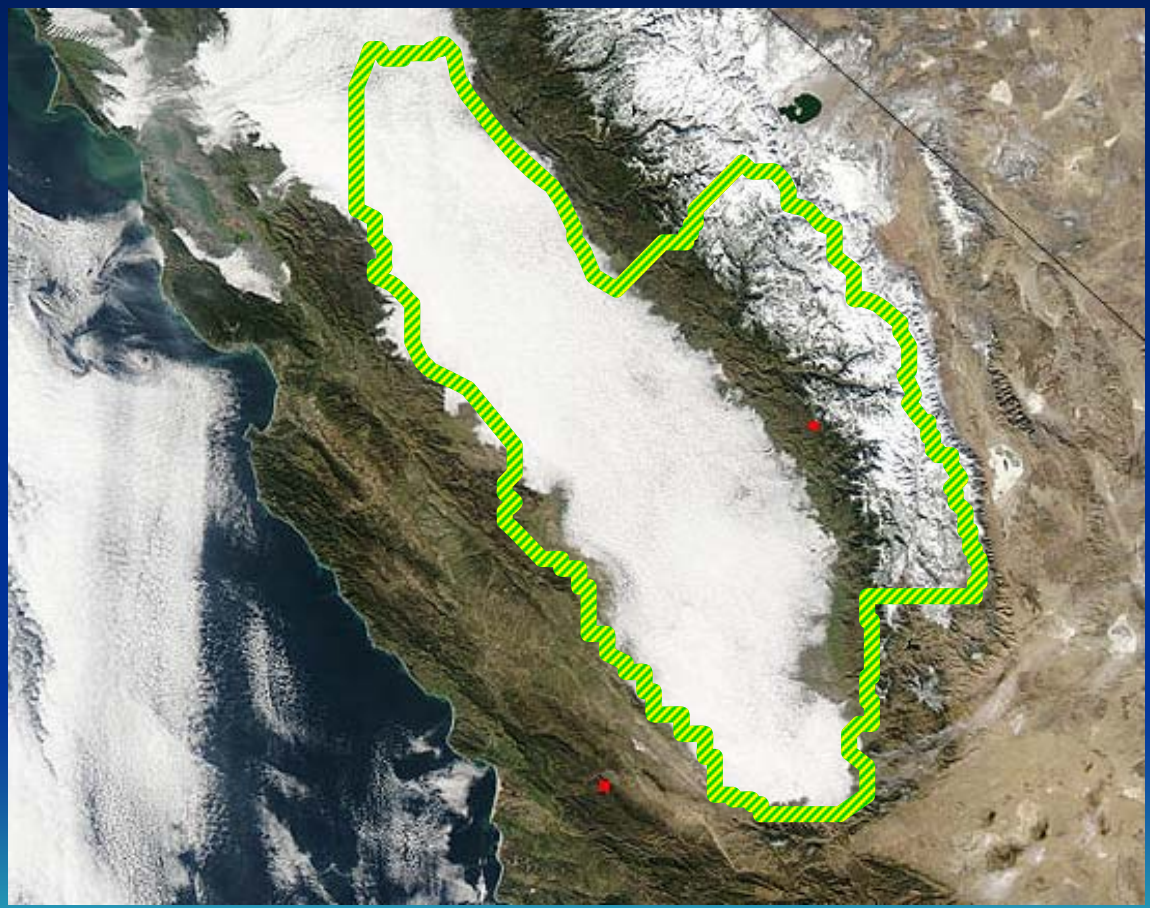
San Joaquin Valley Regulations and Beyond

