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# **Diesel Exhaust Fluid Forum**

## **The road to EPA 2010 for industry and regulators**

### **Tuesday, 11 November**

For more information on the Diesel Exhaust Fluid Forum please contact  
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# *The Road to EPA 2010*



Diesel Exhaust Fluid Forum

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November 11, 2008

# *Overview*

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- EPA Office Transportation & Air Quality
- Why do we need to control emissions?
- EPA's National Clean Diesel Campaign
- EPA and Urea SCR
- Our Mutual Roles Going Forward





# Office of Transportation and Air Quality

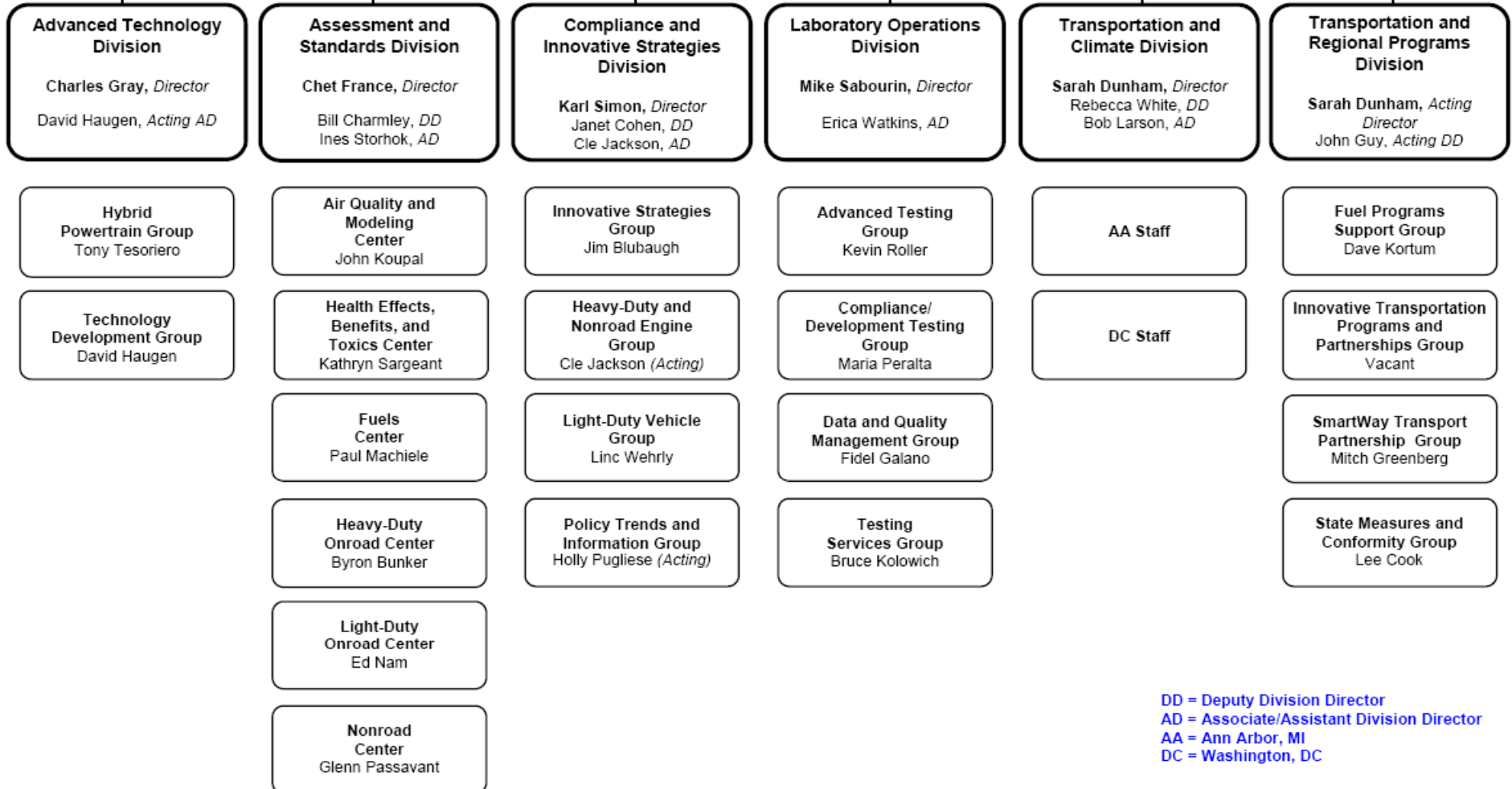
October 2008

**Margo Tsirigotis Oge, Office Director**

Lori Stewart, Associate Office Director  
 Karen Orehowsky, Chief of Staff  
 Mike Haley, Planning & Budget Office

**Christopher Grundler, Deputy Office Director**

Tracey Bradish, Public Information and Human Resources  
 Amy Caldwell, Centralized Services Group Manager



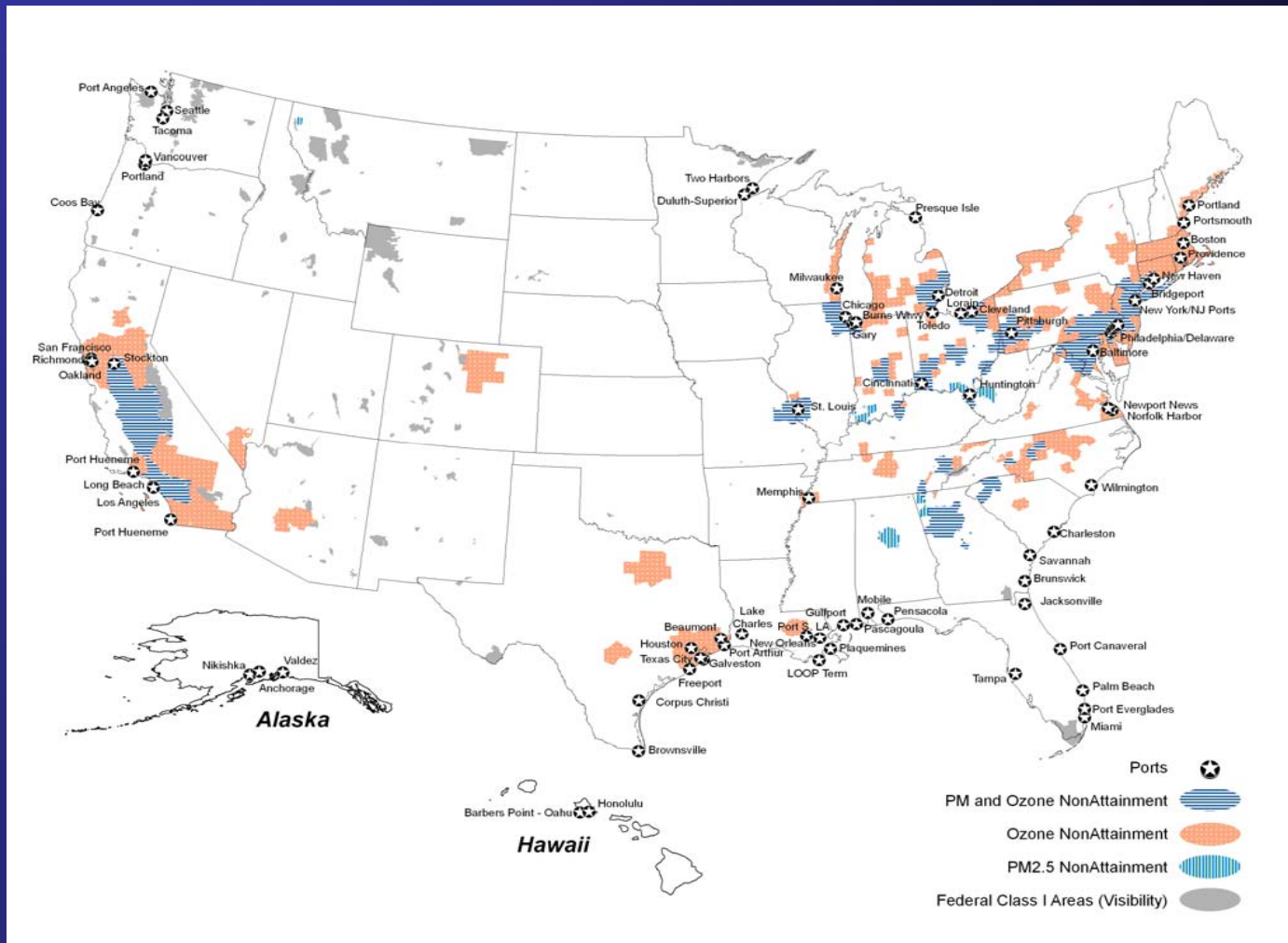
DD = Deputy Division Director  
 AD = Associate/Assistant Division Director  
 AA = Ann Arbor, MI  
 DC = Washington, DC

