Wisconsin's Clean Diesel Grant Programs Summary

Wisconsin Department of Natural Resources

March 2013

PUB AM-510 2013

Wisconsin Department of Natural Resources
Bureau of Air Management
Box 7921- AM/7
Madison, WI 53707
Phone 608-266-7718
Fax 608-267-0560

This publication is available in alternative format (large print, Braille, audio tape, etc.) upon request. Please contact the Bureau of Air Management, phone 608-266-7718, for more information.

Publication AM-510 2013

This report summarizes the results of the clean diesel grant programs administered by the Wisconsin Department of Natural Resources (DNR) and its close partners. Wisconsin is benefitting and will benefit substantially more in the future from the pollution reduction, health cost savings, and local economic incentives of clean diesel grant programs. Strong public-private partnerships have made these programs successful. Grantees garner fuel-efficiency and improve their bottom-line with clean diesel technology installations. Technology manufacturers and vendors, some of which are based in Wisconsin, also receive financial benefits by selling and installing the clean diesel technologies. Wisconsin citizens benefit from cleaner air and health cost savings. The benefits will only become more impressive due to the numerous other grant programs and individual actions in progress and yet to come.

EXECUTIVE SUMMARY

- Diesel vehicles and equipment are vital to the transportation system and economy. These hard-working machines are durable, long-lasting and generally fuel-efficient. However, due to their longevity they are a large source of harmful emissions.

- Clean diesel grant programs offer much-needed financial assistance to diesel equipment operators to purchase and install technologies that will reduce emissions from older diesel equipment.

- Many clean diesel grants have been available nationwide and in Wisconsin to fund technologies such as exhaust retrofit devices, idle reduction devices, engine repowers, engine emission upgrades and equipment replacements.

- Over 3,600 pieces of equipment from all types of diesel operations in Wisconsin, including truck, school bus, transit bus, construction, agricultural, locomotive and municipal, have benefited from these grant programs.

- The projects described in this report will reduce over 486,000 tons of emissions and over 41 million gallons of diesel fuel.

- Implementing clean diesel technologies is an extremely cost effective means of improving air quality. Projects under the Wisconsin clean diesel grant programs have an average lifetime cost-effectiveness of approximately $4,000 per ton of emissions reduced (excluding CO2).

- A $13.3 million federal and state investment into Wisconsin's clean diesel grant programs has been matched nearly 1:1 with $13.3 million (excluding in-kind contributions) from the grant recipients.

- Emission reductions achieved under these grant programs will result in nearly $11.5 million savings each year in health benefits and over $178 million in health cost savings over the lifetime of the programs.

- For every $1 of federal or state dollars invested in these programs over $13 of health costs were saved.

BACKGROUND

The United States Environmental Protection Agency (U.S. EPA) estimates that there are approximately 20 million diesel engines operating across the country.[1] Diesel-powered engines are the workhorse of the nation's transportation economy playing a vital role in freight movement, construction, public transportation, and agriculture. However, many scientific studies have linked diesel pollution, which contributes to particulate matter (PM, also called soot), ozone (also called smog) and air toxics, with a number of cancer risks and respiratory and cardiac health effects.[2] Reducing diesel engine emissions is one of the most important air quality and public health challenges facing the United States.

Diesel emissions account for approximately 56 percent (116,601 tons per year) of the state's total mobile source nitrogen oxide emissions (NOx) and 63 percent (5,567 tons per year) of the state's total mobile source fine particulate matter emissions (PM2.5).[3] Recent regional evaluations from the Lake Michigan Air Directors Consortium (LADCO) suggest that diesel emissions from mobile sources - both on-highway and nonroad - represent about 40 percent of total NOx emissions in the state and between 15 to 20 percent of the total direct PM 2.5 emissions in the state. NOx is a precursor to ozone pollution and contributes to secondary PM 2.5 formation. Over one third (approximately 2.1 million residents) of Wisconsin's population lives in the eastern counties that have historically experienced elevated ozone and/or PM 2.5 levels and this population is at the highest risk for suffering the health effects sited above.[4] The U.S. EPA is expected to finalize a more stringent ozone National Ambient Air Quality Standard (NAAQS) in 2011 and is scheduled to review the PM 2.5 NAAQS, which may also be adjusted to conform with prior Clean Air Scientific Advisory Committee (CASAC) recommendations. Controlling diesel emissions is important to both public health and to maintain Wisconsin's attainment of federal air quality standards.

