

**ST. LOUIS  
DIESEL EMISSION REDUCTION  
PILOT PROJECT  
Final Report – April 30, 2009**

**Subaward between Central States Air Resources Agencies Association  
(CenSARA) and Missouri Department of Natural Resources (DNR)  
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## Executive Summary

Reducing diesel emissions from freight transport across the United States and in congested metropolitan areas is one of the most important air quality challenges facing the country today. The St. Louis Diesel Emission Reduction Pilot Project was a collaborative effort launched by the Missouri DNR Air Pollution Control Program (APCP) and the Grace Hill Clean Air Program (CAP) to test run and evaluate the effectiveness of the EPA's SmartWay program to achieve diesel emission reductions through voluntary measures. The pilot project recruited five trucking operations to install SmartWay diesel retrofit equipment, adopt idle reduction strategies, and obtain their feedback. The *St. Louis Diesel Retrofit Program* website is posted online.<sup>1</sup>

A St. Louis Diesel Retrofit Workshop was held at the Anheuser-Busch Visitor Center to recruit the five trucking fleets, and inform the wider trucking community about the EPA's SmartWay program. Trucking fleet managers were highly interested to hear the environmental and technical information presented by Missouri DNR, Grace Hill, and the EPA-verified diesel equipment manufacturers. The trucking community is amenable to collaborating on efforts to reduce diesel emissions, if the necessary technical and financial assistance is provided. Trucking is a most competitive business, with little time and money to spare, so guidance and funding is needed to identify the most appropriate retrofit technologies and cover costs. Technical assistance to trucking fleets might take a form similar to an energy audit, creating jobs and expanding a new sector of the economy in the process.

Tom Weakley of the Owner-Operator Independent Drivers Association (OOIDA) attended the workshop, and subsequently hosted a follow-up workshop at OOIDA headquarters in Grain Valley, Missouri, to further discuss and collaborate on freight transport and air quality issues of mutual concern. Overall, a wide range of ideas was produced that builds upon the SmartWay program established by the EPA, to achieve further reductions in diesel emissions in concert with improving public health, and the efficiency of freight transport across the central states Blue Skyways region.

While there is some debate about whether short or long haul truck drivers are more at risk from diesel exposure, urban areas are heavily traversed by both types of trucks. A mix of public and private, large and small, in-town and over-the-road trucking operations was recruited for the pilot project in order to obtain a broad overview of practical experiences with the SmartWay approach.

A number of SmartWay technologies and strategies were identified to be effective in reducing emissions from both in-town and over the road trucks. Diesel fuel price fluctuations and the economic downturn were decisive factors in the types of diesel retrofit equipment that were selected by the trucking fleet managers. Fuel-efficient, affordable technologies and strategies are the future of effective diesel emission reduction programs.

## **I Introduction**

The Saint Louis industrialized regions spanned by interstates I-70, I-64, I-44, I-55, and the Mississippi riverfront are bustling with diesel-powered truck, train, and river barge traffic. A major concerted diesel emissions reduction program is needed to address the heavy-duty diesel emission sources of particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), SO<sub>x</sub>, NO<sub>x</sub>, VOC, and HAP that impact throughout the Ozone and PM<sub>2.5</sub> Nonattainment Area.

The Missouri Department of Natural Resources does not regulate diesel emissions from industrial and commercial mobile sources. Federal EPA emission standards require over 90 percent reductions in 2007 and newer onroad diesel truck engines, and 80 - 90 percent emission reductions are being phased in for nonroad construction, industrial, and agricultural vehicles, locomotives, and marine vessels. However, these new standards do not apply to existing older heavy duty diesel vehicles which pollute at much higher rates. Many of which will remain in service for another 10 to 30 years.

The U.S. EPA's SmartWay Transport Partnership promotes a range of control strategies and technologies to reduce emissions and fuel consumption costs associated with the existing ground freight transportation infrastructure. Controls include emission filters, improved aerodynamics, idle reduction technologies, and driver training. This pilot project represents the first action taken by Missouri DNR to address diesel emissions from mobile sources. It is the outgrowth of MDNR participation on the Blue Skyways Collaborative since BSC's inception in 2005.

The St. Louis Diesel Emission Reduction Pilot Project was funded by the EPA through a Blue Skyways Collaborative grant, and administered by the Central States Air Resource Agencies (CenSARA). Missouri is a member of the Blue Skyways Collaborative, one of seven regional collaboratives established by the EPA to promote voluntary diesel emission reduction projects. It is led by EPA Regions 6 & 7 and coordinated by CenSARA, with ten member states, Clean Cities, regional, and community organizations, trucking companies, industries, and trade associations.

Federal funding through the Diesel Emission Reduction Act (DERA) expanded from about \$5 million two years ago to \$50 million last year. To this has been added \$300 million this year through the American Recovery & Reinvestment Act (ARRA) stimulus funding. These funds will be awarded by EPA for investment in clean, efficient diesel technologies.

- **Project Partners**

This pilot project was a collaboration between the Missouri DNR Air Pollution Control Program (APCP), Grace Hill Clean Air Program (CAP), and five St. Louis-based municipal public, commercial, industrial, and independently owned and operated trucking fleet operations: The City of St. Louis Street Division, Tocco Foods, M & L Foods, Fred Weber, and Rendon's Trucking.

All diesel retrofit equipment was installed by Truck Centers and Wedge Tires in the City of St. Louis. EPA-verified diesel retrofit equipment, quotes, and technical presentations at the St. Louis Diesel Retrofit Workshop were provided by Caterpillar, Cummins, Donaldson, Eaton, and Engine Control Systems.

Anheuser-Busch generously donated the use of the meeting space at their Visitor Center complete with all the staffing, furnishings, equipment, refreshments, and a resplendent eighteen-wheeler Budweiser truck fully outfitted with diesel emission reduction equipment.

Many people in St. Louis, the EPA, and the APCP contributed to this project. Initial backing and recommendations came from those in attendance at the last St. Louis Community Air Project (CAP) meeting. This pioneering community-based project with its air toxics monitoring, emission inventory, and health risk assessment activities led by Emily Andrews, Suzannah Fuchs, Erica Fendler, Marcus Rivas, Kevin Herdler, Jim Hirtz, Terry Rowles, and Eric Giroir laid the groundwork for future community involvement in air quality projects.<sup>2,3,4</sup> Special thanks is due to Susan Schau of the St. Louis Regional Asthma Consortium for her support.

Pilot project activities were conducted in the St. Louis area by Lauren Mitchell and Doug Eller of the Grace Hill Clean Air Program (CAP). Grace Hill is a community organization that provides a wide range of services in the City of St. Louis. Doug and Lauren committed to carrying out this project despite having no prior experience working with the trucking industry. They had developed and led a successful campaign to reduce diesel emissions from school buses throughout the City of St. Louis Public Schools. One of the notable successes of this pilot project is that it has led to Grace Hill assuming a leadership role in carrying out expanded diesel emission reduction projects in the City of St. Louis.

