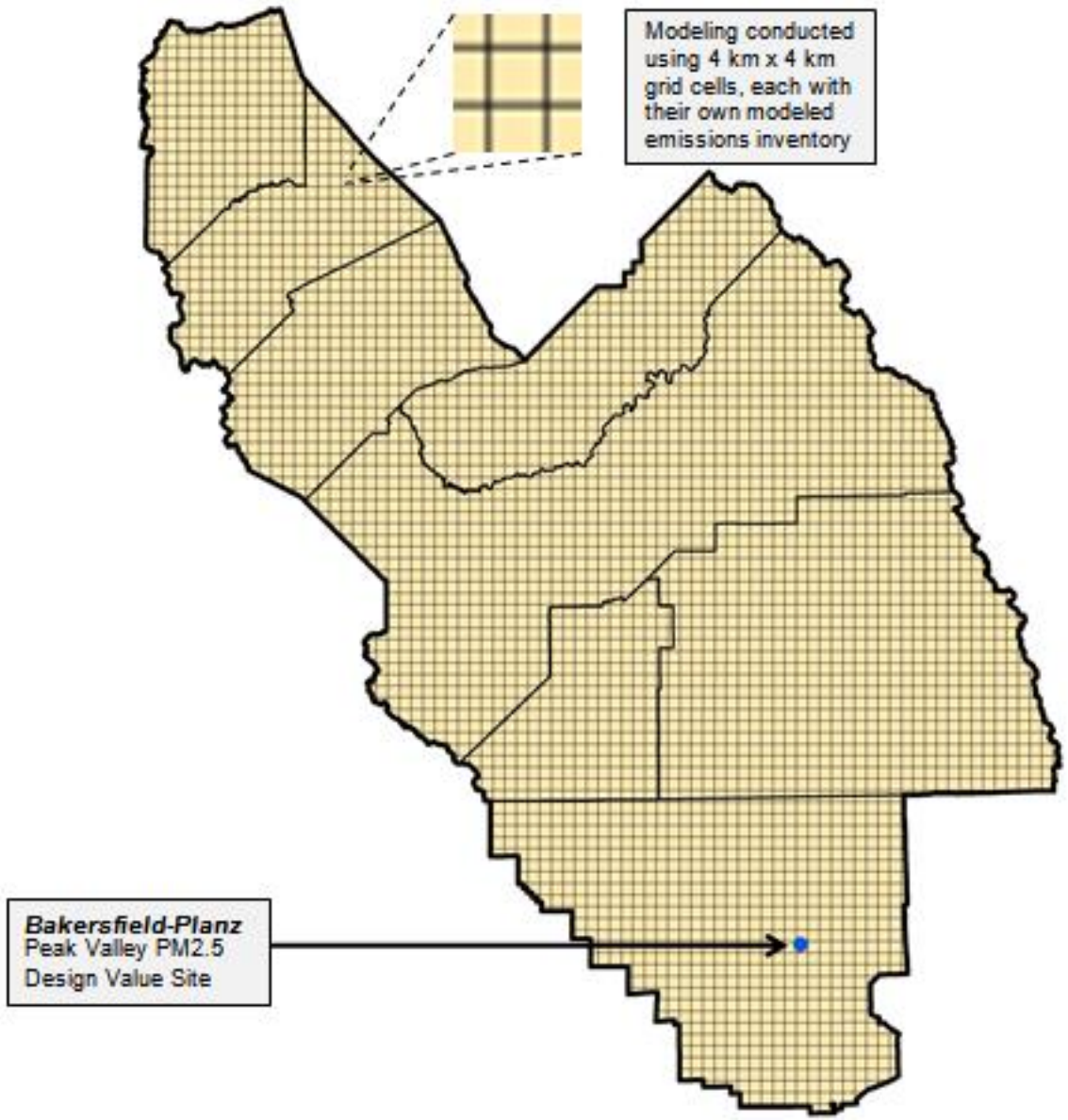
More Precise Modeling Needed

Generalized Assumptions Not Reliable for Complex PM2.5 Attainment Planning

- District will work closely with ARB, utilizing our recently acquired modeling capabilities, to conduct in-depth air quality modeling that more precisely and accurately predicts PM2.5 concentrations at Bakersfield-Planz design value site and other peak monitoring sites, accounting for the following characteristics
  - Location
  - Emissions particle size speciation
  - Seasonality
  - Temporal patterns
  - Current control programs that include episodic curtailment based on meteorological conditions

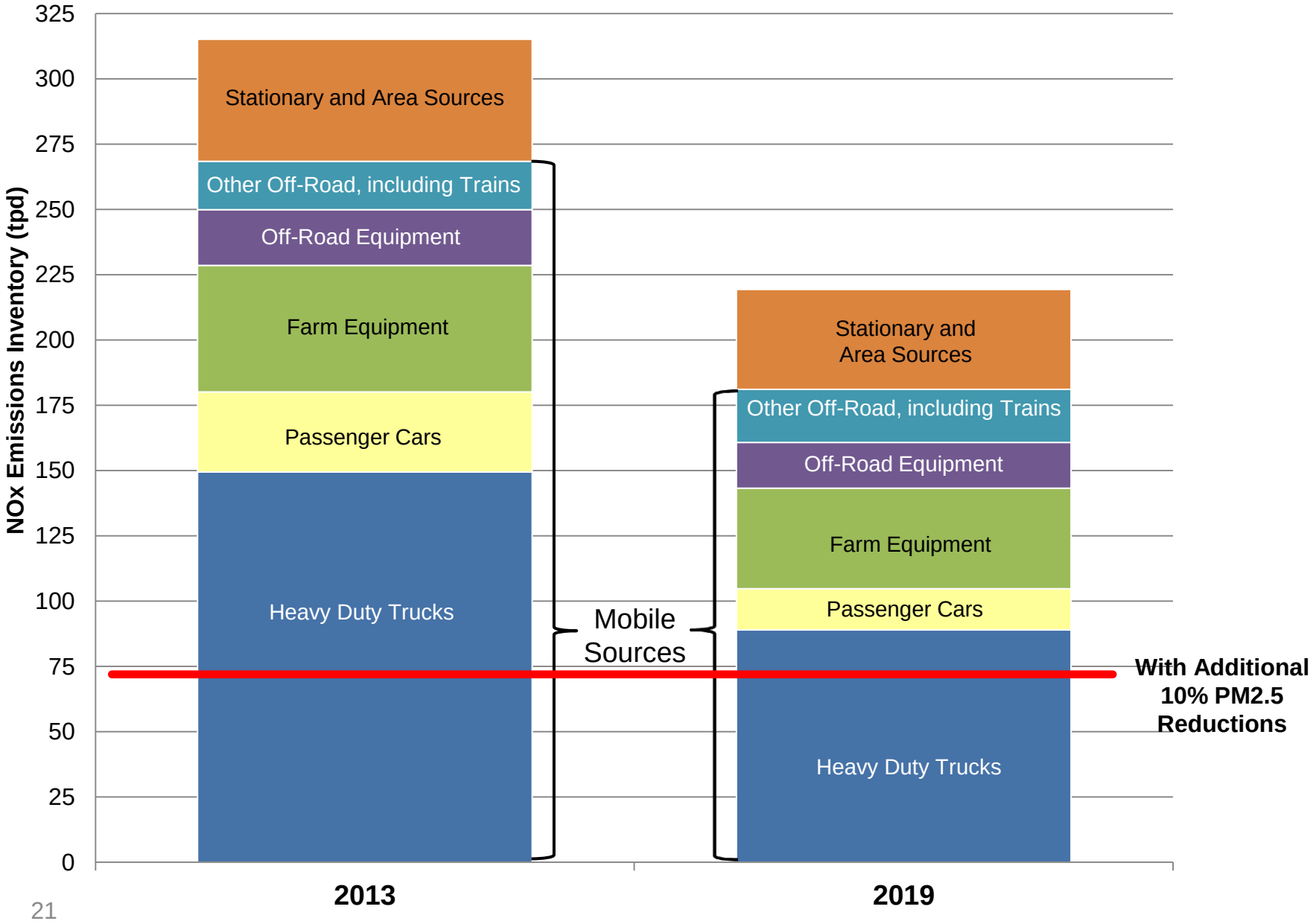
More Precise Modeling Needed (cont'd)