Under the Clean Air Act, EPA set stringent standards for diesel fuels and new diesel engines, including heavy-duty trucks, buses, and nonroad equipment. In 2006, ultra low sulfur diesel (ULSD) became available for the on-highway fleet and in 2010 ULSD became required for use in nonroad equipment. Cleaner truck standards took effect beginning in model year 2007. In 2004, EPA promulgated the Clean Air Non-Road Diesel Rule resulting in dramatic pollution reductions from nonroad heavy duty diesel engines in construction, agriculture, industrial and airport equipment. The standards under this rule took effect for new engines in 2008 and will be fully phased in for most engines by 2014. Engines greater than 750 horsepower will have one additional year to meet the standards. EPA also established the Clean Locomotive and Marine Diesel Rule, phased in 2008 to 2015, for new and remanufactured engines. In 2030, when these rules are fully implemented, nationally harmful pollution will be cut by 95 percent and the annual public health and economic benefits are expected to exceed $150 billion per year.[5]

Diesel engines have very long life cycles, often in excess of 20 years. While EPA's rules impact new engines and fuel, the challenge remains to address existing unregulated and older diesel engines, commonly referred to as the "legacy fleet," as expeditiously and practicable as possible. To accelerate public health benefits, EPA Region 5 is leading the Midwest Clean Diesel Initiative (MCDI), a public-private partnership to voluntarily reduce diesel emissions prior to, or in addition to mandatory deadlines. A public and private stakeholder partnership in Wisconsin's diesel industry, known as the *Wisconsin*

---

[1] United States Environmental Protection Agency. (August 2009). *Report to Congress: Highlights of the Diesel Emissions Reduction Program*. (EPA Publication No. EPA-420-R-09-006).
[2] United States Environmental Protection Agency. (May 2002). *Health assessment document for diesel engine exhaust*. (EPA Publication No. EPA/600/8-90/057F).
[3] United States Environmental Protection Agency. 2005 National Emissions Inventory.
[4] U.S. Census Bureau. 2009 estimates. Retrieved from http://quickfacts.census.gov/qfd/states/55000.html
[5] United States Environmental Protection Agency. (November 2005). *National Clean Diesel Campaign factsheet*. (EPA Publication No. EPA-420-F-05-012).

Clean Diesel Coalition, supports MCDI's goal of reducing emissions from the legacy fleet. The coalition explores, develops and implements diesel emission reduction strategies. It uses education and financial assistance to help diesel equipment operators reduce emissions.

EPA determined that their clean diesel grant programs are the most cost-effective strategy for reducing diesel emissions, apart from PM reductions realized through EPA regulations for heavy-duty diesel engines and diesel fuel.[1] There was also a study conducted to compare the cost-effectiveness of eligible Congestion Mitigation and Air Quality (CMAQ) program strategies, which found diesel retrofit projects to be the second most cost-effective strategy. The CMAQ study indicates that other CMAQ strategies such as van pool programs, traffic signalization improvements, alternative fuel vehicles, bike paths, or high occupancy vehicle lanes cost any where from $10,000 to over $200,000 per ton equivalent of air pollution removed, whereas diesel retrofit projects cost only $5,340 per ton equivalent of air pollution removed.[6] Reducing diesel emissions also is an extremely cost-effective means to improve public health. According to EPA, every $1 spent on diesel emission reduction produces $13 in health benefits.[7]

The Wisconsin DNR, with support through the Wisconsin Clean Diesel Coalition, encourages diesel operators to undertake a variety of emission reduction strategies in an effort to improve air quality, safeguard public health and reduce fuel consumption. DNR and other organizations offer several grant programs to encourage and assist these efforts. Many of the intended benefits have been achieved through the grant programs and requests for their continuation remain high, demonstrating overwhelming support for the success and continuation of these programs.