- **Diesel Health Effects**

Diesel exhaust causes lung cancer, cardiovascular diseases and other serious health problems. The lifetime cancer risk from diesel particulate matter (PM) exceeds the risks from all other air toxics combined. Diesel fumes from older trucks cut short the lives of more than 20,000 Americans each year, according to a report by the Clean Air Task Force.<sup>5</sup> Nationwide, diesel exhaust causes almost 3,000 early deaths from lung cancer. Diesel pollution causes some 27,000 non-fatal heart attacks and 410,000 cases of asthma each year. Health damages from diesel exhaust will total some \$139 billion by 2010. The majority of these deaths and diseases could be avoided by applying currently available diesel retrofit control technologies.

The Asthma and Allergy Foundation of America ranks St. Louis as the worst city in the United States for asthma for 2009. In inner-city areas of St. Louis, the rate of asthma in children is almost three times the national average. Air pollution is a known factor influencing the development and expression of asthma. Studies show the closer children live to a freeway, the greater their chances of having asthma. Air pollution levels of particulates, ozone, SO<sub>2</sub> and NO<sub>2</sub>, have been shown to trigger symptoms of asthma and to increase emergency department visits and hospitalizations. Children living in inner-city locations breathe a disproportionate quantity of air pollution. These children suffer with serious chronic respiratory health problems such as asthma as a result.<sup>6</sup>

The health effects of diesel exhaust are also a serious concern to the trucking industry. According to Tom Weakley at OOIDA, the average life expectancy of truck drivers is in the late 50's, far below that of the average American. Most of these truckers carry no health insurance. A 2005 National Institute of Safety and Health (NIOSH) study found the highest significantly elevated proportionate heart disease, acute myocardial infarction, and other forms of heart disease and lung cancer mortality for long haul truck drivers age 15-54.<sup>7</sup> However, based on 30,000 workers' records, researchers from Harvard University and the University of California in Berkeley found that short-haul drivers are exposed to more exhaust than long-haul drivers because they often leave their windows open while driving. The report said fresh, newly released particles have a greater potential to cause mutations of DNA.<sup>8,9</sup>

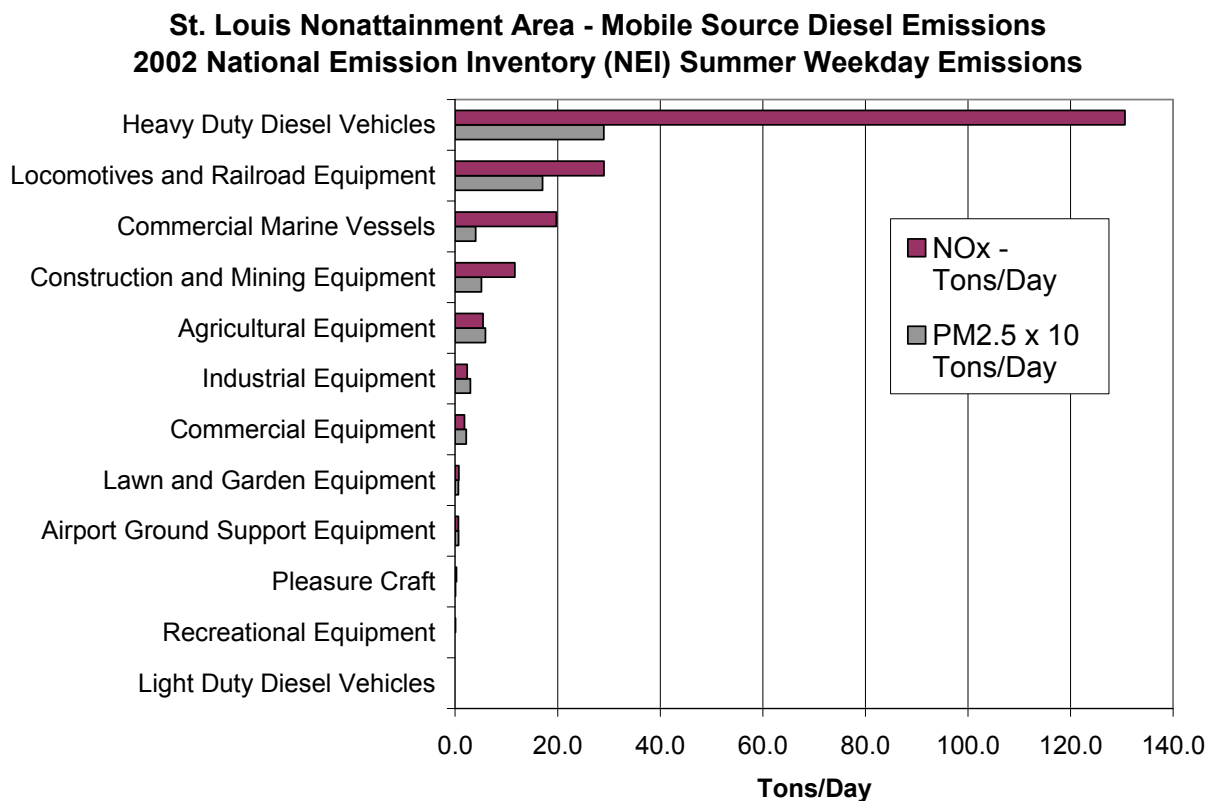
Whether short or long haul truck drivers are more at risk from diesel emission exposure, urban areas are subject to both types heavy diesel truck traffic in appreciable amounts. Current diesel truck and emission inventories do not distinguish between the two. One goal of this pilot project was to include both in-town

and over the road trucks to evaluate the efficacy of selected SmartWay technologies and strategies to reduce their emissions.

- **Diesel Emission Inventory**

The 2002 National Emission Inventory (NEI) of PM2.5 and NOx emissions from diesel motor vehicles in the St. Louis Ozone and PM 2.5 Nonattainment Area in Missouri and Illinois is shown below. This data indicates that onroad heavy-duty diesel trucks are the principal mobile source of diesel PM2.5 and NOx emissions in the St. Louis area.

An updated area-specific inventory is needed in order to more accurately quantify the numbers and ages of trucks in fleets throughout the St. Louis MPO, diesel emissions, appropriate diesel retrofit technology, and company contact information.



The scale of diesel trucking transport operations throughout the St. Louis metropolitan area, across Missouri and the U.S. is given by Bureau of Labor Statistics data. There are about 25,000 industrial and commercial truck drivers based in the St. Louis region, plus tens of thousands of trucks making pickups, deliveries and passing through St. Louis from all parts the country.

