

National Clean Diesel Campaign

Fuel Regulations and Requirements

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Widespread Need for Air Pollution Reductions

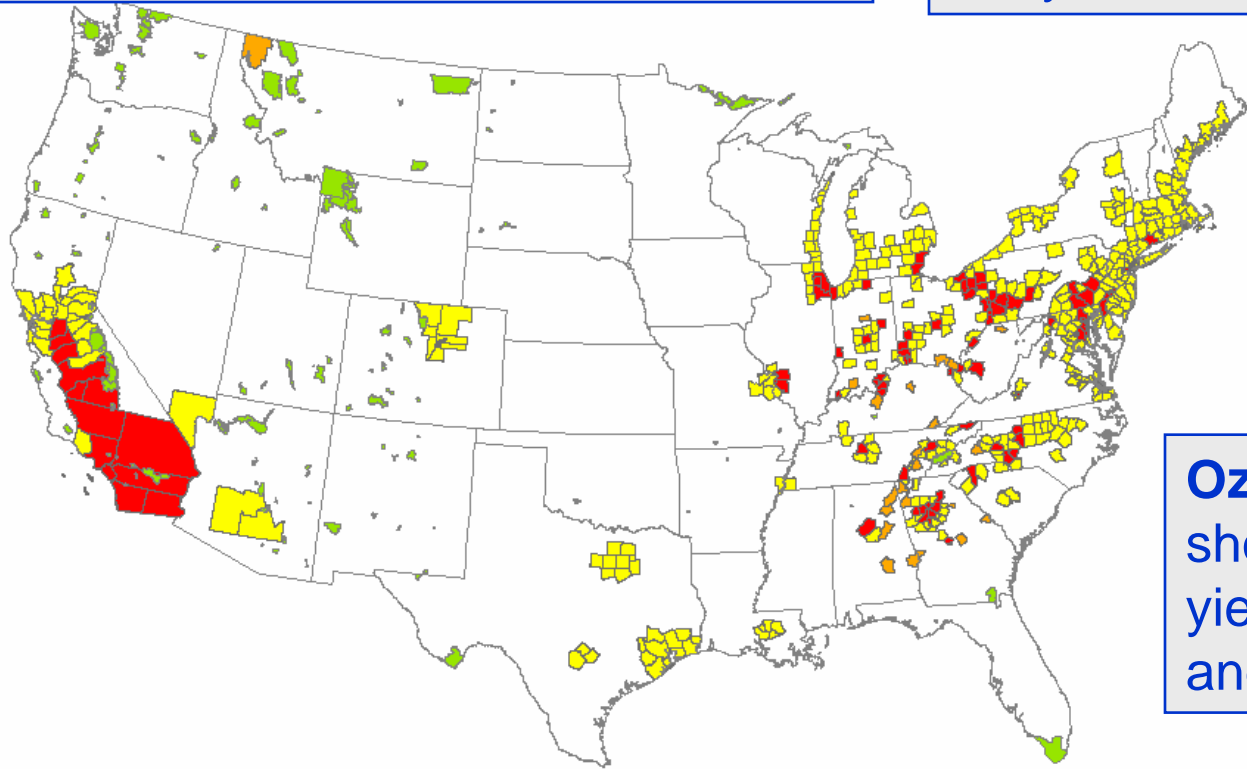
65 million people live in areas that violate the fine PM air quality standard; 159 million people live in areas that are not in attainment for ozone

Fine particles from diesel exhaust can remain in the atmosphere for weeks, and carry over hundreds of miles

Diesel exhaust is likely to be carcinogenic to humans

Ozone has been shown to reduce yields of vegetables and field crops

Clean Air Act requires EPA to take steps to remedy regional haze in 156 pristine "Class I" areas



- 8 Hour Ozone Nonattainment Areas
- Counties Exceeding PM2.5 NAAQS
- 8 Hour Ozone Nonattainment AND PM2.5 NAAQS Exceedances
- Federal Class I Areas (Visibility)

Overview of Current Clean Fuel & Engine Programs

Taking a Systems Approach:

Regulating the engine and fuel as a system to
optimize costs and environmental benefits

Program Considerations

- Treat the diesel fuel and engine as a system.
- Transfer advanced technology from 2007 highway program to nonroad applications.
- Get timely, large emission reductions to help States' attainment and maintenance plans.
- Provide 6-10 years lead time to deal with technical challenges and diversity of industries & products covered.
- Include flexibility provisions to minimize costs.

