

EPA's Program for Clean Diesel Engines & Fuel



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EPA's Diesel Program

- Clean Air Act Title II gives EPA standard setting authority
 - Effect only NEW engines
- Regulations based on performance standard not on specific technology
- What do we do about the 11 million diesel engines in use today?
 - Mandatory programs? No Federal authority
 - Voluntary Programs to Retrofit, Replace & Reduce Idling & other emission control strategies

Phase-In of New Mobile Source Programs

Light-duty
Tier 2



vehicles



gasoline

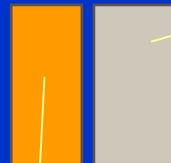
Heavy-duty
highway

*diesel
fuel*



engines

Nonroad
Tier 4



diesel fuel: 1st step

2nd step



engines

2000 2002 2004 2006 2008 2010 2012 2014 2016

A Systems Approach-- Fuel & Engines

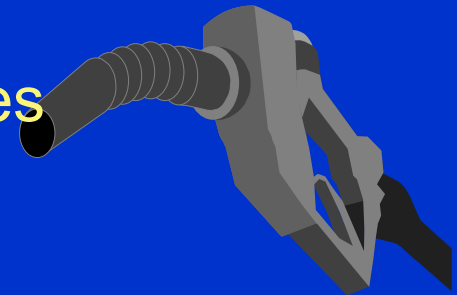


- **Diesel aftertreatment**

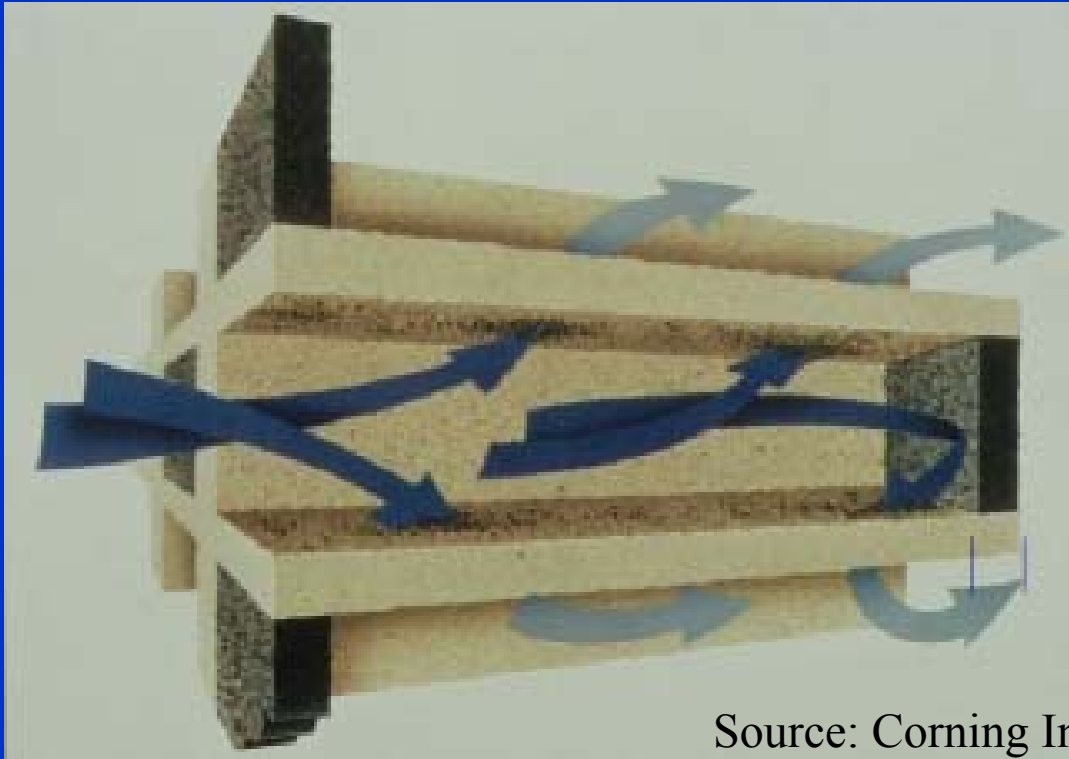
- Stringent new standards for NO_x and PM
 - Reductions of >95% PM, ~90% NO_x
- Also new test requirements to ensure control in use

- **Fuel sulfur reduced to 15 ppm**

- Enables the aftertreatment technologies
- AND gets large immediate sulfate PM reductions from existing fleet
- AND lowers engine maintenance costs
 - sulfur acidifies oil, corrodes engine parts
 - benefits owners of new *and old* equipment

