Maritime Air Quality Technical Working Group
Long Beach, California

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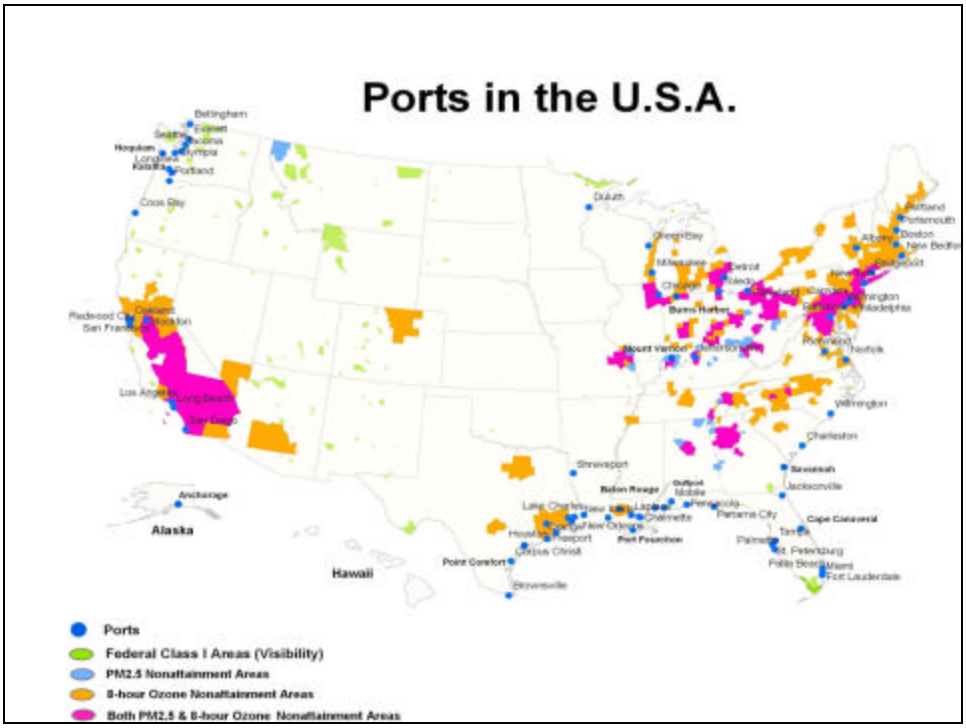
Region IX

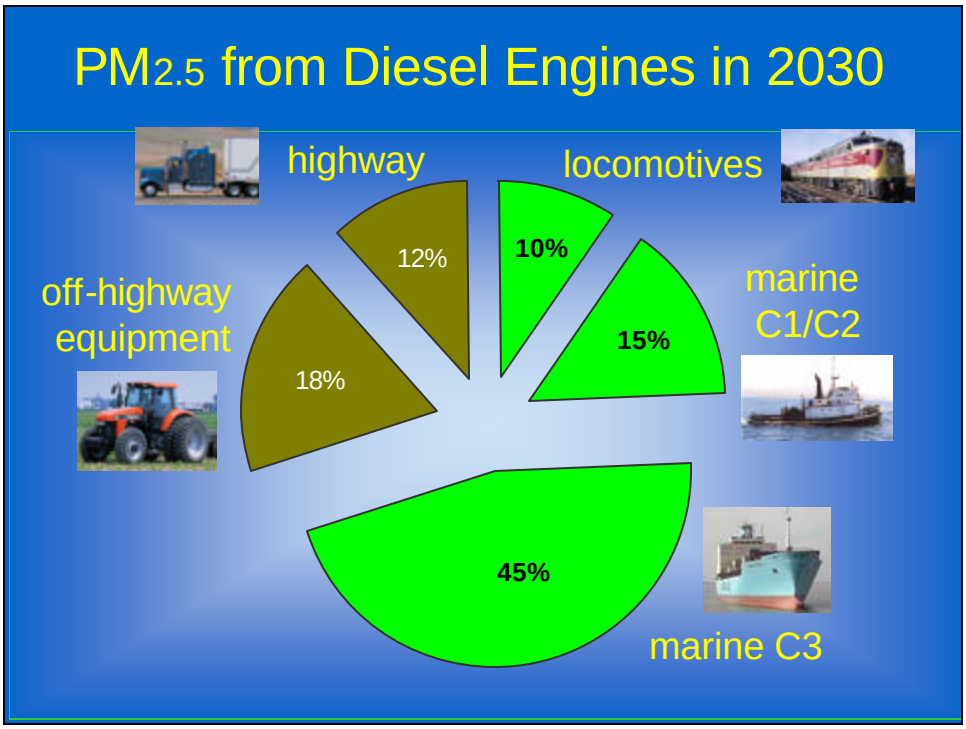
US EPA Updates

Locomotive Tier 3 and Marine Category 1 & 2 Notice of Proposed Rulemaking

MARPOL Annex VI and SOx Emission Control Areas

Collaboration and EPA Leadership


Ports in the U.S.A.
Alaska
Hawaii
Ports
Federal Class I Areas (Visibility)
PM2.5 Nonattainment Areas
8-hour Ozone Nonattainment Areas
Both PM2.5 & 8-hour Ozone Nonattainment Areas


