National and Regional Strategies to Reduce Diesel Emissions

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Why Focus on Reducing Diesel Pollution?

• New England has some of the highest asthma rates in the country – all six New England states have childhood asthma rates above 10 percent
• All of CT, MA and RI, and coastal areas of ME and NH do not meet the ozone standard
• Portions of southwest CT designated nonattainment for fine particles (i.e., PM$_{2.5}$)
• Diesel engines are significant contributors to air pollution, especially in urban areas
• There are cost-effective ways to reduce pollution from existing diesel engines
Ozone Nonattainment Areas in New England
PM$_{2.5}$ Nonattainment Areas in the Northeast
Unhealthy Air Quality Continues to Affect Connecticut

Connecticut Peak Ozone Air Quality Index (AQL)

Connecticut Peak PM 2.5 Air Quality Index (AQL)

Peak AQI for August 13, 2005

PEAK AQI August 13, 2005
EPA’s Clean Diesel Campaign - Regulations for New Engines

• Nationally, EPA has set standards for **new diesel engines and diesel fuel** that will result in the use of advanced pollution control technology
  - In Dec. 2000, EPA set very stringent standards for new heavy-duty trucks and buses that take full effect beginning in 2007
  - In May 2004, EPA set very stringent standards for new nonroad diesel engines which will take effect beginning in 2008
  - The new standards will cut PM and NOx emissions from new diesel engines by over 90 percent

• These regulations will result in very large public health and environmental benefits:
  - By 2030, particulate matter reduced by ~250,000 tons/year, nitrogen oxides by ~4 million tons/year
  - Annual benefits expected to exceed $150 billion, with a cost of approximately $7 billion
EPA’s Clean Diesel Campaign - Voluntary Diesel Retrofit Program

- EPA is implementing a robust voluntary diesel retrofit program to reduce pollution from **existing diesel engines** through the use of pollution controls and cleaner fuels.
- Five sectors targeted: School Buses, Ports, Construction, Freight, Agriculture.
- Retrofit options include:
  - Cleaner diesel fuel
    - Low sulfur diesel fuel (300 ppm) reduces PM emissions 10-15 percent compared to non-road diesel fuel.
    - Ultra low sulfur diesel fuel (15 ppm) reduces PM emissions an additional 5-10 percent beyond LSD.
  - Advanced pollution controls
    - Diesel Oxidation Catalyst reduces PM emissions 20 – 40%.
    - Diesel Particulate Matter Filter used in combination with ULSD reduces PM emissions 90 percent.
Reducing Diesel Emissions in New England

• Numerous innovative programs are underway to reduce diesel pollution from transportation and construction

• EPA, the states and our local partners are working to reduce emissions from diesel vehicles through:
  ➢ Anti-idling education and enforcement
  ➢ Diesel retrofits and cleaner fuels
  ➢ Heavy-duty vehicle testing
Anti-Idling Rules in New England

- EPA Region 1 has developed educational materials to discourage idling
- CT, MA & NH have anti-idling rules
- The CT & MA rules are included in the state air quality plan, and enforceable by EPA
- EPA has enforced the Massachusetts rule and imposed fines against:
  - Eleven bus operators at Logan Airport
  - Massachusetts Bay Transportation Authority
Reducing School Bus Idling in New England

- Every New England state has a program to reduce school bus idling that includes:
  - Creative materials to educate and involve drivers and school officials in local anti-idling campaigns
  - Direct outreach to school superintendents
  - Recommendations to limit idling on school grounds
- Connecticut, Maine, and New Hampshire have signed anti-idling agreements with their school transportation associations
- Massachusetts has developed a video for school bus drivers and is implementing an initiative that includes driver training and enforcement of the state’s 5 minute idling law
- In Rhode Island, 13 out of 36 school districts have adopted formal anti-idling policies, and more than 400 school bus drivers have received anti-idling training
Urban Bus Retrofits in New England

• Massachusetts Bay Transportation Authority (MBTA)
  - Entire fleet of 980 buses has either been retrofitted with filters and is using ULSD or runs on compressed natural gas
    - Result of Central Artery mitigation commitments

• Rhode Island Public Transit Authority (RIPTA)
  - Using ULSD in 156 buses and working to install filters on as many buses as technologically feasible
    - Funded through enforcement settlement agreement and with CMAQ funds

• Connecticut Transit – Stamford Division
  - 31 buses equipped with filters and using ULSD
    - Funded with CMAQ funds
School Bus Retrofit Projects in New England

• EPA’s Clean School Bus USA Grants (FY’03 & 04)  
  (Decisions pending on $7.5 million FY05 funds)  
  - Statewide, Maine – 450 buses  
  - Medford, Massachusetts – 70 buses  
  - Stamford, Connecticut – 35 buses  
  - Manchester/Nashua, New Hampshire – 45 buses  
  - Warwick, Rhode Island – 70 buses

• Funded through EPA or State Enforcement Settlement Agreements  
  - Boston, Massachusetts – 600 buses  
  - Norwich, Connecticut – 42 buses  
  - New Haven, Connecticut – 180 buses  
  - Hartford, Connecticut – 200 buses  
  - Bridgeport, Connecticut – 200 buses

