



# EPA's Clean Diesel Program

*Gene Tierney*

*Assistant Director*

*Office of Transportation and Air Quality*

# Overview

- ➔ Highway Diesel Program
- ➔ Nonroad Diesel Program
- ➔ In-use Diesel Program
- ➔ New Diesel Program

# Systems Approach to Control

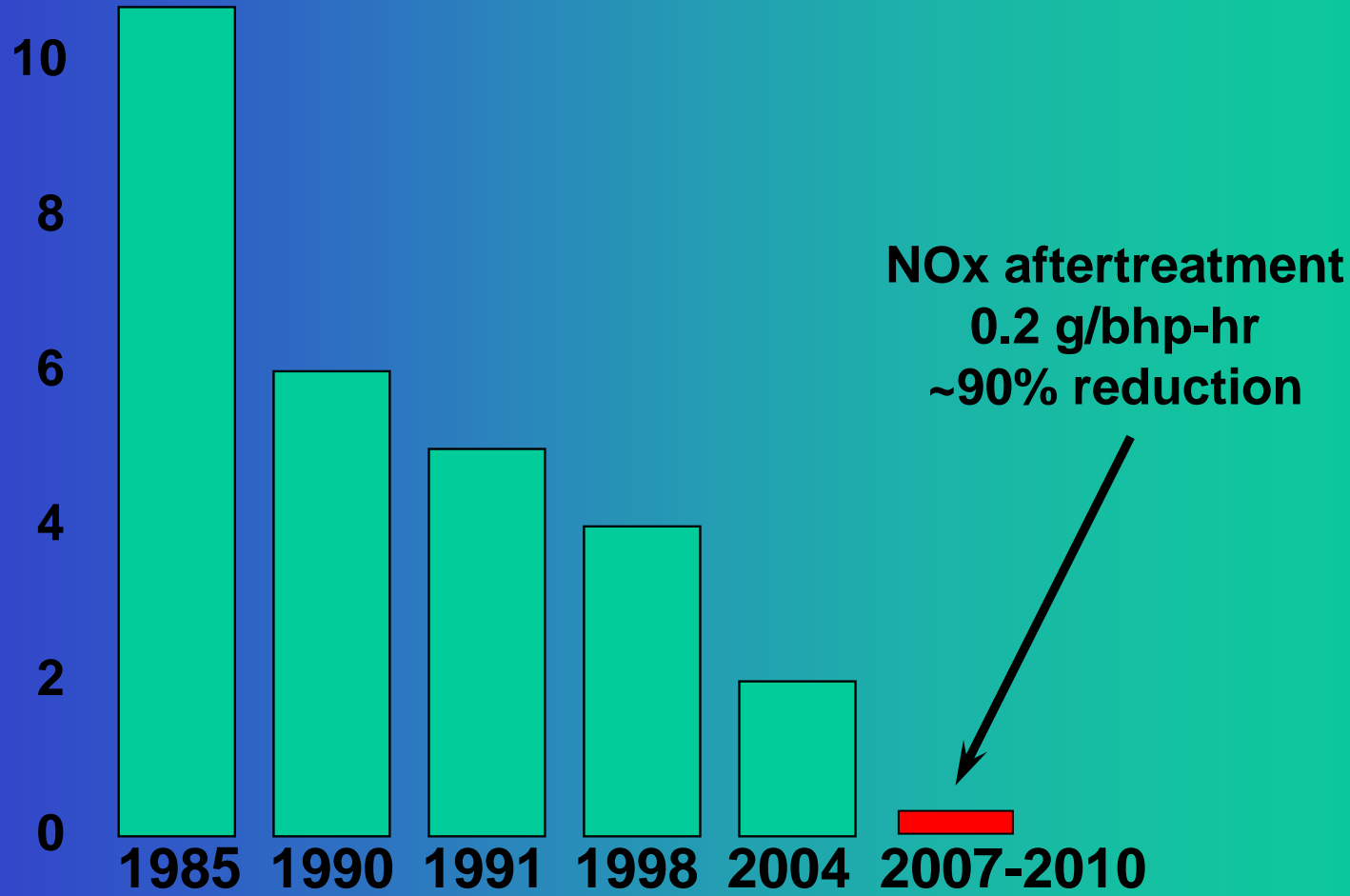
- ➔ Catalyzed diesel particulate filters
  - ⚡ Dramatic particulate reductions
  - ⚡ Traps collect and burn away particulate matter
- ➔ NOx adsorber catalyst technology
  - ⚡ Developing at a rapid pace
  - ⚡ Catalyst converts pollutants to less-harmful by-products
- ➔ Diesel fuel sulfur control
  - ⚡ Enables advanced emission control technology
  - ⚡ Immediate sulfate reductions from existing fleet