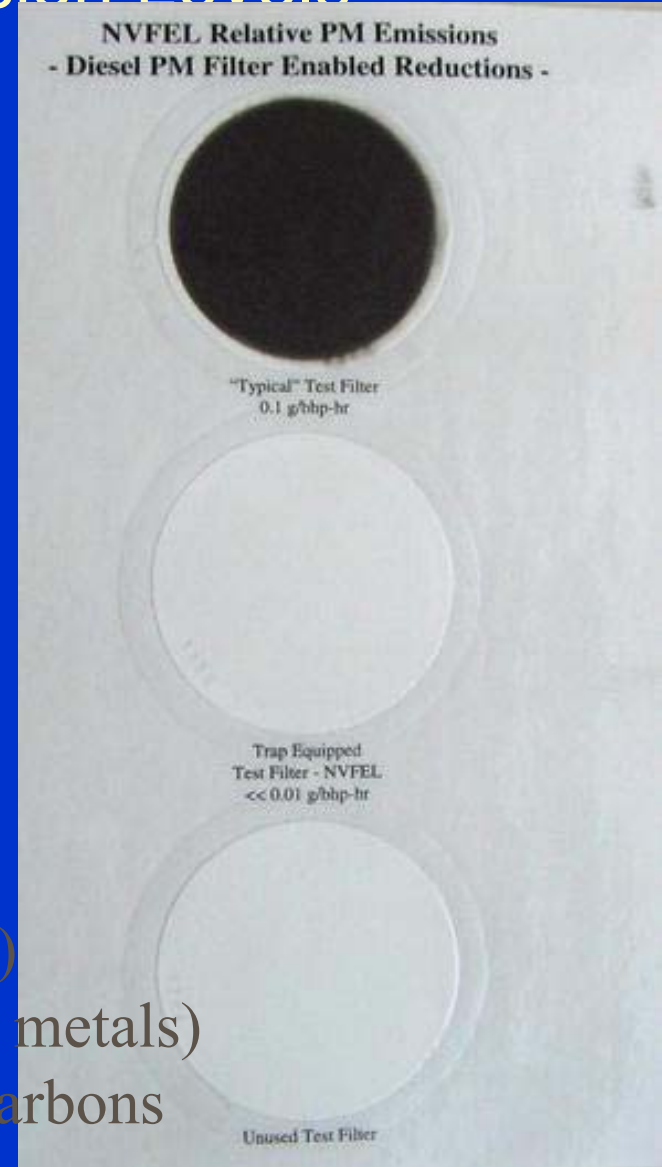


Enabling Near Zero Emission Levels



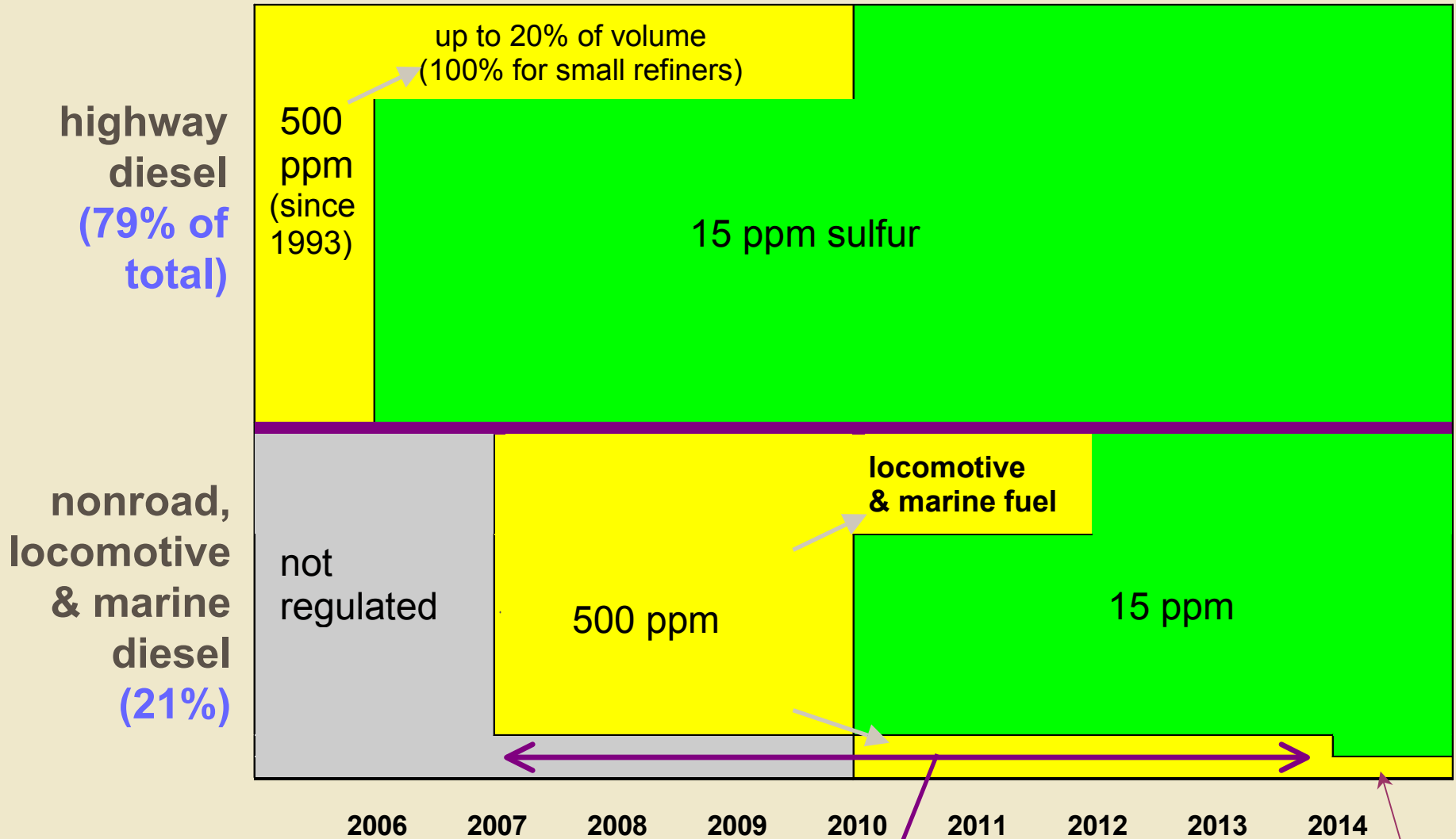
Source: Corning Inc.

