Innovative Strategies for Cleaner Air

National Clean Diesel Campaign Program Information Kit

National Clean Diesel Campaign

Welcome to the National Clean Diesel Campaign!

REDUCING emissions from diesel engines is one of the most important air quality challenges facing the country. Even with more stringent heavy-duty highway and nonroad engine standards set to take effect over the next decade, millions of diesel engines already in use will continue to emit large amounts of nitrogen oxides (NOx) and particulate matter (PM), both of which contribute to serious public health problems. These emissions cause thousands of premature deaths, hundreds of thousands of asthma attacks, millions of lost work days, and numerous other health impacts every year.

Building on the successes of the U.S. Environmental Protection Agency's (EPA's) regulatory and voluntary efforts to reduce emissions from diesel engines, EPA has created the **National Clean Diesel Campaign (NCDC).** The purpose of the Campaign is for EPA to work with businesses; government, environmental, and community organizations; and industry to reduce the pollution emitted from diesel engines across the country through the implementation of varied control strategies and the sustained involvement of national, state, and local partners.

In this Program Overview Kit, you will find:

- Fact sheets on clean diesel regulations.
- A list of verified technologies for diesel retrofits.
- A list of resources and Web sites for more information.
- A National Clean Diesel Campaign fact sheet.
- Brochures and other literature describing each of the NCDC's sector initiatives: school buses, ports, construction, freight, and agriculture.

For more information, please visit our Web site at **www.epa.gov/cleandiesel.**

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Clean Air Nonroad Diesel Rule Summary

General Background

On May 10, 2004, the U.S. Environmental Protection Agency (EPA) announced one of the most dramatic advancements in clean air protection since passage of the Clean Air Act Amendments of 1990. EPA's Clean Air Nonroad Diesel Rule requires stringent pollution controls on diesel engines used in industries such as construction, agriculture, and mining, and it will slash the sulfur content of diesel fuel. The rule will be a major step towards reaching our nation's clean air and public health goals.

The Clean Air Nonroad Diesel Rule is the latest in a series of Clean Diesel actions that are designed to reduce emissions from nearly every type of diesel vehicle and equipment. This nonroad diesel program combines cleaner engine technologies with cleaner fuel—similar to the on-highway diesel program—with an end result of dramatic environmental and public health benefits.

The new standards will cut emissions from nonroad diesel engines by more than 90 percent. Nonroad diesel equipment, as described in this rule, currently accounts for 47 percent of diesel particulate matter (PM) and 25 percent of nitrogen oxides (NOx) from mobile sources nationwide.

Sulfur levels will be reduced in nonroad diesel fuel by 99 percent from current levels (from approximately 3,000 parts per million [ppm] now, to 15 ppm in 2010). The lower sulfur fuel will provide immediate public health benefits by reducing PM from engines in existing nonroad equipment. It also makes it possible for engine manufacturers to use advanced clean technologies, similar to catalytic technologies used in passenger cars. New engine standards take effect, based on engine horsepower, starting in 2008.

More than 650,000 pieces of nonroad diesel equipment sold in the United States each year will be covered by this rulemaking. Currently, about six million pieces of nonroad diesel equipment are in use in the United States. Based on average expected equipment lifetime, this entire inventory should be upgraded by 2030.

The overall benefits of the nonroad diesel program significantly outweigh the costs by a ratio of 40 to 1.

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Environmental and Health Benefits

When the full inventory of older nonroad engines has been replaced, EPA expects to annually reduce:

- NOx by 738,000 tons.
- PM by 129,000 tons.

When all older nonroad engines have been replaced, EPA expects to annually prevent:

- 6,000 children's asthma-related emergency room visits.
- 8,900 hospitalizations.
- 12,000 premature deaths.
- 15,000 non-fatal heart attacks.
- 280,000 cases of respiratory symptoms in children.
- 1,000,000 lost work days.

Estimated Costs

- The anticipated costs vary with the size and complexity of the equipment, but are in the range of 1 to 3 percent of the total purchase price for most nonroad diesel equipment categories.
- The estimated added cost for low-sulfur fuel will average about 4 cents per gallon.
- The use of ultra-low sulfur fuel will significantly reduce engine maintenance expenses.

For More Information

For more information on the Clean Air Nonroad Diesel Rule, please visit **www.epa.gov/nonroad-diesel**.