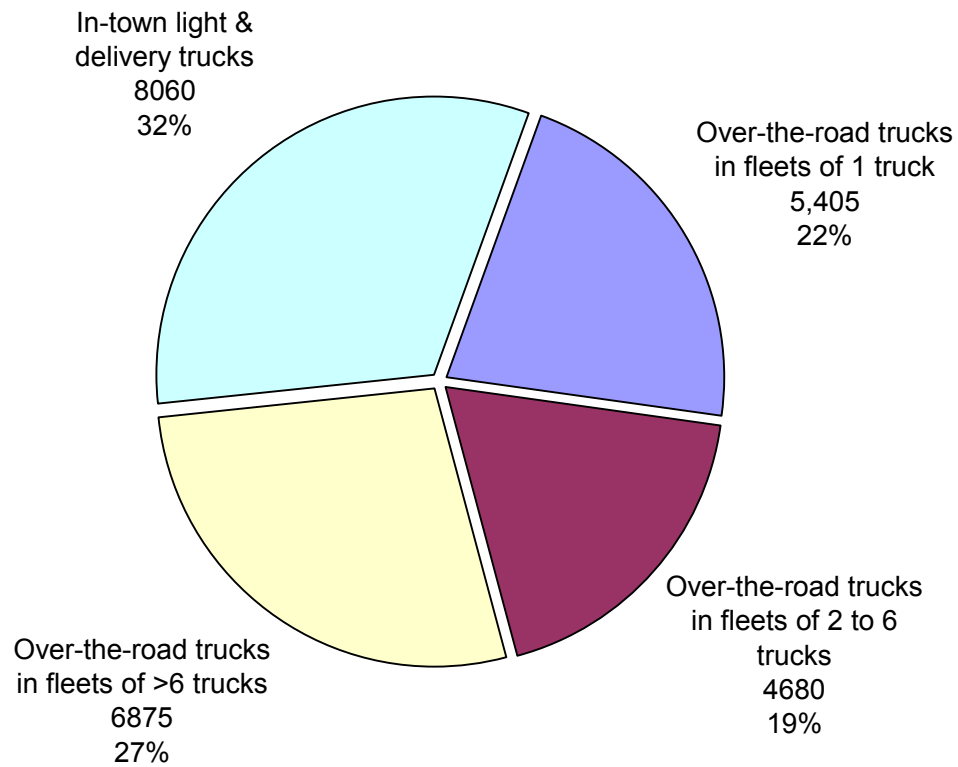
**Truck Drivers in St. Louis, Missouri, and the U.S.:**

	<u>Heavy Tractor Trailers</u>	<u>Light or Delivery Trucks</u>	<u>TOTAL</u>
St. Louis MPO:	16,960	8,060	25,020
Missouri:	44,550	15,420	59,970
United States:	1,693,590	922,900	2,616,490

Bureau of Labor Statistics estimates for 2007 ([http://www.bls.gov/oes/current/oes\\_41180.htm](http://www.bls.gov/oes/current/oes_41180.htm); [http://www.bls.gov/oes/current/oes\\_MO.htm#b53-0000](http://www.bls.gov/oes/current/oes_MO.htm#b53-0000)); <http://www.bls.gov/oes/current/oes533032.htm#st>, and <http://www.bls.gov/oes/current/oes533033.htm#st>).

Combining these statistics with the OOIDA information that small business fleets of six heavy tractor trailers or less comprise 96% of all the long haul trucks on the road, while 50% of all long haul trucks are driven by owner- operators of one truck, gives the preliminary St. Louis metropolitan area onroad diesel truck fleet inventory shown below.

### Preliminary St. Louis Area Onroad Truck Inventory



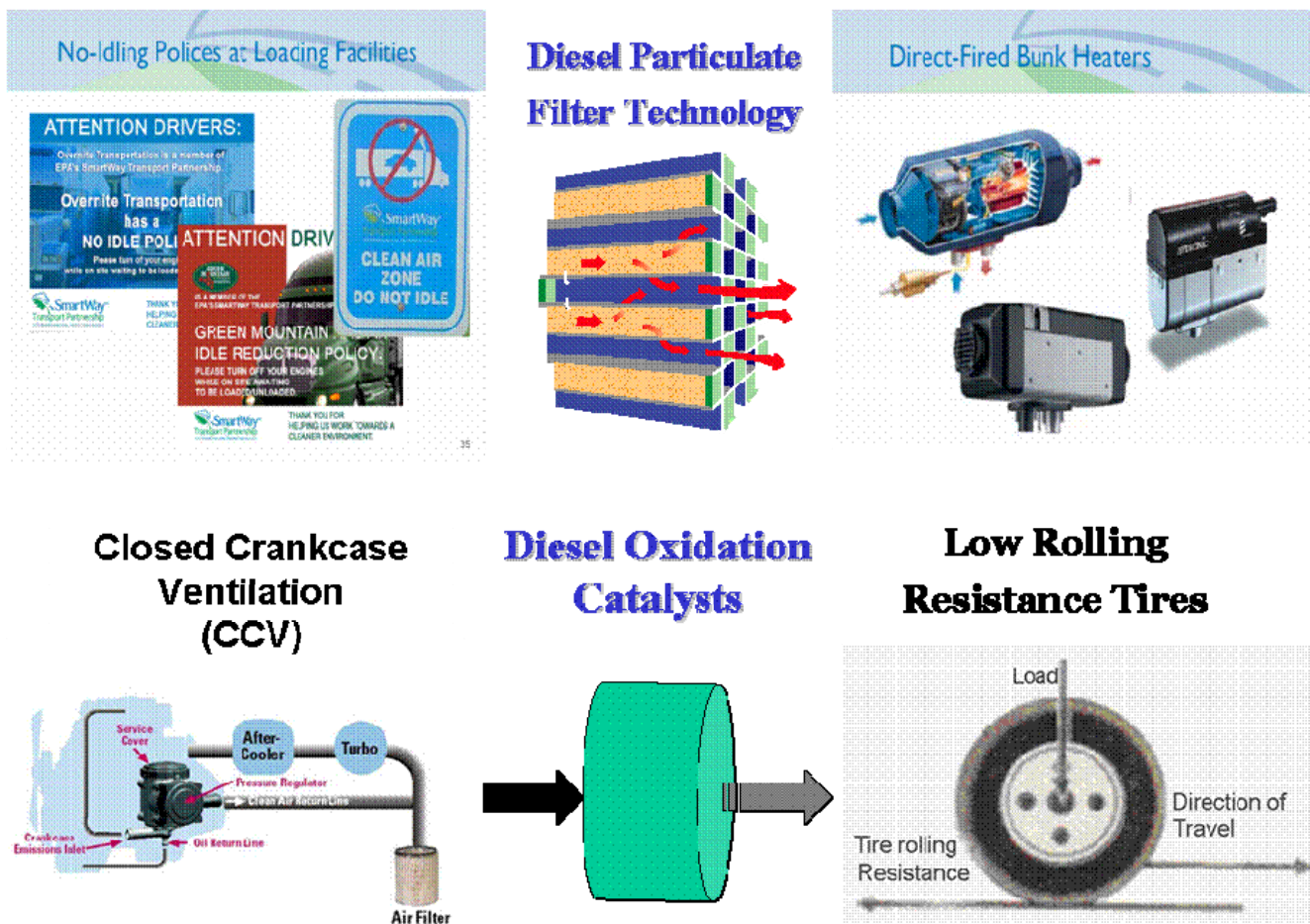
While in-town trucks are the single largest category of onroad diesel trucks, this category breaks down further into large, small, and single owner fleets upon further resolution and St. Louis area-specific input. Actual numbers may differ substantially due to recent fluctuations in diesel fuel prices and the economy. A more accurate inventory would provide a better indicator of priorities for diesel retrofit funding and outreach, particularly when compiled with an inventory of the ages and emissions of diesel vehicles. The start of such an inventory could be the registration worksheet for the St. Louis Diesel Retrofit Workshop.

One oversight of the workshop was in making contact with fleet managers of smaller numbers of trucks and single over the road truck owner - drivers. The assistance of OOIDA in making contact with a number of these small business owners helped to recruit some drivers for the pilot project. More focused efforts in this regard are needed as smaller fleets have the oldest trucks most in need of retrofit equipment, technical assistance, and funding. They are often the most difficult to get in touch with since they are on the road and having to contend with fuel prices and other economic realities on a daily basis.