Catalyzed Diesel Particulate Filters (CDPFs)
can eliminate 99% of solid particles (soot & metals)
can eliminate >90% of semi-volatile hydrocarbons



EPA Regulation of Diesel Fuel Sulfur

Regulations apply June 1 at refinery, Aug 1 at terminal, Oct 1 at retailer

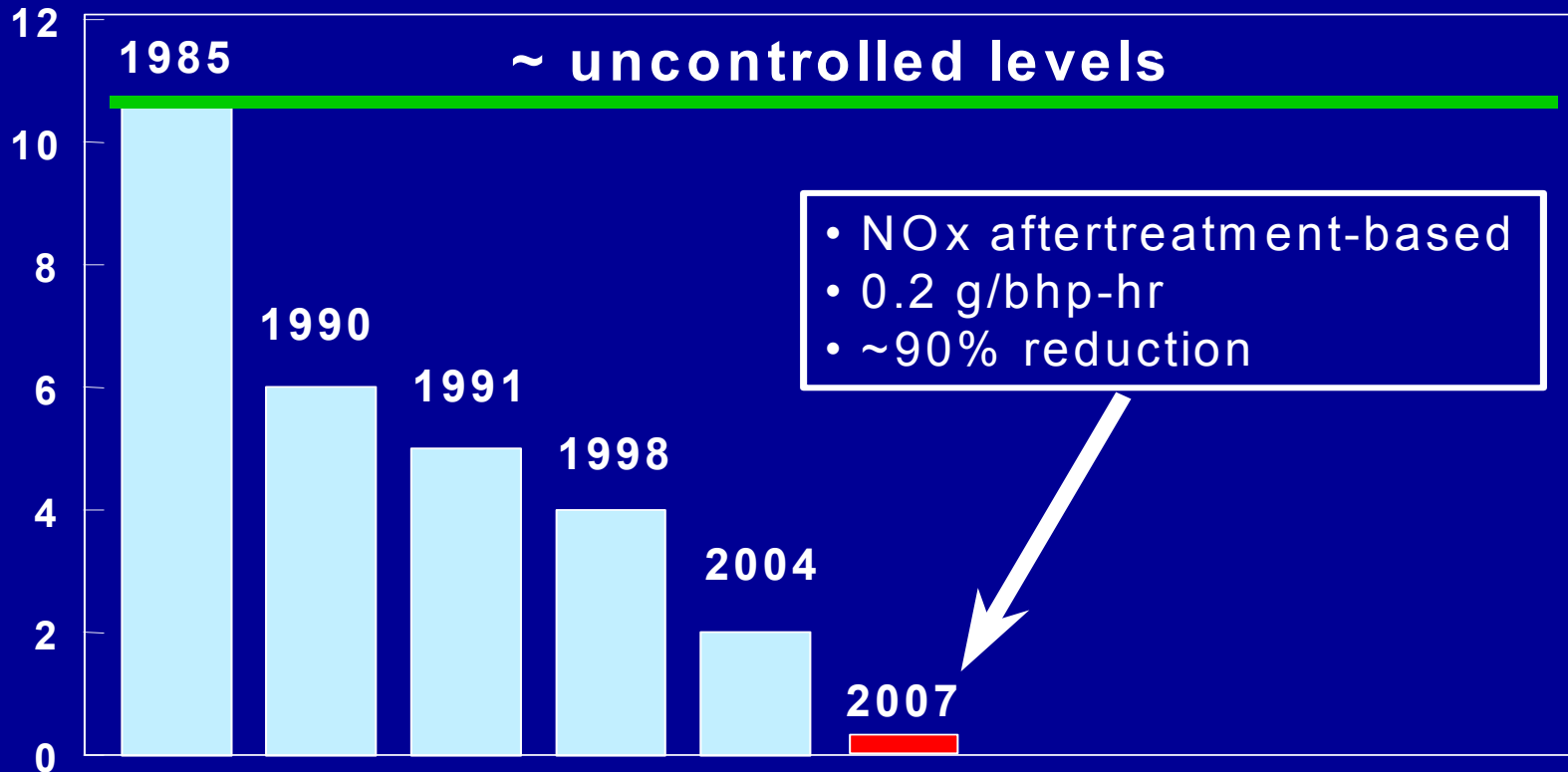


for transmix, small refiner fuel, and thru use of credits, except in Northeast & Alaska
(expiration date not yet set for 500 ppm locomotive & marine transmix)