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Heavy-Duty Engine & Vehicle Standards & Highway Diesel Fuel Sulfur Control Requirements Summary

General Background

THE U.S. Environmental Protection Agency's (EPA's) new emission standards, taking effect in model year 2007, apply to heavy-duty highway engines and vehicles. EPA's Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements require stringent pollution controls on diesel engines used in trucks and buses. The requirements will be a major step toward reaching our nation's clean air and public health goals. Because emission control devices are damaged by sulfur, EPA is also reducing the level of sulfur in highway diesel fuel by 97 percent by mid-2006.

Heavy-duty engines emit large amounts of nitrogen oxide (NOx), which contribute to ozone, and particulate matter (PM). The PM emitted by heavy-duty engines contributes to serious public health problems, such as lung cancer, aggravation of respiratory and cardiovascular disease and asthma, acute respiratory symptoms, chronic bronchitis, and decreased lung function. Exposure is widespread, particularly in urban areas.

Heavy-duty trucks and buses account for about one-third of NOx emissions and one-quarter of PM emissions from mobile sources. In some urban areas, the contribution is even greater. EPA's program will result in PM and NOx emission levels that are 90 percent below the levels of today's cleanest engines.

EPA's program includes provisions to facilitate the transition to the new standards and to encourage the early introduction of clean technologies. It provides flexibility in various testing and compliance requirements and addresses differences between the new technologies and existing engine-based technologies.

Refiners will be required to produce diesel fuel for use in highway vehicles with a sulfur content of no more than 15 parts per million (ppm), beginning June 1, 2006. This fuel will be available across the country by Fall 2006.

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The overall benefits of the Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements significantly outweigh the cost by a ratio of approximately 20 to 1.

Environmental and Health Benefits

When the program is fully implemented, annual emission reductions will prevent 8,300 premature deaths, more than 9,500 hospitalizations, and 1.5 million lost work days. The program will provide annual emission reductions equivalent to removing the pollution from more than 90 percent, or about 13 million, of today's trucks and buses.

Estimated Costs

Emission reductions and the resulting significant public health and environmental benefits of the program will come at an average cost increase of about $1,200 to $1,900 per new vehicle, depending on the vehicle size. When fully implemented, the sulfur reduction requirement will increase the cost of producing and distributing diesel fuel by about 4½ to 5 cents per gallon.

For More Information

For more information on the Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements, please visit **www.epa.gov/otaq/diesel.htm**.

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Verified Technologies List

THE U.S. Environmental Protection Agency (EPA) evaluates the durable emission reduction capabilities of a wide range of technologies. Through this process, EPA is working to instill confidence in our stakeholder community that the verified emission reductions will be achieved in-use. The verification process includes a technical review of the technology as well as tightly controlled testing to quantify statistically significant levels of emission reductions.

The table below summarizes all the diesel retrofit technologies that EPA has approved, to date, for use in diesel engine retrofit programs through the Voluntary Diesel Retrofit Program. The table shows approved manufacturers' products, where they are applicable for use as a verified technology, and the percent reduction (of verified or tested levels) that EPA will recognize for emission reductions for each technology.

Visit **www.epa.gov/otaq/retrofit/retroverifiedlist.htm** to learn more about these retrofit technologies and their operating criteria. Be sure to check the Web site regularly for the most updated list of verified technologies.

Verified Retrofit Technologies

Manufacturer	Technology	Applicability	Reductions (%)			
			Particulate Matter (PM)	Carbon Monoxide (CO)	Nitrous Oxides (NOx)	Hydro-carbons (HC)
Caterpillar, Inc.	Catalyzed Converter/Muffler (CCM)	Highway: heavy-heavy and medium-heavy duty, 4-cycle, non-EGR, model year 1998 - 2003, turbocharged or naturally aspirated engines	20	20	N/A	40
Caterpillar, Inc.	Diesel Particulate Filter (DPF)	Nonroad: 4-cycle, non-EGR equipped, model year 1996 - 2005, turbocharged engines with power ratings 130 ≤ Kilowatts < 225 (174.2 ≤ Horsepower < 301.5)	89	90	N/A	93
Clean Diesel Technologies, Inc. ETV	Platinum Plus Purifier System (fuel borne catalyst plus DOC)	Highway: medium-heavy and heavy-heavy duty, 4-cycle, model year 1988 - 2003, turbocharged or naturally aspirated engines	25 to 50	16 to 50	0 to 5	40 to 50

ETV This symbol indicates a technology was evaluated under EPA's Environmental Technology Verification (ETV) Program. The ETV Program provides an independent process to test and document the results of testing various technologies. This symbol illustrates where certain technologies were evaluated by the ETV Program in conjunction with EPA's Voluntary Diesel Retrofit Program. Additional information on the ETV program is available at **www.epa.gov/etv**.