• National EPA settlement with Toyota Motor Corporation - 2003  
  - $20 million in school bus retrofit projects nationally, including  
    - Yarmouth & Biddeford, Maine  
    - Newington, Connecticut
Construction Retrofit Projects in New England

- **Central Artery ("Big Dig") Project in Boston**
  - 200 construction vehicles

- **Q-Bridge on I-95 in New Haven, CT**
  - 65 vehicles

- **Massachusetts Highway Department**
  - Effective March 2005, **all** construction contracts include requirements for retrofitted equipment
  - This will have a significant impact statewide
    - For example in 2003, MassHighway invested $416 million in 475 road and bridge construction projects

- **MBTA has, since 2001, included requirements for retrofits in all construction contracts**
  - More than 40 projects in Greater Boston using retrofitted equipment
Other Retrofit Projects in New England

- **Commuter Trains – Boston**
  - All 55 MBTA Commuter Trains are using cleaner low sulfur diesel on road fuel
  - Funded through 2 EPA NE enforcement settlement agreements
- **Shuttle Buses - Boston**
  - 17 buses serving Longwood Medical area hospitals
  - First privately funded retrofit project in New England
- **Tourist Trolleys - Boston**
  - First tourist trolley retrofit project in the northeast
  - 35 trolleys (Funded through an EPA grant)
- **City of Cambridge/Massachusetts Institute of Technology Vehicles**
  - 32 vehicles with a range of retrofit technologies including, oxidation catalysts, crankcase filters, and particulate matter filters, as well as cleaner fuels, (ultra-low sulfur diesel fuel, biodiesel, and cetane enhancers)
- **Port of Boston - Conley Container Terminal Vehicles**
  - 36 vehicles operating at the port equipped with oxidation catalyst
Heavy-Duty Vehicle Testing

- In Massachusetts, all heavy-duty diesel vehicles (weighing more than 10,000 pounds) must undergo an emissions test every other year.
- Connecticut, Maine, New Hampshire, and Rhode Island conduct roadside testing.
Northeast Diesel Collaborative

- New joint venture of EPA Region 1, Region 2, NESCAUM and the eight Northeast States to reduce emissions from diesel vehicles

- Builds upon a long and successful history of cooperation among Region 1, Region 2, NESCAUM and the northeast states to address air quality challenges

- Will pursue sector-based approach to reduce emissions from
  - Trucks
  - Transit and School buses
  - Construction equipment
  - Locomotives
  - Marine engines
Goals of Northeast Diesel Collaborative

- Launch additional local diesel retrofit initiatives
- Increase enforcement of idling restrictions
- Expand construction retrofit requirements in urban areas and to private sector projects
- Expand transit bus retrofits to other transit authorities
- Retrofit schools buses in EJ areas, establish retrofit/clean purchasing requirements for new school buses across the Northeast
- Retrofit additional fleets, establish retrofit/clean purchasing requirements for municipal fleets across the Northeast
Potential Strategies

• Locomotives
  - Can be a significant source of urban air pollution
    - Large diesel engines, generally not well controlled
  - NESCAUM study of the contribution of locomotives to local air pollution in New Haven

• Effective strategies to reduce locomotive emissions already exist
  - Cleaner Fuel
    - Low Sulfur Diesel (300 ppm) fuel
      - Reduces PM emissions 10-20 percent
      - In early 2005, MBTA paying only approx. 1 cent per gallon more than high sulfur fuel (3,000 ppm)
    - Ultra Low Sulfur Diesel Fuel
      - Additional 5-10 percent reduction in PM emissions
Potential Strategies

• **Cleaner Engines**
  - Rebuild engines to Tier 0 (reduces NOx by approx. 33%)
  - Purchase cleanest available engines
  - Retrofit
    - Demonstration Project underway in Boston to test a Diesel Oxidation Catalyst on a Commuter Train
    - Expected to reduce PM emissions 15-35%

• **Idle Reduction**
  - Locomotive Auxiliary Power Units (APUs)
    - Can reduce idling fuel consumption by up to 85%, saving up to 20,500 gallons of fuel per year
    - 30 CSX switchyard locomotives in MA and CT have installed APUs to reduce idling
Diesel Related Funding Opportunities

- **EPA’s Appropriations Act for FY 06 (signed Aug. 2, 2005)**
  - $5 million for National Clean Diesel Campaign
  - $7 million for Clean School Bus USA

- **Transportation Bill**
  - Diesel retrofits eligible for CMAQ funds
  - Authorizes $55 million for Clean School Bus USA program

- **Energy Bill**
  - Diesel Truck and Fleet Modernization – Authorizes $100 million over three years
  - Reducing Diesel Emissions – Authorizes $1 billion over 5 years
  - Clean School Bus USA – Authorizes $55 million per year FY06 and FY 07 (same as Transportation Bill)
  - Anti-Idling for trucks and locomotives - Authorizes $140 million over three years through EPA administered grant programs
For More Information…

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- www.epa.gov/otaq/retrofit
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