# Highway Diesel Program

# Highway Diesel Program

- ✈ NOx and PM standards for trucks and buses
  - ⚡ 90%+ emission reductions
  - ⚡ Based on high efficiency control devices
  - ⚡ NOx standards phase-in between 2007-2010
  - ⚡ Incentives for early technology introduction
- ✈ Highway diesel fuel sulfur cap of 15 ppm
  - ⚡ 80% by 2006
  - ⚡ 100% by 2010
  - ⚡ Enables advanced control technology
  - ⚡ Flexibility for small and western refiners

# Highway Diesel NOx Standards



# Benefits of Clean Diesels

## ✈ Annual Emission Reductions

- ⚡ 2.6 million tons of NO<sub>x</sub>

- ⚡ 110,000 tons of PM

## ✈ Health Benefits

- ⚡ Annually prevent

- ✧ 8,300 premature deaths

- ✧ 5,500 cases of chronic bronchitis

- ✧ 17,600 cases of acute bronchitis in children

- ✧ 360,000 asthma attacks

- ✧ 386,000 cases of respiratory symptoms in kids

- ✧ 1.5 million lost work days

- ✧ 7,100 hospital visits

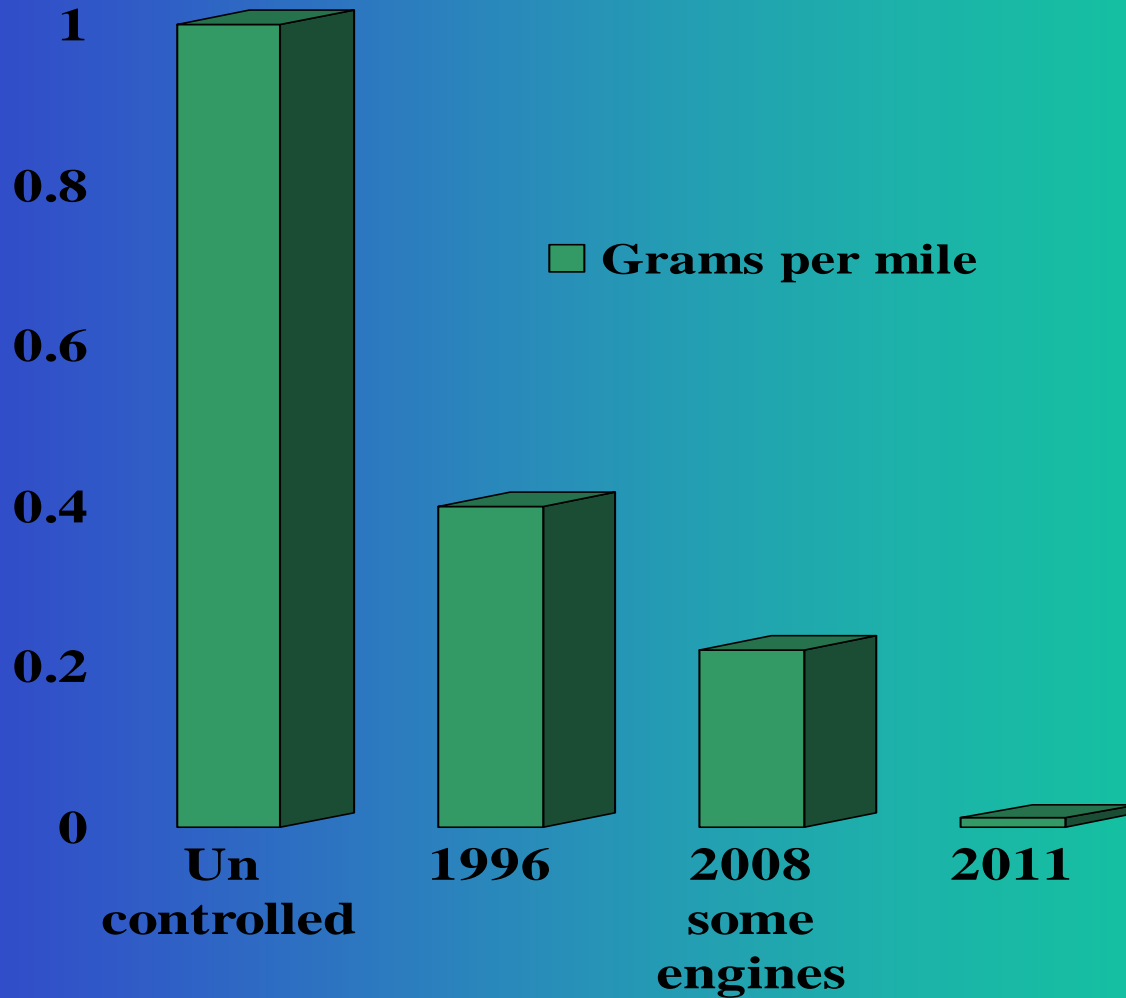
- ✧ 2,400 emergency room visits for asthma

# Nonroad Diesel Program

# Nonroad Diesel Program

- Engine standards phase-in 2011-2014
  - ⚡ >95% PM reduction
  - ⚡ ~90% NOx reduction
  - ⚡ Enhanced testing rules ensure in-use reductions
- Nonroad diesel fuel sulfur control
  - ⚡ 500 ppm sulfur cap in 2007
    - ✧ for nonroad, locomotive, and marine diesel
  - ⚡ 15 ppm sulfur cap
    - ✧ nonroad diesel fuel in 2010
    - ✧ locomotive and marine diesel fuel in 2012

