VOLUNTARY DIESEL RETROFIT PROGRAM

“Making Diesel Engines Cleaner”

Outreach and Planning Group
Certification and Compliance Division
Office of Transportation and Air Quality
What is the Voluntary Diesel Retrofit Program?

- A voluntary program designed to encourage the installation of pollution-reducing technology on existing diesels

- We are building a market for clean diesel concepts
  - Accelerating the delivery of ULSD
  - Forging business partnerships and relationships
  - Investing EPA resources to accelerate market growth
Why Retrofits Are Necessary

- **Health Reasons**
  - Toxic emissions, respiratory problems
  - Studies on the effects of diesel exhaust

- **Visibility, Regional Haze**

- **Benefits of 2007 HDE regulations are long-term**

- **Diesel Engines last 20-30 years**

- **The Voluntary Diesel Retrofit Program deals with existing engines today**
  - Benefits are immediate
  - Technology is available
Retrofit Program Goals - 2002

- 130,000 Retrofits:  
<table>
<thead>
<tr>
<th>HC</th>
<th>CO</th>
<th>NOx</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>36,000</td>
<td>171,432</td>
<td>40,000</td>
<td>17,500</td>
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</table>

- Integrate major school bus initiative into current program

- Integrate Regional ULSD delivery strategy
  - Work with Regional staff and local fleet owners to create high volume ULSD fuel requests for local refiners

- Integrate more funding options and incentives
84,000 Retrofits around the U.S.

- Eliminating tons of pollution and air toxics:
  - **HC**: 25,000
  - **CO**: 110,000
  - **NOx**: 25,500
  - **PM**: 11,500

- How are we building this market?
  1. Partnerships
  2. Retrofit Technology Assessment
  3. Funding and Financial Incentives
  4. Demonstration Projects
  5. Outreach, Marketing, and Service
Retrofit Program Partners

• The diesel retrofit program brings together a variety of partners:
  – EPA
  – Diesel Technology Forum
  – Manufacturers of diesel engines
  – Manufacturers of retrofit technologies
  – Oil industry
  – Owners/operators of diesel fleets
  – Air quality planners in state/local governments
  – Community groups and non-profit organizations
What is Retrofit Technology?

• Retrofit technology can be:
  any change to an engine system above and beyond what is required by EPA regulations that improves the engine’s emission performance:
  • Catalyst or filter
  • Engine upgrade
  • Early engine replacement
  • Use of cleaner fuels or additives
  • Idling control equipment
  • Combination of above
Retrofit Technology Verification

• **Foundation of Retrofit Program**
  – Separate legitimate, commercial technologies from the rest

• **Developing emissions testing protocols to evaluate performance**
  – Device protocol finished (catalysts, filters, upgrades): DONE
  – Selective Catalytic Reduction (SCR): DONE
  – Fuels and Fuels Additives: IN DEVELOPMENT

• **Verified Retrofit Technology List**
  – Available on Retrofit web site
  – Detail emission performance, durability, and necessary conditions for success
The Price of Retrofit Technology

Summary of PM Control Measures

- Urban Bus Rebuild Program
- Coke manufacturing
- 1994 OH HD Diesel
- Kraft Process Scrubber
- Construction Dust Control

Source: EPA Regional Haze analyses
The Price of Retrofit Technology

Summary of NOx Control Measures

- Tier 2 Stds: LDTs
- Gas Turbine - Oil: SCR w/ water injection
- Gas Turbine - Natural Gas: SCR w/ water injection
- Cement Mfring: SCR

Source: EPA Regional Haze analyses
# Funding Retrofit Projects

<table>
<thead>
<tr>
<th>Source</th>
<th>Investment</th>
<th># Retrofits</th>
<th>Cost/Retrofit</th>
<th># Cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA</td>
<td>$765,000</td>
<td>194</td>
<td>$4,000</td>
<td>9</td>
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<tr>
<td>HD Settlement</td>
<td>$2,600,000</td>
<td>440</td>
<td>$5,900</td>
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<tr>
<td>Market</td>
<td>$208,000,000</td>
<td>69,595</td>
<td>$3,000</td>
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</tbody>
</table>

- **EPA funded demonstration projects**
  - Partners match funds
  - Project must expand