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# Why do we need to control emissions?



# Large Portions of US Do Not Meet the National Ambient Air Quality Standards

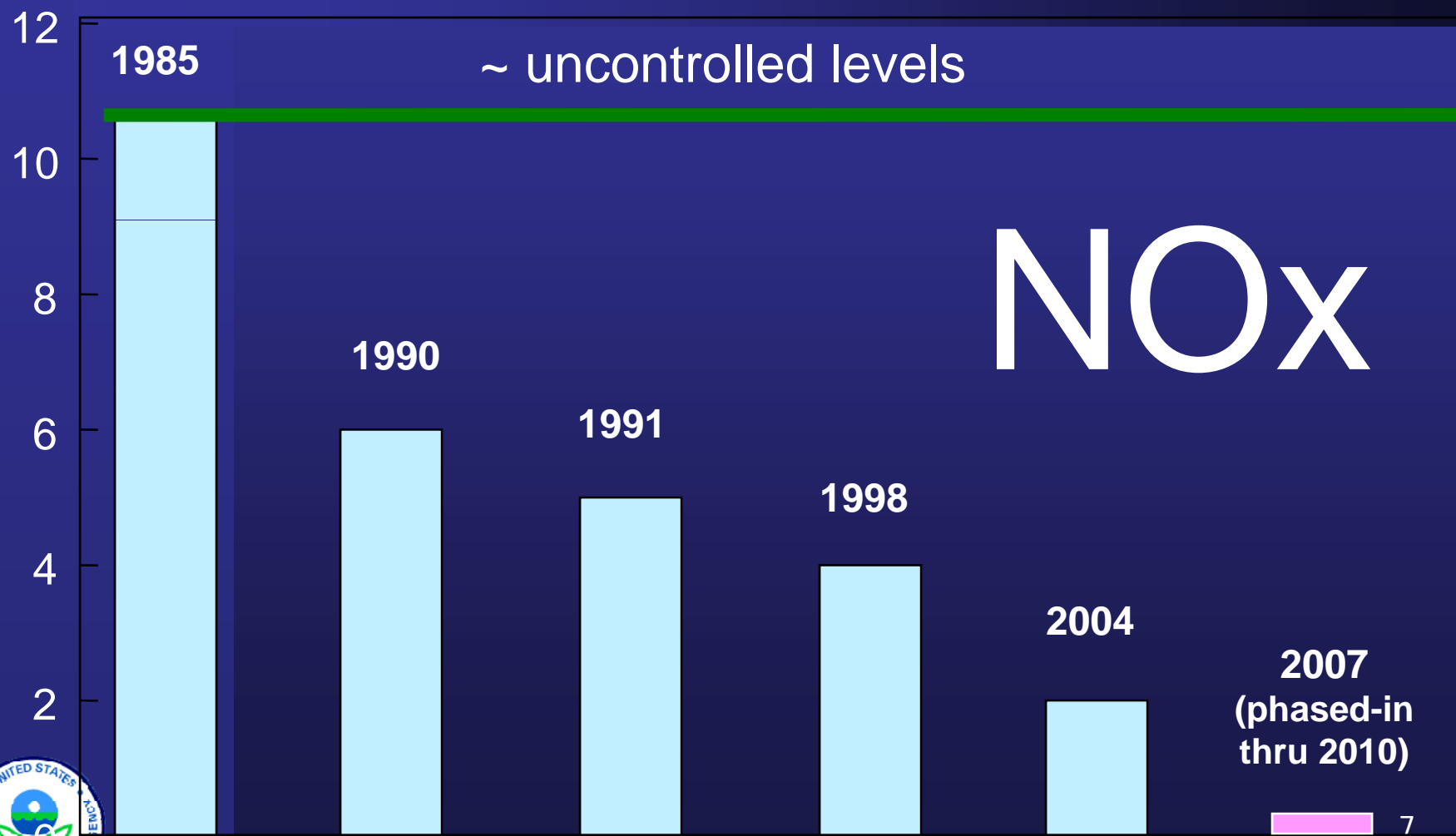


# *Air Quality Need & Public Health Concerns*

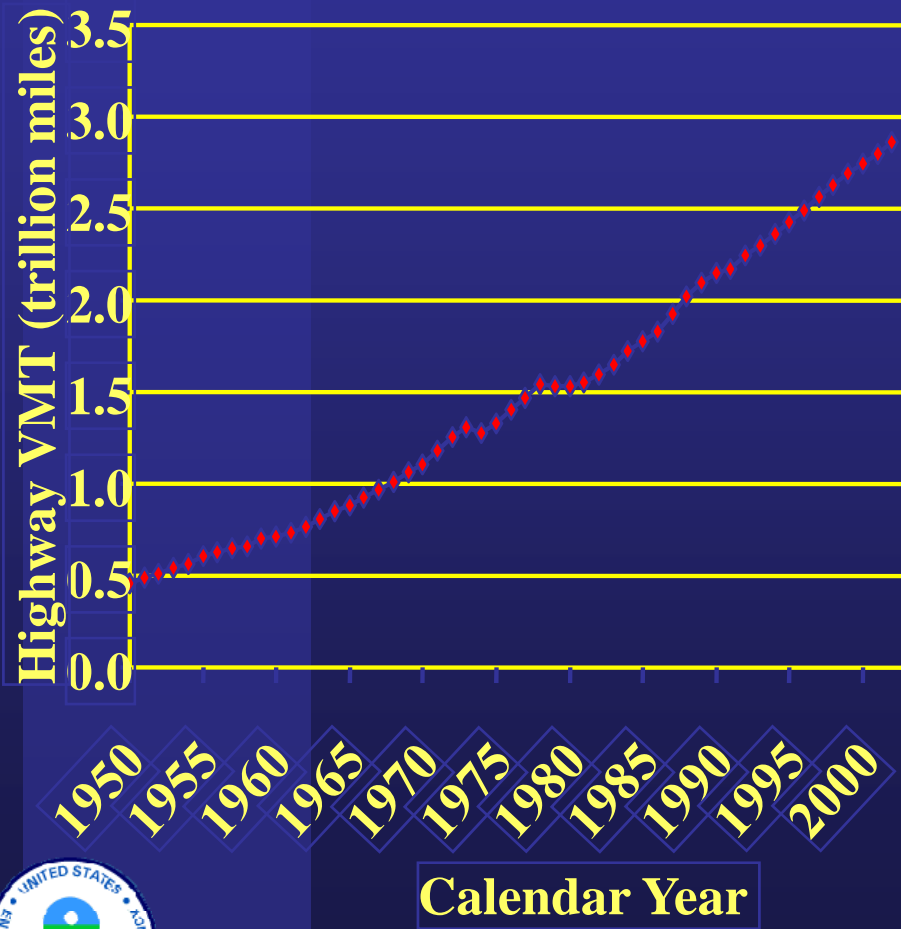
- Diesel trucks and buses comprise 28% of the NO<sub>x</sub> and 20% of the PM from U.S. mobile source emissions.
- Contributions are even higher in some areas with serious air quality problems.
- Diesel exhaust has been implicated in an increased risk of lung cancer and respiratory disease.
- EPA has concluded that diesel exhaust is a likely human carcinogen.
- PM and NO<sub>x</sub> from diesel contribute to asthma and other serious respiratory health problems.