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Verified Retrofit Technologies

Manufacturer	Technology	Applicability	Reductions (%)			
			Particulate Matter (PM)	Carbon Monoxide (CO)	Nitrous Oxides (NOx)	Hydro-carbons (HC)
Clean Diesel Technologies, Inc. ETV	Platinum Plus Fuel Borne Catalyst/Catalyzed Wire Mesh Filter (FBC/CWMF) System	Highway: medium-heavy duty, 4-cycle, model year 1991 - 2003, non-EGR, turbocharged or naturally aspirated engines	55 to 76[1]	50 to 66[1]	0 to 9[1]	75 to 89[1]
Donaldson ETV	Series 6000 DOC & Spiracle (closed crankcase filtration system)	Highway: heavy-heavy and medium-heavy duty, 4-cycle, non-EGR, model year 1991 - 2003, turbocharged or naturally aspirated engines	25 to 33[2]	13 to 23	N/A	50 to 52
Donaldson ETV	Series 6100 DOC	Highway: heavy-heavy and medium-heavy duty, 4-cycle, non-EGR, model year 1991 - 2003, turbocharged or naturally aspirated engines	20 to 26	38 to 41	N/A	49 to 66
Donaldson ETV	Series 6100 DOC & Spiracle (closed crankcase filtration system)	Highway: heavy-heavy and medium-heavy duty, 4-cycle, non-EGR, model year 1991 - 2003, turbocharged or naturally aspirated engines	28 to 32[2]	31 to 34	N/A	42
Engelhard	DPX Catalyzed Diesel Particulate Filter	Highway: heavy-duty, 4-cycle, model year 1994 - 2002, turbocharged or naturally aspirated engines	60	60	N/A	60
Engelhard	CMX Catalyst Muffler	Highway: heavy-duty, 2-cycle engines	20	40	N/A	50
Engelhard	CMX Catalyst Muffler	Heavy-duty: highway, 4-cycle engines	20	40	N/A	50
International Truck & Engine Corp.	Green Diesel Technology-Low NOx Calibration plus Diesel Oxidation Catalyst with Ultra Low Sulfur Diesel (ULSD)	Highway: light heavy-duty, 4-cycle, Navistar/International engines, model years 1999 - 2003 in the following families: XNVXH0444ANA YNVXH0444ANB 1NVXH0444ANB 2NVXH0444ANB 3NVXH0444ANB	0 to 10	10 to 20	25	50

[1] These effectiveness figures are provisional values subject to change pending final review of the test data.

[2] Total PM reduction figures reflect reductions from both tailpipe and crankcase emissions.

Note: For aftertreatment devices, the reductions are based on the installation of retrofit technologies to engines that were originally produced without diesel oxidation catalysts or diesel particulate filters.

Verified Retrofit Technologies

Manufacturer	Technology	Applicability	Reductions (%)			
			Particulate Matter (PM)	Carbon Monoxide (CO)	Nitrous Oxides (NOx)	Hydro-carbons (HC)
Johnson Matthey	Catalyzed Continuously Regenerating Technology (CCRT) Particulate Filter	Highway: heavy-heavy, medium-heavy, light-heavy duty, urban bus, 4-cycle, non-EGR model year 1994 - 2003, turbocharged or naturally aspirated engines	60	60	N/A	60
Johnson Matthey	Continuously Regenerating Technology (CRT) Particulate Filter	Highway: heavy-duty, 2-cycle and 4-cycle, model year 1994 - 2002, turbocharged or naturally aspirated engines	60	60	N/A	60
Johnson Matthey	CEM™ Catalytic Exhaust Muffler and/or DCC™ Catalytic Converter	Highway: heavy-heavy, medium-heavy, light-heavy duty, non-urban bus, 4-cycle, non-EGR model year 1991 - 2003, turbocharged or naturally aspirated engines	20	40	N/A	50
Johnson Matthey	CEM Catalyst Muffler	Highway: heavy-duty, 2-cycle engines	20	40	N/A	50
Lubrizol	PuriNOxWater emulsion fuel	Highway & Nonroad: heavy-duty, 2-cycle and 4-cycle engines	16 to 58	-35 to 33[3]	9 to 20	-30 to -120[3]
Lubrizol Engine Control Systems ETV	Purifilter - Diesel Particulate Filter	Highway: heavy heavy-duty, medium heavy-duty; urban bus; 4-cycle; model years 1994 - 2003; turbocharged or naturally aspirated; non-EGR engines	90	75	N/A	85
Lubrizol Engine Control Systems	AZ Purimuffler or AZ Purifier Diesel Oxidation Catalyst with Low Sulfur Diesel Fuel (30 ppm S max)	Highway: medium heavy-duty, 4-cycle, model years 1991 - 2003 Cummins and Navistar/International engines originally manufactured without any aftertreatment which are turbocharged or naturally aspirated, non-EGR engines	40	40	N/A	70
Lubrizol Engine Control Systems	AZ Purimuffler or AZ Purifier Diesel Oxidation Catalyst with Low Sulfur Diesel Fuel (30 ppm S max)	Highway: heavy heavy-duty, 4-cycle, model years 1991 - 1993 Cummins engines originally manufactured without exhaust aftertreatment which are turbocharged or naturally aspirated, non-EGR engines	35	40	N/A	70