GRANT PROGRAM DESCRIPTIONS

Below is a list of the clean diesel grant programs that have been offered to date by DNR and its government partners. The benefits relayed in this report are a result of these specific programs.

DNR-Congestion Mitigation and Air Quality (CMAQ) Retrofit Program
DNR received over $1 million through the CMAQ program from the federal and state Department of Transportation (DOT) to install exhaust retrofit devices on school buses and municipal equipment. Funding was made available from 2004 through 2010 to public and private school bus fleets and municipalities in the 10 counties in eastern Wisconsin that were in non-attainment of the 1997 ozone NAAQS.

DNR-Midwest Clean Diesel Initiative (MCDI) Nonroad Retrofit Grant
DNR received $50,000 from U.S. EPA's MCDI to install exhaust retrofit devices on nonroad municipal equipment and private construction equipment.

DNR-Midwest Clean Diesel Initiative Waste Hauler Grant Program
DNR received approximately $50,000 from U.S. EPA's MCDI to retrofit waste haulers with exhaust controls. After funding eligible waste haulers, remaining funds were used to install idling control devices on long-haul trucks at a Wisconsin-based trucking company.

---

[6] Westcott, Robert F. (2005). *Cleaning the air: Comparing the cost effectiveness of diesel retrofits vs. current CMAQ projects*. Retrieved from http://www.dnr.state.wi.us/air/pdf/dieselretrofitcosteffstudy.pdf
[7] Diesel Technology Forum. (February 16, 2011). DTF statement on the Administration's proposed FY 2012 budget. Retrieved from http://www.dieselforum.org/whats-new/dtf-statement-on-the-administration2019s-proposed-fy-2012-budget

DNR-Diesel Emission Reduction Act (DERA) Wisconsin Clean Diesel Grant Program
Since 2008, DNR has received $295,000 to 353,000 annually through U.S. EPA's DERA State Clean Diesel Grant Program. The grants are leveraged by subrecipients. Funds have been made available to owners of various diesel-powered equipment (on-road, off-road and stationary) within the public and private sector for a variety of technologies (exhaust control retrofits, on-board idling reduction devices, engine emission upgrades, engine repowers, and equipment replacements). Eligible project types and match requirements were expanded over the program's lifetime.

DNR-DERA Wisconsin Municipal and School Bus Grant
DNR received $1,182,826 from U.S. EPA's DERA National Clean Diesel Funding Assistance Program. The grant was leveraged by match from the subrecipients in varying amounts depending on project type. Funds were allocated to municipal and school bus fleets, which have a direct public benefit, for exhaust retrofits, idle controls, emission upgrades, engine repowers, and vehicle replacements.

DNR-DERA American Recovery and Reinvestment Act (ARRA) Wisconsin Clean Diesel Grant Program
DNR received $1.73 million from U.S. EPA's DERA State Clean Diesel Grant Program through ARRA. The grant was leveraged by match from the subrecipients. Funds were made available to owners of any diesel-powered equipment (on-road, off-road and stationary) within the public and private sectors for a variety of technologies.

DNR-DERA ARRA Switch Locomotive Idle Reduction Grant
DNR received approximately $571,000 from U.S. EPA's DERA National Clean Diesel Funding Assistance Program through ARRA. The grant was leveraged by the subrecipients. Funds were allocated to two locomotive fleets to install idle reduction devices on switch locomotives, which are older, high idle and high emitting vehicles. Lower than expected costs allowed remaining funds to be reallocated to three fleets that applied for the DERA State Grant. This resulted in idle reduction units for long haul trucks and engine powers on construction equipment.