- **EPA settlement agreement opportunities**

- **Current long term funding sources and drivers:**
  - CMAQ
  - State budgets
  - Carl Moyer (CA)
  - TERP (TX)
  - Volunteerism
  - Creative contracting

- **Grants traditionally focused on Alternative Fuels are beginning to include clean diesel options**
Demonstration Projects:

1. **Seattle as a Model**

   - **Demonstration project Spring 2000**
     - EPA $100K grant for Everett School District buses
   
   - **Expansion:**
     - “The Dennis McLerran Factor” creates the *Clean Diesel Solutions Program*
     - ULSF for Seattle and King County transit fleets, school bus fleets, waste haulers, Port of Seattle, Boeing
     - PM filters and catalytic converters for these fleets
     - Phillips Seattle refinery may install new catalyst in 2003

   - **Press Event launching *Clean Diesel Solutions Program***
     - Governor Whitman in attendance
     - Television news coverage
     - Program received one of EPA’s Clean Air excellence Award
Demonstration Projects:

2. New York as a Model

- Demonstration project February, 2000
  - Developed by project partners
  - ULSF and PM filters for 25 buses
  - Evaluate durability and emission performance

- Expansion:
  - ULSF for entire transit fleet (4400 buses)
  - Install PM filters on buses
  - Truck stop electrification (Hunts Point, New York Throughway)
  - School buses (New York Power Authority)
  - World Trade Center site
Demonstration Projects:

3. Philadelphia School Bus Project

- 3M Corporation donated $250K to Pennsylvania
- EPA contributed $50K, technical expertise
- PA DEP solicited bids from local school districts
  - Selected School District: Wissahickon
- Catalytic converters and PM filters
- Project Partners:
  - 3M, PA DEP, Wissahickon School District, OTAQ, Region 3
- Integration with Southeastern Penn Transit Authority
  - SEPTA has committed to begin using ULSD beginning this summer
  - Partners are exploring ways to combine the school district and SEPTA orders to achieve the lowest price
The School Bus Initiative

- There are over 500,000 school buses in operation
  - 50% are over 10 years old
  - 30% are over 15 years old
- OTAQ, Regional Offices, and the Office of Children’s Health are working together to:
  - Replace 75% of the oldest school buses with new buses
  - Retrofit 75% of the remaining buses
  - Eliminate all unnecessary idling of buses
- There are a number of school bus retrofit projects across the country:
  - Birmingham, AL
  - Everett, WA
  - Hammond, IN
  - Los Angeles, CA
  - New York, NY
  - San Diego, CA
  - Philadelphia, PA
- Numerous studies are addressing children’s health effects from exposure to diesel exhaust
  - NESCAUM, CARB, EPA, Yale University, Good Morning America Story
The Role of Ultra Low Sulfur Fuel

• The foundation of many retrofit projects will be the fuel supply
  – Many technologies require Ultra Low Sulfur Fuel (ULSF)
  – Some can operate on current fuel but can not achieve full emission reduction potential
  – PM filter with ULSF achieve reductions over 90%
  – Construction equipment with ULSF provides significant reductions

• ULSF is becoming more widely available throughout the country
  – Several fuel companies can distribute ULSF today
  – Retrofit Web site maintains a list of fuel companies

• EPA is working with local governments and fleets to create large regional ULSF requests
Outreach and Marketing

• Voluntary Diesel Retrofit Program web site is our primary tool for distributing information about the program
  – Information about diesel emissions
  – Available retrofit technology
  – Funding and Financial Incentives information
  – Contact information
  – Existing retrofit projects and Case Studies
  – Retrofit Calculator
  – http://www.epa.gov/otaq/retrofit

• Each EPA Region is represented on the Retrofit Team
  – Regional Retrofit Player of the Year Award

• Conferences, Forums, Press

• Diesel Technology Forum Video
What’s Next:

• There are ~30 million existing diesels engines
  – Each year 2 million more are introduced

• Retrofit Program Growth:
  – Steady growth through 2005
  – Accelerated growth 2006 - 2010 (ULSD)
  – New diesel fleet (2007 rule) begins to take over in 2010

• How we reach this potential
  – NOx control technology
  – State Air quality programs: SIPs, Conformity, Offsets
  – Create a fuel neutral discussion: CNG vs. Clean Diesel
  – DOT/DOE coordination
    • CMAQ funds, Clean Cities and Clean Buses Programs