# Nonroad Diesel PM Standards



# Costs and Benefits

## → Compliance costs

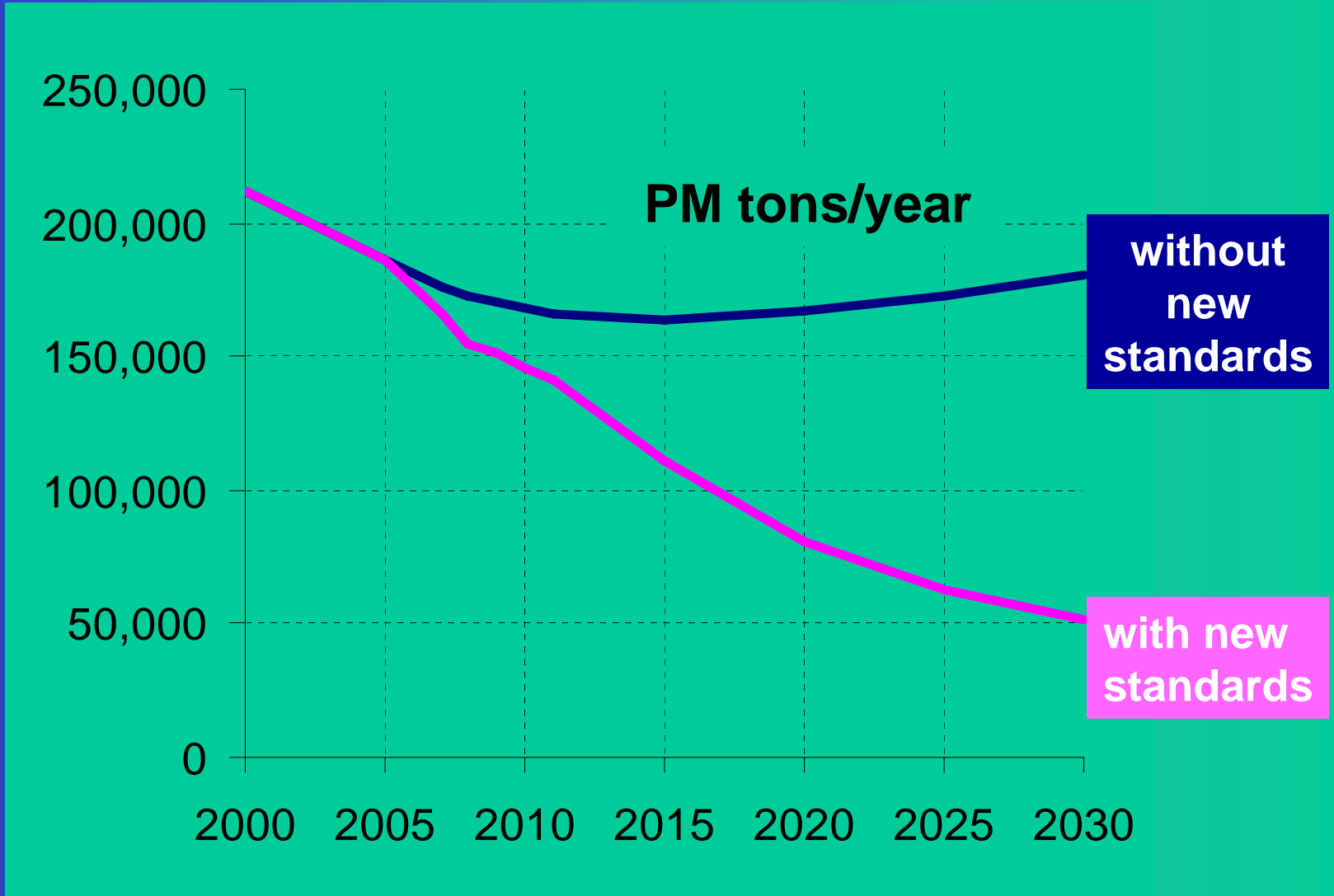
- ⚡ ~ 1-3 percent of the total purchase price for most nonroad diesel equipment categories
- ⚡ ~ 4 cents per gallon of fuel
- ⚡ Total costs are \$2 billion/year