Vehicle Pollution: Progress

g/hp-hr Highway Diesel NO_x Standards

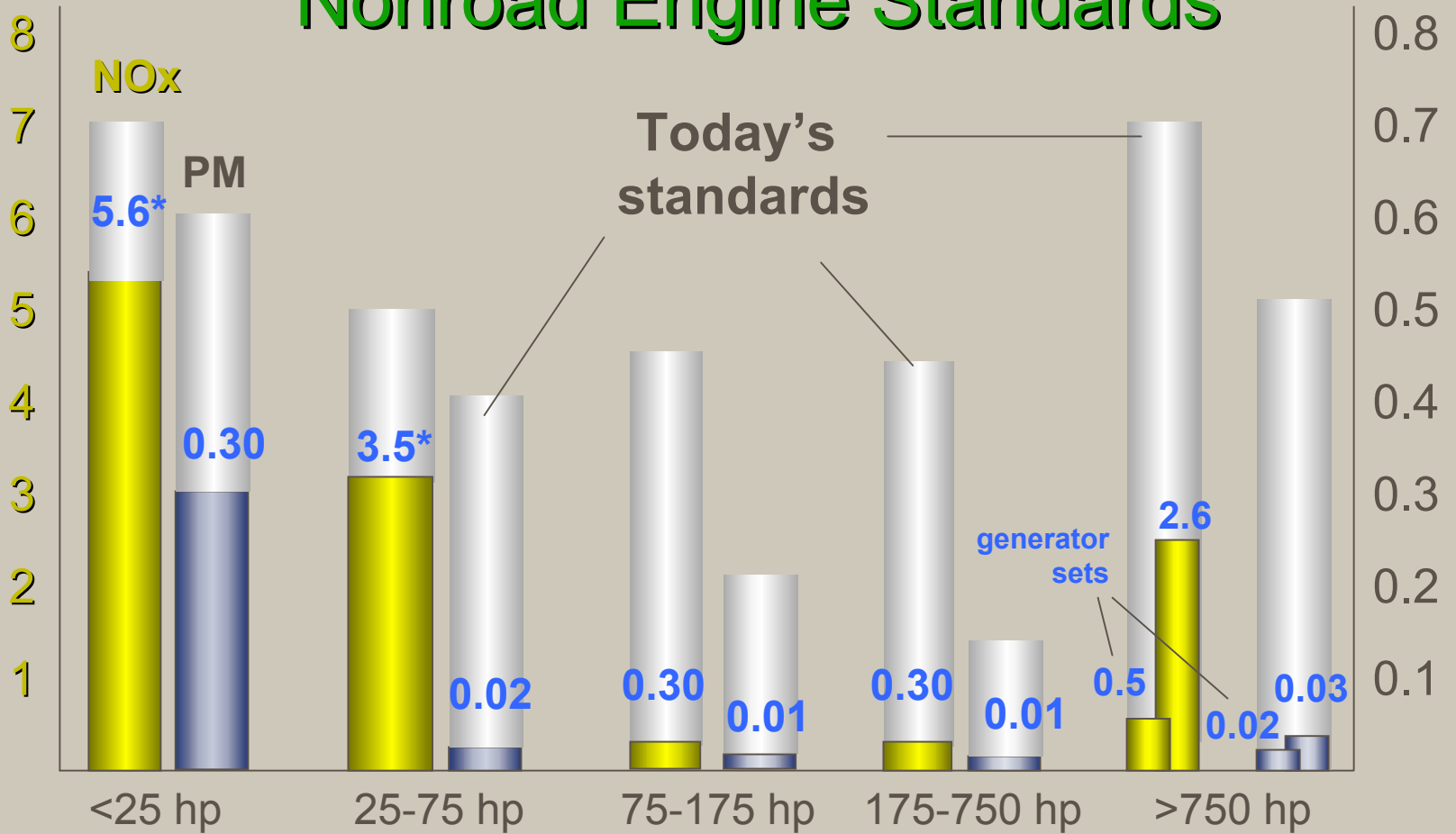


NOx
(g/hp-hr)

Tier 4

PM
(g/hp-hr)

