



National Clean Diesel Campaign



Clean Diesel Strategies

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Overview

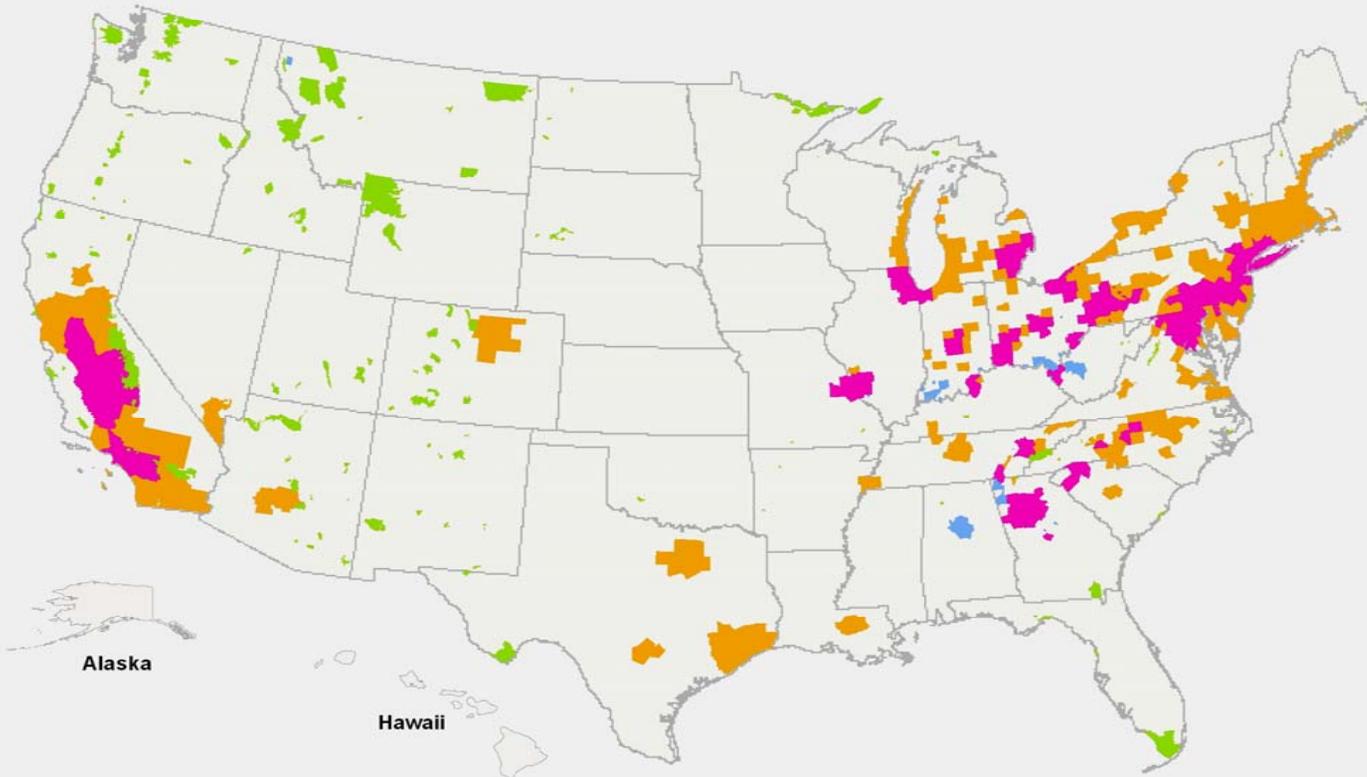
- **The Need for Innovative Transportation Programs**
 - Public health and diesel emissions
 - Energy and greenhouse gas emissions

- **Overview of Program Goals and Progress**
 - National Clean Diesel Campaign
 - SmartWay Transportation Partnership

Diesel Engines & Emissions

- ❑ Reducing emissions from diesel engines is one of the most important air quality challenges facing the country
- ❑ Even with more stringent standards taking effect in the next decade, over the next 20 years, millions of in-use engines will continue to emit large amounts of pollution
- ❑ This pollution will continue to contribute to numerous instances of premature mortality, asthma attacks, lost work days and many other health impacts

Ozone and PM 2.5 Nonattainment Areas



- Federal Class I Areas (Visibility)
- Counties Exceeding PM_{2.5} NAAQS Only
- Counties Exceeding 8-hour Ozone NAAQS Only
- Counties Exceeding Both NAAQS

Why Clean Diesel?