Comprehensive Approach to Vehicle and Equipment Emissions Reduction

- **Tier 2 Standards (1999 rulemaking)**
 - 77-95% lower light-duty vehicle standards (beginning in 2004)
 - Same standards for light trucks and cars; gasoline and diesel
- **Heavy-Duty 2007 Standards (2000 rulemaking)**
 - Diesel sulfur control (15 ppm maximum, beginning in 2006)
 - 90% lower heavy-duty gasoline & diesel vehicle standards
- **Nonroad Tier 4 Standards (2004 rulemaking)**
 - Diesel sulfur control (2 steps - 500 ppm in 2007, 15 ppm in 2010)
 - 90-95% lower emission standards - based on highway technology
- **Diesel Retrofit (ongoing)**
 - Ultra-low sulfur diesel fuel enables advanced technologies
 - Realize substantial air quality and health benefits earlier
- **Locomotive and Marine Diesel Standards (in process- 2006)**
 - Marine diesel sulfur control (15 ppm maximum) in 2012
 - Considering requiring same technologies

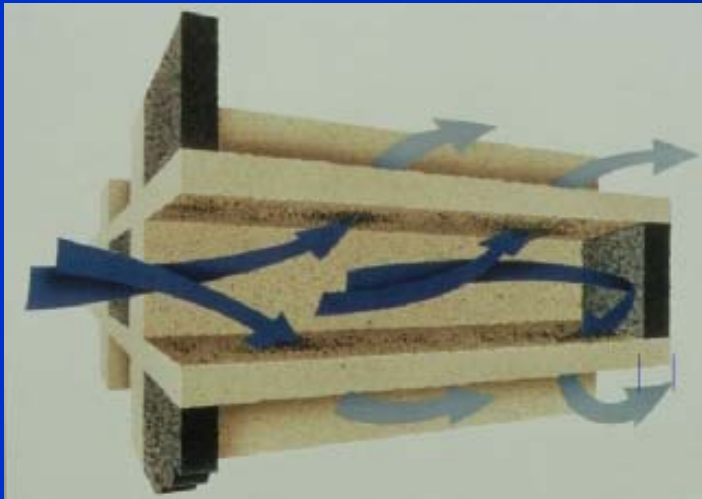


Removing Sulfur is Key to Reducing Emissions

- Sulfur is a catalyst poison
- Removing sulfur, much like removing lead from gasoline, allows for maximum catalyst efficiency
- Reductions in fuel sulfur provide immediate PM reductions
- Ultra-Low Sulfur Diesel Fuel (Highway and Nonroad)
 - Enables PM filters that can eliminate 99% of carbonaceous PM
 - Enables advanced NO_x catalysts giving 90+% reductions
 - Immediate benefits from in-use fleet