- **SmartWay Diesel Emission Reduction Strategies**

The EPA developed the SmartWay Transport Partnership for trucking fleets and drivers to increase fuel economy and reduce emissions by retrofitting their pre-2007 trucks with one or more pieces of diesel emission reduction equipment. Retrofit equipment to reduce emissions includes diesel particulate filters (DPFs) (formerly called a diesel PM filter), and diesel oxidation catalysts (DOCs) for both in-town and over-the road fleets, and idle reduction equipment like the auxiliary power unit (APU) and streamlining attachments for over-the-road trucks. Installed together, one or more pieces of diesel retrofit equipment are called an Upgrade Kit or SmartWay Package. Both in-town and over-the road trucks can increase fuel economy and emission reductions by designating no-idling zones, adapting idle-reduction strategies, and installing the equipment shown here.

**SmartWay Retrofit Equipment & Strategies**  
**Effective on both In-Town and Over-the-Road Trucks**



Additional SmartWay equipment for long haul trucks include aerodynamic streamlining attachments for the cab and van, auxiliary power units (APUs), and battery-operated air conditioners (BACs). A good explanation of the roles of aerodynamics, low rolling resistance tires, idle reduction practices, and driving efficiency in improving engine performance and fuel efficiency is given in Truck Engine Performance by AER [18]. Both in-town and over-the-road trucking operations were recruited for this pilot project in order to obtain a broad overview of practical experiences with the SmartWay approach.

EPA designed the SmartWay packages to pay for themselves in terms of fuel savings. Installing a complete SmartWay package can achieve fuel cost savings of up to 25 percent and an equivalent reduction in diesel and greenhouse gas emissions. Online SmartWay calculators show monthly fuel savings more than cover monthly payments for any of various SmartWay packages.

SmartWay Retrofits, Packages, Prices, and Fuel Savings									
TECHNOLOGY	Cost	Cost to Trucker	Fuel Saving Per Mo	Monthly	Net Monthly Savings	% Fuel Save	Emission Reductions		
				Loan			PM	HC	CO
				Payment @ 9% For 48 Months					
<b>Idle Reduction Device -</b>									
- Bunk Heater	\$1,500	\$1,500	\$215	\$37	\$178	5%	5%	5%	5%
- Auxiliary Power Unit (APU)	8,500	8,500	330	212	118	8%	8%	8%	8%
<b>Increase Fuel Efficiency</b>									
Aluminum Wheels / Single Wide Tires	5,600	5,600	153	139	14	4%	4%	4%	4%
Trailer Aerodynamics	2,400	2,400	191	60	131	5%	5%	5%	5%
<b>Exhaust Aftertreatment Device -</b>									
-Diesel Oxidation Catalyst	1,200	1,200	0	30	-	-	20%	50%	40%
-Particulate Matter (PM) Filter	6,000	0	0	149	-	-	90%	60%	60%
<b>SAMPLE PACKAGES</b>									
1. PM Filter, DOC, Heater, Aero	\$11,100	\$5,100	\$406	\$127	\$279	10%	92.0%	65.0%	64.0%
2. PM Filter, DOC, APU, Aero	18,100	\$12,100	521	421	\$100	13%	92.6%	66.5%	65.2%
3. PM Filter, DOC, Heater, Tires, Aero	16,700	\$10,700	\$559	\$266	\$293	14%	92.8%	67.0%	65.6%
4. PM Filter, DOC, APU, Tires, Aero	\$23,700	\$17,700	674	441	\$233	17%	93.4%	68.5%	66.8%

## II. Diesel Pilot Project

- **Pilot Project Objectives**

The objective of this study was to demonstrate the diesel emission reductions achievable by the voluntary adoption of the EPA SmartWay approved diesel retrofit technologies and control strategies. Since DNR has not been involved in diesel emission reduction activities before, this pilot project will recruit five trucking operations to put the SmartWay program through its paces and obtain their feedback. It will investigate the level of support and kinds of technology trucking firms are actually willing to install, technical assistance and funding needed, in order to achieve diesel emission reductions by the voluntary adoption of the EPA SmartWay program.

If a pilot program proves successful in reducing diesel emissions on a small scale, one outcome may be to develop a diesel emission reduction program for control strategies. The Air Pollution Control Program may recommend a large-scale diesel retrofit program as one of the SIP contingency measures. A full-scale regulatory program based upon the EPA SmartWay Transport control measures could achieve up to 90 per cent reductions in diesel fine particulate matter (PM<sub>2.5</sub>), NO<sub>x</sub>, VOC, and HAP emissions. Added benefits include increased fuel efficiency with fuel cost savings of up to 40 percent, and an equivalent reduction in greenhouse gas emissions.

- **Pilot Project Description**

The pilot project was designed to test run key components of a diesel emission reduction program. The program is to recruit, provide technical information and assistance to, and reimburse five (5) participating trucking firms for their installation of a SmartWay package that includes either a diesel oxidation catalyst (DOC) or a diesel particulate filter (DPF), plus additional emission reduction equipment. Key components of the diesel emission reduction pilot project were carried out as follows, and as provided in the Grace Hill Workplan (Attachment A):

- A St. Louis Diesel Retrofit Workshop was held to educate municipal, industrial, and trucking company fleet managers, environmental engineers, and independent owner-operator truck drivers. Pilot project participants were recruited at the workshop.
- Pilot project participants retrofitted one or more pre-2007 trucks in their fleet with EPA-verified SmartWay diesel retrofit equipment, which included either a diesel particulate filter (DPF) or diesel oxidation catalyst (DOC). Through this grant, MDNR and Grace Hill reimbursed the participants up to \$4,500 for the purchase of either a DPF or DOC, and additional optional diesel retrofit equipment.
- This project also funded the designation of No Idling zones and provided instruction on idle reduction practices at the participating companies, presented by the Grace Hill Clean Air Program (CAP).
- Diesel emission reductions achieved by the retrofit equipment installations and idle reduction measures are being calculated, based upon the fuel savings documented by project participants.
- Participant feedback and emissions reductions are being used to evaluate the progress and effectiveness of SmartWay voluntary measures to achieve needed reductions in diesel emissions.

## **1. St. Louis Diesel Retrofit Workshop**

The purpose of the workshop was twofold, both to recruit pilot project participants, and to engage the wider trucking community in an exchange of information on SmartWay diesel retrofit and air quality issues of mutual concern. The mechanics of putting on a workshop involve a surprising number of planning, publicity, contacts, and coordination activities. Beginning with the selection of a convenient, appealing, central location. This was found at the Anheuser-Busch Visitor Center in St. Louis.

The workshop was held virtually at no cost to the grant. In addition to the meeting space, it leveraged the technical expertise of the diesel retrofit manufacturers who also provided the coffee break refreshments and buffet Caribbean lunch prepared by Mi Hungry. Following the workshop was a social hour hosted by Anheuser Busch, which allowed for further interaction between the trucking and technical participants.