December 12, 2006

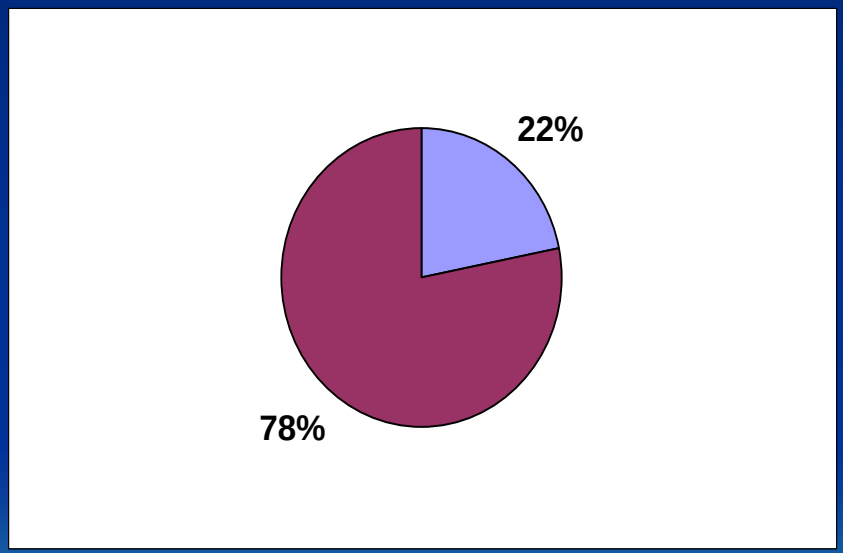
Why is the San Joaquin Valley Prone to Air Pollution?



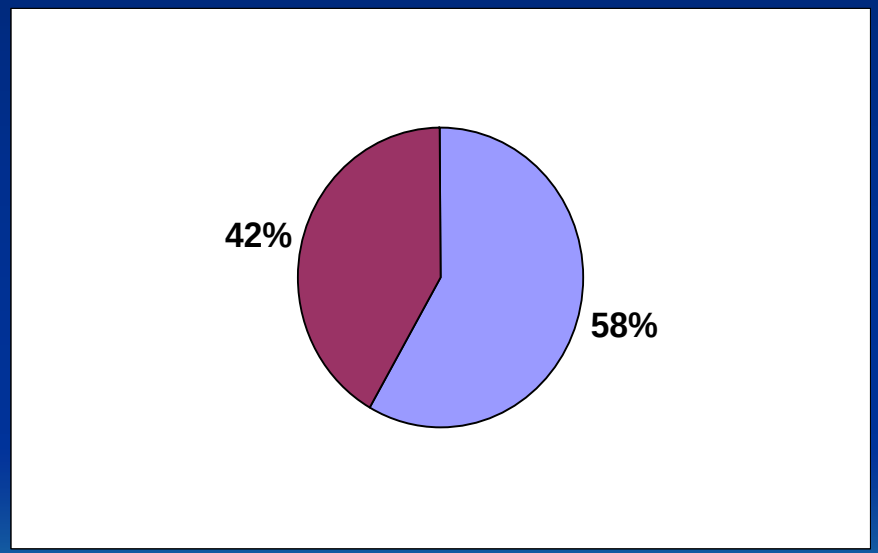
- Topography and weather create ideal conditions for serious air pollution

78% of NOx emissions and 42% of ROG emissions in 2005 were from mobile sources.

Nitrogen Oxides (NOx)