# Highway Diesel Standards

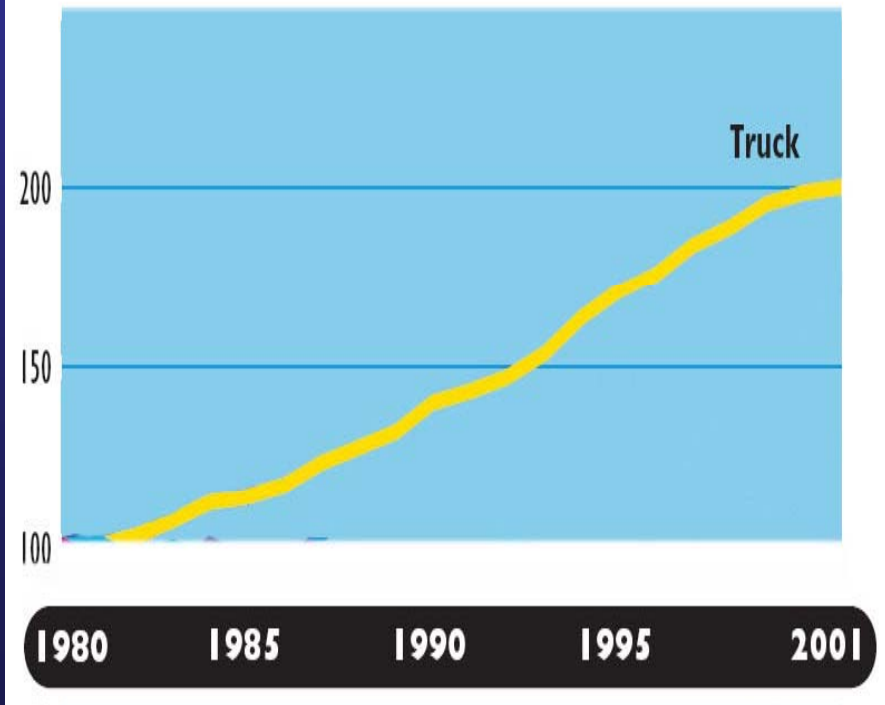
grams per hp-hour



# Growth In Transportation Offsets Gains from Cleaner Vehicles

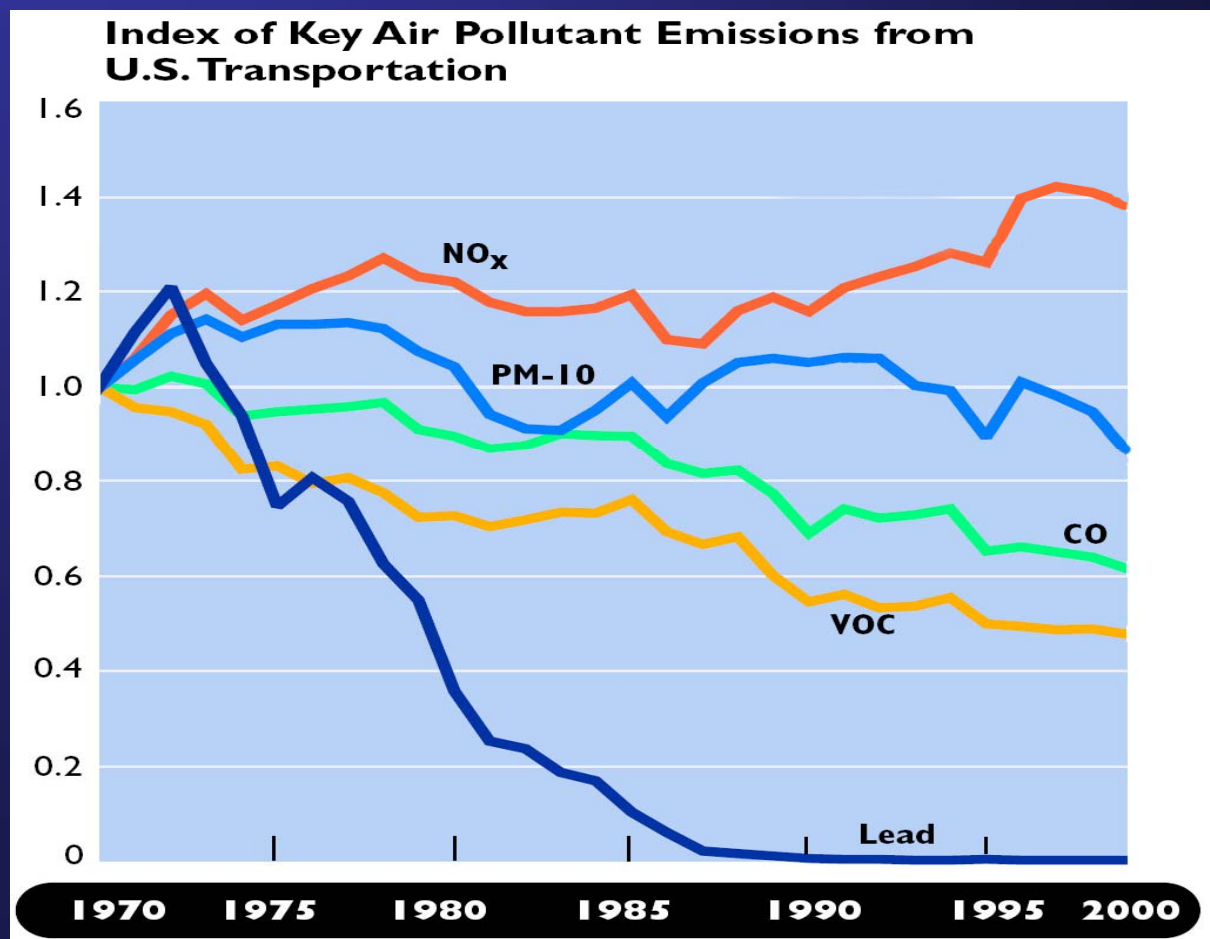