State Energy Office (SEO)-Truck Idle Reduction Grant Program
The Wisconsin Department of Commerce received state funding through Wisconsin Act 25 to establish a grant program to reduce idling on Wisconsin-based long haul trucks. The program, covering half of the cost of the idle control device, funded approximately $4 million from 2006 to2008 and then was supplemented with a $2 million grant from ARRA when the state funds ended (EPA's DERA National Clean Diesel Funding Assistance Program). The program was renewed at $1 million per year for fiscal years 2012-2015. The program is now housed at the State Energy Office.

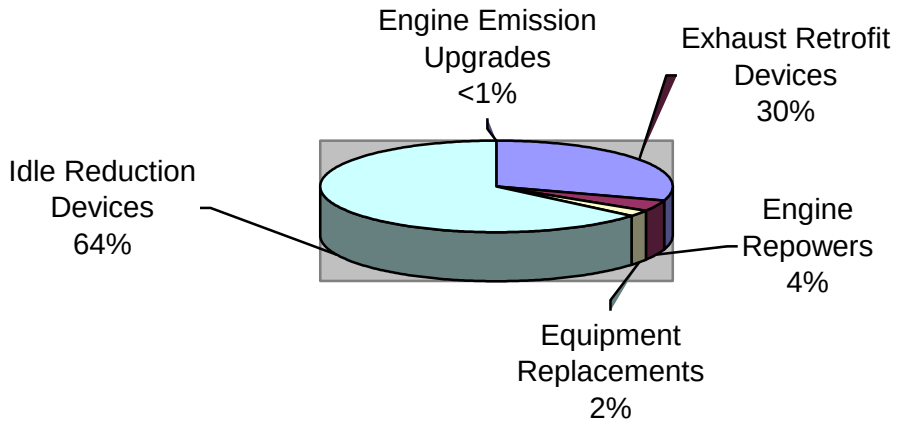
DOT-DERA Nonroad Engine Repower Grant Program
The Wisconsin DOT received $750,000 in 2008 through U.S. EPA's DERA National Clean Diesel Funding Assistance Program. Grants were offered at 50 percent (up to $30,000 per repower) for engine repower projects on older construction equipment to companies that performed highway construction projects in Wisconsin.

PROJECT SUMMARY

The table below lists the number of pieces of equipment and type of equipment funded by these grant programs by project type. Overall, 3,670 pieces of equipment have been impacted to date, reducing emissions and saving fuel and operating costs for trucking companies, school districts and bus companies, construction companies, agricultural operations, municipalities and others (results are more extensively detailed in the Grant Program Results Summary Table).

Project Type	Equipment Type	# of Pieces of Equipment
Exhaust Retrofit Devices	School Buses	799
	Construction Equipment (trucks and nonroad)	88
	Municipal On-road Equipment (dump trucks, packers, lifts, sweepers)	187
	Municipal Off-road Equipment (cranes, forklifts, boats)	13
	Generators	5
Idle Reduction Devices	Trucks	2,194
	School Buses	120
	Locomotives	40
	Municipal Equipment	7
Engine Repowers	Construction Equipment	68
	Agricultural Equipment	34
	Refrigeration trailers	32
	Generators	5
Engine Emission Upgrades	Construction Equipment	7
Equipment Replacements	School Buses	47
	Refrigeration Trailers	21
	Construction Equipment	1
	Refuse Hauler	1
	Dump Truck	1
		3,670

Amount of Equipment by Project Type



Below are brief descriptions of the technologies used under the various projects contained in this report.