PM2.5 from Diesel Engines in 2030
highway
locomotives
off-highway equipment
marine C1/C2
marine C3
12%
10%
15%
18%
45%

Mobile Source NOx in 2030

aircraft

locomotives

other nonroad

17%

6%

12%

16%

marine C1/C2

12%

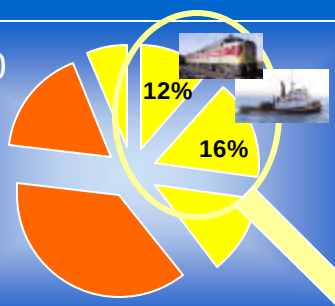
37%

highway

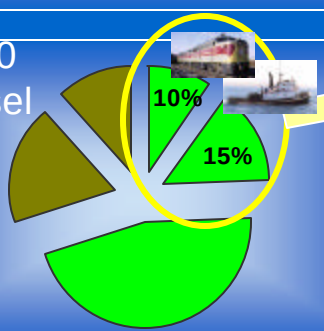
marine C3

New Standards for Locomotives and Marine Diesels

2030 NOx



2030 diesel PM



- **Potential reductions on the order of:**
  - **~900,000 tons/yr of NOx**
  - **~25,000 tons/yr of PM**
- **Compares to nonroad rule reductions of:**
  - **738,000 tons/yr of NOx**
  - **129,000 tons/yr of PM**

Locomotive & Marine Diesel Rulemaking

- Patterned after, and coordinated with, highway and nonroad diesel programs
- Covers locomotives and all marine diesel engines <30 liters/ cylinder
  - Applies to new locomotives and new engines for tugs, barges, ferries
- Targets NOx and (especially) PM aftertreatment
- Locomotive/marine fuel control already set--
  - 500 ppm sulfur in 2007, 15 ppm in 2012
- NPRM end 2006/early 2007: FRM end of 2007
- Now working with stakeholders on issues raised

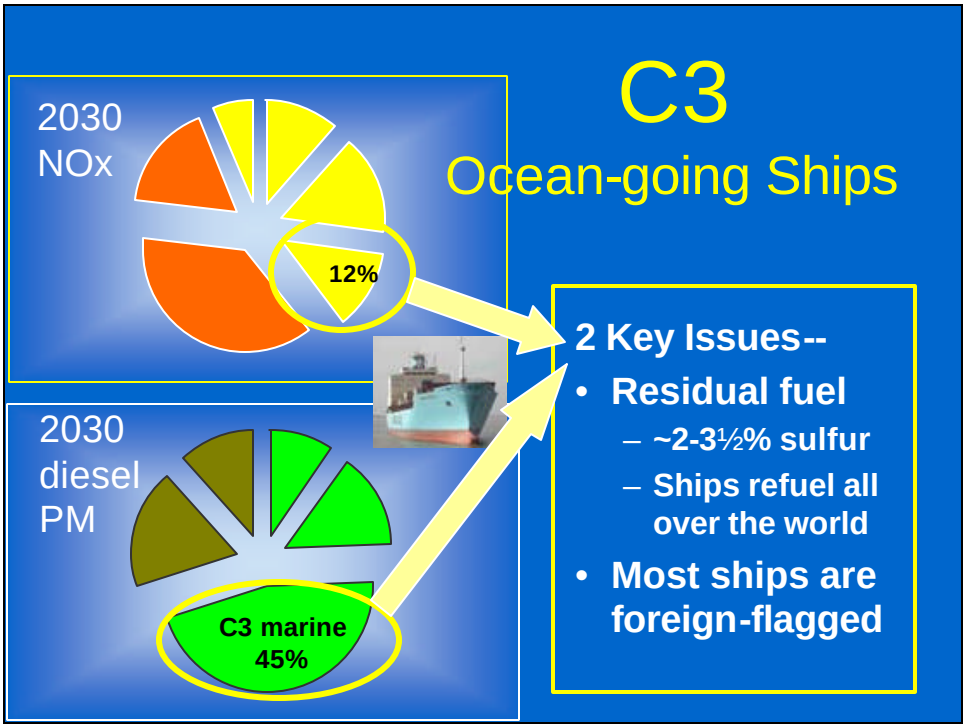
Locomotive and Marine Rule

- Early reductions
  - Existing engines: locomotive remanufacture standards, beginning in 2010 or earlier if kits are available
    - Exploring whether this approach can be applied to some marine diesels as well
  - New engines: standards based on engine changes, expected to begin 2012
  - Goals: 50% PM reduction, 10-50% NOx reduction
- Long-term new engine standards
  - Aftertreatment-forcing standards, beginning 2015-2017
  - Goals: 90% PM reduction, 80% NOx reduction

New standards will be enabled by fuel sulfur controls for marine and locomotive diesel fuel

- 500 ppm in 2007 and 15 ppm in 2012

C3
Ocean-going Ships



2 Key Issues--

- **Residual fuel**
  - **~2-3½% sulfur**
  - **Ships refuel all over the world**
- **Most ships are foreign-flagged**

C3 Engine Controls

- Two-prong strategy for additional standards--
  - Work through IMO toward a new tier of international engine emission standards
  - ANPRM early 2007
- Next tier of standards is expected to be identified by the end of 2007.

