



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:

<u>HC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>
36,000	171,432	40,000	17,500
- 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:**

<u>HC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>
25,000	110,000	25,500	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:

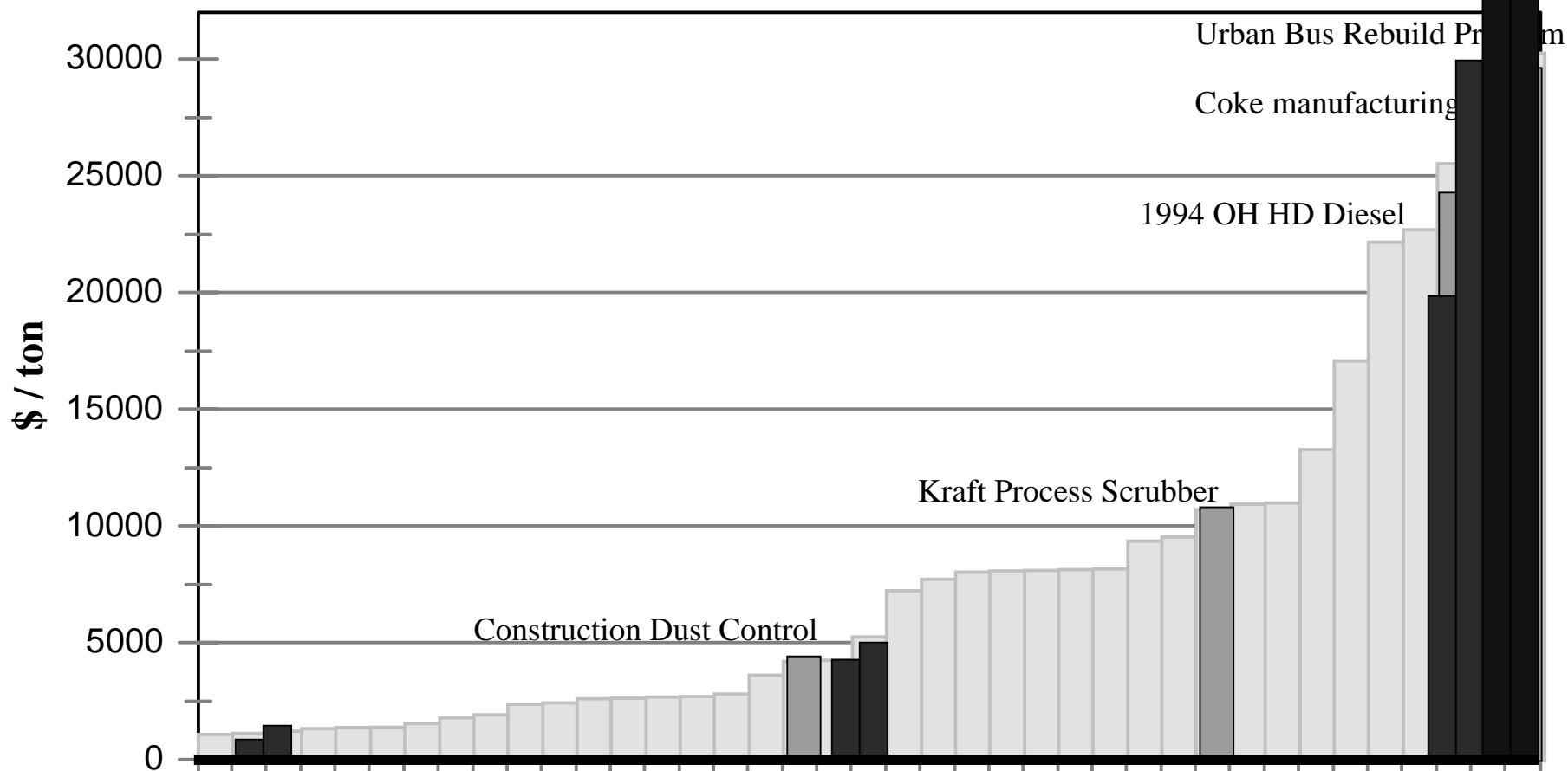
- **Catalyst or filter**
- **Engine upgrade**
- **Early engine replacement**
- **Use of cleaner fuels or additives**
- **Idling control equipment**
- **Combination of above**