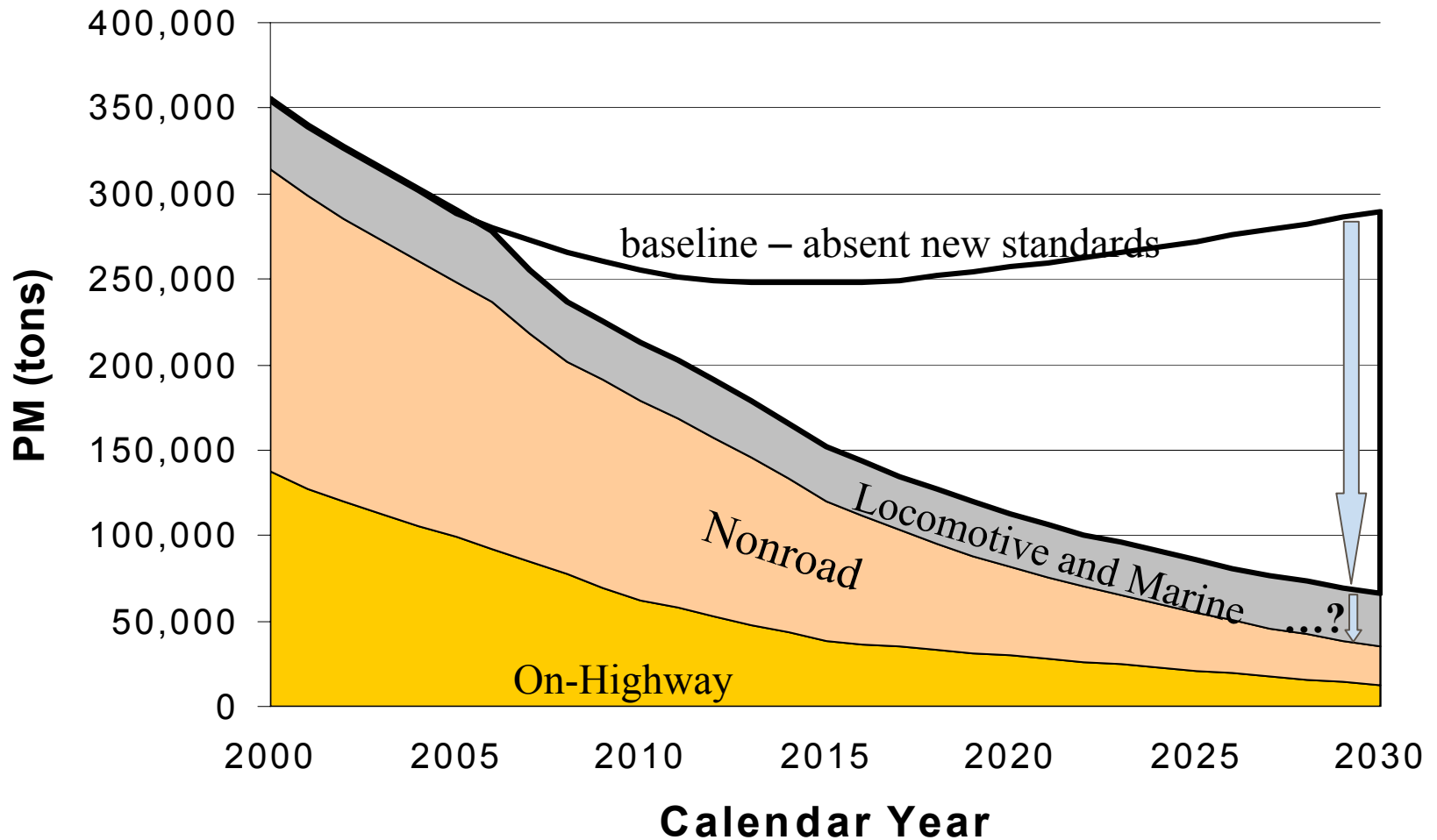
Nonroad Engine Standards



* This is a combined NOx + hydrocarbon standard

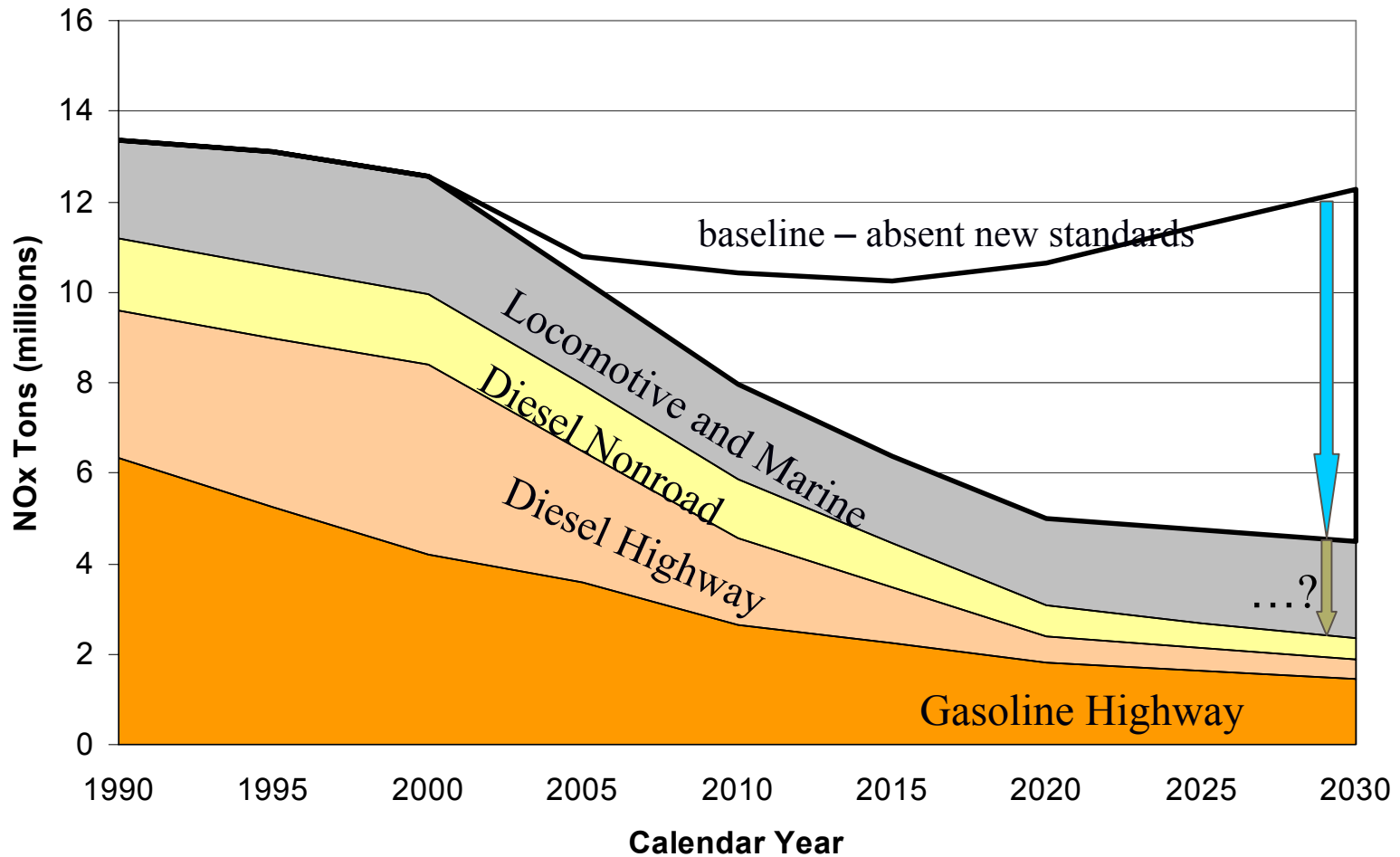
Clean Fuel and Vehicle Programs