[3] Negative sign "-" indicates an increase in emissions.

Verified Retrofit Technologies

Manufacturer	Technology	Applicability	Reductions (%)			
			Particulate Matter (PM)	Carbon Monoxide (CO)	Nitrous Oxides (NOx)	Hydro-carbons (HC)
Lubrizol Engine Control Systems	AZ Purimuffler AZ Purifier	Highway: heavy-duty, 2-cycle engines	20	40	N/A	50
Lubrizol Engine Control Systems	AZ Purimuffler AZ Purifier	Highway: heavy-duty, 4-cycle engines	20	40	N/A	50
Various	Biodiesel (1 to 100%)	Highway: heavy-duty, 2-cycle and 4-cycle engines	0 to 47	0 to 47	0 to -10[3]	0 to 67
Various	Cetane Enhancers	Highway: heavy-duty, 4-cycle, non-EGR-equipped engines	N/A	N/A	0 to 5	N/A

Memorandum of Agreement with California Air Resources Board

EPA signed a Memorandum of Agreement (MOA) with the State of California Air Resources Board (ARB) for the Coordination and Reciprocity in Diesel Retrofit Device Verification. The MOA establishes reciprocity in verifications of hardware or device-based retrofits, and further reinforces EPA's and ARB's commitment to cooperate on the evaluation of retrofit technologies. This agreement commits EPA and ARB to work toward accepting particulate matter (PM) and nitrogen oxide (NOx) verification levels assigned by the other's verification programs. Additionally, as retrofit manufacturers initiate and conduct in-use testing, EPA and ARB agreed to coordinate this testing so data generated may satisfy the requirements of each program. This MOA is intended to expedite the verification and introduction of innovative emission reduction technologies. Additionally, this MOA should reduce the effort needed for retrofit technology manufacturers to complete verification.

In addition to the above list of EPA-verified retrofit technologies, EPA recognizes and accepts those retrofit hardware strategies or device-based systems that have been verified by ARB. Information about ARB's Verification Program and its list of verified technologies can be found at **www.arb.ca.gov/diesel/verdev/verdev.htm**.

For more information on the National Clean Diesel Campaign, please visit **www.epa.gov/cleandiesel**.

[3] Negative sign "-" indicates an increase in emissions.

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Program Resources

PROGRAM INFORMATION

National Clean Diesel Campaign General Information Fact Sheet

www.epa.gov/cleandiesel/publications.htm

Fact sheet describing the National Clean Diesel Campaign's regulations, voluntary programs, technologies, and partnerships. It provides a basic overview of the Campaign and the effective methods that are available to reduce pollution from diesel engines. *(EPA-420-F-05-012, November 2005)*

Clean School Bus USA: Today's Buses for Tomorrow's Children

www.epa.gov/cleanschoolbus/outreach.htm

Brochure providing general information about the Clean School Bus USA program. The brochure discusses the strategies that are available to school districts that want to reduce children's exposure to diesel exhaust. *(EPA-420-F-03-039, October 2003)*

What You Should Know about Reducing Diesel Exhaust from School Buses

www.epa.gov/cleanschoolbus/outreach.htm

Fact sheet providing information about retrofitting school bus diesel engines; replacing older school buses with newer, cleaner buses; and reducing emissions through idling reduction and other smart driving practices. *(EPA-420-F-03-038, November 2003)*

Clean Ports USA

www.epa.gov/cleandiesel/ports

Brochure describing the Clean Ports USA program. It provides information to port authorities, terminal operators, and communities on reducing emissions from existing diesel engines and nonroad equipment at ports. *(EPA-420-F-05-033, November 2005)*