**MEETING SPACE** - Anheuser-Busch generously donated the use of the beautiful meeting space at their Visitor Center. They provided not only the space but it came complete with all the staffing, furnishings, equipment, and refreshments. Moreover, a stunning eighteen-wheeler Budweiser truck fully outfitted with diesel emission reduction equipment was parked outside to view. (Attachment E)

**WORKSHOP FLYER** - Preparations for the St. Louis Diesel Retrofit Workshop & Expo included the design and posting of this public announcement on a new ACP website. (Attachment D) [1.]

**PUBLICITY** – Publicity was also provided by local business and national online trucking publications. The St. Louis Business Journal, East-West Gateway Newsletter, and the Owner-Operator Independent Drivers Association, OOIDA Land Line Magazine featured informative articles announcing the upcoming workshop. (Attachment F)

**TURNOUT** - On Blue Skyways conference calls states planning workshops have asked how we had such a good turnout. A week and a half before the event, we only had a dozen or so people registered. A number of ACP staff began calling every trucking fleet and industry in the St. Louis area and signing them up for the workshop. This worked well, although it was labor intensive. We registered and had a turnout of about 60 attendees. (Registration worksheet available upon request)

**WORKSHOP AGENDA** - The day of the workshop, Doug Eller from Grace Hill, Jim Kavanaugh, and Mollie Freebairn gave an overview of the EPA SmartWay diesel emission reduction concepts. David Lamb talked about the Idle-Reduction Rule. Lauren Mitchell provided perspectives of parents and children living with respiratory and other health problems in the City of St. Louis. (Attachment G)

**TECHNICAL TALKS** - Five of the nation's foremost diesel equipment companies; Caterpillar, Cummins, Donaldson, Eaton, and Engine Control Systems, presented the latest EPA-verified diesel retrofit and hydraulic hybrid technology. These companies had displays around the perimeter of the room, for fleet managers to meet with them and make arrangements to have SmartWay packages installed on vehicles in their fleet.

**PANEL DISCUSSION** - The panelist discussion provided information on upcoming Diesel Emissions Reduction Act (DERA) funding from EPA Region 7 Blue Skyways Collaborative. Perspectives on the impacts of diesel emissions on air quality, health effects, and the importance of diesel emission reduction strategies were discussed by Missouri DNR, City of St. Louis, American Lung Association of the Central States, St. Louis Regional Asthma Consortium, St. Louis Regional Clean Cities, East-West Gateway, Anheuser-Busch, and Lohr Distributing. Their participation was important to begin to build the awareness, support and involvement that will be required to carry out an effective diesel emission reduction program in the St. Louis area.

## KEY WORKSHOP OUTCOMES & FINDINGS:

- Sixty trucking representatives attended and showed great interest and appreciation for the material being presented.
- Workshop was rated very highly. This type of education and outreach is important in order to reach the trucking community, who expressed a readiness to engage in future discussions and collaborative projects. (Attachment I)
- A representative of the Owner-Operator Independent Drivers Association attended, and provided a number of worthwhile comments. A few months later OOIDA hosted a meeting at their headquarters in Grain Valley to continue the discussion of freight transportation and air quality issues of mutual concern.
- One shortcoming of the workshop was in making contact with fleets of smaller numbers of trucks and single over the road truck owner - drivers. They are often the most difficult to get in touch with since they are on the road and having to contend with fuel prices and other economic realities on a daily basis.
- The assistance of OOIDA in making contact with a number of these small business owners helped to recruit some drivers for the pilot project. More focused efforts in this regard are needed as in general, smaller fleets have the oldest trucks that are most in need of diesel retrofit equipment or vehicle replacement, technical assistance, and funding.
- Ten attendees signed up for more information about the Pilot Project. (Attachment H)
- We were ultimately successful in selecting five pilot project participants: the City of St. Louis Streets Division which has a public municipal fleet of over a hundred diesel powered vehicles of many different makes; Fred Weber, St. Louis area's industry leader in heavy and highway construction, Tocco Foods and M&L Foods, both longtime food distribution companies that have been in the City for generations, and one independent over the road business, with one truck owned by the Rendons.

## 2. SmartWay Package Installation

For trucking fleet managers and environmental engineers looking for ways to save on the costs of their freight transportation business activities, SmartWay offers a wide variety of opportunities. SmartWay technologies and practices can help truck carriers save fuel and money, reduce air pollution, and cut carbon dioxide emissions that contribute to climate change. A highly recommended introduction to the topic is the Chrome Shop Mafia 4-minute video that sums up the over-the road SmartWay strategies.

Through this grant, DNR reimbursed the five project participants up to \$4,500 for the purchase and installation of a SmartWay package on one or more pre-2007 trucks in their fleet. As shown on the **Pilot Project Application** (Attachment J) the purchase requirements and options were:

- The \$4,500 must be used to purchase and install at least one diesel particulate filter (DPF) or diesel oxidation catalyst (DOC) on one or more pre-2007 trucks. The reimbursement for the DOC or DPF was intended to cover most or all of the cost of equipment that reduces diesel emissions by 20 to 90 percent, but does not pay for itself by reducing fuel costs.

Remaining funds were optionally used to:

- Install a crankcase ventilation system (CCV) and NO<sub>x</sub> Engine Reflash Adjustments in addition to the installation of a DPF or DOC.
- Install one or more DOCs, CCVs, and NO<sub>x</sub> Engine Reflash Adjustments on additional vehicles.
- Use remaining funds for the purchase of an APU or other idle reduction equipment such as bunk heater or battery-powered air conditioner.

Grace Hill worked closely with prospective project participant applications to assist them in the selection of the most appropriate retrofit equipment for their vehicles. St. Louis diesel retrofit installers were contacted and coordinated. EPA-Verified Diesel Retrofit Equipment Companies & Installers in St. Louis, price range estimates for diesel retrofit equipment were compiled in Attachment K for reference.

Trucking fleet managers handled some arrangements themselves, in others Grace Hill assisted in the process of making the arrangements and scheduling. Reimbursements were made for each retrofitted truck after installation of all the equipment has been made and verified by Grace Hill, and the receipt(s) submitted to Missouri DNR.

### **Low Rolling Resistance Tires for In Town Trucks**

Only EPA-approved retrofit equipment that has been demonstrated to achieve the specified fuels savings and emissions reductions should be installed.

### **3. Idle Reduction Zones & Practices**

Participants agreed to establish No-Idling Zone and allow instruction to be provided to their drivers on adapting idle reduction strategies at their facility. The project funded the establishment of No-Idling zones, which are designated by No-Idling signs. These were installed by the company prior to the reimbursement of funds by DNR. Instructions on idle reduction practices at the participating companies were provided by the Grace Hill CAP.

Establishing idle reduction zones requires very little in terms of financial investment, yet is one of the most effective means to achieving both considerable diesel emission reductions, and increasing fuel efficiency and cost savings. It is therefore a key component of the SmartWay information that was presented to St. Louis truckers and businesses, which are looking at how they can reduce emissions and save on rising fuel costs.

### III. Project Results

- **Evolution of SmartWay Emission Reduction Strategies**

Experience from this pilot project has demonstrated trucking companies need more funding assistance as necessary. States such as Arkansas and Minnesota provide low interest loans to small businesses for equipment that meets or exceeds environmental regulations. EPA and OOIDA have finance programs for trucking companies to install selected SmartWay packages. Fuel prices have climbed so steeply in the last year that SmartWay equipment is no longer affordable for many trucking firms unless it reduces fuel consumption, or is covered by DERA funding. Since DPFs (formerly called PM filters) do not improve fuel efficiency, trucking companies are not willing to pay the additional \$5,000 – 10,000 for them.