Generalized Assumptions Not Reliable for Complex PM2.5 Attainment Planning



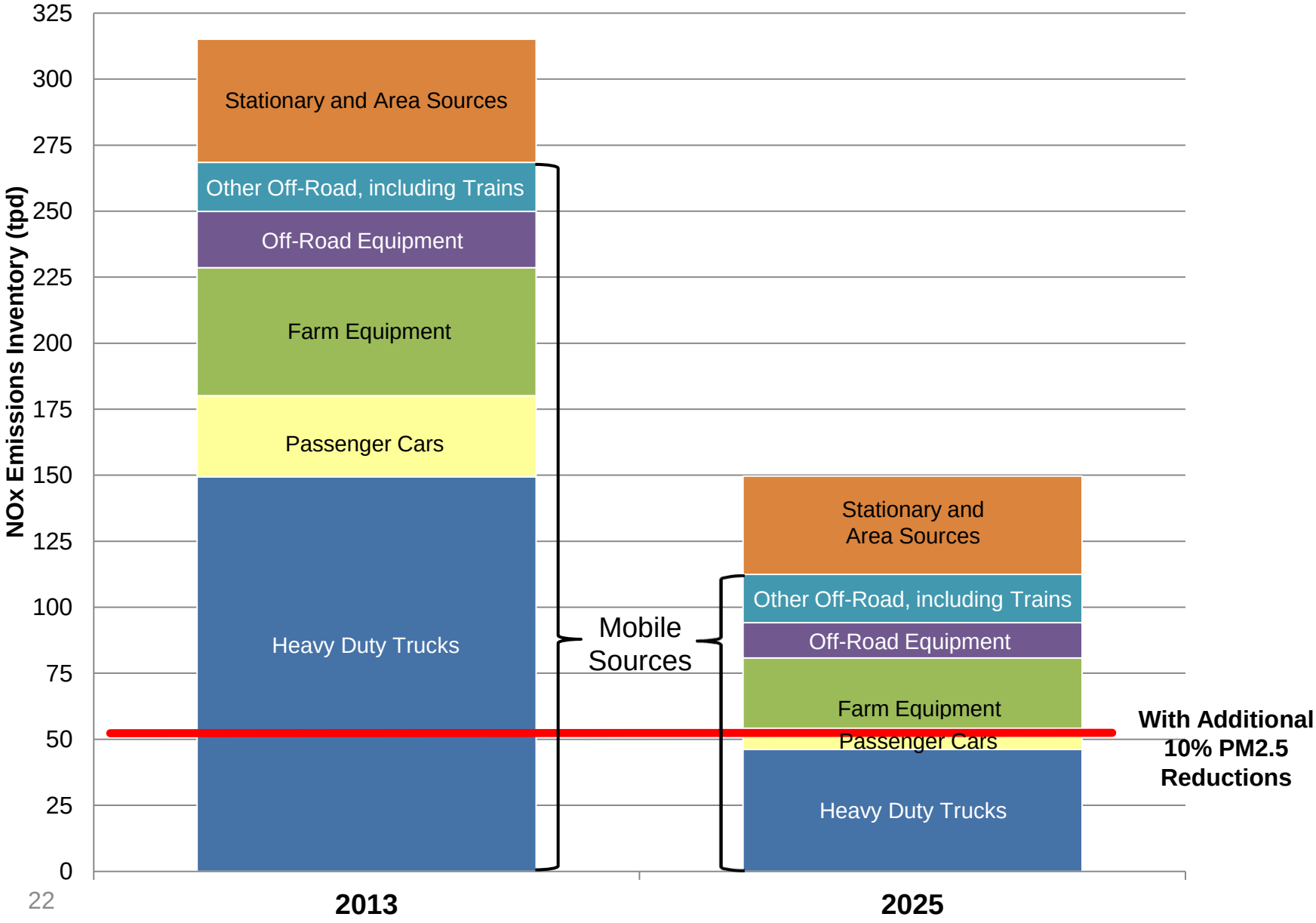
Projected Emissions Reductions Required for Attainment

(2006 24-hr PM2.5 Standard)



Projected Emissions Reductions Required for Attainment

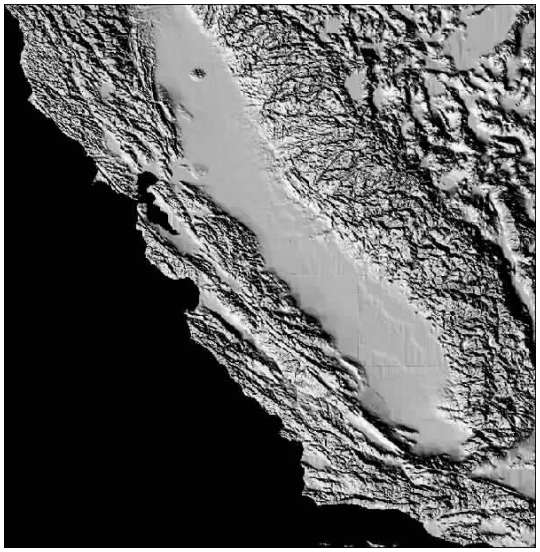
(2012 Annual PM2.5 Standard)