Diesel PM Reductions

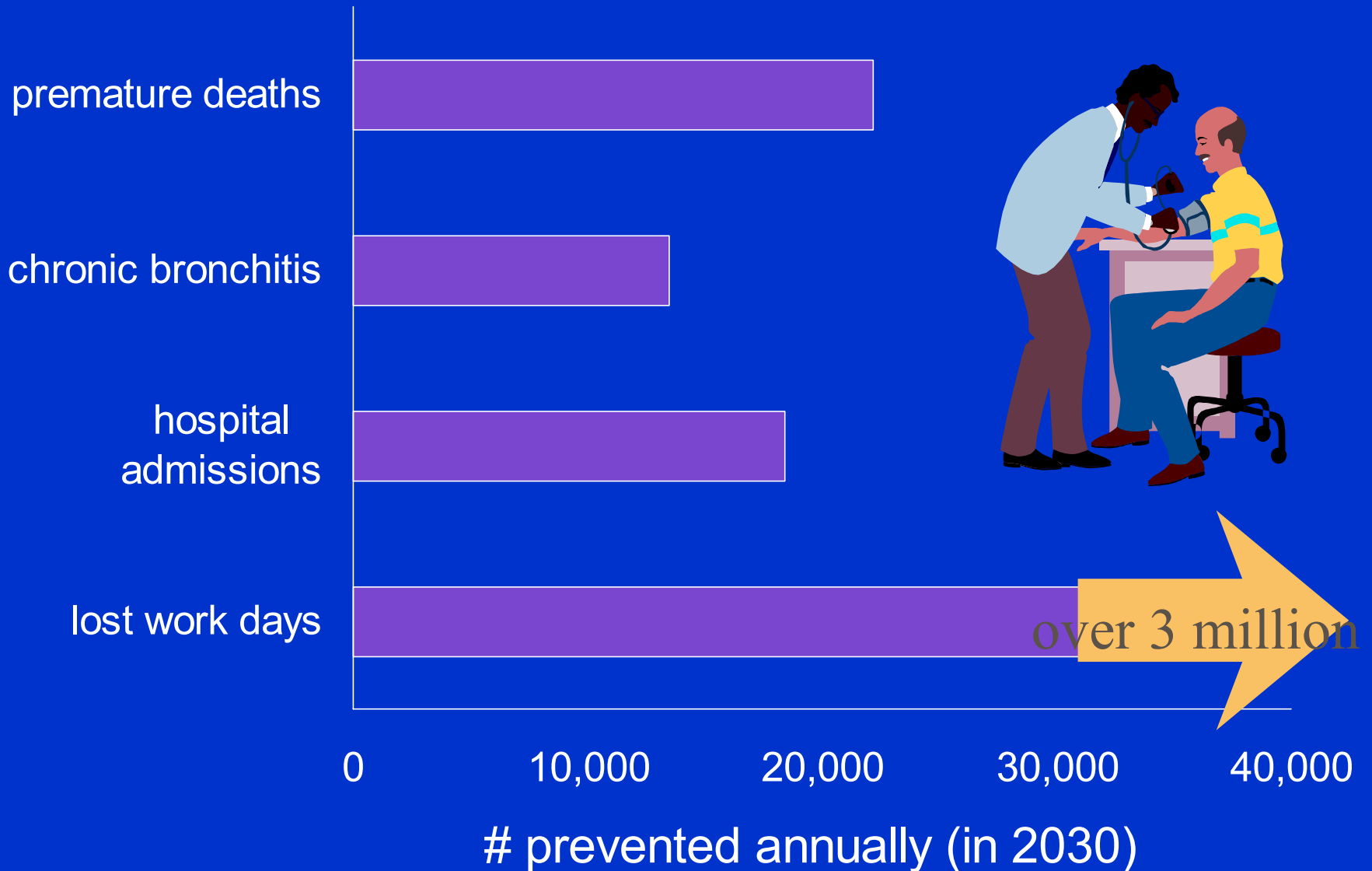


Clean Fuel and Vehicle Programs

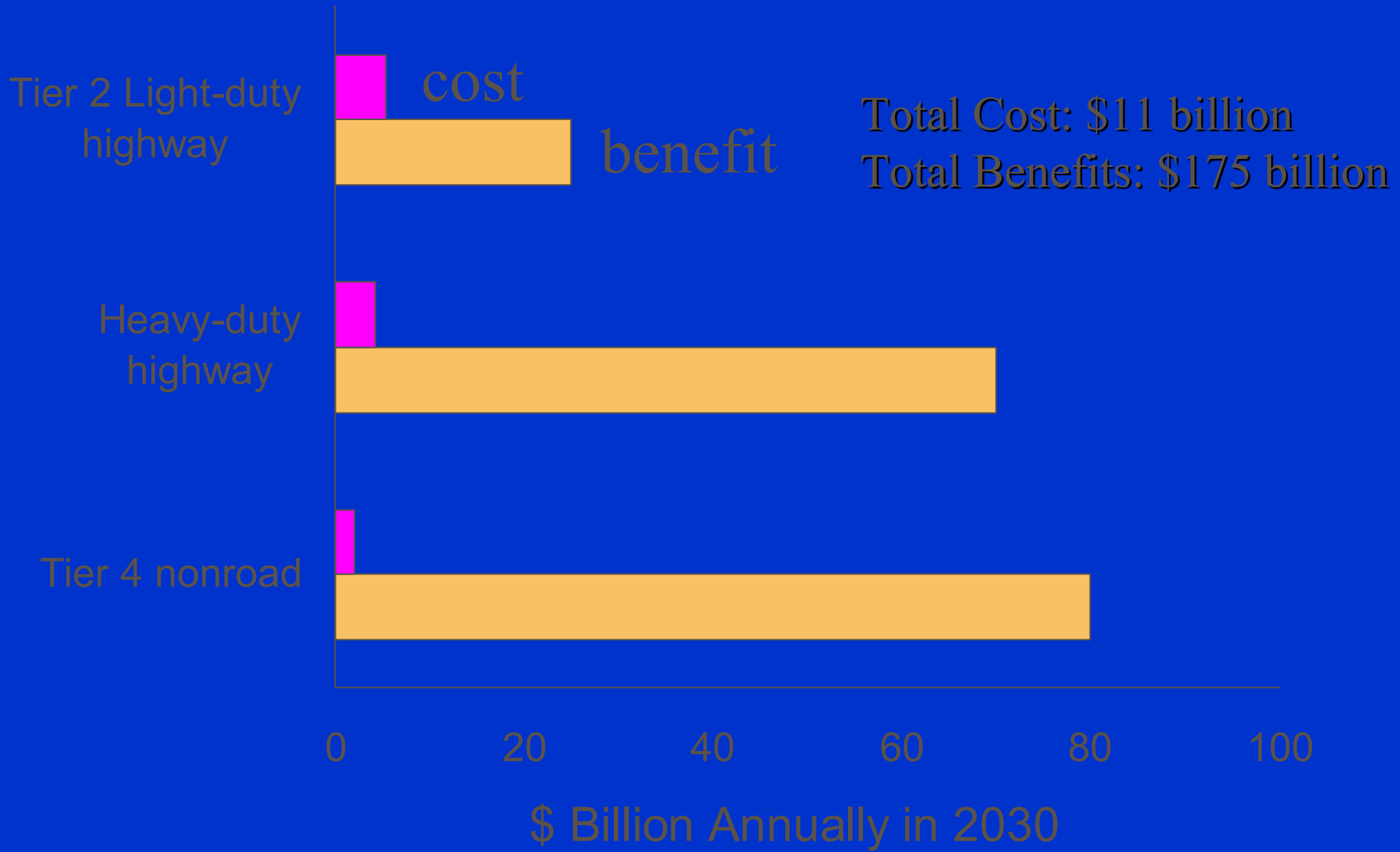
NOx Reductions