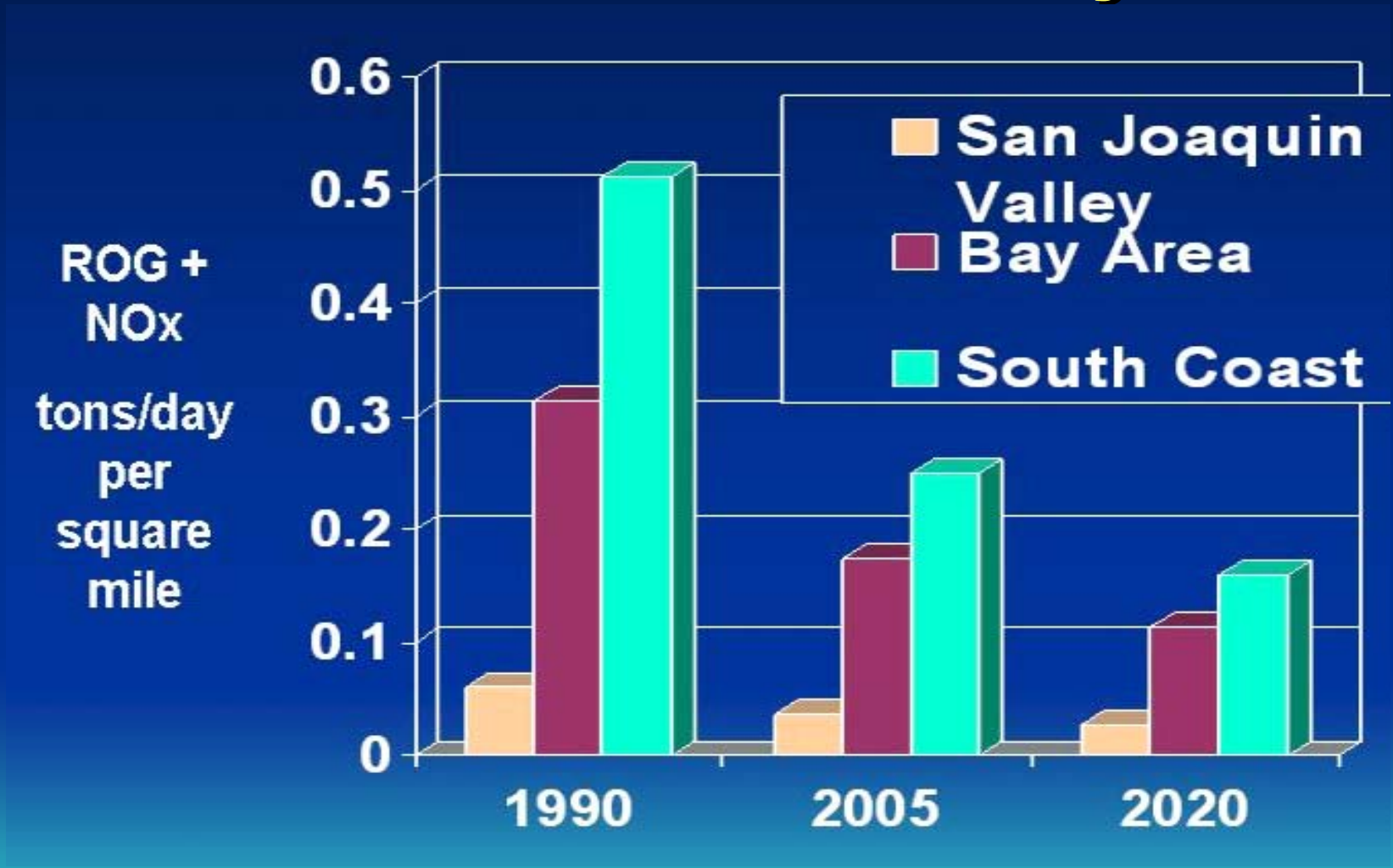


Reactive Organic Gases (ROG)