## → Annual benefit with all nonroad engines replaced

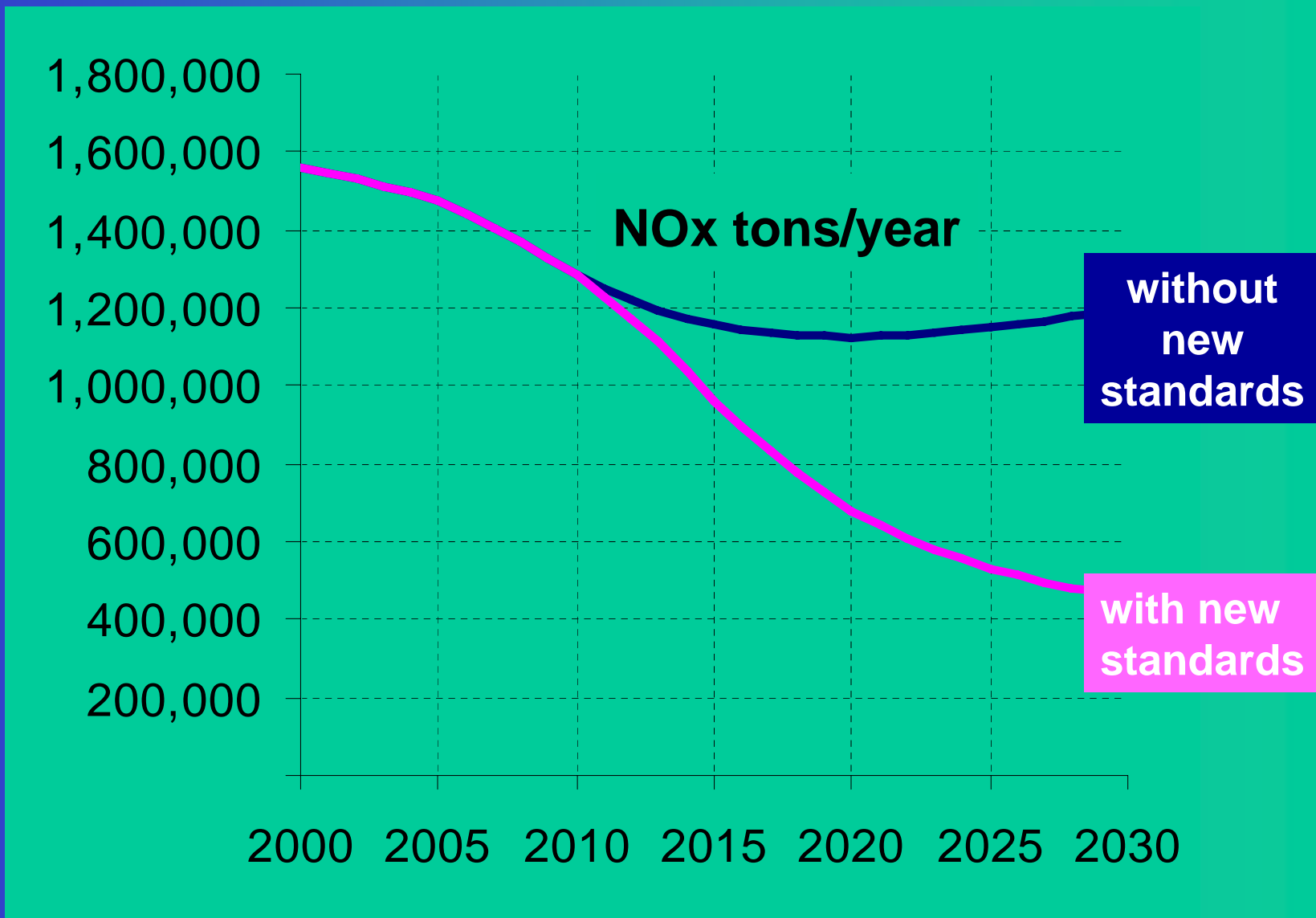
- ⚡ 12,000 premature deaths
- ⚡ 15,000 heart attacks
- ⚡ 280,000 cases of respiratory symptoms in children
- ⚡ 1,000,000 lost work days
- ⚡ 738,000 tons of NO<sub>x</sub> and 129,000 tons of PM