Growth Trends of U.S. Domestic Freight  
Ton-Miles by Mode: 1980-2001



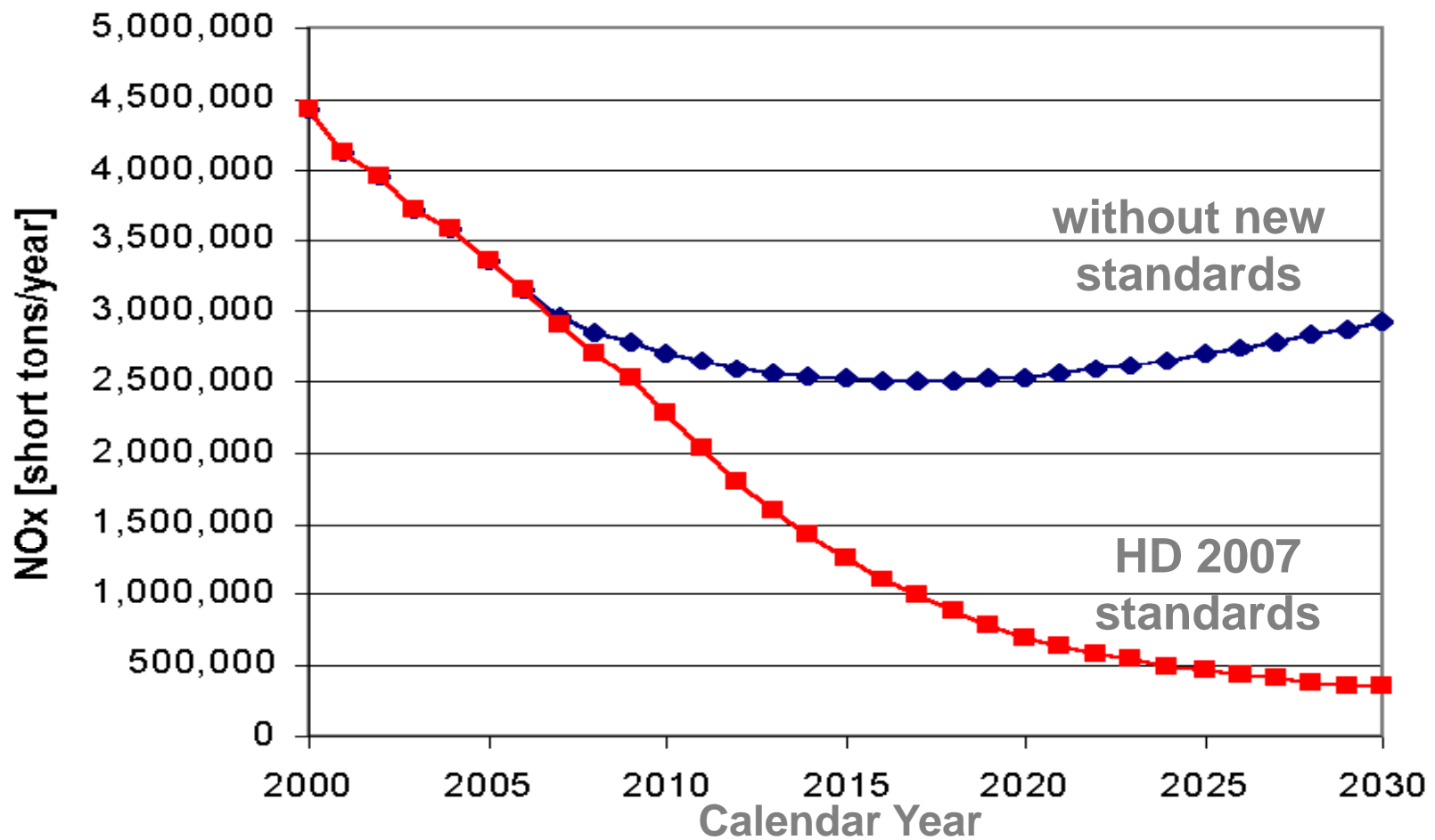
Source: U.S. Department of Transportation – Bureau of Transportation Statistics