A full scale onroad and offroad mobile diesel vehicles emission reduction program would have far-reaching effects, approaching 90 per cent reductions in heavy-duty diesel emissions of PM and SOx, 10 to 17% reductions in NOx, and 65 % of VOCs or HAPs.

- **Original Estimates - Fuel Savings & Emission Reductions**

Based on previous estimates in the original proposal, diesel emission reductions for the installation of five (5) SmartWay Packages consisting of a DPF, DOC, APU, and aerodynamic attachments, would be calculated as follows:

Annually, five (5) class 8 heavy duty diesel trucks travel:

100,000 miles per year / 6 mpg average = 16,667 gallons of diesel x 5 trucks =  
83,335 gallons of diesel every year

These five trucks emit:

60 Lb Diesel PM + 3,500 Lb NOx x 5 trucks = 300 Lb PM + 17,500 Lb NOx

**FUEL SAVINGS & DIESEL EMISSION REDUCTIONS TO BE ACHIEVED:**

5 SmartWay package #2:

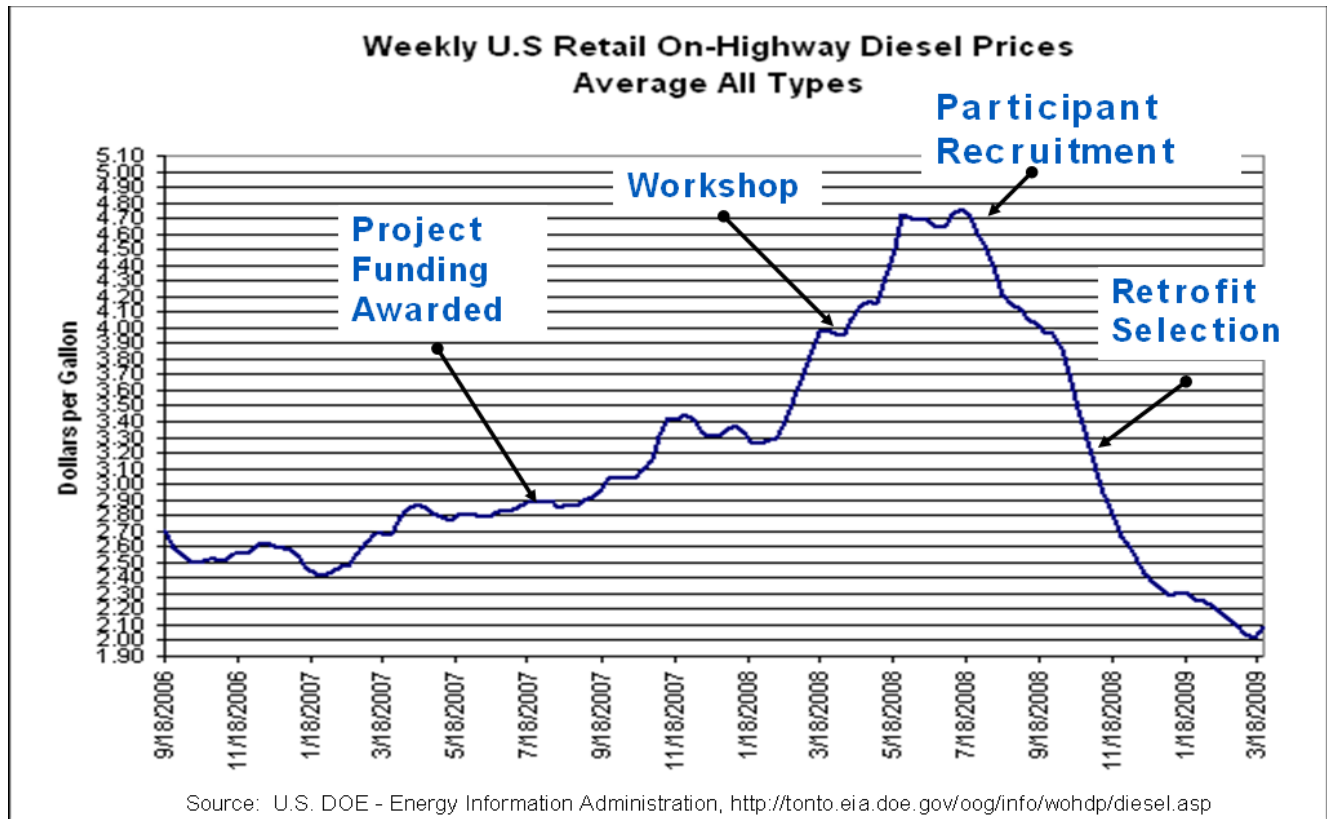
Annual Fuel Savings - 10,834 gallons of diesel

Emission Reductions - 150 Lb Diesel PM + 2,275 Lb NOx

Actual fuel savings and emission reductions achieved by the retrofit equipment installations and idle reduction measures are being monitored. In order to determine actual emission reductions as accurately as possible, participants recorded their fuel use before and after installation of the retrofit equipment. Log sheets were provided to companies for tracking the fuel usage and start/ending mileages. Due to the fact that only five trucking companies participated in this project, the actual emissions are minimal and not quantifiable. We believe that the above fuel savings & emission reduction calculations from the original estimates are a reflection of the actual reduction from this project.

- **Factors Accounting for Variance**

The change in fuel prices over the course of the pilot project played a decisive role in the drivers that were able to participate in the project, their ability to pay something out of pocket for equipment they really needed, and the choices in the kinds of diesel retrofit equipment to install. Shown below is the pilot project timeline, superimposed upon the weekly average price of diesel fuel over the course of the project, as tracked by the Energy Information Administration [20].



At the height of the fuel prices in May, June, and July, we spoke with several independent truck drivers that were nominated by OOIDA to participate in the program. Their businesses were in such turmoil at the time that it was difficult for them to say with certainty if they would be driving and even where they would be living in the near future. They were very interested in any assistance we could give them in purchasing auxiliary power units (APUs) which would enable them to shut off their engines overnight and save substantial amounts of fuel. By the time we were able to change the grant’s purchase option requirements in order to be able to meet their requests, however, the price of fuel was beginning to slide, and with it their economic interest in purchasing APUs.

Modifications were made to the diesel retrofit equipment purchase options as we learned that additional flexibility in purchase options would be of substantial assistance to them, in terms of the number and kinds of vehicles, and types of emission-reducing equipment that they would be able to purchase. The skyrocketing cost of diesel fuel was driving many trucking operations out of business.

**High Fuel Costs Threaten Bankruptcy for Truckers – At \$1,000 a fill-up, independent drivers suffer, and costs to consumers rise,**

“42,000 trucks, or 2.1 percent of the nation's capacity, were idled in the first quarter—with nearly 1,000 companies going bankrupt. Broughton says the cash-flow crisis caused by unrelenting weekly diesel price increases has truckers looking to borrow money for basic operating expenses—license tags, insurance, and, of course, fuel. The credit-crunched bankers are cutting their losses and repossessing rigs.”