Exhaust Retrofit Devices – Several types of devices can be installed to a vehicle's exhaust system to reduce tailpipe emissions. A few different types were used under these grant programs. Diesel Oxidation Catalysts (DOC) reduce emissions of PM, hydrocarbons (HC) and carbon monoxide (CO) at a cost ranging between $700-$5,000 depending on the application. DOCs are maintenance-free. Diesel Particulate Filters (DPF) are similar to DOCs, but have up to triple the PM reductions, higher HC and CO reductions, require regular maintenance and cost over $8,000. Partial DPFs, which have the emission reductions and costs between a DOC and DPF, were used in one of these grant programs. Closed Crankcase Ventilation filters (CCV) are devices that capture almost 100 percent of the engine crankcase emissions and are used in conjunction with a DOC. They cost approximately $500-$1,000. Exhaust retrofit devices are a cost-effective way to reduce emissions on middle-aged equipment, though some devices have maintenance and operation impacts making the devices below average in popularity if other emission control options exist for the targeted application.

Idle Reduction Devices – Several types of technologies reduce idle time by powering essential vehicle components with the main engine turned off. These technologies provide electricity, heat to an engine, and/or heating and air conditioning (HVAC) to a vehicle's interior. Idle controls under these programs include diesel powered Auxiliary Power Units (APU) at a cost of $8,000-10,000, Battery Powered HVAC units at a cost of $6,000-9,000, direct fired heaters (DFH) at a cost of $2,000-4,500, Thermal Storage Systems at a cost of $4,000-5,000, and automatic engine shut-down/start-up systems for locomotives at a cost of $9,000-$18,000. Idle controls reduce primary pollutants (NOx, PM, HC, and CO) and largely reduce carbon dioxide (CO2) emissions. Idle reduction devices are very popular because they reduce emissions while saving fuel and maintenance costs. They are very cost-effective and the fuel savings allow for a high return on investment.

Engine Repowers – A repower consists of replacing an older engine with one that meets more stringent emission standards. Repowers primarily reduce emissions of NOx, but also PM, HC and CO. The cost of a repower can range from $7,000 to over several hundred thousands of dollars depending on the engine application. The smaller and more accessible engines cost less for parts and labor. Engine repowers are a very cost effective solution for reducing emissions and they often save fuel and maintenance costs on outdated engines that still have a long expected remaining life on the rest of the equipment. They are especially favored for nonroad applications due to the longevity and expense of the equipment, which can extend its lifespan simply with a new engine versus an entire replacement.

Engine Emission Upgrades – Some fleets opt to rebuild an engine, rather than repower/replace it. During a complete rebuild, or separately, the engine's emission components may be upgraded to reduce the engine emissions. Upgrades reduce all of the primary pollutants (NOx, PM, HC and CO) at a cost of $25,000-$40,000. An engine emission upgrade is a cost-effective way to reduce emissions, specifically if the equipment is already undergoing an engine rebuild, but it is generally not popular as a stand alone emission reduction solution since it has few additional benefits.

Equipment Replacements – Replacements consist of completely replacing an entire vehicle/piece of equipment. While costly, this is sometimes the only option for reducing exhaust from an older piece of equipment. Engine repowers, upgrades and exhaust retrofits are not options for every vehicle type. Replacing a vehicle reduces all primary pollutants and the cost range varies from a few thousand dollars to millions of dollars depending on the equipment. While replacements are favorable, they are generally cost-prohibitive and a last resort when no other emission reduction solution exists.

GRANT PROGRAM RESULTS SUMMARY TABLE

The table below summarizes the details and key results of the individual diesel grant programs including emission reductions by pollutant, fuel savings, total project costs, and cost effectiveness based on emissions reduced. While diesel emissions include several mobile source air toxics, this report identifies the key pollutants of concern: Nitrogen Oxides (NOx), Particulate Matter (PM), Hydrocarbons (HC), Carbon Monoxide (CO) and Carbon Dioxide (CO2). These pollutants contribute to elevated ozone, particulate matter, and greenhouse gas levels. The emission reduction estimates are provided in annual and lifetime tons reduced, while the fuel savings and cost-effectiveness estimates are given over the project lifetime.