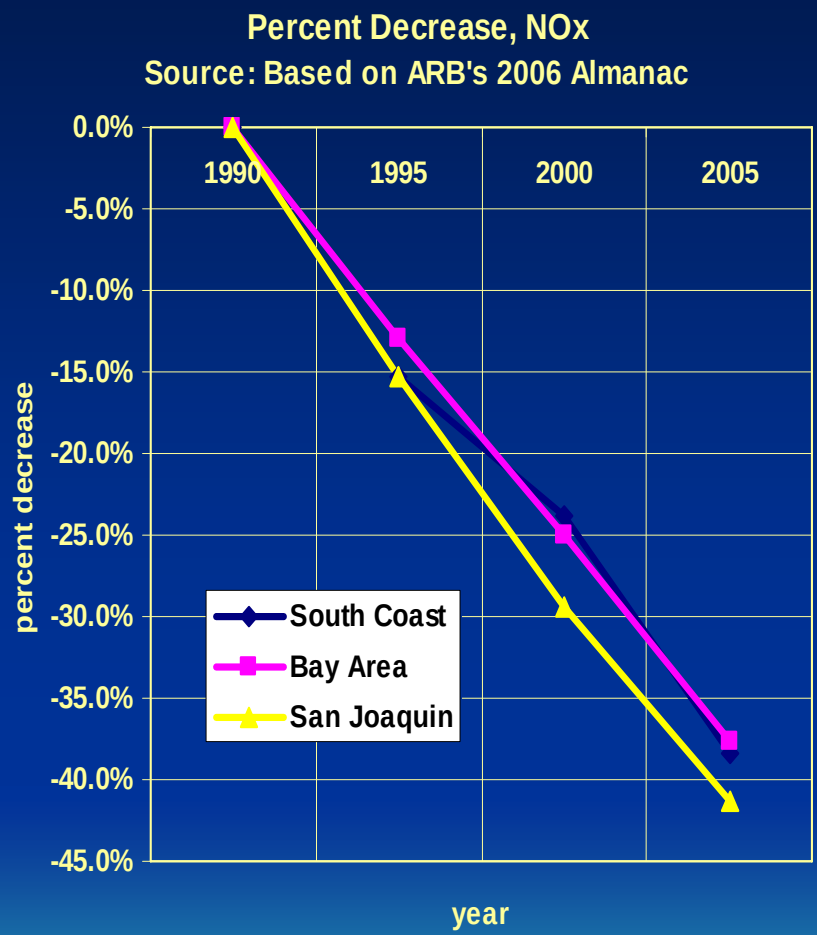
Mobile Sources Stationary Sources

Pollution Density



Emissions Comparison

- The Valley has reduced emissions at the same rate or better than other areas in California.
- Similarity of Valley and South Coast air quality problems reflects Valley's low tolerance for air pollutant emissions