<http://www.usnews.com/articles/news/national/2008/05/02/high-fuel-costs-threaten-bankruptcy-for-truckers.html>

### **Big Firms, Independent Truckers Throttle Down Over Fuel Costs,**

“The nationwide average price for diesel fuel is \$4.698, down from a record high of \$4.845 in mid-July but significantly higher than the \$2.954 of a year ago, according to the American Automobile Association. ... During a recent stop in Memphis, Wes Wolford of Phoenix said he spends \$3,000-\$4,000 a week in fuel but estimates he saves \$600 by reducing his speed on the interstate. Wolford, a contract driver with Prime Inc., also cuts his fuel usage via an auxiliary power unit (APU), a smaller diesel engine that provides heating, cooling and electrical power in the cab while the truck engine is turned off during rest periods.”

<http://www.commercialappeal.com/news/2008/aug/03/focus-commercial-trucking-the-braking-point/>

- **Experience Learning from Trucking Fleet Managers Feedback**

The prices of DPFs range from \$5,000 - 14,000 so there is at least a small additional cost to purchasing one in this project. If truckers had any disposable income this would be a good deal for them to get a DPF starting at \$500. In a discussion with Dana Brewster of Engine Control Systems, an EPA-verified DPF manufacturer on the subject of how best to market DOCs and DPFs to truckers, he said in part,

*"Based on my experience it is almost impossible to get this market group to purchase this product unless it is 100% funded by state or federal funding. Even when the product and labor is fully covered, the sales process still requires a lot of persistent selling to get the fleet manager to install a DOC or DPF on their vehicles. Because this is not a mandated program like the CA market, truckers are reluctant to install this product on their expensive vehicles. It truly does take a fleet manager that has a "green" mentality to make a project like this happen. It is baffling to me how many fleets decide not to apply for the federal funding that covers 100% of the product when it helps the environment and does not cause any negative effect on their vehicle. The more pressure and education your department can apply to fleet managers combined with the retrofit vendors' sales efforts, the greater the chance of success for your pilot program."*

While we dearly want to encourage the installation of DPFs, it seems that Dana has provided a realistic assessment of the situation. The cost seems to make DPFs out of reach without full federal funding, despite the fact that DPFs achieve greater diesel emission reductions than can be achieved by any other means. This market does have an excellent future with 2007 and newer trucks. Federal emission regulations for new trucks require the installation of DPFs or comparable emission reduction technologies, which at present there are none.

DOCs in contrast appear to have wide acceptance as the available federal funding covers 100% of the cost and no maintenance is needed. The option to purchase an APU with remaining funds appears most likely to achieve greater emissions reductions for those trucking operations with the greatest need of the funding. The greatest emission reductions that can realistically be achieved by most over-the-road truckers is to install a DOC, CCV, NOx engine reflash adjustment, adopt no-idling practices, and apply

the remaining funding, plus several thousand dollars of their own or obtain financing, toward the purchase of an APU.

Between these purchase options and the designation of No-Idling Zones and practices, participating fleets should achieve a major reduction in their diesel emissions in a highly cost-effective manner.

## **IV. Lessons Learned and Recommendations from the Pilot Project**

### **Education & Outreach**

- Education & outreach are important tools in working with the trucking industry in order to establish:
  - A database of trucking companies, municipal and industry-owned trucking fleets, and independently owned and operated truck drivers.
  - An inventory of onroad diesel vehicles and emissions.
  - A forum for exchanging information on freight transportation issues, new technologies, and driver training. (Possibly similar to the St. Louis Chapter of the U.S. Green Building Council)
- Communication should be maintained with trucking company on requirements, opportunities, programs, and policies.

### **Diesel Retrofit Technologies**

- Diesel retrofit technology that fleets can and will install are heavily determined by fuel prices and other economic conditions.
- Affordable, fuel-saving technologies are the future of diesel-powered freight transport.
- SmartWay diesel retrofit equipment options available in pilot project:
  - **Emission Filters – Filter Exhaust PM & Gases**
    - Diesel Particulate Filters (DPFs) or PMF
    - ✓ Diesel Oxidation Catalysts (DOCs)
  - **Streamlining Attachments – Improve Fuel Efficiency**
    - Cab & Van Attachments
    - ✓ Low Rolling Resistance Tires (Super Singles & Duals)
  - **Idle Reduction Technology – Reduce Fuel Use**
    - Direct Fired Bunk Heaters
    - Battery-Powered AC
    - ✓ Auxiliary Power Units (APUs)
  - ✓ **Diesel retrofit equipment preferred by trucking fleets**
- APUs should come standard on new long haul trucks.
- Most promising new energy efficient vehicle technology is the hydraulic hybrid.
- The worst emitting trucks should be replaced with 2007 or newer vehicles.

## **OOIDA (Owner-Operator Independent Drivers Association) Recommendations**

- Overnight parking and services for over-the-road trucks are needed because there is an epidemic shortage of parking for over the road trucks throughout the U.S. This leads to overnight parking in residential areas and idling of vehicles overnight.
- Longer loading dock hours would result in fewer trucks being stranded in cities overnight, waiting for the loading docks to reopen.
- Rules affecting over the road trucking such as idling limits and retrofitting requirements should be applied evenly across the U.S. rather than having a patchwork quilt that drivers cannot keep track of.
- Intermodal/Smart freight transport to utilize what is currently in service, phasing in of more energy efficient transport such as from trucking to rail should be coordinated with the retirement of older vehicles, new employment opportunities and training for truck drivers (such as in diesel emission reduction industry).

## **Recommendations for Future Diesel Emission Reduction Programs**

- Worst-emitting 10% of trucks are responsible for 90% of diesel emissions
- Identify worst emitters with remote sensing or visually
- Hydraulic hybrid replacements for frequent stop & go routes
- No-Idling signs needed throughout areas with idling restrictions