MARPOL Annex VI

MARPOL is the International Convention for the Prevention of Pollution from Ships 1973/78.

- Annex VI establishes global standards applicable to air emissions from ships.
- Current Annex VI standards are NOx only and are based on in-engine controls; expected result – 20% reduction by 2030.
- Addresses NOx, SOx, VOCs, ODS, fuel quality, and shipboard incinerators.
- Entered into force in May 2005.

MARPOL Annex VI Negotiations

- Negotiations are underway to develop more stringent Tier II NOx and SOx standards and to expand coverage to PM and existing engines.
- Specific issues under negotiation:
  - Tier II & III NOx standards for new engines.
  - Standards for existing engines.
  - Lower sulfur limits for marine fuels.
  - VOC standards for tankers.
  - Expansion of the Annex to address PM.
- Negotiations are expected to be completed in 2008 with new standards effective as early as 2010.
- US Ratification

SOx Emission Control Areas

- MARPOL Annex VI provides a mechanism for the creation of SOx Emission Control Areas (SECAs) where ships must use low-sulfur fuel (15,000 ppm) or alternative mechanisms such as scrubbers.
- The U.S. and Canada are currently exploring the feasibility of designating such an area in North America

SECA Process

- Studies underway will examine feasibility for the West Coast, Gulf Coast, East Coast, and Great Lakes.
- Decision to pursue designation will be a decision of the USCG requiring interagency agreement.
- Important to note that we are strictly exploring feasibility at this stage.

SECA Process

- Once analytical studies are completed, we will need to decide what areas we will pursue, decide on boundaries, and other significant issues.
- Any SECA proposal will be made jointly with Canada and we hope to enlist Mexico's support for a trilateral proposal.
- Parties to Annex VI must approve any SECA proposal. If approved, the requirements become effective 26 months later.

National Clean Diesel Campaign: Two Components

- Regulations for new engines
- Voluntary measures to address existing diesel fleet
  - Retrofit older vehicles and equipment with emissions reduction technology
  - Replacement of oldest vehicles and equipment
  - Idling reduction, smart operations, etc.

EPA Regional Initiatives

- Many localized, regional approaches have been established:
  - West Coast Diesel Collaborative
  - Northeast Diesel Collaborative
  - Mid-West Clean Diesel Initiative
  - Mid-Atlantic Diesel Collaborative
  - Blue Skies Collaborative

  www.westcoastcollaborative.org

EPA Leadership

- Much can be done by working collaboratively under Federal leadership
  - National Regulations
  - Regional Collaboratives
  - National tools
    - Early fleet modernization
    - SIP guidance and credits
    - Easy to use models and calculators
    - Verification of technologies
    - Packaging technologies to match port operators' business models

Federal Leadership (cont'd)

- Implementing strategies that have Energy Security (fuel savings) and emissions benefits
  - SmartWay Upgrade kits
  - Efficiency gains and sustainability in new port terminals
  - Work with DOT's Freight Initiative
  - Clean construction equipment, fleet modernization and retrofit for cargo handling equipment
- Assessing the direct emission reduction potential of port operational strategies
  - on dock rail
  - virtual container yards
  - chassis pools
- Assessing potential NOx reductions resulting from fuel efficiency improvements

Ocean-Going Vessel Conference

- San Diego, CA on Feb 7-8, 2007
- Purpose: Bring together key port officials, shippers, freight owners, ship and engine manufacturers, and finance community to discuss:
  - Technologies/operational strategies - reduce emissions
  - Financing strategies to minimize costs/maximize opportunities
  - Short and Long term business impacts associated with increasing freight emissions:
    - Queues and wait times
    - Diverting OGVs to 2nd and 3rd choice ports
    - Ports inability to expand under current environmental conditions
- Co-sponsors: EPA, Pacific Merchant Shipping Association (PMSA), Ports of LA, Long Beach and San Diego, MARAD, CARB

Conclusions

- EPA is developing a program to achieve large PM and NOx reductions from locomotives and marine diesels that burn distillate fuel.

- We can and will take steps to reduce emissions from ocean-going vessels.

  - Pursuing more stringent air emission standards for ships under MARPOL Annex VI and considering designation of a North American SECA.