## → Monetized benefits: \$80 billion/year

# Nonroad Diesels PM Reductions



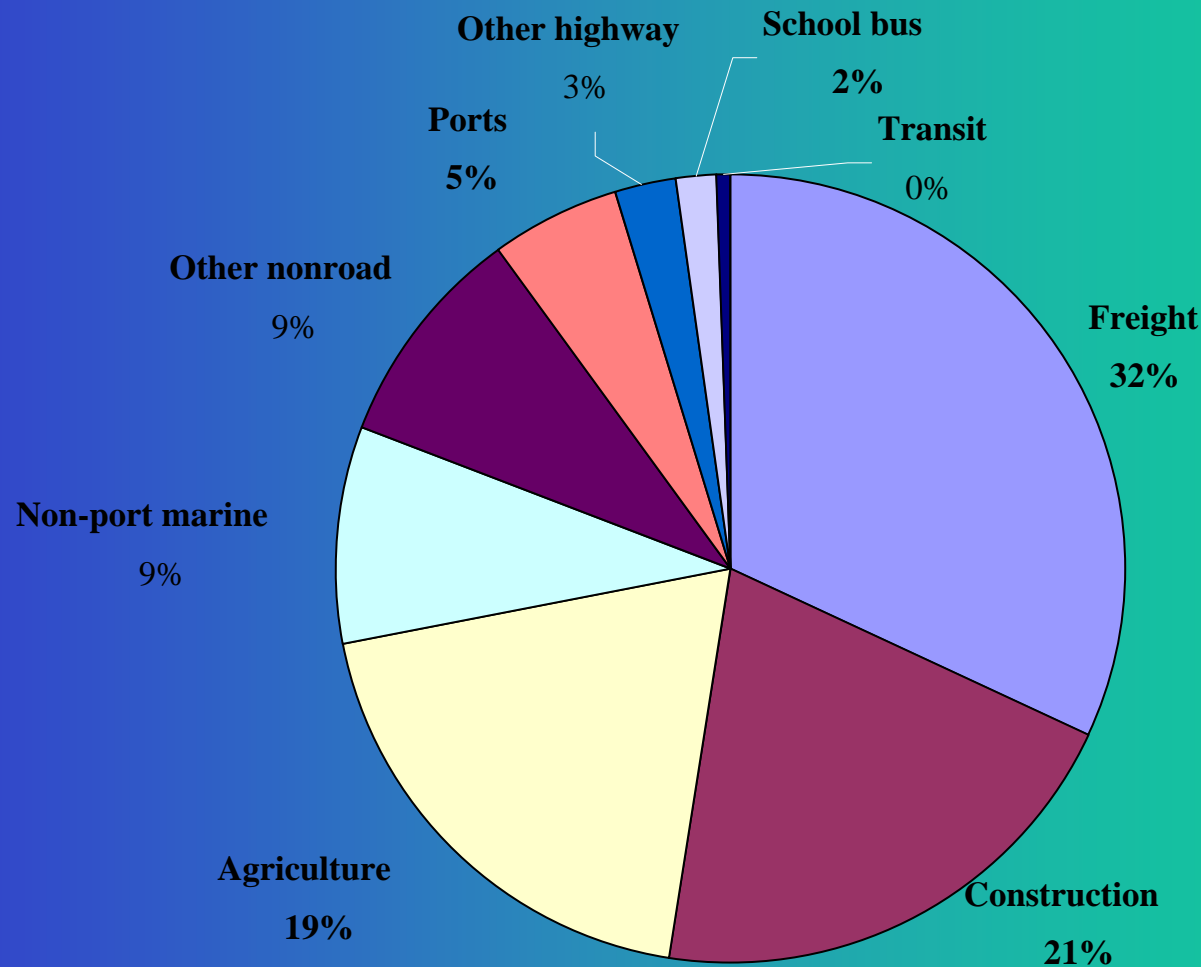
# Nonroad Diesels NOx Reductions



# National Clean Diesel Campaign

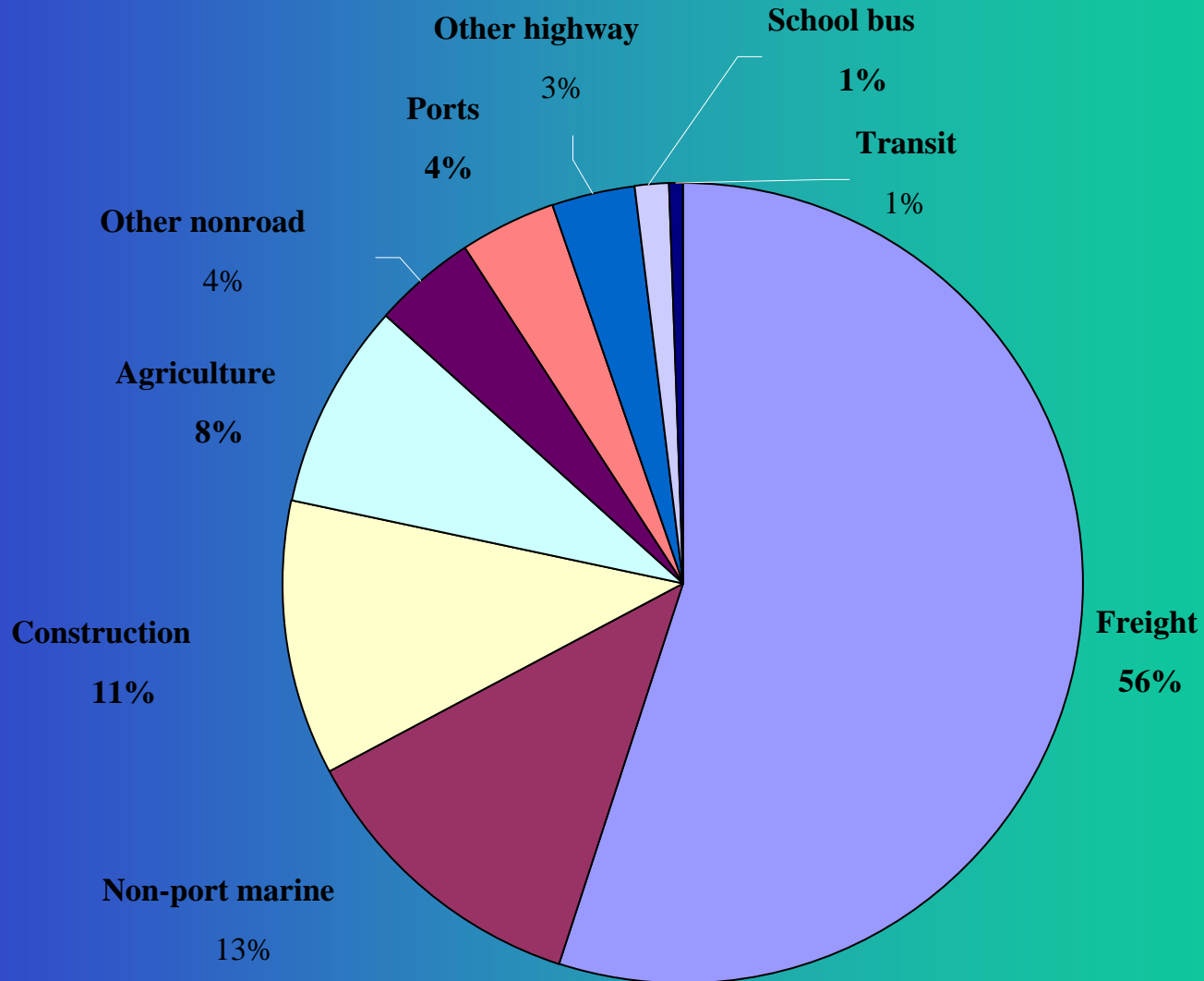
# 2004 Diesel PM2.5 Emissions by Sector

305,000 tons



# 2004 Diesel NOx Emissions by Sector

6.3 million tons



# National Clean Diesel Campaign

## ➔ Goal

- ⚡ Reduce emissions from the legacy fleet of over 11 million diesel engines by 2014

## ➔ Activities

- ⚡ Technology verification
- ⚡ Provide technical and policy analysis
- ⚡ Coalition-building and outreach
- ⚡ Establish projects through grant competitions