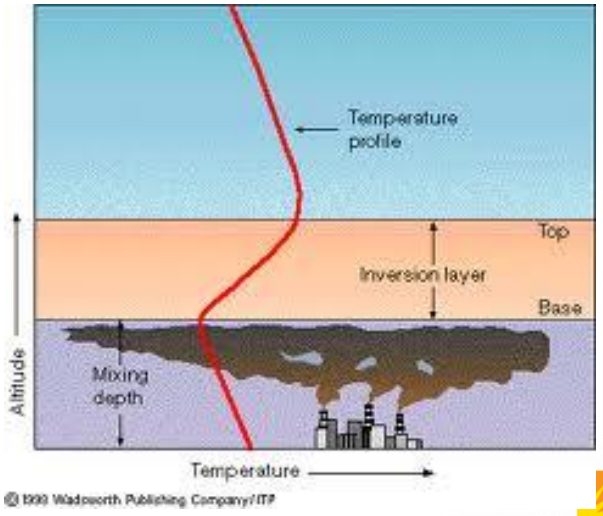


Progress Towards Attainment

Valley PM2.5 Challenges

- Geography and meteorology
- Temperature inversions
- Biogenic emissions
- Air pollution transport
- Population increases
- Ongoing drought

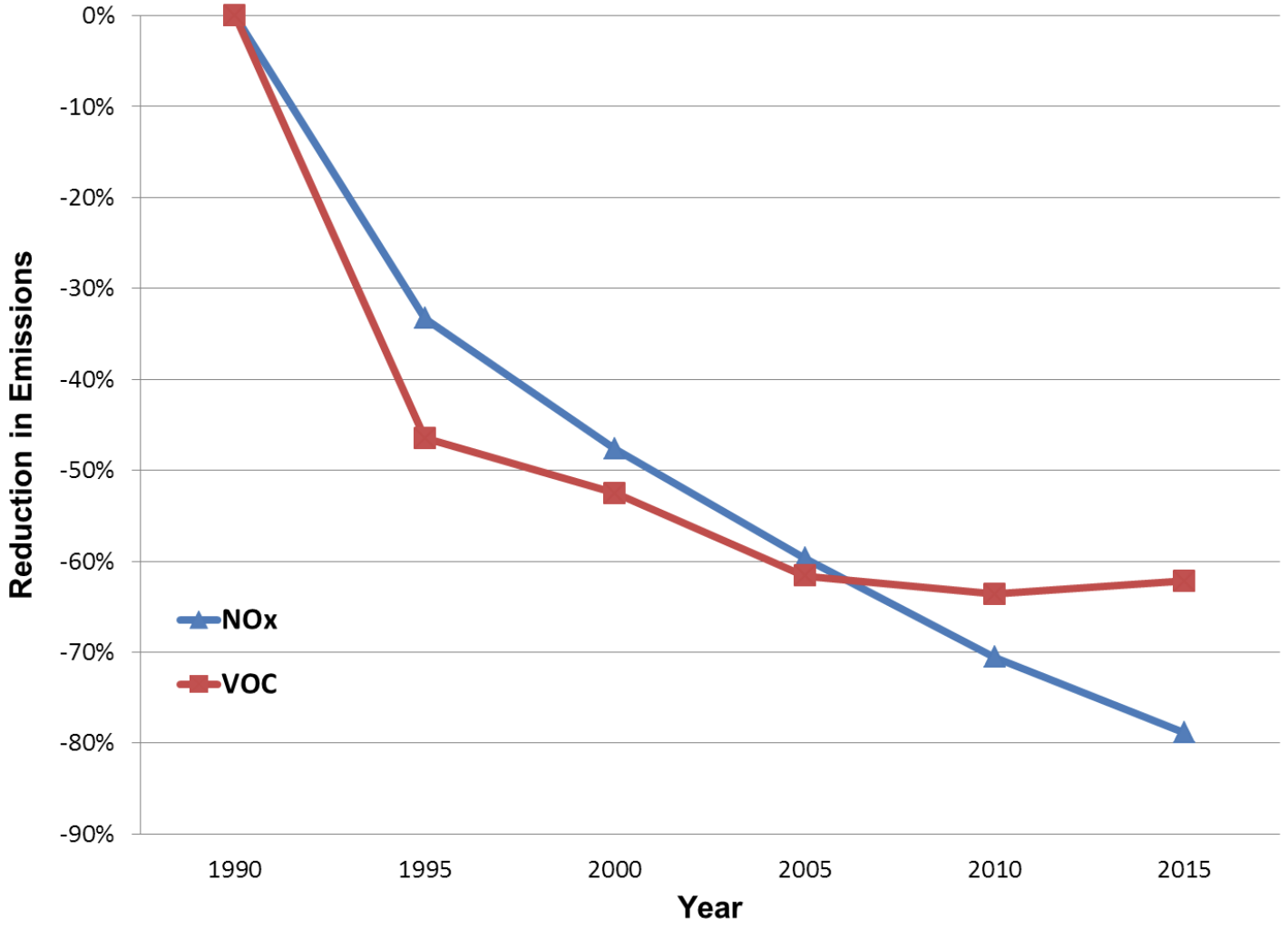




District's Strategy has Significantly Improved Air Quality in the Valley

- District has adopted numerous attainment plans
  - Toughest air regulations in the nation
  - Adopted over 600 stringent rules and regulations
  - Groundbreaking rules serve as model for others
  - Over 80% reduction in stationary source emissions
- $40 billion spent by businesses on clean air
- Strong incentive programs ($1.4 billion in public and private investment reducing 120,000 tons of emissions)
- Public education and participation
  - Build public support for tough measures adopted
  - Urge air friendly behavior by public
- Through these combined efforts, Valley's air quality better than any other time on record