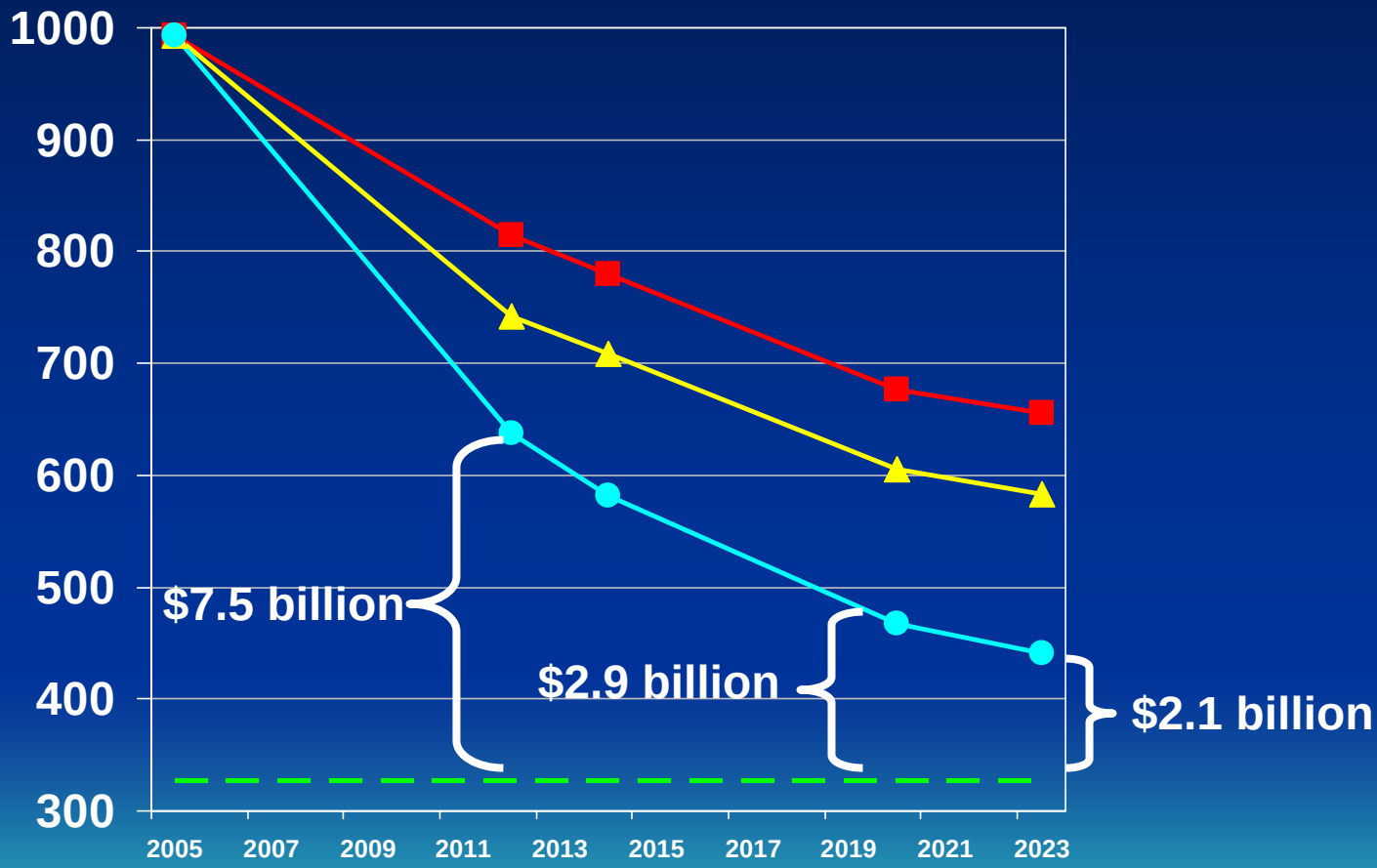
Past District Regulatory Efforts

- **The District has toughest rules in the state**
- **Over 500 rules & amendments since 1992**
  - **Fireplaces**
  - **Voluntarily expanded Smog Check II testing**
  - **Wine production and storage**
  - **Conservation Management Practices (farms)**
  - **Indirect Source Review (development)**
  - **Confined Animal Feeding Operations**
  - **Engines, boilers, turbines, glass-melting furnaces**

What is Needed for SJV to Attain the Federal Standards?

- Computer models are used to establish a "carrying capacity," the emissions level the atmosphere can "carry" and attain
- The SJV's carrying capacity indicates that 2012 NOx and VOC emissions each need to be reduced by about 60%
- The combined NOx+VOC inventory for 2012 is 815 tpd, so about 480 tpd of reductions are needed

Bridging the Gap



4-Faceted Control Strategy

- Regulatory component (District rules)
- Incentive-based strategies
- Alternative compliance
- Local, state, and federal sources/partnerships

Reductions from Control Measures

- New reductions from recent District rules (not yet in inventory) = 72 tons/day by 2012
- Reductions from new District rules & programs = 46 tons/day by 2012
- Reductions from state & federal mobile source emissions = 80 tons/day by 2014
- Balance from incentive-based programs funded by local, state & federal funds

New District Control Measures

- **Exhaustive evaluation**
  - **Analyzed all District NOx & VOC rules**
  - **Comparison with other districts: South Coast, Bay Area, & Ventura County**
- **Investigated control measures from other nonattainment areas**

  - South Coast, Sacramento, Houston
- **Six town hall meetings- ideas from public**
- **Modeling scenarios for episodic, geographic controls.**

Innovative Controls Being Considered

- Green Contracting: require municipalities and private sector to select air-friendly products and services
- Employer-Based Trip reduction: require employers to promote ridesharing
- Accelerate Fleet Turnover: require public fleet operators to modernize fleets and deploy lowest-emission vehicles
- Indirect Source Review: apply to more projects, require longer reductions
- Alternative Energy Strategies: sustainable energy projects to mitigate increase in fossil fuel electrical generation

ARB Controls

- Existing Light Duty Auto. Controls Will Continue to Provide Benefit
- New Near-Term Reductions
  - Smog Check Improvements
  - Expanded Fleet Mod. Program
  - Emission Reduction Plan for Goods Movement and Ports
- Long-Term Regulations Requiring Fleet Modernization