Emission reductions were estimated using the U.S.EPA Diesel Emissions Quantifier (DEQ), MOBILE 6.2 and National Mobile Inventory Model (NMIM). A variety of models were used given the complex nature of quantifying emissions from different types of engines operating under various conditions and due to the limitations of each model for certain project types. Some of these modeling limitations could not be remedied. For example, the NMIM model does not account for fuel savings from engine repower projects, thus fuel savings are actually higher than the estimates provided. The DEQ accounts for emissions from fuel, even if the fuel type is not related to the funded project, thus there is a decrease in NOx reductions and an increase in other pollutant reductions for the two programs where biodiesel was used and these emissions are not related to the grant program.

It is important to note that the DNR-administered grant programs' results are augmented by other programs implemented in Wisconsin. There were other grant programs and many private fleet investments that have not yet shared final data with DNR. Thus, the emission reductions estimated in the table below, while significant, represent a fraction of the total voluntary diesel emission reductions achieved across the state.

Grant Program	Project Type (Total # of Equipment Impacted)	Equipment Type (# of pieces impacted per type of technology)	Emission Reductions (tons) Annual/Lifetime					Lifetime Fuel Saved (gallons)	Total Project Cost
			NOx	PM	HC	CO	CO2		Cost-Effectiveness ($/ton)[1]
DNR- CMAQ Retrofit[2]	Exhaust Retrofits (935)	-School bus (611 DOC, 30 CCV, 74 DOC+CCV, 35 partial DPF) -On-road municipal (172 DOC) -Nonroad municipal (13 DOC)	-0.319/ -4.350	1.160/ 11.430	4.905/ 54.990	12.254/ 131.000	0	0	$1,008,039 $5,221/ton
DNR- EPA_MCDI Non-road	DOCs (20)	Construction equipment (20 DOC)	0	0.260/ 1.090	0.310/ 1.320	2.080/ 9.870	0	0	$41,000 $3,339/ton
DNR- EPA_MCDI Refuse Haulers + Trucks[3]	Idle Reduction + DOCs (12)	-Trucks (9 APU) -Refuse Haulers (3)	1.955/ 29.650	0.057/ 0.850	0.048/ 0.660	0.129/ 1.800	87.500/ 1,324	119,285	$84,120 $2,552/ton
DNR- EPA_DERA State 2008-2011	Mix (210)	-Trucks (91 mixed idle devices) -Refrigeration trailers (9 engine repowers, 1 replacement) -School buses (28 DFH, 16 replacements, 6 DOC) -Construction trucks (16 DOC) -Construction nonroad (8 DOC, 6 engine repowers, 1 engine emission upgrade) -Municipal onroad (7 DOC, 7 idle) -Irrigation sets and pumps (12	45.114/ 479.637	3.104/ 34.980	2.739/ 33.171	7.620/ 99.793	1,350/ 12,221	1,126,840	$3,280,579 $5,066/ton