Decrease in Stationary Sources Emissions



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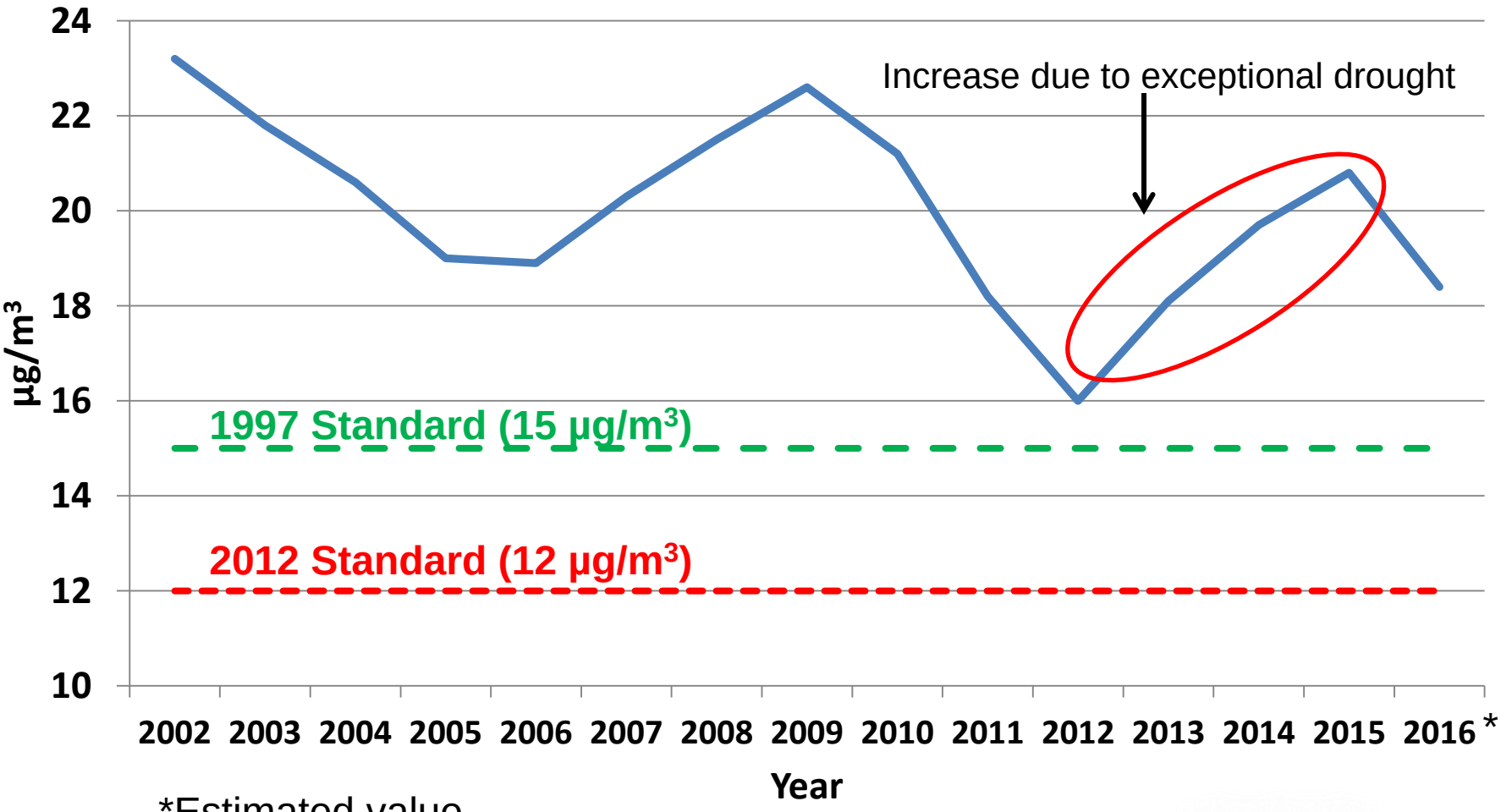
Trend in Valley's Annual PM2.5 Design Value



*Estimated value

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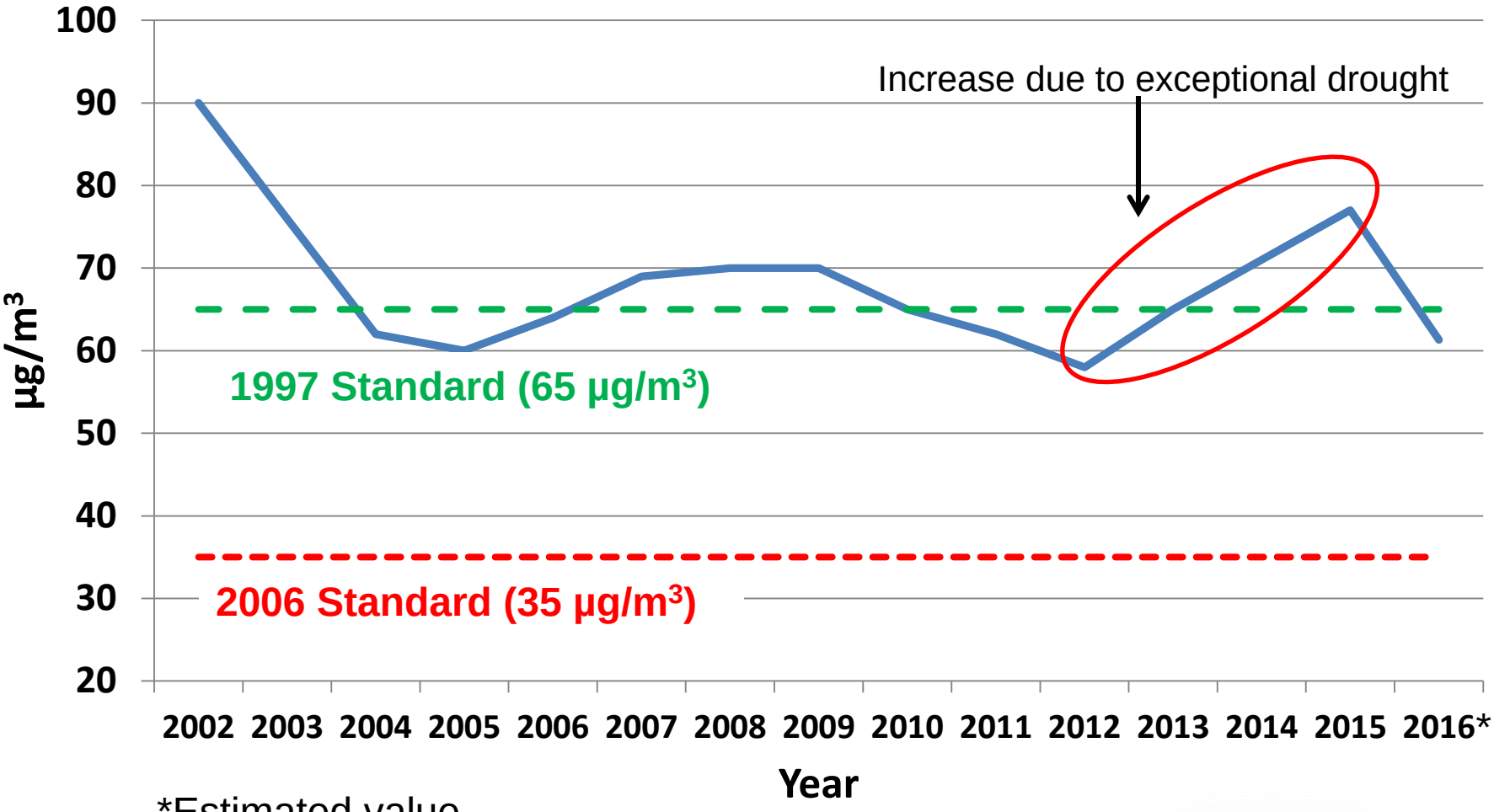
Trend in Valley's 24-hour PM2.5 Design Value