Protecting Public Health & Environment

- ❑ As both industry and population grow, air quality becomes an increasingly important issue for all communities
- ❑ Concern over air quality translates into additional and more stringent requirements, and ultimately, increased cost
- ❑ The public can have high exposures to diesel emissions, such as children from school buses or workers at urban construction sites and even people around government installations

Why Clean Diesel?

Cost Effective Emissions Reductions

- ❑ Fuel savings strategies can result in net savings
- ❑ Diesel retrofit can provide a benefit-to-cost ratio of up to 13:1
- ❑ Nonroad retrofits can provide some of the most cost-effective NO_x and PM reductions
- ❑ Diesel retrofit costs can average \$5,630/ton of NO_x reduced.*
 - Median cost for traffic signalization estimated at \$20,100/ton of NO_x/HC.**
 - Median cost for park and ride lots estimated at \$43,000/ton of NO_x/HC**
- ❑ For particulate matter, diesel retrofit can range from \$11,000 - \$70,000/ton of PM

* From the Texas Emissions Reduction Plan's 2004 Biennial Report to the Legislature

** Transportation Research Board Special Report 264 "Congestion Mitigation and Air Quality Improvement Program: Assessing 10 Years of Experience"

Clean Diesel Program Successes

- ❑ Nearly 400,000 engine retrofits completed or in progress
 - Over 2 million children in 200 school districts are riding approx. 40,000 cleaner buses
- ❑ PM and NO_x reductions from existing clean diesel programs will provide nearly \$5 billion in health benefits over their lifetime
- ❑ Over 800 shipping and trucking companies have committed to reducing emissions from roughly 375,000 trucks
- ❑ Idle reduction projects are in place along major highway-interstate corridors
- ❑ Partners have contributed significant resources
 - 2 external dollars for every 1 federal dollar invested
 - States have established programs with funding

National Clean Diesel Campaign

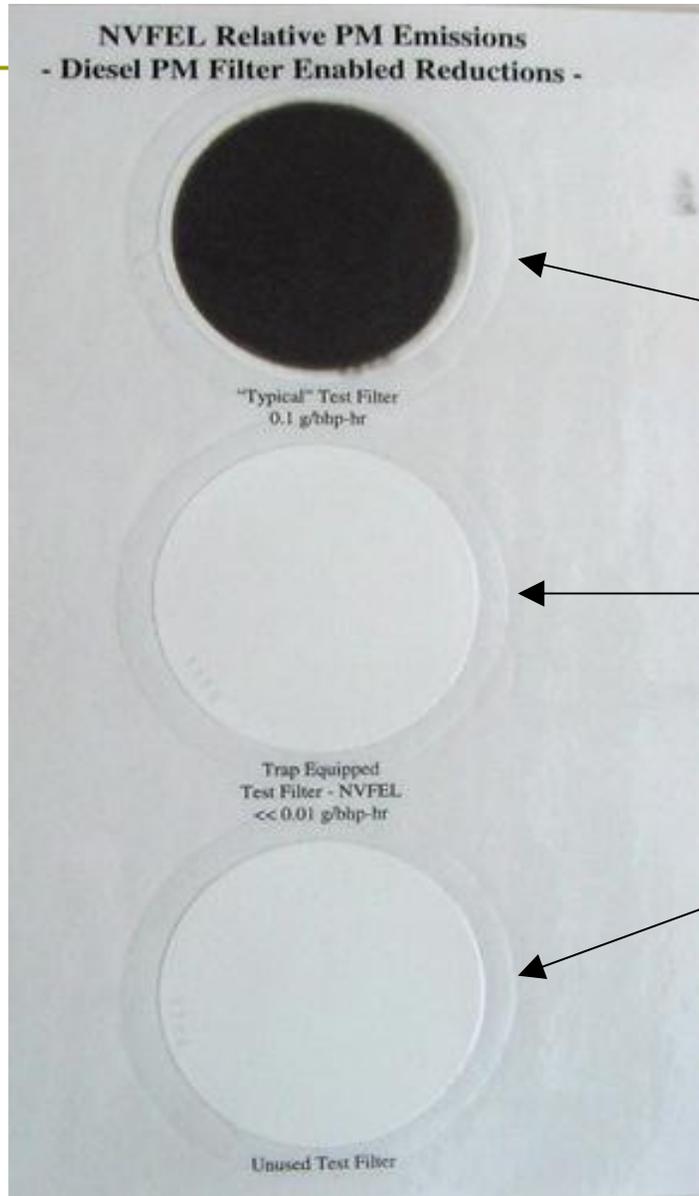
- ❑ Both regulatory and voluntary strategies
- ❑ Goal: *reduce PM and NOx emissions from the legacy fleet of over 11 million diesel engines by 2014*
- ❑ Focus on Five Sectors:
 - School buses, Ports, Construction, Agriculture, Freight
- ❑ Promoting retrofitting, early replacement, and idle reduction
- ❑ Program activities:
 - Technology verification
 - Technical and policy analysis
 - Coalitions and outreach
 - Innovative funding for projects
 - ❑ Federal grants, loans and tax incentives