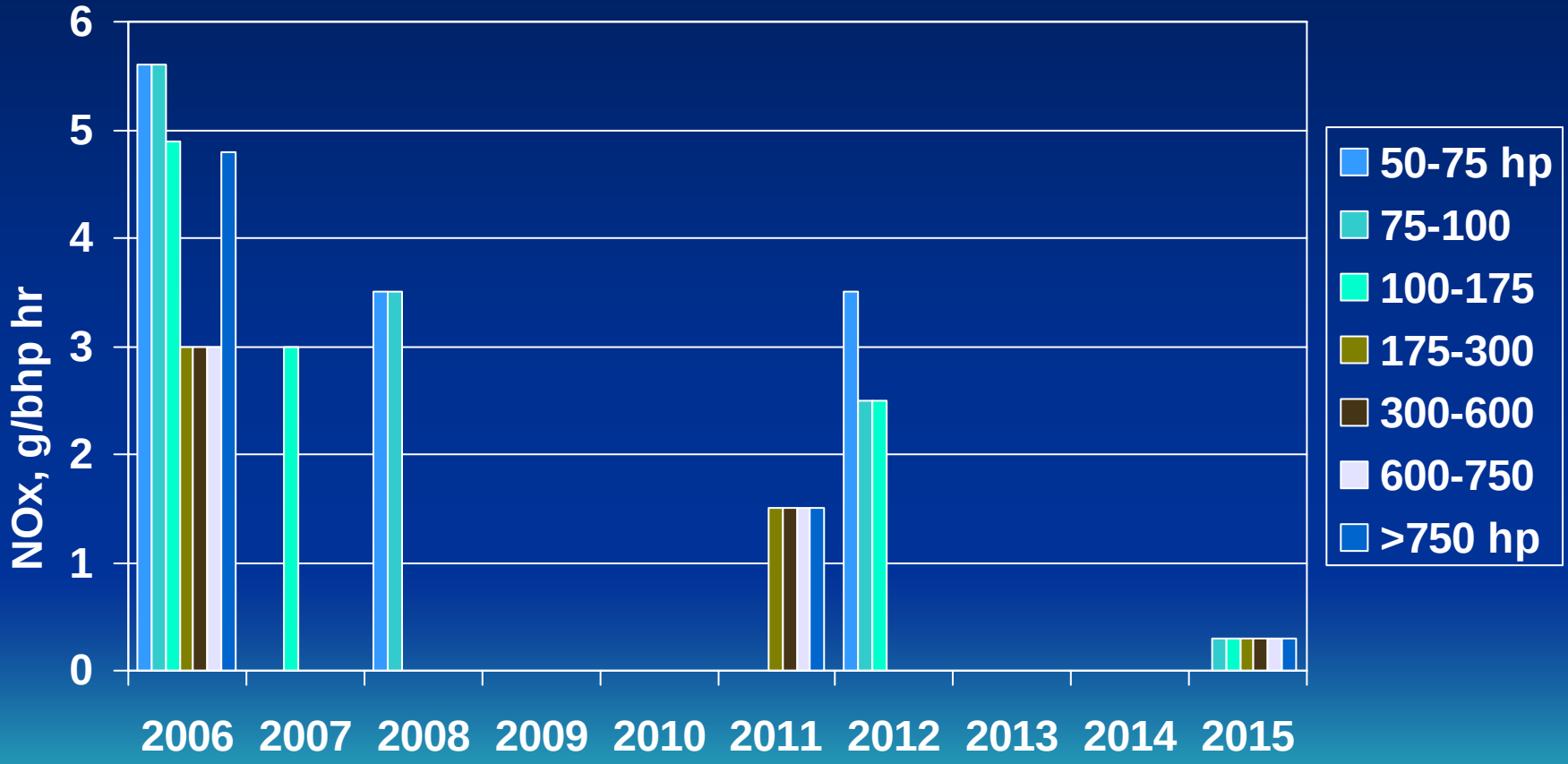
EPA On-Road Standards

- Phase in Standards for New Vehicles
  - 2004-2006=2.4 or 2.5 gram/bhp NOx
  - 2007=1.2 grams/bhp NOx
  - 2010=.2 grams/bhp NOx
- Substantial phase-in period as vehicles are replaced
- Opportunity for Incentive Funds to Accelerate turnover