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

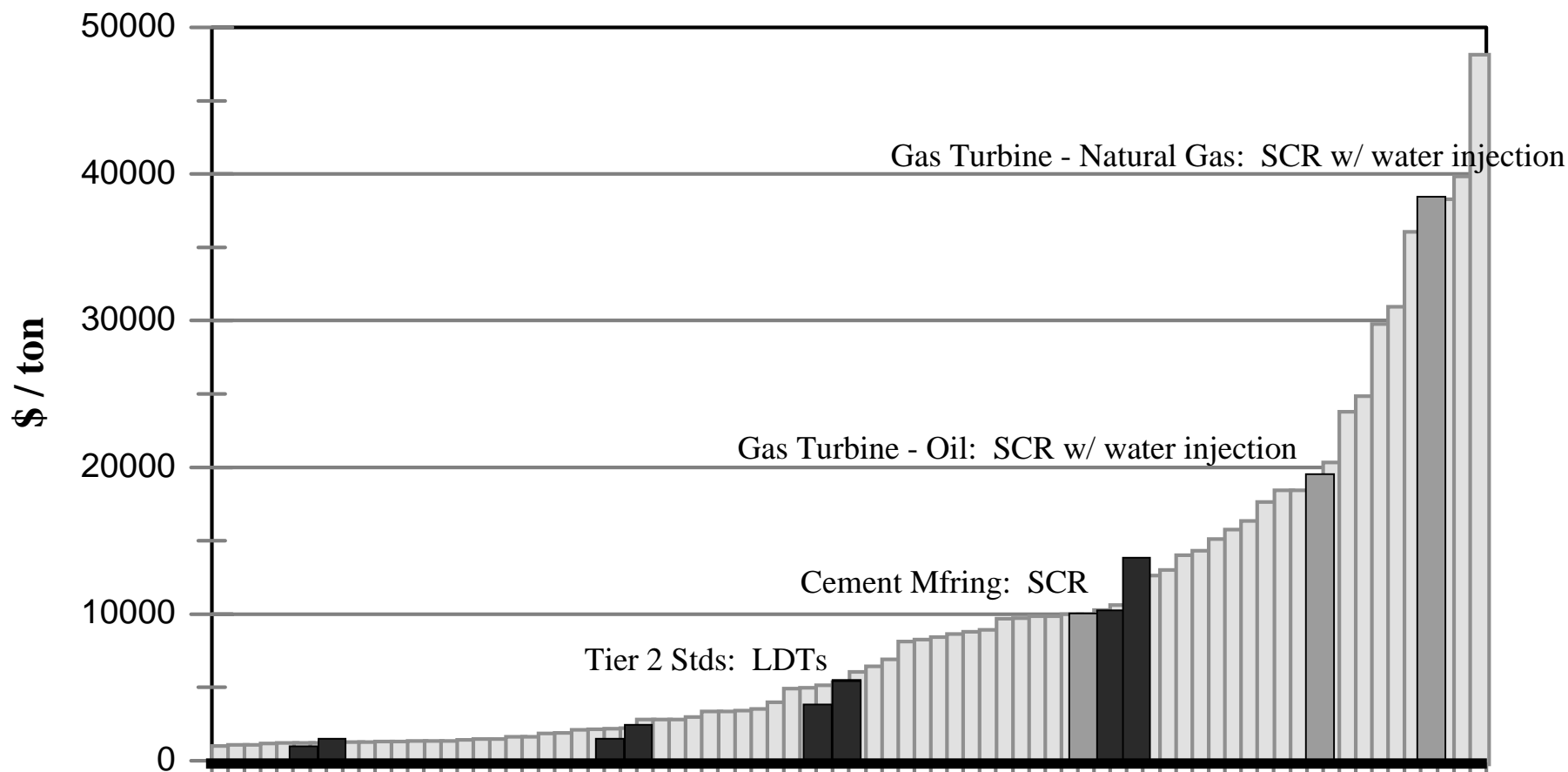


Source: EPA Regional Haze analyses

PM Emission Control Measures

The Price of Retrofit Technology

Summary of NO_x Control Measures



Source: EPA Regional
Haze analyses

NO_x Emission Control Technology

Funding Retrofit Projects

<u>Source</u>	<u>Investment</u>	<u># Retrofits</u>	<u>Cost/Retrofit</u>	<u># Cities</u>
EPA	\$765,000	194	\$4,000	9
HD Settlement	\$2,600,000	440	\$5,900	2
Market	\$208,000,000	69,595	\$3,000	23

- **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 Thoroughway)
 - 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: Wissihickon
- **Catalytic converters and PM filters**
- **Project Partners:**
 - 3M, PA DEP, Wissihickon 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**
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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