*Estimated value

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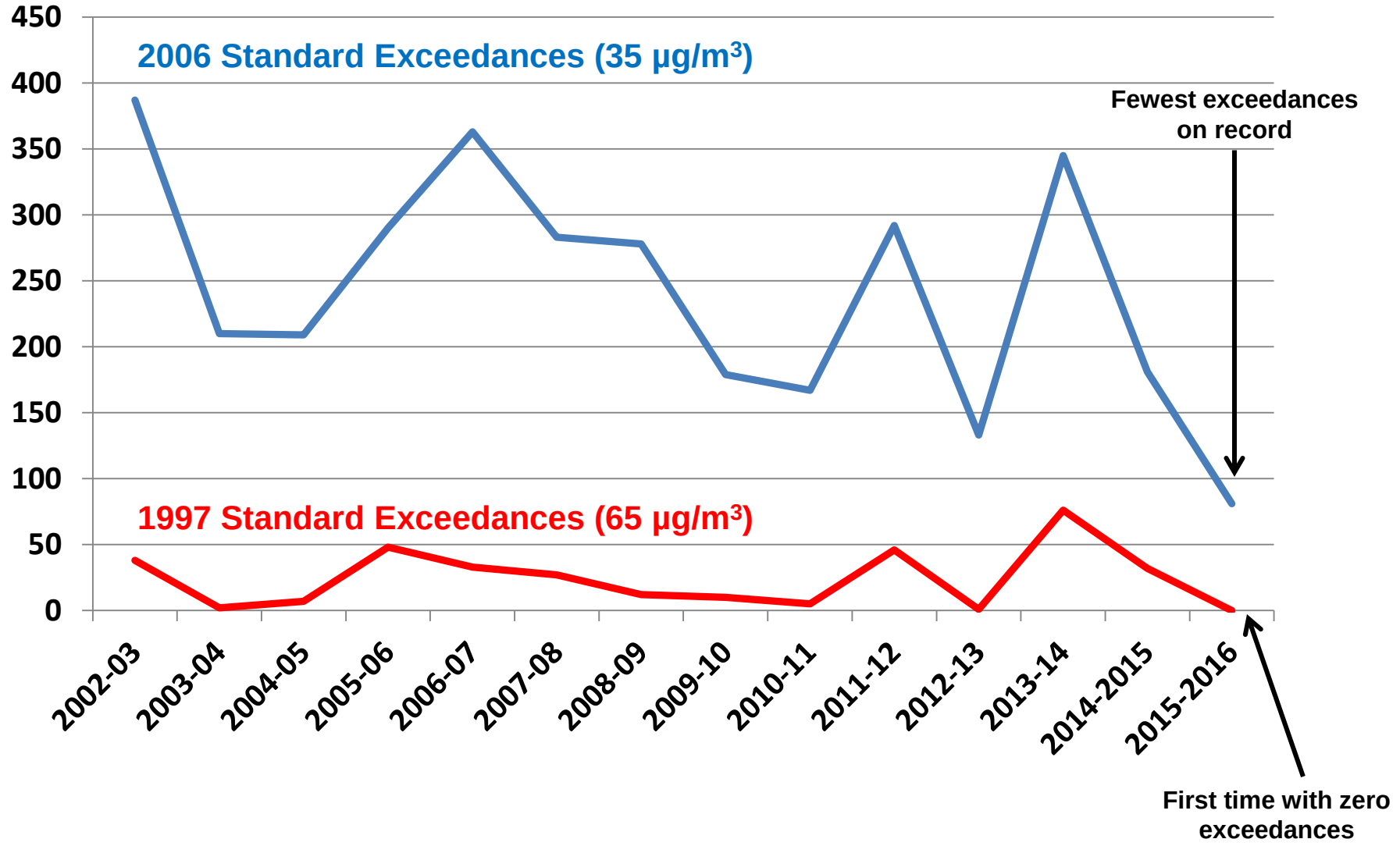
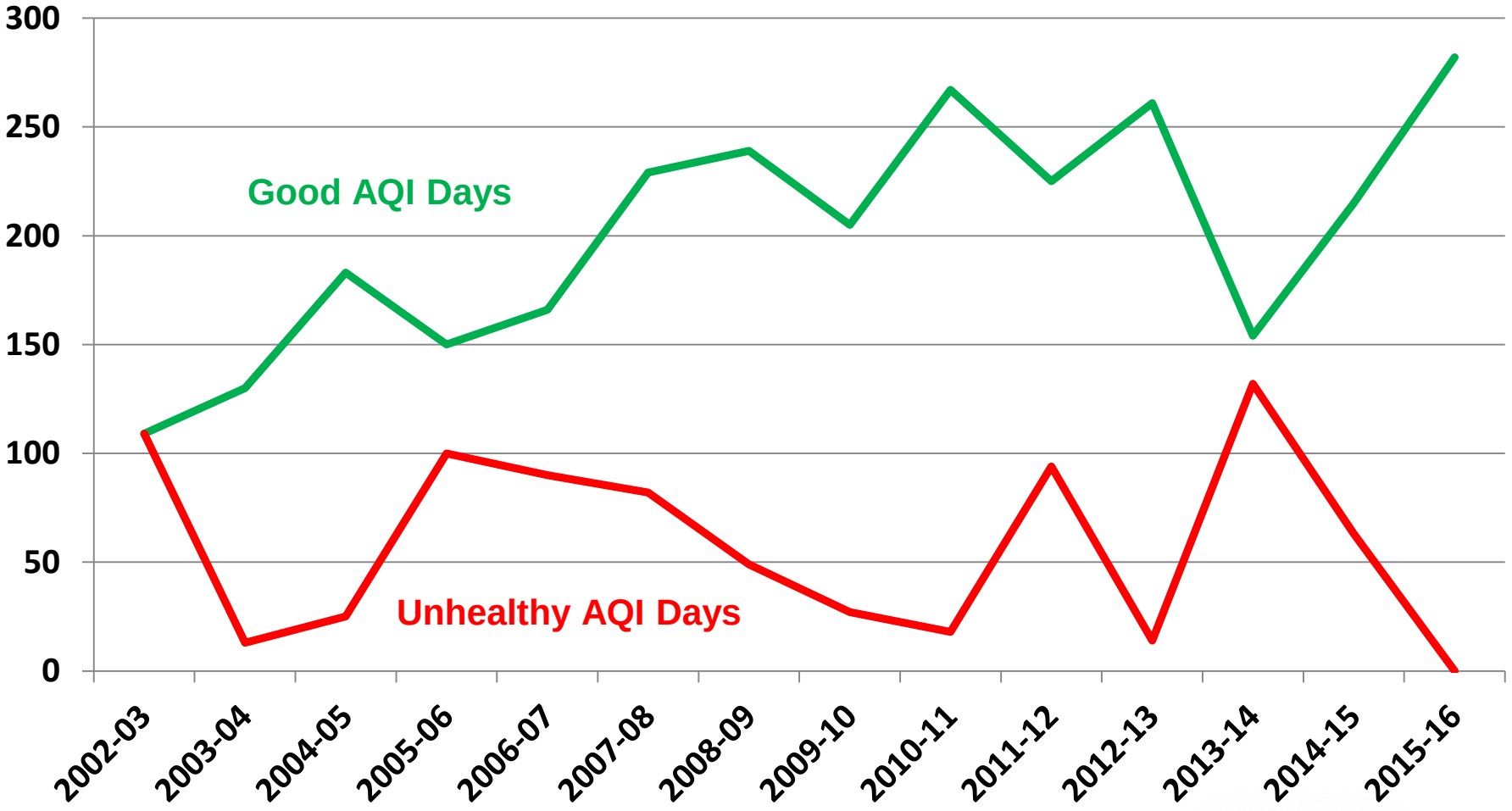
Trend in County-Days Exceeding 24-hour PM2.5 Standards per Winter Season (Nov-Feb)