		engine repowers) -Refuse Truck (1 replacement) -Generator (1 engine repower)							
DNR- EPA_DERA Municipal & School Bus	Mix (129)	-School bus (31 replacements, 42 DFH, 24 DPF, 19 DOC) -Construction nonroad (5 engine emission upgrades, 3 engine repowers) -Work trucks (5 DOC) -Dump truck (1 replacement)	7.820/ 137.100	0.530/ 7.890	0.950/ 14.070	4.100/ 57.310	41.500/ 503	45,286	$3,386,305 $15,651/ton
DNR- EPA_ARRA State	Mix (386)	-Trucks (202 mixed idle devices) -Refrigeration trailers (23 engine repowers, 20 replacements) -School buses (51 DFH) -Construction trucks (23 DOC) -Construction nonroad (21 DOC, 13 engine repowers, 1 emission upgrade, 1 replacement) -Irrigation sets (22 engine repowers) -Generators (5 DOC, 4 engine repowers)	77.278/ 1,094	3.993/ 39.610	5.453/ 35.630	21.892/ 148.690	2,734/ 43,308	3,905,399	$3,036,445 $2,304/ton
DNR- EPA_ARRA Locomotive	Idle Reduction + Engine Repowers (69)	-Switch locomotives (40 idle timers) -Trucks (27 battery HVAC) -Construction equipment (2 engine repowers)	137.192/ 2,644	4.144/ 71.440	8.194/ 154.450	16.463/ 284.660	4,575/ 90,953	7,070,263	$738,048 $234/ton
SEO- WI Act 25 Truck Idle Reduction	Idle Reduction (1,303)	Trucks (1,303 mixed idle devices)	293.386/ 5,453	6.855/ 128.766	3.096/ 47.472	18.576/ 282.768	13,009/ 241,044	21,715,709	$9,287,733 $1,571/ton
Commerce- EPA_ARRA Truck Idle Reduction	Idle Reduction (562)	Trucks (562 mixed idle devices)	120.268/ 1,869	2.810/ 44.398	1.686/ 25.852	10.116/ 153.988	5,364/ 83,353	7,509,275	$4,168,121 $1,991/ton
DOT- EPA_DERA Nonroad Repower	Engine Repowers (44)	Construction equipment (44 engine repowers)	59.056/ 349.630	5.910/ 36.970	5.835/ 35.310	26.557/ 168.880	0	0	$1,634,360 $2,766/ton
Total Lifetime Emission Reductions			**12,052**	**377.424**	**402.925**	**1,339**	**472,706**		
Total Fuel Savings								**41,492,057 gallons**	
Total Cost (Grant Dollars/Match Dollars)								**$26,664,750 ($13,378,625/ $13,286,125)**	
Average Cost Effectiveness								**$4,070/ton**	

[1] Cost-effectiveness is based on total project cost (grant dollars plus subrecipient match dollars) and all pollutant reductions combined over program lifetime, except CO2. Including CO2 reductions significantly improves cost-effectiveness.
[2] 150 pieces of on-road municipal equipment in this program use biodiesel fuel, which has an emission reduction reflected in the estimate, unrelated to the program.
[3] The three refuse haulers in this program use biodiesel fuel, which has an emission reduction reflected in the estimate, unrelated to the program.

SUCESSES AND BENEFITS

Air Quality Benefits

The clean diesel grant programs are achieving substantial emission reductions. Approximately 14,171 tons of the pollutants (486,877 tons including CO2) identified in the grant program results summary table will be reduced over the lifetime of these programs. Lifetime NOx reductions alone are equivalent to reducing emissions from over 9.3 billion miles of on-road vehicle travel.[8] The financial assistance and results of these programs have encouraged continued industry participation leading to ongoing and long-term air quality benefits. The Grant Program Results Summary Table contains details each program's emissions reductions.

Health-Economic Benefits

Health cost savings can be realized by reducing air pollution. A landmark study analyzed the costs of hospitalization, chronic illness, asthma attacks and lost work days associated with various emissions of motor vehicles.[9] Using findings from this study, over $11.5 million in total annual health cost savings is achieved by the clean diesel programs outlined in this report. These health costs savings are primarily achieved by reducing NOx and PM2.5. Annual NOx emission reductions alone totaled over 741 tons for a health cost savings of over $8.4 million per year. Even more substantial is the estimated lifetime health cost savings of $178,068,730.

Annual Health Cost Reduction from Diesel Grant Emission Reductions (annual ton reduction*cost per ton)

NOx	PM	HC	CO	CO_2	Total
741.750*$11,332	28.823*$109,000	33.216*$718	119.787*$50	27,161*?	
$8,405,511	**$3,141,707**	**$23,849**	**$5,989**	**-**	**$11,577,056**

Lifetime Health Cost Reduction from Diesel Grant Emission Reductions (lifetime ton reduction*cost per ton)

NOx	PM	HC	CO	CO_2	Total
12,052*$11,332	377.424*$109,000	402.925*$718	1,339*$50	472,706*?	
$136,573,264	**$41,139,216**	**$289,300**	**$66,950**	**-**	**$178,068,730**

Other Economic Benefits

Fuel savings

Over 41 million gallons of fuel are estimated to be saved through the lifetime of these grant programs, which saves over $163 million at today's price of $3.95 per gallon of diesel. This is equivalent to removing over 2,100 long-haul trucks from the road for a year. Please refer to the Grant Program Results Summary table for a breakdown of fuel savings by program.