National Clean Diesel Campaign

- ❑ Broad stakeholder support, thousands of projects around the country

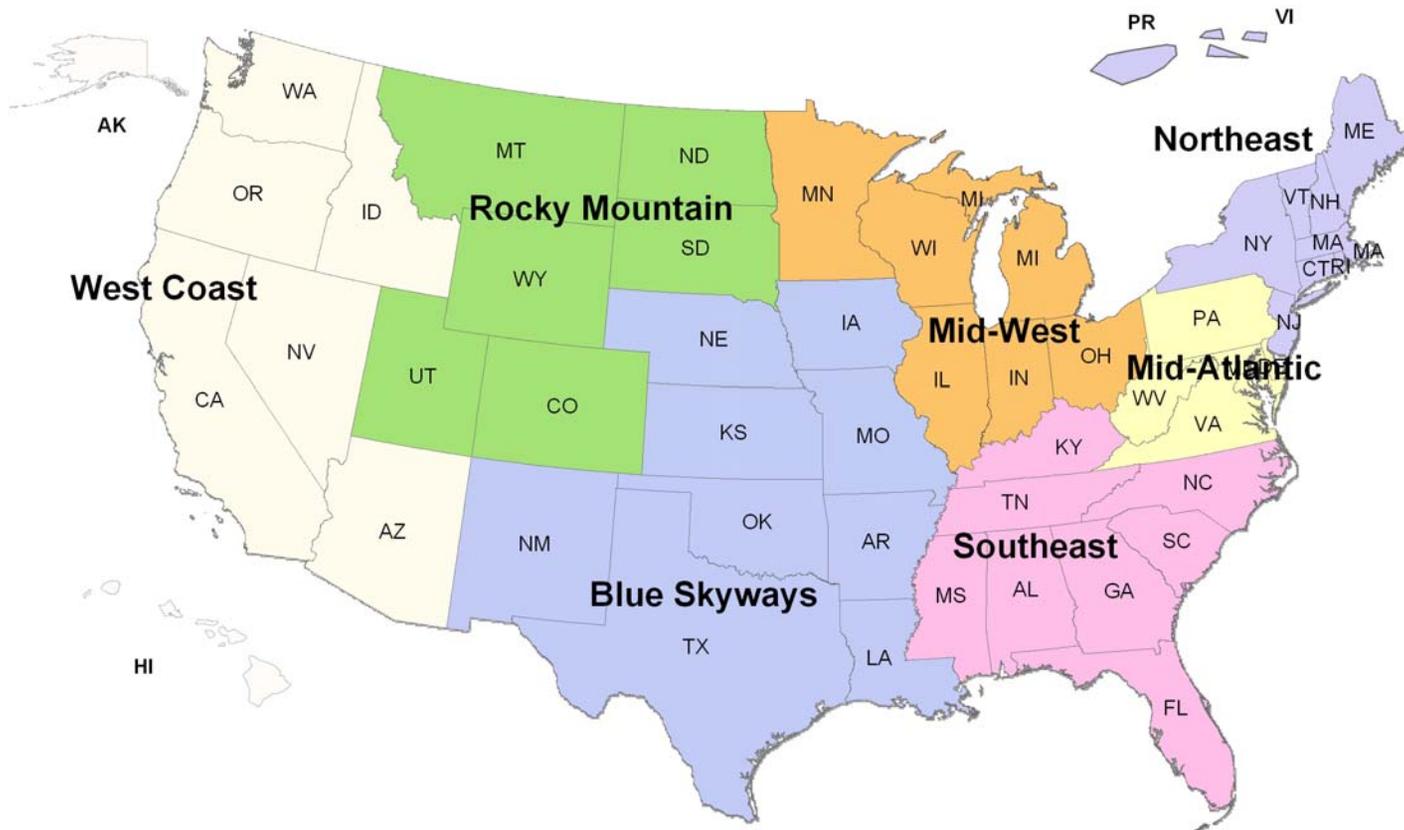
Diesel Particulate Filter



- Typical test filter – pre 2007 engines
- Test filter – 2007 and newer engines
- Unused test filter

Map of EPA Regional Diesel Collaboratives

Regional Clean Diesel Collaboratives



What is the SmartWay Transport Partnership?



- ❑ Voluntary partnership between EPA and the freight industry:
 - Creating a demand for cleaner more fuel efficient goods movement
 - Industry interests: reduce fuel consumption, public recognition, improved public image, corporate sustainability
 - EPA interests: reduced emissions (CO₂, NO_x, PM) and improved energy security
 - Save up to 600 million gallons of diesel fuel per year
 - Resulting in savings of up to 7 million metric tons CO₂ and 30,000 tons NO_x per year
 - **Save the trucking industry over \$2 billion in annual fuel and maintenance costs.**

- ❑ SmartWay Components:
 - **Corporate Partnerships:** Over 750 truck and rail carriers, shippers, logistics companies, truck OEMs
 - **National Transportation Idle-Free Corridors:** Eliminate unnecessary idling along major transportation routes
 - **Marketing and Education:** PSA campaign, SmartWay brand
 - **Innovative Financing:** Develop creative public-private financing programs

SmartWay Upgrade Kit Example 1: Long Haul (e.g., Post Office Class 8 Trucks)

Device	Cost/Unit (Retrofit)	PM Reduction	NOx Reduction	FE/CO ₂ Change
Fuel Efficient Tires (low rolling resistance)	\$5,600	--	4%	4%
Diesel Oxidation Catalyst	\$1,200	35% (constant)	--	--
Trailer Aerodynamics (skirt and gap reducers)	\$2,400	--	5%	5%
Auxiliary Power Unit (reduces idling)	\$8,000	90% reduction from main engine idling PM	9%	9%
Totals:	\$17,200	35%	18%	18%

For a truck traveling 100,000 miles/year @ 6 mpg (16,667 gallons /year)