Trend in PM2.5 Good and Unhealthy AQI County-Days per Winter Season (Nov-Feb)



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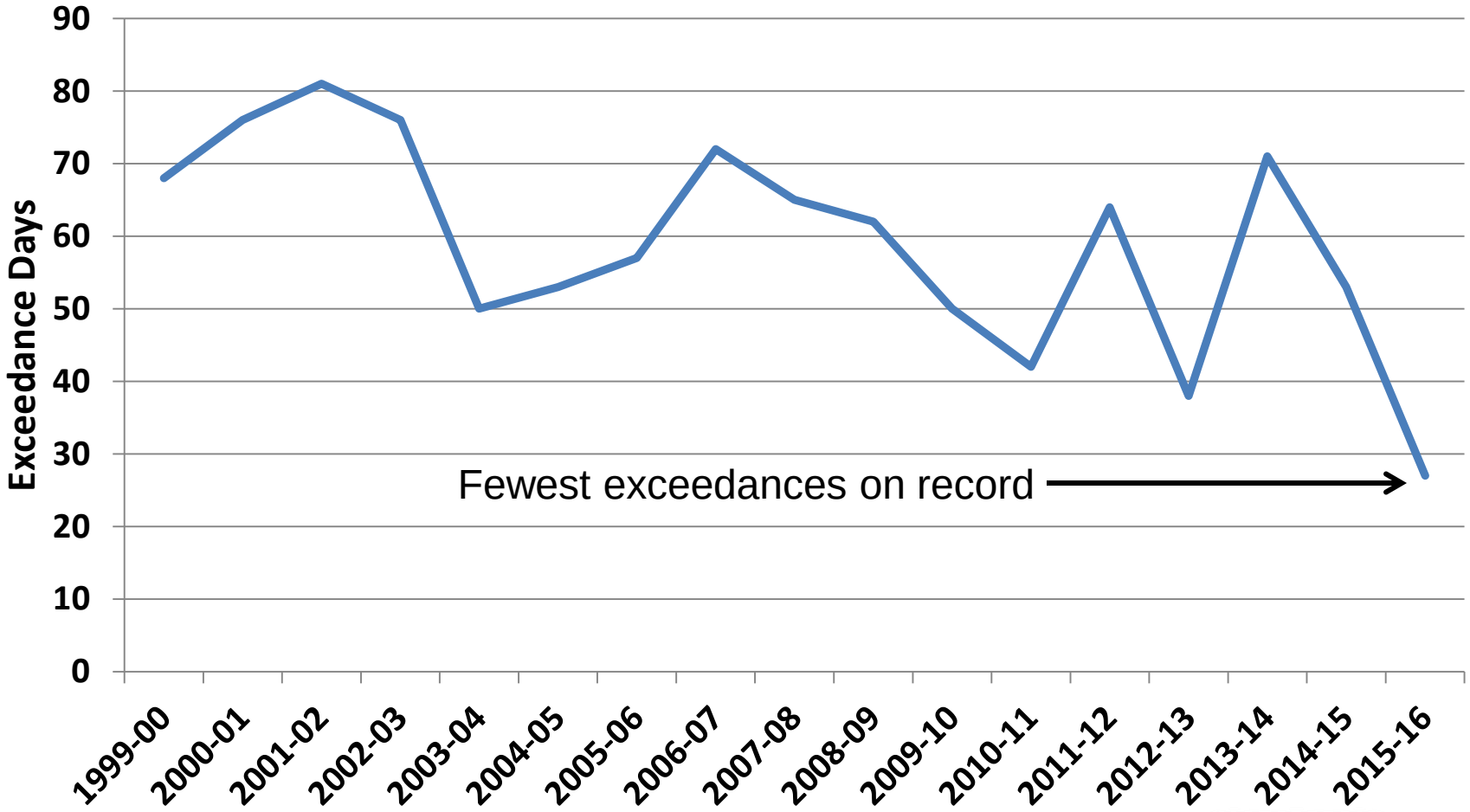
Days Valley Exceeded 35 µg/m^3 Standard during Wood-Burning Season (Nov-Feb)



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Federal Clean Air Act Mandates for PM2.5

PM2.5 Deadlines and Mandates

- 1997 Standard 24-hr (65 µg/m^3) and annual (15 µg/m^3)
  - District misled into thinking attainment deadline would be extended to 2020
  - Serious Attainment Deadline: 2015
  - 5% Plan due December 31, 2016
- 2006 Standard 24-hr (35 µg/m^3)
  - Serious Attainment Deadline: 2019 – plan due August 2017
    - Attainment demonstration requires clean data finding for 3 consecutive years 2017-2019 (must essentially reach attainment by 2017)
  - 5 year extension available
    - District will only ask for extension if reasonable mobile and stationary control measures are not adequate to achieve attainment

PM2.5 Deadlines and Mandates (cont'd)

- 2012 Standard annual (12 µg/m³)
  - Moderate Attainment Deadline: 2021
  - District adopted a Moderate Area Plan with impracticability demonstration and request for reclassification to Serious with 2025 deadline
    - ARB tabled adoption of plan and directed staff to return (Feb. 2017) with additional measures to reduce mobile and stationary source emissions in the pre-2025 timeline
  - 5 year extension to 2030 available
    - District will only ask for extension if reasonable mobile and stationary control measures are not adequate to achieve attainment

Federal Clean Air Act Requirements

- Plan must satisfy all applicable federal mandates, including:
  - Attainment Demonstration
  - Reasonable Available Control Measures (RACM)
  - Reasonable Further Progress (RFP)
  - Quantitative milestones
  - Contingency measures
  - Precursor Demonstration
  - Requirements for Major Sources
  - Emissions Inventory
  - Best Available Control Measures (BACM)
  - 5% annual reduction demonstration

Federal Clean Air Act Requirements

- The Clean Air Act requires an attainment plan to provide for attainment of the standard as expeditiously as practicable
- Plan must include specific enforceable emissions reductions necessary to demonstrate attainment by the applicable deadline in order to be approvable
- Plan emissions reductions must occur in sufficient quantity and time to achieve a future year design value that meets the applicable federal standard
  - Requires 3 consecutive years of clean data (e.g. 2019 attainment deadline requires 2017-2019 clean data finding)
- Failure to identify sufficient near term emissions reductions and develop approvable plan would subject Valley to devastating federal sanctions