Reduced maintenance

Numerous projects within these programs reduce maintenance costs for the participating fleets. For example, installing newer engines saves time and money that fleet operators have had to spend maintaining outdated engines. Installing idle reduction devices reduces the run time of the main truck engine, reducing wear and tear and associated maintenance and parts costs. Many fleets undertake these projects with the goal of reducing maintenance and associated costs.

---

[8] Estimate calculated using travel and emission results for southeastern Wisconsin from MOVES2010a modeling performed by the Wisconsin Department of Natural Resources for updating the State Implementation Plan submitted to the U.S. EPA. (November 2011).

[9] McCubbin, Donald R. & Delucchi, Mark A. (September 1999). The health costs of motor-vehicle-related air pollution. *Journal of Transport Economics and Policy, Vol. 33*, Part 3, pp.253-86.

PROGRAM CONTINUATION

There are tremendous benefits achieved through clean diesel grant programs. The programs, administered by DNR and its partners, have sparked interest and encouraged personal investment by fleets statewide. Grant participants and partners are sharing the success stories through the diesel industry and are creating positive energy and continued participation, extending the program benefits well into the future.

There is a strong desire within the diesel industry and DNR to continue these programs. When grants are available, EPA and DNR alike receive funding requests several times greater than the funds available. DNR is in the midst of administering more programs with U.S. EPA funds and will continue to seek state and federal assistance. These clean diesel programs have proven to be a very cost-effective means of reducing emissions and a win-win for all, benefitting business, health and the environment.

PROGRAM FEEDBACK

"Our new refrigeration reefer unit would not have been possible without the grant. It is hard to believe how much we have saved in fuel alone. Less fuel, less exhaust, cleaner burning." Pete Hogan, Head Technician from Earl L. Bonsack Inc., recipient of DERA grants for idle reduction devices and refrigeration trailer replacement.

"Thank you for all of the positive things that the WDNR has done to help out many of my customers and our company, Inland Power Group. Your department helped many of my customers …reduce their overall emissions and in many cases, you have helped them to reduce their fuel consumption as well…With your assistance and leadership, customers are able to test various technologies that, in many cases, lead to the customer specifying this technology onto additional equipment paid for 100 percent by the customer. …Inland Power Group, based in Butler, Wisconsin, appreciates the increased service and parts business associated with helping these customers secure emission reduction devices and products that help to reduce fuel consumption….I realize that without the work you and your counterparts have been providing, suppliers like Inland and their customers would find it extremely difficult to help to promote and to reduce the emissions in our region." Bob Giguere, Product Support Manager, Inland Power Group

"The clean diesel programs, administered by the Wisconsin Department of Natural Resources, have proven to be valuable additions to our ever-evolving emissions business. Whether it is retrofit, repower or idle reduction, the result is a significant increase in business opportunities for Cummins NPower and for our customers, along with a significant improvement in air quality for all the citizens of Wisconsin." Jeff Ludwig, Territory Manager for Emissions Solutions, Cummins NPower

"Hortonville Area School district is always looking for ways to help keep our air clean, and is willing to do whatever we can to achieve this goal. Unfortunately, because of budget restrictions we are not able to utilize these technologies until we work these products through the vehicle replacement rotation, which are about 15- 20 years. Grants allow us to apply for, and hopefully receive funds to expedite our process of receiving new technology. We are running an article in our school district newsletter, which goes to all of our residents, along with including information about this on our district website. I plan to continue applying for any future grants that are available to help us keep the air for our children clean." Harold Steenbock, Transportation Supervisor, Hortonville Area School District