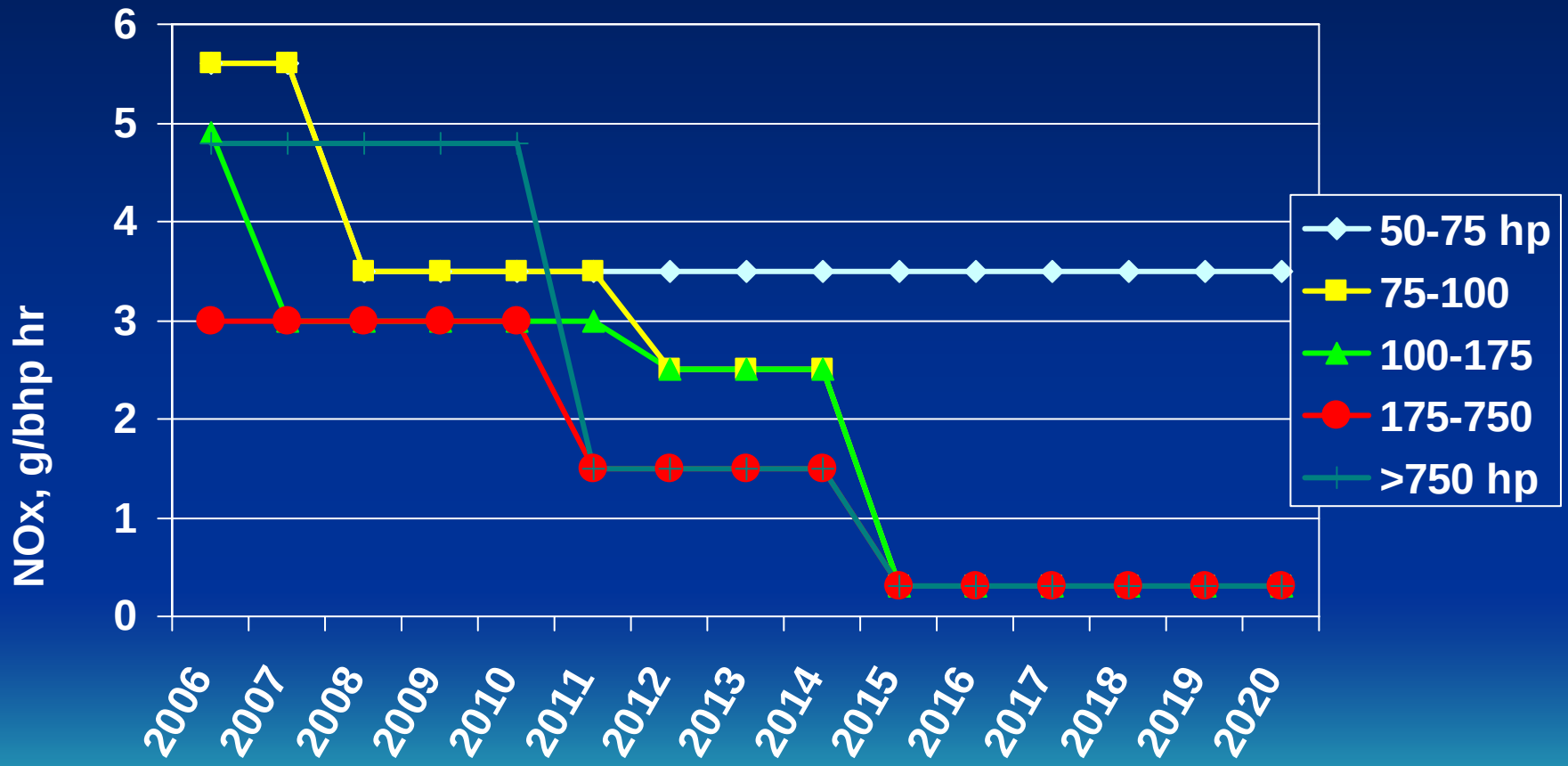
EPA Off-Road Standards

- Tiered Standards Based Upon Horsepower
  - Tier I 1999-2006=6.9 grams/bhp NOx
  - Tier II 2001-2011=4.6 grams/bhp NOx+HC
  - Tier III 2005-2012=3.0 grams/bhp NOx+HC
  - Tier IV 2008-2012=0.3 grams/bhp NOx+HC
- Substantial phase in as vehicles are replaced
- Opportunity for Incentive Funds to Accelerate Turnover

US EPA Off-Road Engine NOx Standards



US EPA Off-Road Engine NOx Standards



Locomotive Standards

- Tiered Standards Based Upon Locomotive Age
  - Tier 0 (1973-2001 Model Years)
    - 9.5 grams/bhp NOx
  - Tier I (2001-2004 Model Years)
    - 7.4 grams/bhp NOx
  - Tier 2 (2005 and Later Model Years)
    - 5.5 grams/bhp NOx
  - New Standards Proposed as early as 2011
    - EPA has indicated likely delay to 2015