- Fuel savings: 3,000 gallons @ \$4.50/gallon → \$13,500/year
- Payback period: \$17,200 / \$13,500 → 1.2 years

SmartWay Upgrade Kit Example 2: Short Haul (e.g., State DOT Truck)

Device	Cost/Unit (Retrofit)	PM Reduction	NOx Reduction	FE/CO ₂ Change
Automatic Tire Inflation	\$750	--	1-3%	1-3%
Automatic Engine Shut-Down System (idling timer)	\$900	100% reduction from main engine idling PM	3-5%	3-5%
Fuel Efficient Tires (low rolling resistance)	\$5,600	--	4%	4%
Diesel Oxidation Catalyst	\$1,200	35% (constant)	--	--
Totals:	\$8,450	35%	8-12%	8-12%

For a truck traveling 100,000 miles/year @ 6 mpg (16,667 gallons /year)

- Fuel savings: 1,333-2,000 gallons @ \$4.50/gallon → \$6,000-9,000/year
- Payback period: \$8,450 / \$6,000-9,000 → <1.4 years

No-Idling Polices at Loading Facilities



Clean School Bus USA



- ❑ Clean School Bus USA is a public-private environmental partnership that seeks to reduce children's exposure to air pollution from diesel school buses

- ❑ The goal of Clean School Bus USA is to reduce both children's exposure to diesel exhaust and the amount of air pollution created by diesel school buses

- ❑ The program emphasizes three ways to reduce public school bus emissions through
 - Idle reduction
 - Engine retrofit
 - Clean fuels
 - Bus replacement

Clean School Bus Case Study



The Columbus Municipal School District (Mississippi)

- ❑ The Columbus Municipal School District recognized the need to safeguard the health and safety of its students and the community as a whole.
- ❑ Reduced idling around loading and unloading areas by implementing Idling Management Policies
- ❑ Installed 52 Diesel Oxidation Catalysts on most of its school bus fleet to further reduce diesel emissions at about \$1,200 each.
- ❑ Its efforts have been recognized by the media, the national and state environmental programs and have received local appreciation from the community's students and parents.