Enabling Near Zero Emission Levels

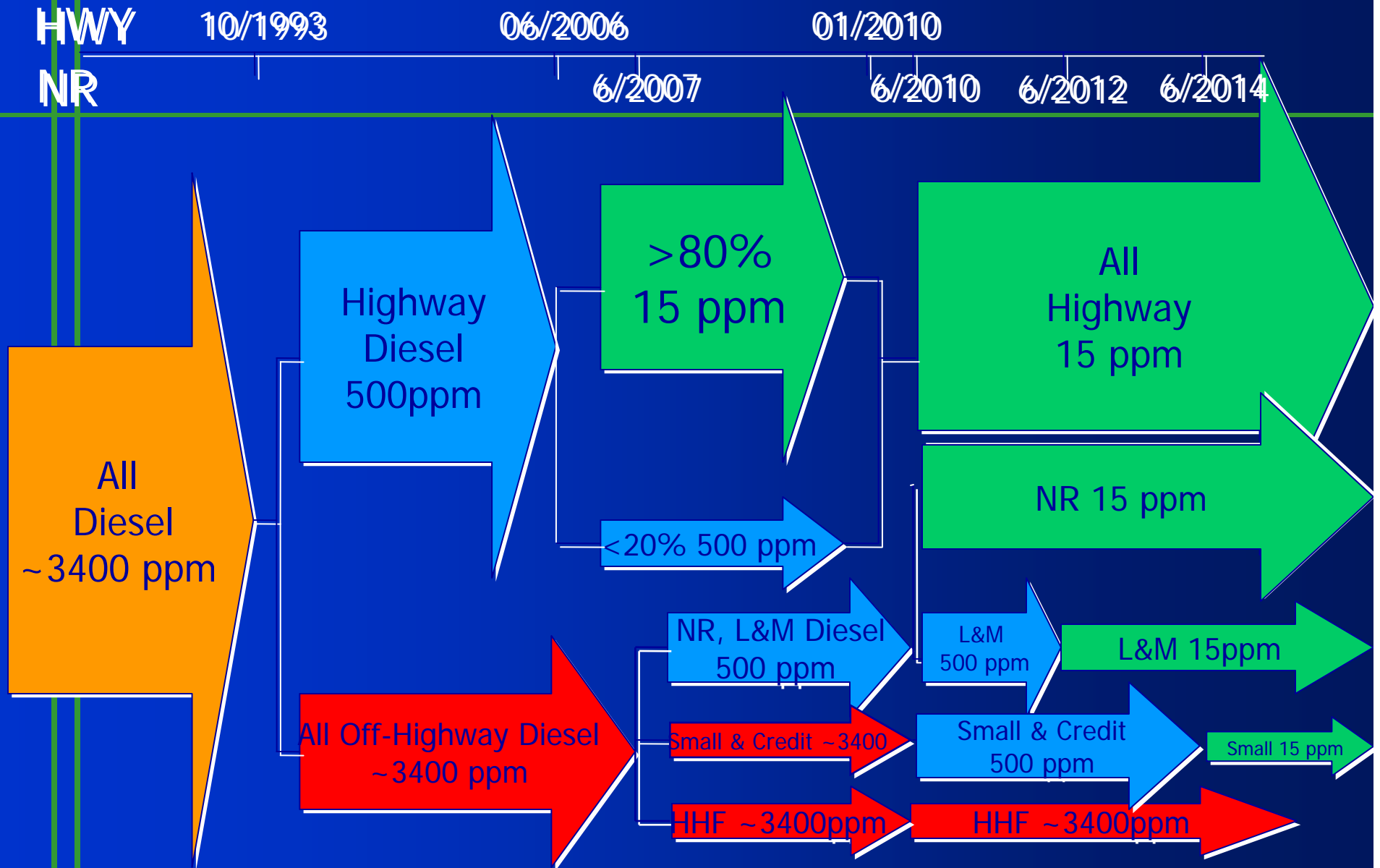
- Typical test filter *current standards*
- Test filter *2007 standards*
- Unused test filter