Opportunities for Additional Federal Reductions

- Timely New Locomotive Controls
  - EPA Proposing delay from 2011 to 2015
- Mitigate Impact from Prescribed Burning in Nat. Forests/Parks (Avg. 11 tons/day VOC)
- Mitigate Impact from NAFTA Trucks
- Tighten Corporate Average Fuel Economy Standards (CAFÉ)

Expediting Attainment

- Additional funding for incentives can…
- Expedite attainment
- NOx emission inventory is dominated by mobile sources – 78% in 2005
- Federal Regulations Apply to New Vehicles
- Natural turnover of vehicle fleet is too slow for expeditious attainment

How much funding is needed to "bridge the gap"?

- Emissions reductions cost ~$7,000/ton
- For a permanent reduction (>10 years), cost is $25 million per ton/day
  - ($7,000*365*10) ≅ $25.6 million
- 2012 "gap" is ~300 t/d
- 300 t/d * $25 million per ton/day = $7.5 billion
- Costs to "bridge the attainment gap"
  - $7.5 billion for attainment in 2012
  - $2.9 billion for attainment in 2020
  - $2.1 billion for attainment in 2023

District Incentive Programs

- Voluntary incentive programs utilized to promote early introduction of reduced emission technologies
  - On-Road Heavy-Duty Vehicles
    - Fleet modernization – replace older high-emitting trucks (21.11 g/mi NOx) with new trucks (6.36 g/mi NOx) achieving 84% NOx reduction
    - Retrofit – NOx and/or PM retrofit devices to reduce PM by 80% and NOx by 25%
    - Potential Reductions – 126 tons/day
  - Off-Road Heavy-Duty Vehicles
    - Construction, mining, tractors, forklifts – replace old uncontrolled Tier 0 engines/vehicles with new Tier 3&4 engines resulting in 50%-75% reduction
    - Retrofit – NOx and/or PM retrofit devices to reduce PM by 80% and NOx by 25%
    - Potential Reductions - 55 tons/day

District Incentive Programs

- School Buses
  - Replace pre-1987 buses (16.65 g/mi NOx) with new 2007 buses (0.51 g/mi NOx) achieving a 97% reduction
  - Retrofit – NOx and/or PM retrofit devices to reduce PM by 80% and NOx by 25%
  - Potential Reductions - 1 ton/day
- Agricultural Irrigation Pump Engines
  - Engine replacement - old uncontrolled Tier 0 engines/vehicles with new Tier 3&4 diesel and natural gas engines and zero emission electric motors resulting in 50%-100% reduction
  - Retrofit – PM retrofit devices to reduce PM by 80%
  - Potential Reductions - 10 tons/day

District Incentive Programs

- **Locomotives**
  - Engine replacement of line haul/passenger and switcher locomotives – uncontrolled Tier 0 (1973-2001) engines (9.5-14 g/bhp-hr) with newer Tier 1&2 engines (11-5.5 g/bhp-hr) resulting in 42% reduction
  - Idle reduction technologies will turn off engine when not in use resulting in a 30% reduction
  - Potential Reductions - 9 tons/day
- **High-Emitting Passenger Vehicles**
  - Crush – target off-cycle high emitting vehicles for destruction
  - Replacement – high emitting vehicles with late model low-emission vehicles achieving a 30% reduction
  - Potential Reductions - 9 tons/day

Innovative Strategies

- Moving Freight Off of Trucks
  - New Rail Capacity to Ports
  - Short Sea Shipping
- High-Speed Rail
- Employer Based Travel Demand Programs (Rideshare, Vanpool, Tele-Work)
- Vehicle Scrapping Programs for Gross Polluters

Air Quality Empowerment Zone

- Establish New Program for Area That
  - Severe or Extreme Ozone Non-Attainment
  - PM2.5 Non-Attainment
  - Unemployment 40% over national average
- Umbrella for Federal Assistance
  - Tax Incentives For Fleet and Plant Mod.
  - Enhanced funding through DERA
  - Additional Incentive Programs