The Latest on Mobile Source and Fuel Programs

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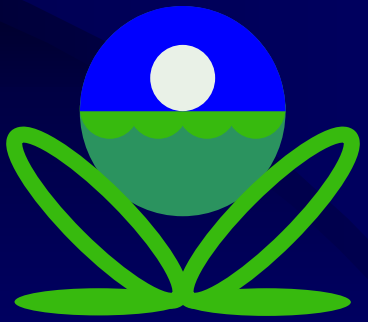


Overview

- Newly Adopted Nonroad Engine Standards
- Progress Toward 2007 Highway Engines & Low Sulfur Diesel Fuel
- Progress Toward New Nonroad Diesel Engine & Fuel Standards



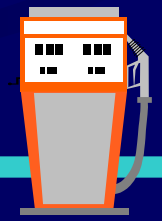
Newly Adopted Nonroad Engine Standards

- Final rule signed last month covers:
  - Recreational marine diesel engines (big sport boats)
  - Large industrial spark-ignition engines (forklifts)
  - Recreational gasoline engines/vehicles (snowmobiles, off-road motorcycles, ATVs)

Newly Adopted Nonroad Engine Standards

- *Standards for different categories phased-in over the next decade*
  - *program includes emissions credit programs, in-use testing requirements*
  - *will reduce millions of tons of pollutants (focus on HC)*
  - *billions of dollars of quantified health and welfare benefits*

Progress Toward 2007



- All litigation resolved by Court in EPA's favor
- Report from EPA's first biennial progress review published June 2002
  - PM technology is becoming well-established
  - NOx technology not as mature
    - But progress to date has been excellent
- Independent review also conducted this year
  - Open, public process following FACA requirements
  - Draft report is undergoing internal review by panel
  - Findings presented at panel's final meeting 9/24,25

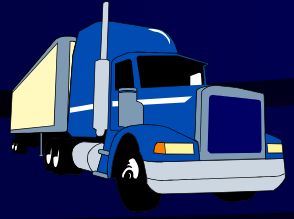
Clean Diesel Independent Review Panel Draft Findings

Engine Emission Control Technology

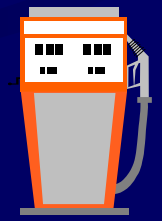
- Very encouraging rate of progress to date.
- No insurmountable issues at this time.
- Key technical challenge remaining is NOx adsorber durability.

15ppm Desulfurization Technology

- No technological impediments to going forward.
- In general, refiners are where they are expected to be.
- Some are proceeding ahead of schedule.
- New technologies have been introduced which could potentially assist refiners in producing 15 ppm S fuel.



Progress Toward 2007



2nd EPA progress review by end of 2003

- Technology progress over next 2 years will be critical to success in 2007.
- Manufacturers will be making 2007 product development decisions in 2004.
- EPA is putting substantial resources into diesel technology development and into meeting with industry experts worldwide.
- Also gearing up to review the pre-compliance reports which refiners and importers must submit annually from 2003 through 2005.

EPA Efforts Underway to Assess Progress

Engines

- NOx adsorber development program at NVFEL
  - focus on durability testing over coming months
  - desulfation strategy development and improvement
  - evaluating novel quad bed by-pass system
  - published four SAE papers presenting test results
- Ongoing meetings w/ engine & emission control companies
  - also receiving hardware support from Johnson Matthey, Engelhard, Delphi ASEC, Corning, Bosch, Cummins, NGK, International
- Working with DOE funded joint industry/government technology demonstration programs
- Monitoring worldwide efforts for advanced technologies

EPA Efforts Underway to Assess Progress

Fuels

- Staying abreast of refining technology developments worldwide
- Ongoing assessment of individual refinery plans
- Assessing distribution system challenges in cooperation with DOE and industry
- Monitoring development of lubricity specifications and test procedures (ASTM)
- Working with Diesel Engine Oil Advisory Panel on development of PC-10 formulation for 2007
- Testing new lube formulations on engines using potential 2007 technologies

Nonroad Diesels

- **Construction**
  - excavators, bulldozers, ...

- **Industrial**
  - portable generators, forklifts, airport service equipment...

- **Agricultural**
  - tractors, combines, irrigation pumps, ...

Need for Action

- A big source of diesel PM
  - Diesel PM increasingly a focus of toxics and air quality concerns
  - High priority for the Agency
- Also potential for major NOx reductions
  - important to States ozone plans
- Top regulatory priority for EPA

A Systems Concept-- Engines & Fuel

Pursuing a systems approach similar to the 2007 highway diesel rule:

- Diesel aftertreatment
  - to achieve significant reductions in NOx and PM
  - new program would also address transient test cycle and in-use emissions
- Fuel sulfur reduced to 15 ppm
  - to enable aftertreatment technologies
  - and get large immediate sulfate PM reductions from existing fleet

Issues for Engine & Equipment Manufacturers

- Timing, level, and scope of standards
  - need for stability between design changes
  - Hundreds of extremely diverse applications
  - Severe operating environments and catalyst effectiveness during low-load operation
- Harmonization
  - with Europe, Japan, and within the U.S.
  - Nonroad diesel companies are far more global than on highway

Issues for Engine & Equipment Manufacturers (continued)