Off-Road Equipment Case Study

Mount Rainier National Park, Washington State

Pilot project using interagency agreement funds subsidized a two-year supply of ULSD for the 37 diesel vehicle fleet and DOCs and/or diesel particulate filter retrofits for up to 18 of the highest use vehicles (construction equipment, plow trucks, snow blowers, snow groomer, tractor, dump trucks, refuse truck). The project also included the use of B20 and a 50 percent biodiesel/50 percent ULSD blend for two generators.



Mt Rainer Nonroad Equipment w/ DOC



Case Studies: Military

- Fort Bragg has a plan to convert all 1,500 non-tactical vehicles to alternative fueled vehicles. Shuttle buses take reserve soldiers to the facility and also accommodate active duty soldiers. Fort Bragg has been recognized by Save Our State, a non profit organization that promotes sustainable economic development as well as part of the Forces Command Sustainability Team by the Department of the Army and Department of Defense.
- Robins Air Force Base Environmental Management is the winner of the Best Overall Environmental Quality Program in the Department of Defense (DoD) in 1994 and the DoD Pollution Prevention Award (Industrial Category in 1995, 1997, 1998, 2001, and 2003).
- Fort Carson has converted over half of their non-tactical vehicles to alternative fuel (bi-fuel, ethanol or CNG). A pilot biodiesel (B20) initiative in 2004 took use of the AFVs a step further.

Case Studies: Military



Camp Pendleton Marine Corps Base utilized clean diesel technology to excavate 120,000 cubic yards of contaminated soil as part of its Superfund cleanup

- Partnership between EPA, Navy, Marine Corps, West Coast Environmental (the cleanup contractor), Caterpillar and Huss
- All equipment used ULSD with B20 biodiesel blends
- 6 pieces of equipment used the latest engine technology compared to using older engines reducing PM by about 63%
- 2 pieces of equipment retrofitted with diesel particulate filters reducing PM by at least 85%

By looking at new ways of conducting this cleanup, the Navy estimates saving \$27 million from the original cost estimate.

Opportunities to help meet Executive Order 13423

- Neighborhood and Community well-being among the military's 225 schools– to reduce children's exposure to diesel emissions
 - School Bus Idle Reduction Programs
 - School Bus Retrofits
 - Renewable fuels School Bus Idle Policy implementation throughout all military installations
- Serve as a Clearinghouse for information- provide testimonials and articles and keep communication flow between military and SEDC partners. Including participate in workshops:
 - DoD Air Managers Roundtable
 - DoD Annual Conference
 - SEDC Partners Meeting
- Explore Cleaner diesel fuel/ B20 application opportunities inside and outside Bases
- Incorporate language into construction contracts and air quality management plans clean construction equipment strategies
 - Idle reduction strategies
 - Ultra Low Sulfur Diesel (ULSD) fuel
 - Retrofits and modernization of engines

Other opportunities:

As part of an environmental settlement with Environmental Defense Fund, EPA is exploring ways of promoting the use of clean diesel engines and fuels in the federal government.

- ❑ Held brief discussions with DOD, DOT, GSA, NPS
- ❑ Appear to be opportunities in Federal agencies for further education on clean diesel and for reductions of diesel exhaust at the national level
- ❑ Could pursue several options such as:
 - Construction projects that would use contractual language to encourage cleaner diesel construction equipment
 - Holding discussions with bus fleet operators in national parks to encourage no idling
- ❑ For more information, contact in EPA's Office of Air Quality Planning & Standards

Chris Stoneman- email: stoneman.chris@epa.gov

For more information...



National Clean Diesel Campaign

**National Clean Diesel Campaign Website
(including links to Regional Collaboratives)**

www.epa.gov/cleandiesel



SmartWay Transport Partnership

www.epa.gov/smartway