Freight Sector: SmartWay Transport Partnership

www.epa.gov/smartway/index.htm

Brochure providing an overview of the SmartWay Transport Partnership. It includes general information about opportunities available in the various freight industry sectors to reduce diesel exhaust, improve fuel efficiency, and realize health benefits. *(EPA-420-F-05-052, November 2005)*

Clean Construction USA

www.epa.gov/cleandiesel/construction.htm

Brochure encouraging the use of innovative technologies and incentives to reduce diesel exhaust emissions from existing construction equipment and vehicles. *(EPA-420-F-05-032, November 2005)*

Clean Agriculture USA

www.epa.gov/cleandiesel

Fact sheet providing general information on emission control technologies and biodiesel and renewable fuels that reduce diesel exhaust emissions from the existing fleet of agricultural equipment and vehicles in use across the country. *(EPA-420-F-05-031, November 2005)*

TECHNOLOGY

Verified Technologies List

www.epa.gov/otaq/retrofit/retroverifiedlist.htm

Table summarizing all the diesel retrofit technologies that EPA has approved for use in engine retrofit programs. *(EPA-420-B-05-005, November 2005)*

Clean Ports USA Technology Options

www.epa.gov/cleandiesel/ports

Table summarizing the technologies available to assist port authorities, terminal operators, state and local governments, and communities in reducing diesel emissions at ports. *(EPA-420-B-05-014, December 2005)*

REGULATORY INFORMATION

Clean Air Nonroad Diesel Rule Summary

www.epa.gov/nonroad-diesel/2004fr.htm

Fact sheet summarizing EPA's rule to reduce emissions from nonroad diesel engines by integrating engine and fuel controls. Exhaust emissions will decrease by more than 90 percent and new fuel requirements will decrease the allowable levels of sulfur in nonroad diesel fuel by more than 99 percent. *(EPA-420-F-04-029, November 2005)*

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Clean Diesel Truck and Bus Rule Summary

www.epa.gov/otaq/diesel.htm

Fact sheet summarizing EPA's rule that set new emissions standards for model year 2007 heavy-duty highway engines and vehicles and new standards for reducing the sulfur content of highway diesel fuel. *(EPA-420-F-05-044, November 2005)*

COLLABORATIONS

Regional initiatives and state programs provide immediate and significant environmental results by working collaboratively with businesses, government and community organizations, industry, and others.

Northeast Diesel Collaborative

www.northeastdiesel.org

The Northeast Diesel Collaborative is a local initiative that builds on a foundation of voluntary action. Developed with EPA Regions I and II, the initiative encourages participants to engage in projects that will reduce transportation-related air pollution to help address the high asthma rates in the Northeast. The program partners with the Northeast States for Coordinated Air Use Management (NESCAUM).

Mid-Atlantic Clean Diesel Collaborative

www.dieselmidatlantic.org

The Mid-Atlantic Diesel Collaborative is a partnership among leaders from EPA Region III, state and local governments, and private and environmental sectors in a regional campaign to reduce diesel emissions.

Midwest Clean Diesel Initiative

www.epa.gov/region5/air/mobile/mobile.htm

www.epa.gov/midwestcleandiesel

EPA Region V's Midwest Clean Diesel Initiative is a cooperative, public-private effort to reduce diesel emissions along major transportation corridors from various sectors including trucking, locomotive, construction, and ports, with an emphasis on urban areas in the Midwest.

Southeast Diesel Collaborative

www.epa.gov/region4/air/mobile/volprog.html

The Southeast Diesel Collaborative is a partnership among leaders from EPA Region IV, state and local governments, and private and environmental sectors in a regional campaign to reduce diesel emissions.

West Coast Diesel Collaborative

www.westcoastcollaborative.org

In the West, EPA Region VI and X were instrumental in creating the West Coast Diesel Collaborative. This initiative is a partnership among leaders from federal, state, and local government; the private sector; and environmental groups in California, Oregon, Idaho, Washington, Alaska, Canada, and Mexico, committed to reducing diesel emissions along the West Coast.

FUNDING ASSISTANCE

Carl Moyer Program

www.arb.ca.gov/msprog/moyer/moyer.htm

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program or CMP) is a grant program that funds the incremental cost of cleaner-than-required engines and equipment. Public or private entities that operate eligible engines and/or equipment in California can participate by applying directly to their local air pollution control or air quality management districts. Examples of eligible engines and equipment include heavy-duty on-road and off-road, marine, locomotive, stationary agricultural pumps, forklifts, airport ground support equipment, and heavy-duty auxiliary power units.

