EPA’s National Clean Diesel Campaign and the North American ECA

AAPA-ESPO Meeting  March 23, 2011

Office of Transportation & Air Quality
Jim Blubaugh

U.S. Environmental Protection Agency
Overview

• Reducing diesel engine emissions
• Innovative and Regulatory programs
• North American ECA
U.S. Ports and Nonattainment Areas

- More than 40 major ports are located in PM$_{2.5}$ or ozone nonattainment areas
- About 88 million people live in 39 areas that do not meet the PM$_{2.5}$ NAAQS or that contribute to violations in other counties
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

Nonroad Diesel
sales over 650,000 / yr
12B gallons / yr
final rule 2004
fully phased in 2015

Heavy-Duty Highway
sales 800,000 / yr
40B gallons / yr
final rule 2000
fully phased in 2010

Locomotive/Marine
sales 40,000 marine engines,
1,000 locomotives / yr
6B gallons / yr
final rule 2008
fully phased in 2017

Ocean Going Vessels
CAA Rule Dec 2009
IMO MARPOL Annex VI
ECA Controls
- Fuel Based 2015
- SCR Catalyst Based 2016

Note: sales and diesel fuel usage vary year-to-year; these figures are for comparison purposes only

These standard-setting rulemakings are key enablers for collaborative partnerships with industry and state & local governments.
Marine and Locomotive Engines

- **Locomotive and Marine C1 and C2**
  - March 2008 EPA adopted more stringent PM and NOx exhaust emission standards for locomotives and marine diesel engines.
  - EPA’s three-part program:
    - (1) Tightening emission standards for existing marine engines when they are remanufactured;
    - (2) Setting near-term engine-out emission standards (Tier 3), for newly-built locomotives and marine diesel engines; and
    - (3) Setting longer-term standards (Tier 4), for newly-built locomotives and marine diesel engines that reflect the application of high-efficiency aftertreatment technology.
Comparison of Established Standards for Marine Diesels and Diesel Trucks

- **Marine Tier 3 2009-2014**
- **Marine Tier 2 2004-2009**
- **2007-2010 Trucks**
- **1990**
Ship Contribution to U.S. PM Inventory

Source of inventory estimates: C3 Marine NPRM (July, 2009)
Does not reflect IMO MARPOL Annex VI Amendments (October 2008)
• Clean Ports USA Program
  – Working with port authorities, terminal operators, shipping, truck and rail companies
  – Promote cleaner diesel technologies and strategies through education, incentives, and financial assistance for diesel emissions reductions at ports
  – Voluntary Diesel Retrofit Verification program
  – SmartWay Transport Partnership program
    – Tools, information, and recognition to reduce carbon footprint
• **Technology Strategies**
  – Refuel
  – Retrofit
  – Repair/Rebuild
  – Repower
  – Replace

• **Operational Strategies**
  – Improved Port Efficiency
  – Using On-shore Power
  – Considering Air Quality Impacts of Security Changes
ARRA Funding for Clean Diesel at Marine Ports

- Over $60 million in awards to marine port-related projects, putting Americans back to work to clean the air

Georgia Ports Authority
Port of Houston Authority
Port of Long Beach
Port of Los Angeles
Maryland Port Administration
Port of New York and New Jersey
Port of Oakland
South Carolina State Ports Authority
Tacoma Port Authority

Port of Virginia
Mississippi River Corridor
Great Lakes Commission
Cost-effective Marine Repowers

Northeast States for Coordinated Air Use Management

- EPA awarded $4.45 M to NESCAUM for upgrades of 13 harbor craft vessels with some built as early as 1929, 1946, 1970, etc.

- Estimated Annual Reductions
  - 113.4 NOx tons per year
  - 9 PM tons per year
  - 603.4 CO tons per year
  - Fuel savings: 53,000 gals per year

- Representative Tug Cost-effectiveness of EPA funds
  - $2,200 per lifetime ton NOx
  - $38,500 per lifetime ton PM
Great Lakes: Repowering gen sets

- EPA awarded $1.21 M ARRA grant to Great Lakes Commission
  - $403K match from American Steamship Company
- Repowering 1976 and 1979 service generator sets on 2 bulk carriers during winter off-season
- Improves air quality for 8 states

- Estimated Annual Reductions
  - 36.4 NOx tons per year (40% reduction)
  - 0.4 PM tons per year (49% reduction)
  - Fuel savings: 8,500 gals per year

*The H. Lee White is one of two repowered bulk carriers on the Great Lakes.*
Emerging Technologies: Marine

• Repowering the *Champion Coal*, a Pittsburgh-based towboat

EPA awarded $1.5M to Pennsylvania Dept. of Environmental Protection for a marine engine overhaul known as Caterpillar’s Emission Upgrade kit. The towboat’s two Caterpillar 3500 series Tier 1 engines were rebuilt/upgraded to Tier 2 standards.

  – Estimated Emissions Reductions
    • NOx by 25%
    • PM by 33%
    • HC by 4%
ARRA Projects: Port of Los Angeles

$2M to replace, repower, and retrofit a total of 24 pieces of equipment (27 engines), including harbor craft
ARRA Project: Mississippi River Corridor – Ingram Barge

- 13 Kits on 6 Vessels
- Emerging Technology: ESW’s DOC (below) and Crankcase Ventilation System

PEMS emissions testing by Emisstar
• SmartWay brand identifies shippers and carriers that reduce transportation-related emissions.

• SmartWay helps fleets address domestic goods-movement footprint for fuel efficiency and GHGs
  – Road, Rail
  – Drayage, Borders and Truck-stops

• This program leverages shipper influence with cargo ships/trucking/rail to promote a improved environmental footprint
An Emission Control Area should be considered for adoption by the Organization if supported by a demonstrated need to prevent, reduce, and control emissions of NOx or SOx and particulate matter or all three types of emissions … from ships. (Appendix III, para 1.3)
2020 Potential ECA PM$_{2.5}$ Reductions
Ozone (Smog) reductions from the proposed ECA reach well into the U.S. interior
Benefits and Costs of the Coordinated Strategy

By 2030, the emission reductions associated with the coordinated strategy for OGV will annually prevent:

– Between 12,000 and 30,000 PM-related premature deaths
– Between 210 and 920 ozone-related premature deaths
– About 1,400,000 work days lost
Contact:

- Clean Ports Program contact: Arman Tanman
  - Email: Tanman.Arman@epa.gov
  - Tel: (202) 343-9326

- North American ECA and supporting information are available at: www.epa.gov/otaq/oceanvessels.htm
  - Contact: Michael Samulski
  - Email: Samulski.Michael@epa.gov
  - Tel: (734) 214-4532