# Emission Trends



Source: U.S. Department of Transportation – Bureau of Transportation Statistics

# Nationwide Heavy-Duty NOx Emissions



# NATURAL RESOURCES DEFENSE COUNCIL

## The Campaign to Dump Dirty Diesel

Environmentalists are taking on powerful industries to rid the world of the smoke, smells, and health risks of diesel exhaust.

## Diesel Pollution Poses Growing Health Threat

Thursday, February 24, 2005

By Todd Zwillich

WebMD

San Francisco Chronicle

## Diesel school buses double pollution exposure

Jane Kay, Chronicle Environment Writer

Thursday, October 16, 2003

New York Daily News

April 20, 2005

## Diesel pollution targeted

Clean air bills would require ultra-low fuel

BY FRANK LOMBARDI

DAILY NEWS CITY HALL BUREAU

The City Council will vote today to choke off those black plumes of diesel pollution emitted by city-owned and contracted vehicles - including 6,000 buses.



## Reducing the Health Impacts of Diesel Pollution In California



Union of Concerned Scientists

Citizens and Scientists for Environmental Solutions

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# EPA's National Clean Diesel Campaign (NCDC)



# *National Clean Diesel Campaign*

- Regulations for new engines & low sulfur diesel fuel
  - Light-duty Tier 2 passenger vehicles , Heavy-Duty Diesel Highway, Nonroad Diesel Engines, Locomotive and Marine
  - Upcoming standards Ocean Going Vessels
- Voluntary Programs to **address diesel legacy fleet**
  - Retrofit Program
    - Diesel exhaust catalysts, PM filters, engine modification technologies, cleaner fuels, idle reduction, etc...
  - SmartWay Transport Program
    - Idle reduction, tires, logistics, lubricants, aerodynamics, speed management, etc...