Reasonably Available Control Measures (RACM)

- RACM is the collection of reasonable emissions reductions that, taken as a group, advance attainment of an air quality standard by at least one year for the Valley
  - Includes demonstrations from District, ARB, and Metropolitan Planning Organizations
- Put another way, the total of all potential emission reductions opportunities that are ***not*** included as plan commitments must not advance attainment by one year
- RACM are by definition, reasonable

Reasonable Further Progress (RFP)

- Reasonable Further Progress is the incremental emission reductions leading to the attainment date
- “Generally Linear Progress”
- State must submit an RFP plan that includes
  - Implementation schedule
  - RFP projected emissions for each quantitative milestone year
  - An analysis demonstrating this schedule of aggregate emissions reductions achieves significant progress

Quantitative Milestones

- Quantitative milestones to demonstrate RFP – met every 3 years until area is redesignated attainment
- Demonstrate RFP towards attainment of the applicable attainment date
- No later than 90 days after the date on which a milestone applicable to the area occurs, each State shall submit to EPA a demonstration that all measures in the approved plan have been implemented and that the milestone has been met

Contingency Measures

- Contingency measures are to be implemented if the area fails to meet progress targets (RFP) or attain by the applicable attainment date
- Contingency measures are extra emissions reductions that go into effect without further regulatory action
- Must start occurring automatically, without any further regulatory action
- Contingency measures difficult if not impossible to identify for areas like the San Joaquin Valley with mature air quality programs
  - Can lead to delayed cleanup if measures are delayed for later implementation as contingency

Precursor Demonstration

- EPA provides three approaches for demonstrating that a particular precursor is not a significant contributor to ambient PM2.5 levels that exceed the standard
  - Comprehensive Precursor Demonstration
  - Major Stationary Source Precursor Demonstration
  - Nonattainment New Source Review Demonstration
- EPA recently proposed new guidance on November 17, 2016 outlining requirements for evaluating precursor significance

Emission Inventory

- A comprehensive, accurate, current inventory of actual emissions from all sources of PM2.5 and PM2.5 precursors in the area
- District works closely with ARB and affected stakeholders to ensure the emission inventory is as accurate as possible
- District and ARB currently working on several enhancements to key emissions inventory categories:
  - Updated locomotive emissions
  - Paved and unpaved road dust emissions
  - Residential wood burning
  - Commercial charbroiling
  - Agricultural harvest and tillage activities

Best Available Control Measures (BACM)

- Serious area plans must implement best available control measures (BACM):
  - Maximum degree of emissions reductions achievable, considering technological and economic feasibility
  - More stringent and extensive implementation than RACM
  - Inclusive of BACT (at least as stringent as New Source Performance Standard and National Emission Standards for Hazardous Air Pollutants guidelines)

BACM Evaluation Process

1. Develop detailed emissions inventory of PM2.5 and precursor source categories
2. Model to determine which sources are significant and which are de minimis for PM2.5
3. Identify potential BACM in other SIPs or achieved in practice in other states for each significant source category, and for each measure evaluate the technological and economic feasibility
4. Compare potential BACM for each significant source category against control measures already adopted
5. Provide for the adoption of any BACM more stringent than existing measures or provide justification for rejecting the potential BACM (feasibility)

Requirements for “5% Plan” to Address 1997 PM2.5 Standard

- Required under Clean Air Act §189(d) for areas that fail to attain PM2.5 standard
- Required for 1997 PM2.5 Standard due to EPA’s inaction on District’s plan/extension request
- Requires 5% reduction in PM2.5 or precursor emissions annually until attainment
- Preliminary calculations indicate Valley has sufficient reductions through 2018, but significant additional reductions required in 2019 and 2020

District's Integrated PM2.5 Strategy

Foundation Includes Numerous Plans Already in Place

- *2007 PM10 Maintenance Plan* (1987 PM10 standard)
- *2007 Ozone Plan* (1997 8-hour ozone standard)
- *2008 PM2.5 Plan* (1997 PM2.5 Standard)
- *2012 PM2.5 Plan* (2006 PM2.5 Standard)
- *2013 Plan for the Revoked 1-hour Ozone Standard* (1979 1-hour ozone standard)
- *2015 PM2.5 Plan* (1997 PM2.5 Standard)
- *2016 Ozone Plan* (2008 Ozone Standard)
- *2016 PM2.5 Plan (2012 PM2.5 Standard)*

Control Measures Currently in Place

- Mobile Source Regulations (ARB)
  - Truck and Bus Regulation
  - Off-Road Regulation
  - Advanced Clean Cars
  - Expanded Passenger Vehicle Retirement
  - Smog Check Improvements
  - And more…
- Stationary/Area Source Regulations (District)
  - Combustion Devices
  - Industrial Processes
  - Coatings and Solvents
  - Oil and Gas
  - Managed Burning
  - Agricultural Processes
  - Residential and Commercial Sources
  - Waste Management
  - And more…

District Incentive Programs Provide Significant Emissions Reductions

- Highly successful, respected, and acclaimed
- Over $1.4 billion invested, achieving over 120,000 tons of emissions reductions
- Accelerate adoption of cleaner technologies
  - Address sources outside District authority
  - Reduce emissions ahead or beyond regulations
- Wide variety of incentive strategies
  - Heavy duty equipment (ag equipment, trucks)
  - Community incentives (vanpools, vehicle rebates, woodstove changeout, electric lawn mowers)

District Will Leave No Stone Unturned

Guiding Principles

Regulations

*Require businesses to reduce emissions, and enforce through permits and other mechanisms

*Must require at least BACM – District rules extend well beyond these requirements

Incentives

*Reduce emissions through voluntary incentive programs

*Most cost-effective emissions reductions available

*Critical to continue securing additional funding

Technology Advancement

*New technology needed to meet increasingly difficult federal air quality standards

*Promote advancement of new technologies through incentives and other efforts

Outreach and Policy Efforts

*Outreach to residents and businesses to assist with rule compliance and encourage voluntary efforts to reduce emissions

*Adopt and pursue policy positions through legislative and other avenues

District Control Measures Under Consideration

Leave No Stone Unturned

- San Joaquin Valley Healthy Soils Initiative aimed at reducing directly emitted particulate matter while enhancing crop yield
  - Evaluate further practices that minimize dust from wind erosion and soil disturbances while improving soil health
- Enhanced Conservation Management Practices (CMP) for ag operations to reduce directly emitted particulate matter
  - Current rule reduces PM emissions by over 34 tons/day
  - Evaluate all feasible opportunities for additional emissions reductions