Texas Emissions Reduction Program

www.tnrcc.state.tx.us/oprd/sips/terp.html

The Texas Emissions Reduction Plan (TERP) is a comprehensive set of incentive programs aimed at improving air quality in Texas. The Texas Commission on Environmental Quality administers TERP grants and other financial TERP incentives.

Washington State Clean School Bus Program

www.pscleanair.org/dieselsolutions/schoolbus

Under this program, approximately 7,500 diesel school buses, more than three-quarters of the existing fleet statewide, will be retrofitted between now and 2008 to make them cleaner for the children who ride them. It will also provide cleaner air for citizens to breathe throughout the communities the buses serve. Washington's program is one of the premier voluntary school bus retrofit programs in the country.

FOR MORE INFORMATION

To learn more about the National Clean Diesel Campaign, please visit **www.epa.gov/cleandiesel**.

Publications are available at no charge from the National Service Center for Environmental Publications (NSCEP). Phone orders can be placed by calling (800) 490-9198 or (513) 489-8190, Monday through Friday, 7:30 a.m.—5:30 p.m. (EST). Orders can also be placed online at www.epa.gov/ncepihom/ordering.htm.

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National Clean Diesel Campaign Fact Sheet

REDUCING emissions from diesel engines is one of the most important public health challenges facing the country. Even with more stringent heavy-duty highway and nonroad engine standards set to take effect over the next decade, millions of diesel engines already in use will continue to emit large amounts of nitrogen oxides (NOx) and particulate matter (PM)—both of which contribute to serious public health problems.

These emissions cause thousands of premature deaths, hundreds of thousands of asthma attacks, millions of lost work days, and numerous other health impacts every year. Thankfully, there are a variety of cost-effective technologies that can dramatically reduce diesel emissions and help our nation meet its clean air goals.

Our Goal

Building on the success of its regulatory and voluntary efforts to reduce emissions from diesel engines, the U.S. Environmental Protection Agency (EPA) created the **National Clean Diesel Campaign (NCDC)**. The Campaign is working to reduce the pollution emitted from diesel engines across the country through the implementation of varied control strategies and the sustained involvement of national, state, and local partners.

To fully address the challenges of reducing diesel emissions, EPA is utilizing a multi-pronged approach through the NCDC, including:

- Successfully implementing the 2007 Heavy-Duty Highway Engine Rule and the Clean Air Nonroad Diesel Rule.
- Developing new emission requirements for trains and marine diesels, including large commercial marine engines.
- Addressing engines already in use today by promoting a variety of cost-effective and innovative emission reduction strategies, including switching to cleaner fuels; retrofitting, repairing, repowering, and replacing equipment; and reducing idling.

Exposure to diesel exhaust can:

- *Cause lung damage.*
- *Trigger respiratory problems.*
- *Exacerbate asthma and existing allergies.*
- *Be linked to premature mortality.*

Long-term exposure is thought to increase the risk of lung cancer.

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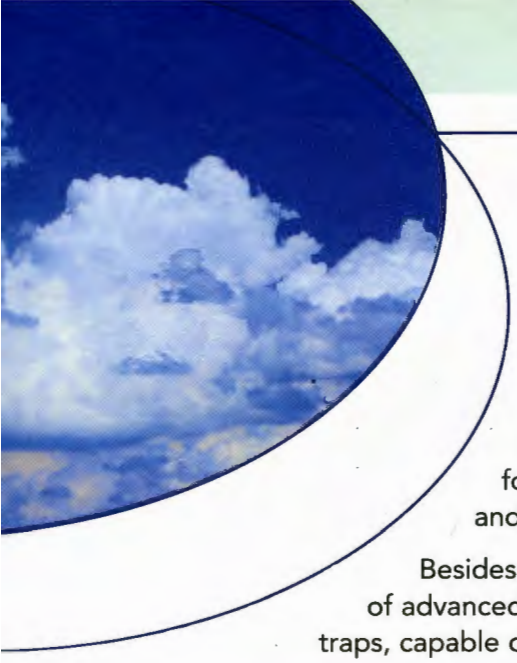


Regulations for New Diesel Engines

EPA is committed to successfully implementing stringent new standards for diesel fuel and new diesel engines. These standards are the critical foundation of the Agency's diesel emissions control program. Clean, ultra-low sulfur diesel fuel will be required for use in highway diesel engines starting in 2006. Lower sulfur diesel fuel for nonroad diesel machines will be required in 2007, followed by ultra-low sulfur fuel for these machines in 2010, and for locomotives and marine engines in 2012.