# Focus on Sector-Based Programs

## → Clean School Bus USA

- ⚡ Modernize nation's school bus fleet by 2010

## → Clean Ports USA

- ⚡ Encourage port authorities/terminal operators to reduce emissions and improve efficiency

## → Clean Construction USA

- ⚡ Encourage emission reductions from construction projects in non-attainment areas

## → SmartWay Transport Partnership

- ⚡ Challenge freight companies to improve fleets

## → Clean Air Agriculture

- ⚡ Promote biofuels, renewables, and retrofits in farming

# Costs and Benefits

- Clean diesel programs currently underway
  - ⚡ Reduce over 20,000 tons of PM
  - ⚡ Provide nearly \$5 billion in health benefits
  - ⚡ Provide a benefit-to-cost ratio of up to 13:1
- Technology Costs/Benefits
  - ⚡ Aftertreatment (DOC, DPF) \$500 - \$8000
    - ✧ 20-90% PM reduction
  - ⚡ Crankcase filtration ~ \$500
    - ✧ 5-10% PM reduction

## Federal Funding to Date

- 2005 National Clean Diesel Campaign Grants
  - ⚡ \$7.5 M for Clean School Bus. 37 grants awarded.
  - ⚡ \$1.1 for ports & construction. 10 grants awarded.
- 2005 SmartWay Transportation
  - ⚡ \$5 M idle reduction demo projects. 5 grants awarded
- FY06 budget
  - ⚡ \$5 Million for National Clean Diesel Campaign
  - ⚡ \$7 Million for Clean School Bus grants
- FY07 budget
  - ⚡ President requested \$50 million to support clean diesel activity

# Future Federal Funding

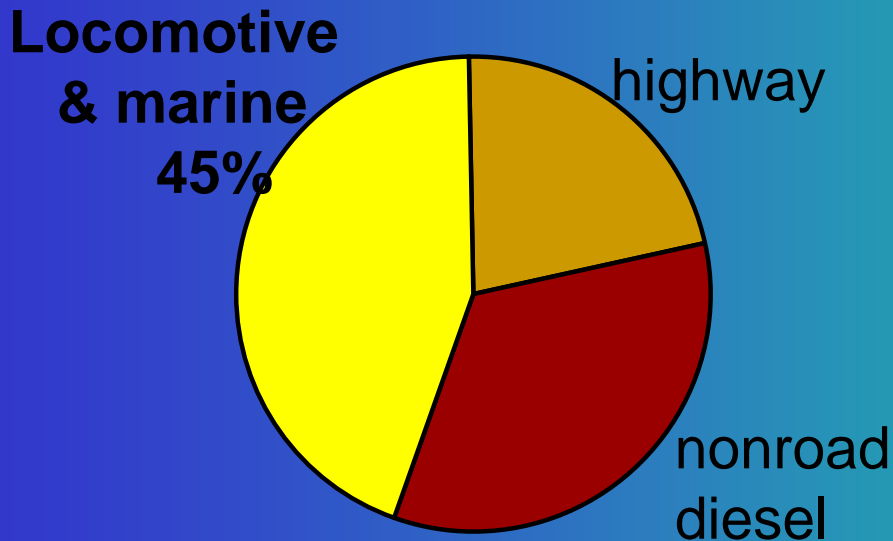
- Diesel Emission Reduction Act (DERA)
  - ⚡ \$1 Billion over 5 years: 150-200 projects
- Fleet Modernization
  - ⚡ \$100 M over 3 years (focus on ports)
- Clean School Bus
  - ⚡ \$110 M over 2 years: 40-75 projects
- Idle Reduction
  - ⚡ \$140M over 3 years
- Congestion Mitigation and Air Quality
  - ⚡ \$1.4 billion per year for 6 years
  - ⚡ Priority: retrofit diesel construction equipment

# Latest Diesel Program

# Locomotive/Marine Rule

- Same systems approach
- Proposal Fall 2006

## *Diesel PM<sub>2.5</sub>*



## *NOx*