District Control Measures Under Consideration

Leave No Stone Unturned

- Continue to develop commercially available and working control technologies for underfired charbroilers
  - Under-fired charbroiler technologies not fully tested and need further evaluation and demonstration in Valley
  - Board approved $750,000 to fund Restaurant Charbroiler Technology Partnership program for demonstration projects to assess feasibility and effectiveness
  - Despite efforts to promote funding, District has faced difficulty in identifying proven technologies and finding restaurants willing to participate
    - Only one restaurant currently demonstrating technology (1 year)
    - One restaurant under contract to begin demonstration
    - No other regions have adopted successful regulations or deployment of technology

District Control Measures Under Consideration

Leave No Stone Unturned

- Enhanced NOx control requirements for flares (Rule 4311)
  - Amend rule to include additional ultra-low NOx flare emission limitations for existing and new flaring activities at Valley facilities to the extent that such controls are technologically achievable and economically feasible, by Dec 31, 2017
  - Amend rule to include additional flare minimization requirements to the extent that such controls are technologically achievable and economically feasible, by Dec 31, 2017

District Control Measures Under Consideration

Leave No Stone Unturned

- Regulatory and incentive-based strategies to electrify agricultural irrigation pumps in areas impacting peak PM2.5 sites in the Valley and where access to electricity is available
  - Ag irrigation pump emissions already reduced by over 80% under Rule 4702 (ag sources still facing looming compliance deadlines)
  - Need to assess economic feasibility of lowering NOx emissions limit for ag engines (current limits lower than non-ag in recognition of rural operation and other limitations)
  - Need additional local, state, and federal incentive funding to accelerate transition

District Control Measures Under Consideration

Leave No Stone Unturned

- Explore the feasibility of prohibiting wood-burning devices in new homes on parcels with two homes or less per acre
  - Current rule already prohibits wood burning devices in homes on parcels with higher density

- Tighter NOx controls for glass plants matching control levels already achieved in practice in the Valley
  - District rule limit of 1.5 lb-NOx/ton of glass pulled
  - District facilities currently meeting 0.6-0.8 lb/ton of glass pulled

- Explore additional SOx controls for glass plants
  - Evaluate the potential for additional reductions from the use of scrubbing or other technologies

District Control Measures Under Consideration

Leave No Stone Unturned

- Enhanced NOx control requirements for boilers and steam generators with a total rated heat input greater than 5 MMBtu/hr
  - Assess lower NOx emission limits based on recent installations and latest technologies
- Explore additional NOx control requirements for boilers and steam generators with a total rated heat input less than or equal to 5 MMBtu/hr

District Control Measures Under Consideration

Leave No Stone Unturned

- Given decline of biomass industry that has served as cleaner alternative for open burning of agricultural waste, continue to identify and develop other alternatives
  - Avoid relaxing prohibitions on agricultural burning where no feasible alternatives are available
  - Explore use of pyrolysis/gasification to convert biomass to syngas, biochar, or other forms of energy
  - Explore use of biomass as mulch/land application/soil incorporation

District Control Measures Under Consideration

Leave No Stone Unturned

- Local funding for replacement of agricultural tractors
- Local funding for replacement of heavy duty trucks
- Local funding for replacement of locomotives
- Local funding for replacement of light-duty vehicles
- Local funding for replacement of construction and other off-road equipment
- Local funding for demonstration of advanced emission reduction technologies through the District's Technology Advancement Program

District-Recommended Mobile Source Measures for ARB Consideration

- Work with ARB to ensure that the State provides all possible mobile source control strategies including incentive-based measures that result in additional reductions in emissions beyond those included in the current control programs
- Revise Mobile Source Strategy to include measures that reduce mobile sources emissions of NOx, directly emitted PM2.5, SOx, and black carbon in the Valley within the 2019-2025 timeframe
- Enhance public fleet regulations allowing for near-zero emissions technologies to achieve near-term reductions

District-Recommended Mobile Source Measures for ARB Consideration

- Add San Joaquin Valley to areas of focus for fuel cell technology development and deployment
  - Valley essentially ignored under current State strategy
- Recognize Valley's need for near-zero emissions technologies that can provide reductions in the more immediate timeframe (2019-2025)
  - Allow for and encourage the use of natural gas that can serve as a bridge to renewable gaseous fuels
- Compel ARB to provide incentive funding to replace residential wood-burning devices in the San Joaquin Valley

District-Recommended Mobile Source Measures for ARB Consideration

- Provide incentive funding to replace heavy-duty diesel trucks
- Provide incentive funding to replace locomotives
- Provide incentive funding to replace light-duty vehicles
- Provide incentive funding to replace construction and other off-road equipment
- Provide incentive funding to replace agricultural equipment

District-Recommended Mobile Source Measures for ARB Consideration

- Provide incentive funding to provide infrastructure for zero and near-zero passenger and goods movement technologies
- Do not overly relax State's portable engine regulation beyond what is necessary to accommodate unavailability of compliant portable engines

Public Outreach Process

Extensive Public Outreach Process

- District's public process will provide multiple opportunities for public and stakeholders to provide comment, ask questions, and request additional information
  - Conduct multiple public workshops
  - Reconvene Public Advisory Workgroup meetings
  - Provide monthly updates at District Governing Board hearings, Citizens Advisory Committee meetings, and Environmental Justice Advisory Group meetings

Public Advisory Workgroup

- Under the guidance of the Board, the APCO formed the Public Advisory Workgroup (PAW) ad hoc committee
- Members consist of representatives from regulated entities (industry, farms, dairy families and municipalities), community advocates, and advisors from EPA and ARB
- The PAW committee will hold numerous meetings which will also be open to the public
- District will reconvene PAW in January

Next Steps in Plan Development Process

- Work with ARB to conduct in-depth air quality modeling that more precisely and accurately predicts PM2.5 concentrations at peak monitoring sites
- Work with ARB to ensure that the State provides all possible mobile source control strategies including incentive-based measures that result in additional reductions in emissions beyond those included in the current control programs
- Evaluate stationary sources for potential emission reduction opportunities under District's jurisdiction
- Schedule additional public workshops
- Reconvene PAW committee meetings
- ARB to continue with public workshops leading to February 2017 report to ARB Board

Timeline and Next Steps

December 2016	• District scoping meeting • ARB workshop
January – July 2017	• District public workshops to discuss proposed plan elements • Public Advisory Workgroup Committee Meetings to discuss potential emission reduction opportunities • ARB public workshops and ARB report on recommended additional measures (Jan-Feb)
Ongoing	Updates at public meetings (Governing Board, Citizens Advisory Committee, Environmental Justice Advisory Group) with opportunities for public input
August 2017	District Governing Board public hearing to consider adoption of the proposed plan

Additional Information

- Up-to-date information available at www.valleyair.org/integrated-pm25-plan
- PM Plans email sign up available at http://www.valleyair.org/lists/list.htm
- Receive email updates on the development of this plan and future air quality attainment plans
- Email comments to airqualityplans@valleyair.org

Open Discussion

webcast@valleyair.org