Benefits of Clean Fuel and Vehicle Programs



Costs & Benefits of Clean Fuels and Vehicles

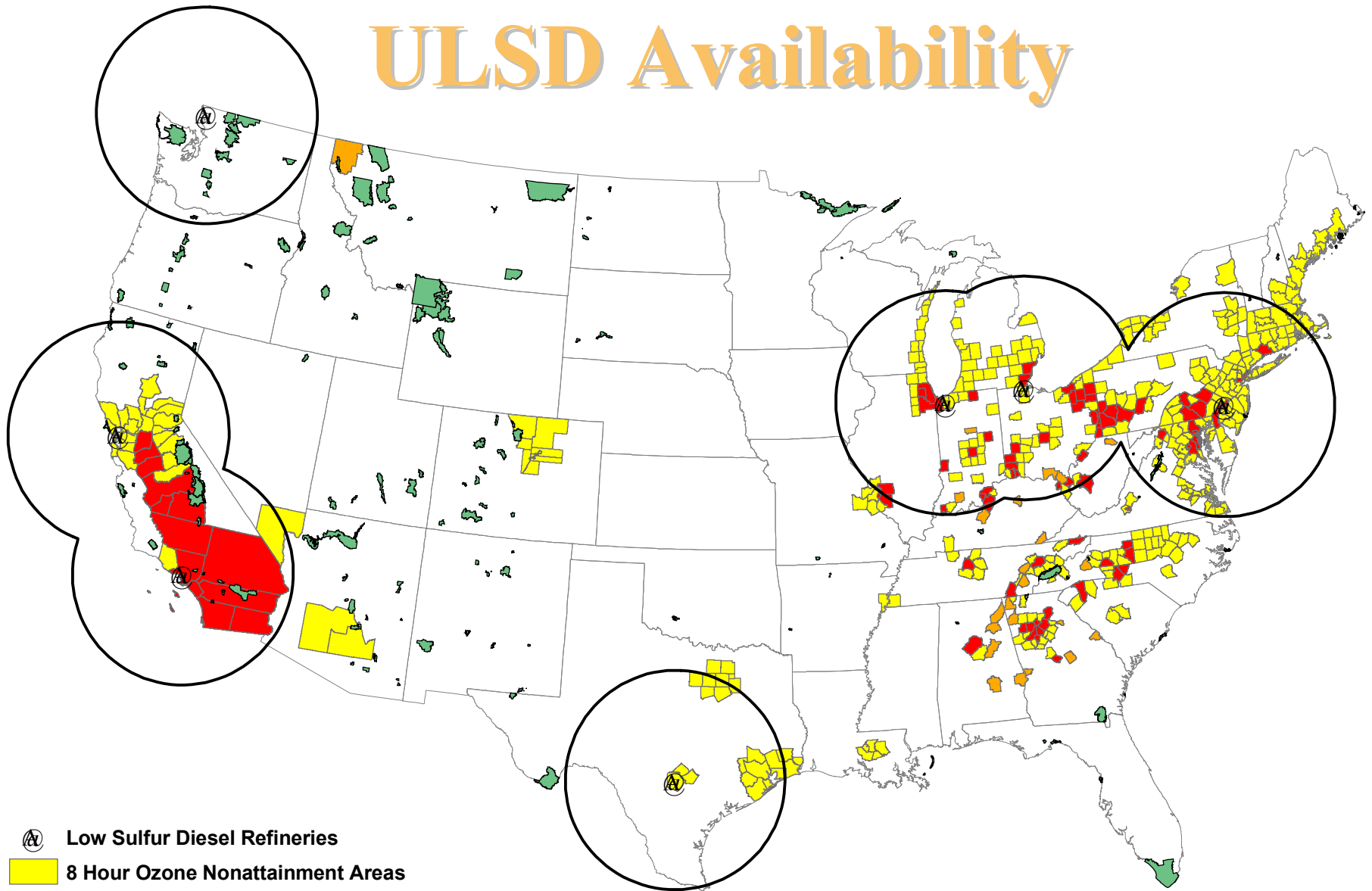









What can be done to reduce “Legacy Fleet” emissions?