# EPA's National Clean Diesel Campaign Regulatory Roadmap

## Tier 2 Light-Duty

final rule 1999

fully phased in 2009

Diesels held to same stringent standards as gasoline vehicles



*These standard-setting rulemakings are key enablers for collaborative partnerships with industry and state & local governments*



## Heavy-Duty Highway

sales 800,000 / yr

40B gallons / yr

final rule 2000

fully phased in 2010



## Ocean Going Vessels

C3 Rule Dec 2009

IMO MARPOL Annex VI

ECA Controls

- Fuel Based 2015
- SCR Catalyst Based 2016



## Nonroad Diesel

sales over 650,000 / yr

12B gallons / yr

final rule 2004

fully phased in 2014



## Locomotive/Marine

sales 40,000 marine engines,

1,000 locomotives / yr

6B gallons / yr

final rule 2008

fully phased in 2017



# *EPA's National Clean Diesel Campaign: Technology Roadmap Mile Markers*

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- Year NOx Standards Premised on Diesel Aftertreatment Become Mandatory
  - 2009 Light-Duty Tier 2 Cars
  - 2010 Heavy-Duty Trucks
  - 2014 Nonroad Equipment
  - 2014 Largest C2 Marine
  - 2015 Locomotives
  - 2017 C1 Marine
  - 2016 C3 Ocean Going Vessels
    - IMO Annex VI Tier 3 standards



# Clean Fuel/Engine Standards will Lead to Substantial Air Quality / Health Benefits

2030 Annual	Light-duty Tier 2	Heavy-duty 2007	Nonroad Diesel Tier4	Total
Cost	\$5 billion	\$4 billion	\$2 billion	\$11 billion
Benefits	\$25 billion	\$70 billion	\$80 billion	\$175 billion
Avoided Premature Mortality	4,300	8,300	12,000	24,600
Avoided Hospital Admission	3,000	7,100	8,900	19,000
Avoided Lost Work Days	0.7 million	1.5 million	1.0 million	3.2 million



# EPA and Urea SCR



# *What's Special About SCR?*

Selective Catalytic Reduction is similar to other diesel emission control technologies in many ways--

- hardware is mounted in the exhaust stream
- relies on catalyst-fostered chemical reactions
- requires sophisticated electronic controllers
- can yield high reduction efficiencies (90%+)

**BUT...without DEF, emissions can increase by 10x or even more**



# EPA's Issues with Urea SCR

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Depends on the user to add DEF when necessary. How can we be assured that will happen?

- Driver Inducement-

- Ensure that vehicles will meet the standards in use (that drivers will not drive with empty DEF tanks).

- DEF infrastructure--

- Ensure that drivers will find DEF wherever they need it.



# US EPA SCR Guidance Document

- EPA published draft guidance document in November 2006
  - Solicited public comment, reviewed stakeholder comments
- Issued final guidance March 2007
  - <http://www.epa.gov/otaq/cert/dearmfr/cisd0707.pdf>
- SCR guidance document
  - Gives examples of acceptable SCR system solutions to address refill
    - For example, no restart after a vehicle refuels with diesel fuel but not DEF
    - Allows for manufacturers to propose other options
  - Describes EPA expectations for DEF infrastructure:
    - Dealerships
    - Truck Stops
    - Back-up plan



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# Our Mutual Roles Going Forward



# *DEF should be readily available*



Would you like  
some DEF with  
those fries?



# *Building a DEF infrastructure*

- No single party can do it alone
  - Urea producers, distributors, retailers and customers
  - Regulators and engine/truck OEMs
- What can EPA do?
  - Provide clear and consistent messaging
  - Ensure all OEMs carry their fair share of the burden to ensure DEF availability
- Need to trust each other to deliver
  - Similar to 2006 ULSD introduction



# *Trust the following*

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- 2010 standards aren't changing
  - NAAQ standards, States, and NCDC
  - Large public health and welfare benefits
- NCDC will drive additional demand
- EPA will ensure OEMs each do their part to build DEF infrastructure
- Trucking industry is fundamentally about logistics, this community can handle DEF



# Key to success will be how we answer the trucking industry's questions?

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- Will DEF be readily available?
- What will DEF cost?
- What will DEF refilling mean for my drivers?



# Conclusion

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- US 2007/10 first big step in National Clean Diesel Campaign
- Reductions are critical to State and community plans to address AQ problems
- EPA will require engine OEMs to demonstrate DEF will be readily available
- To succeed we all need to work together
  - Urea suppliers, distributors, retailers, regulators and trucking fleets