Besides reducing emissions from the existing diesel fleet, clean fuels will enable the use of advanced aftertreatment technologies on new engines. Technologies such as particulate traps, capable of emission reductions of 90 percent and more, will be required under new standards set to begin phasing into the highway sector in 2007, and into the nonroad sector in 2011.

Many areas of the country are designated as "nonattainment areas" and do not meet the National Ambient Air Quality Standards. Recently, EPA designated 474 counties as "out of compliance" with the eight-hour ozone standard and 208 counties as out of compliance with the PM2.5 standard.

As a result of these designations, almost 180 million people are living in counties that are out of compliance with the eight-hour NOx standards. Almost 90 million people now live in PM nonattainment areas.

The new standards will yield enormous long-term benefits for public health and the environment. By 2030, when the engine fleet has been fully turned over, PM will be reduced by 250,000 tons per year, and NOx will be reduced by 3.3 million tons per year. This will result in annual benefits of more than $150 billion, at a cost of approximately $7 billion. Similar stringent emissions standards for locomotives and marine diesels are now being developed. EPA is also working to reduce emissions from large commercial marine diesel vessels, such as cruise and container ships, through the use of cleaner fuels and engines.

Voluntary Programs for the Existing Diesel Engine Fleet

Over the last five years, EPA has launched a number of successful voluntary programs designed to reduce emissions from the diesel fleet. Each program provides technical and financial assistance to stakeholders interested in reducing their fleet's emissions effectively and efficiently. The signals are clear—stakeholders want these programs to grow. Much of this growth will come from focused partnerships and collaborative efforts at the state and local level, including regional collaborative initiatives.

In conjunction with state and local governments, public interest groups, and industry partners, EPA has established a goal of reducing emissions from the more than 11 million diesel engines in the existing fleet by 2014. Looking at these engines, EPA determined there were five sectors that provided the best opportunity to obtain significant reductions, as described on the following page.

*NCDC participants are committed to **reducing diesel emissions** and **finding innovative ways** to protect human health and the environment.*

Verified Technologies

You can find more information on verified technologies at these Web sites:

EPA's Verified Technology List at:
www.epa.gov/otaq/retrofit/retroverifiedlist.htm

ARB's Verified Technology List at:
www.arb.ca.gov/diesel/verdev/verdev.htm

EPA's Idling Control Technology List at:
www.epa.gov/otaq/smartway/idlingtechnologies.htm

Dynamic Tools and Resources

Through the NCDC, EPA has developed a number of tools for stakeholder projects and partnerships, including:

- *Verifying technologies to ensure that the emission performance claimed by manufacturers is, in fact, achieved.*
- *Creating peer-reviewed emission models and State Implementation Plan (SIP) guidance.*
- *Sharing best practices and recognizing environmental leaders.*

Working Together for Cleaner Air

The NCDC will achieve immediate and significant environmental results by working collaboratively with businesses, government and community organizations, industry, and others. Regional initiatives provide an excellent example of how the NCDC will use a proactive, incentive-based approach to achieve environmental results. Members of these initiatives have agreed to collectively leverage additional funds and take a local approach to diesel mitigation.

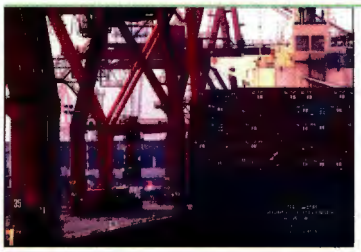
Strong Stakeholder Support

- *EPA has engaged hundreds of stakeholders nationwide from the public and private sector.*
- *Grant solicitations are met by demand 10 times greater than available resources.*
- *Winning grant programs have leveraged an average of two to four times additional resources.*

School Bus Sector

By 2010, **Clean School Bus USA** aims to retrofit or replace the 400,000 diesel school buses in the United States and promote idling-reduction policies in 14,000 school districts. The program works with communities to reduce school bus idling, retrofit current school bus fleets with new technologies, introduce cleaner fuels, and replace the oldest buses with new vehicles that meet stringent pollution control standards. Through the program, EPA is partnering with educators, industry, transportation experts, public health officials, and other community leaders to develop environmentally clean school bus programs nationwide. As of 2004, more than two million children were riding to school on approximately 20,000 cleaner buses due to the Clean School Bus USA program.

Ports Sector



The goal of **Clean Ports USA** is to reduce diesel emissions at maritime ports. The NCDC is partnering with the American Association of Port Authorities and numerous ports and their stakeholders to develop appropriate incentives and strategies to reduce emissions at U.S. ports. EPA is developing the program to help measure the emissions from port activity and identify cost-effective ways to improve the environmental performance of ports.