- DOC - Diesel Oxidation Catalyst
- DPF – Diesel Particulate Filter
- Reflash – reprogram for better NO_x control
- Replacement
- Fuel Options – e.g. switch to lower sulfur fuel
- EPA and the California Air Resources Board have technology verification processes with reciprocity
- Anti-idling strategies
- Best Practices

ULSD Availability



-  Low Sulfur Diesel Refineries
-  8 Hour Ozone Nonattainment Areas
-  Counties Exceeding PM2.5 NAAQS
-  8 Hour Ozone Nonattainment and PM2.5 NAAQS Exceedances
-  Federal Class I Areas (Visibility)

Rings represent a 250 mile radius from refineries.

Air quality data derived from AQS (PM 2.5: 2000-2002 data;
8 Hour Ozone: 2001-2003 data) with data handling per Agency guidance.

Voluntary Diesel Emissions Reductions

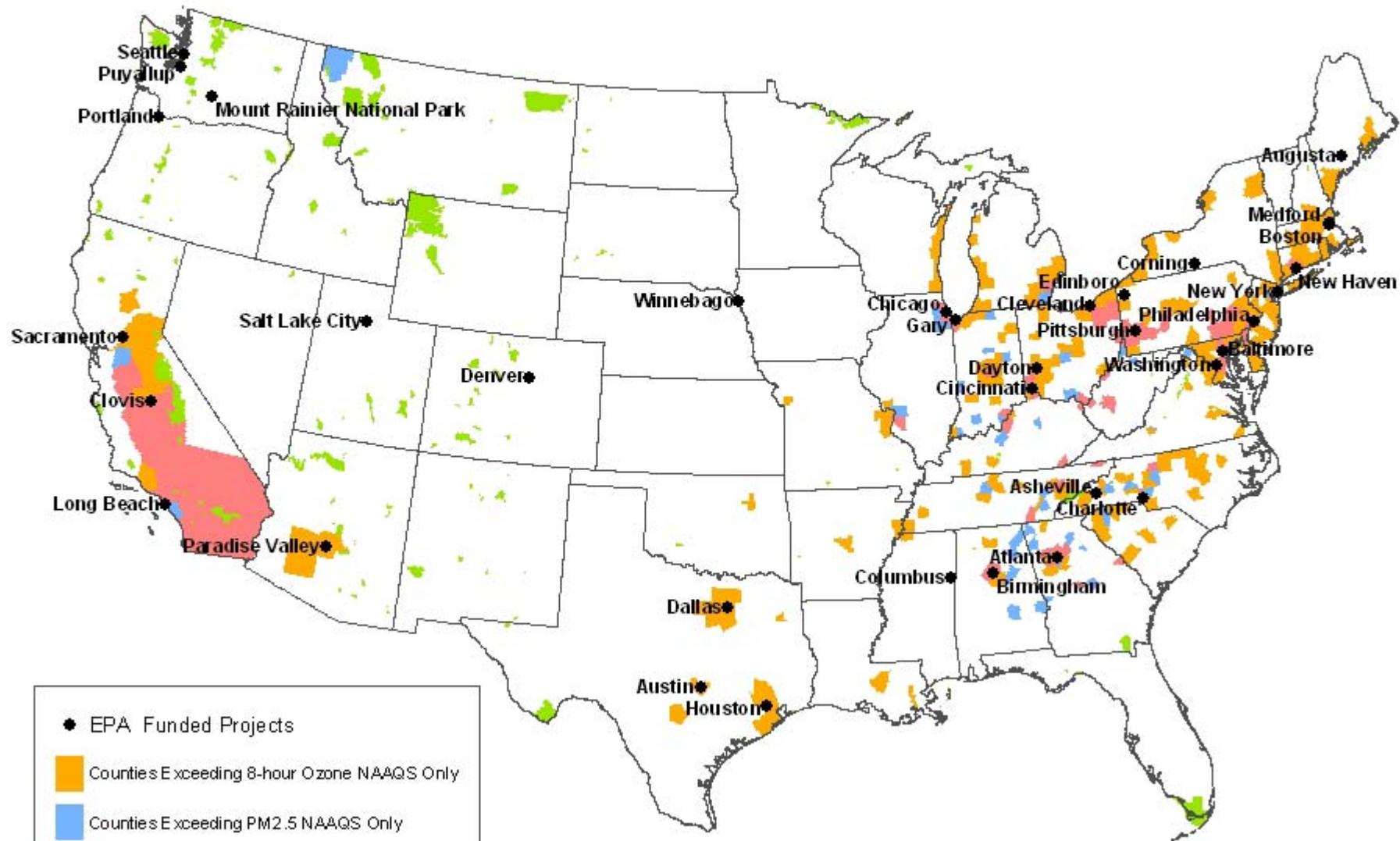
- Voluntary Diesel Retrofit and Replacement Program

- Geographic Strategy to Pull Forward Ultra Low Diesel Fuel (ULSD)
- Provide incentives for new technology in new applications
- By 2003 – 160,000 retrofits
- ULSD early on both coasts and Midwest
- West Coast Diesel Emission Reduction & other collaboratives

- Smartway Transport Program

- Works with shippers and carriers in 31 states







Sector-Based Incentives Strategy

- Federal Advisory Process to expand emission reduction strategies by working with unique sectors using diesel engines
 - Clean School Bus USA
 - Construction
 - Ports & airports
 - Freight
 - Agriculture
- Sectors differ in economic structure, engines and uses of equipment, interested parties
- Incentives need to be built around the specific economics to work

What's Next?

- Federal Advisory Recommendations
 - Jan. 2005 Port Work Shop - Corpus Christi
 - March 2005 Construction Work Shop - CONEXPO - Las Vegas
 - Reg proposals on marine/locomotive
- Federal Assistance
 - New Clean School Bus USA grants
 - New Smartway grants
 - New Retrofit grants
 - West Coast Diesel Emissions Reduction Collaborative and other regional efforts