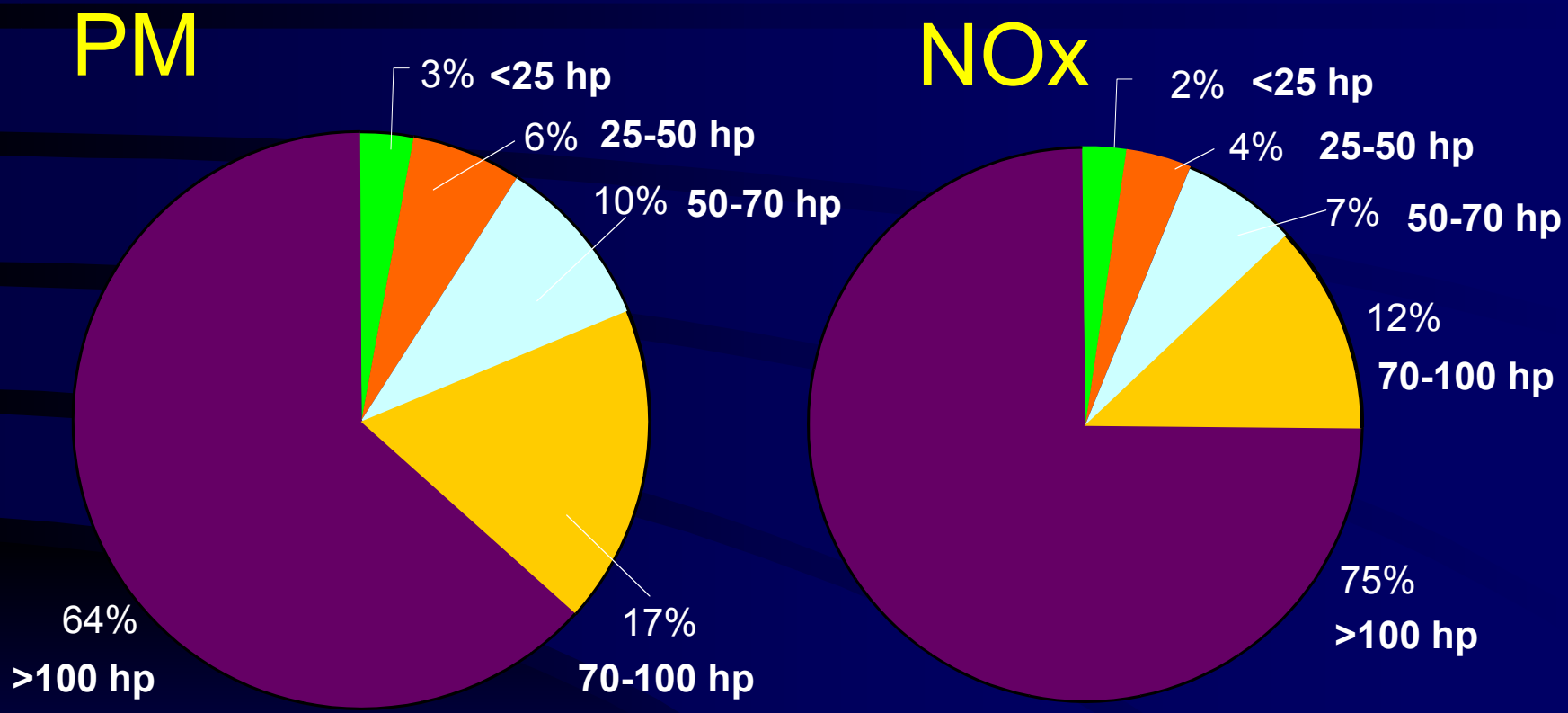
- Implementation flexibility
  - especially for hundreds of equipment manufacturers that are small businesses
- Adapting aftertreatment to small engines

8 hp

16 hp

20 hp

Smaller engines contribute significantly to emissions

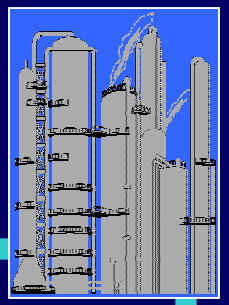


Nonroad Diesel Emissions Fractions, 2000

Challenge of Adapting Technology to Small Engines

- Past *nonroad* diesel standard-setting has relied heavily on transfer of technology developed for heavy-duty *highway* engines.
- Unlike many bigger engines, **engines below ~70 hp** are not typically derived from highway engine designs.
  - Presents some challenges
- Goal is high-efficiency aftertreatment on engines down to as low a hp rating as possible.

Issues for Fuel Providers



- Inclusion of locomotive and marine fuel
- Implementation: When and How? --
  - 100% 15 ppm S all-at-once
  - To 500 ppm S first, then to 15 ppm later
  - Phase-in: regulate end-users instead of refiners
- May be high capital costs for some refineries
  - Especially small refiners
  - Some only make nonroad fuel-- no ready H_2 supply

Emission Reductions

- Potentially very significant PM & NOx reductions
  - PM reductions exceed those of 2007 highway program if assume similar control efficiencies
  - Also large NOx reductions, important to States ozone attainment/maintenance plans
- Also very significant toxics reductions
  - diesel PM and toxic gaseous compounds

Next Steps

- Engaging stakeholders
- Conducting technical analyses
- Proposal to OMB by the end of this year
- Proposal published in early 2003

This project remains OTAQ's top regulatory priority