Construction Sector

The goal of **Clean Construction USA** is to reduce emissions from major construction projects in areas that do not meet national air quality standards. Through the program, EPA is partnering with the Associated General Contractors of America to develop incentives for private fleets to reduce pollution from their vehicles. Government and public interest groups are working together to develop guidance and equipment specifications for public projects and fleets.

Freight Sector

The **SmartWay Transport Partnership** is a collaborative voluntary program between EPA and the freight industry designed to increase energy efficiency and promote strategies to reduce air pollution associated with moving goods in the United States. SmartWay is partnering with trucking companies (such as FedEx and UPS) and major corporations that hire trucking services (such as Ikea and The Home Depot) to create a demand for cleaner, more efficient freight services. SmartWay is also working with states, non-governmental organizations, and the freight industry to eliminate unnecessary engine idling at truck stops, terminals, ports, and locomotive switchyards. The ultimate goal for this program is to transform the fleet into one of high fuel efficiency and low emissions.

Clean Agriculture USA is partnering with the farming community, governmental organizations, and non-governmental organizations (NGOs) to promote clean diesel strategies, including biodiesel and renewable fuels, across the country.

Diesel Emission Reduction Technologies and Strategies

Retrofitting diesel engines is one of the most cost-effective ways to reduce diesel emissions. To help stakeholders identify viable technologies, EPA has developed a list of verified technologies that contains information on expected emission reduction benefits. This list provides information on numerous innovative emission control technologies that EPA has approved for use. Each EPA-verified technology has undergone extensive testing and analysis. EPA has also signed a Memorandum of Understanding with the California Air Resources Board (ARB) to recognize ARB's list of verified emission control options. In addition, EPA has established a comprehensive list of idle-control technologies.

Additionally, EPA has developed innovative guidance that air quality agencies can use to quantify emission reductions achieved by reducing vehicle and locomotive idling. EPA plans to release guidance for air quality agencies to quantify and use emission reductions from specific retrofit actions.

Effective Strategies

Strategies to reduce emissions from diesel engines include:

- Switching to Cleaner Fuels — *using advanced fuels, such as ultra-low sulfur diesel, biodiesel, liquid petroleum gas, and compressed natural gas.*
- Retrofitting — *installing emission-reduction technologies, such as particulate filters and oxidation catalysts.*
- Repairing — *repairing an engine to meet its original standards.*
- Repowering — *replacing an old engine with a newer, cleaner model.*
- Replacing — *replacing an old vehicle or equipment with a cleaner model.*
- Reducing Idling — *reducing a vehicle's idling time.*
- Increasing Energy Efficiency — *incorporating low-rolling resistance tires and advanced aerodynamics for tractors and trailers.*

Regional Collaboratives and Partnerships

Benefiting from economies of scale while protecting against competitive disadvantages, numerous regional initiatives provide an ideal structure for significant reductions across a large geographic area:

- **West Coast Diesel Emissions Reductions Collaborative.** One of the first of its kind, this joint effort includes EPA, U.S. Department of Agriculture Natural Resource Conservation Service, U.S. Department of Energy, U.S. Department of Transportation, Canada and Mexico, as well as state, local, non-profit, and private sector partners from California, Alaska, Washington, and Oregon to reduce air pollution emissions from diesel engines along the West Coast. The collaborative works across sector workgroups to identify, fund, and implement regional diesel emission reduction projects.
- **Midwest Diesel Initiative.** This new, cooperative, public-private effort is reducing diesel emissions along major transportation corridors and various sectors, including trucking, locomotive, construction, and ports, with an emphasis on urban areas.
- **Northeast Diesel Collaborative.** This program builds on a foundation of voluntary action and encourages participants to engage in projects that will reduce transportation-related air pollution to help address the high asthma rates in the Northeast.

Looking to the Future

Building on past successes, the NCDC has established several hundred projects that involve cleaner diesel, idle-reduction, and other environmental control strategies across the country, achieving emission reductions now that will yield benefits for years to come. Each project serves as an innovative, cost-effective model for diesel emission reduction. In addition, many states are using ultra-low sulfur diesel fuel well ahead of EPA's requirements. In total, hundreds of partners nationwide are successfully implementing cleaner diesel projects, resulting in a foundation for the NCDC's efforts to reduce diesel pollution and protect human health and the environment.

How to Get Involved

For more detailed information and a list of contacts, please visit the National Clean Diesel Campaign Web site at **www.epa.gov/cleandiesel**.

National Clean Diesel Campaign

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