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

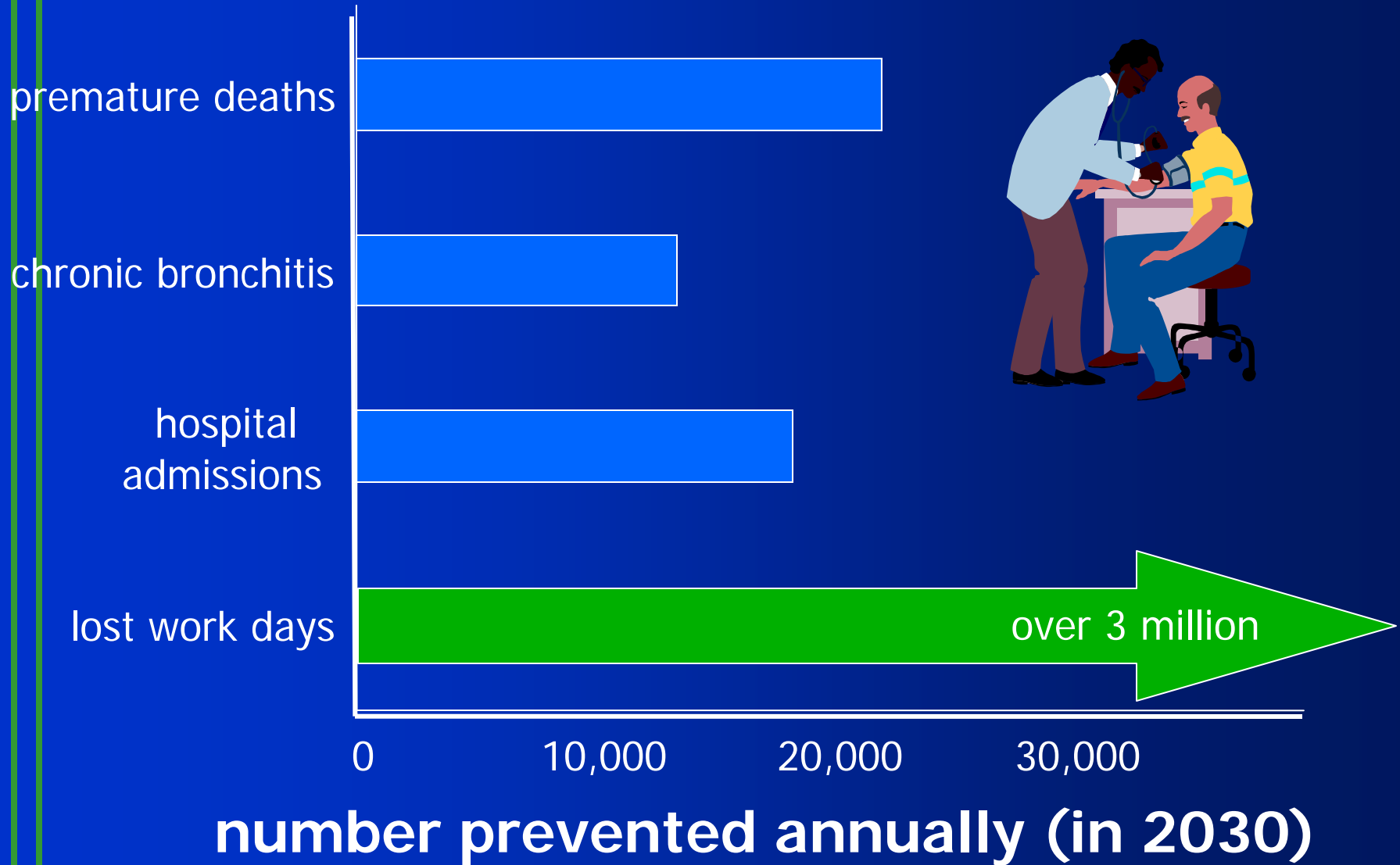


Highway & Nonroad Diesel Fuel Sulfur Control



* This figure is intended to illustrate the timeline for the final highway and nonroad diesel fuel sulfur control programs. It is not drawn to exact scale. Refer to 40 CFR Part 80 for specific program dates.

U.S. Clean Fuel & Vehicle Programs Offer Tremendous Health Benefits



- For more information on fuel and engine regulations:
www.epa.gov/otaq
- For more information on the Nonroad Rule:
www.epa.gov/nonroad