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## **List of Attachments**

**Attachment A: Budget**

**Attachment B: Timeline**

**Attachment C: Grace Hill Workplan**

**Attachment D: Workshop Flyer**

**Attachment E: Budweiser Truck**

**Attachment F: Publicity**

**Attachment G: Workshop Agenda**

**Attachment H: Pilot Project Sign Up**

**Attachment I: Workshop Evaluation**

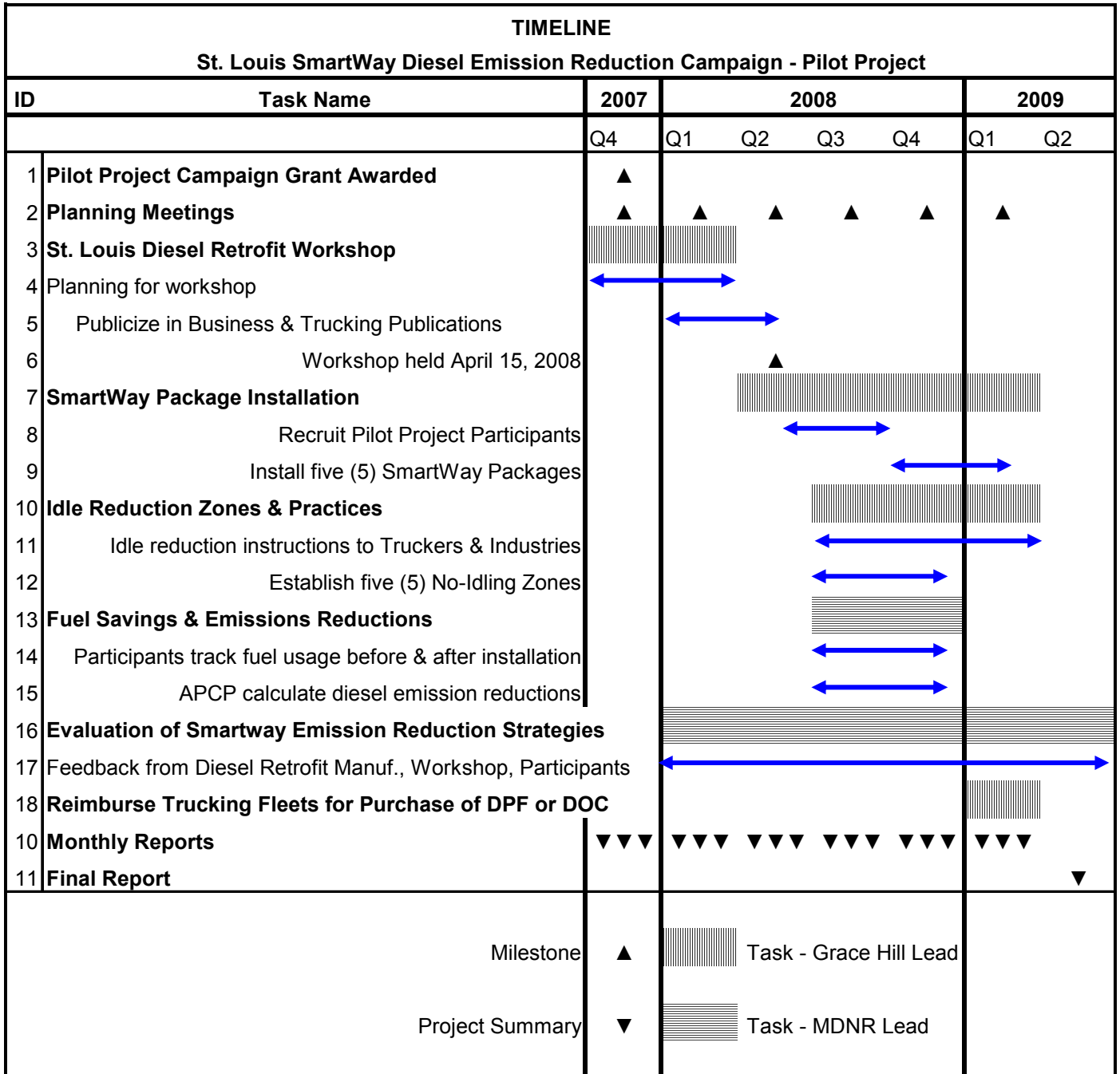
**Attachment J: Pilot Project Application**

**Attachment K: EPA-Verified Diesel Retrofit Equipment Companies & Installers in St. Louis**

## Attachment A: Budget

AIR POLLUTION CONTROL PROGRAM FY 2007 BLUE SKYWAY PROJECT DETAIL BUDGET				
Org 3410	BUDGET CATEGORIES	TITLE	PERCENTAGE OF TIME COMMITTED TO PROJECT	BUDGET CATEGORY TOTALS
<b>PERSONAL SERVICE</b> Oversee project, assist with presentation		Chemist III	10%	
	<b>TOTAL PERSONAL SERVICE</b>			<b>\$4,370</b>
<b>FRINGE @ 42.2</b>				
	<b>TOTAL FRINGE</b>			<b>\$1,844</b>
<b>TRAVEL @ .23 a mile</b> Travel to St. Louis for APCP's personnel attendance at presentation				
	<b>TOTAL TRAVEL</b>			<b>\$80</b>
<b>EQUIPMENT</b>				
	Five (5) Diesel Particulate Filters or DPFs ( @\$4,500 each)			
	<b>TOTAL EQUIPMENT</b>			<b>\$22,500</b>
<b>TOTAL DIRECT COST</b>				<b>\$28,714</b>
<b>Program Specific Distribution (PSD)</b> Subgrant to Grace Hill				
	<b>TOTAL PSD</b>			<b>\$24,863</b>
<b>INDIRECT @ 22.92</b>				<b>\$1,423</b>
<b>TOTAL PROGRAM COST</b>				<b>\$55,000</b>

## Attachment B: Timeline



**Attachment C: Grace Hill Workplan**  
**ST. LOUIS SMARTWAY DIESEL EMISSION REDUCTION PILOT PROJECT**  
**GRACE HILL SUBGRANT WORK PLAN**  
*October 1, 2007 through April 30, 2009*

Grace Hill, in collaboration with the Missouri Department of Natural Resources, Air Pollution Control Program, will assist with carrying out the pilot diesel emission reduction SmartWay campaign in St. Louis. This demonstration project may help lay the groundwork for a larger diesel emission reduction project in the St. Louis area. This subgrant will fund the Grace Hill's participation in this project.

This work plan outlines Grace Hill's contribution below, the basic elements of which are:

1. Plan, organize and host one (1) SmartWay presentation to local heavy duty onroad trucking companies and trucking fleets of other types of companies.
  - a. Select a location to hold the presentation;
  - b. Set a date for presentation;
  - c. Plan the agenda with MDNR's assistance for the presentation;
2. Prepare and submit two (2) articles or announcements for the St. Louis area to publicize the presentation.
  - a. Submit article(s) to MDNR first for approval;
  - b. Articles can be submitted to local business journals, trucking publications, newspapers, or radio;
3. Recruit local heavy duty onroad trucking companies or fleets to participate in the pilot project in the St. Louis area.
  - a. Recruit at least five (5) companies to come to the presentation;
  - b. Ask attending companies to register ahead of time if possible;
4. Provide five (5) signs and a speaker on "No-Idling" for the presentation.
  - a. Provide "No Idling" signs to be installed at the five participating trucking companies' new Idle-Free Zones;
  - b. Present information on the Idle-Free Zones and display "No Idling" signs;
5. Assist and track the installation of five (5) SmartWay packages on the participating companies' vehicles.
  - a. Work with the trucking company to select the most effective retrofit technologies for their trucking fleet;
  - b. Work with MDNR to approve the selected SmartWay package, particularly the diesel particulate filters (DPF) or diesel oxidation catalysts (DOC) to be reimbursed;
  - c. Assist MDNR with collecting survey information for tracking heavy-duty diesel fuel savings, emissions, and emission reductions;
  - d. Provide a brief report to MDNR on the retrofitting installation, including any feed back received during the retrofitting process.

## Attachment D: Workshop Flyer

# St. Louis Diesel Retrofit Workshop and Expo

## Anheuser-Busch Visitor Center

South 12th and Lynch Street, St. Louis

**April 15, 2008 8 a.m. to 4 p.m.**

SmartWay packages designed by the U.S. Environmental Protection Agency and Leading Diesel Retrofit Companies.



### Who should attend?

The St. Louis Diesel Retrofit Workshop and Expo will present SmartWay diesel retrofit equipment and idle reduction strategies. Trucking, industrial, commercial and service fleet operators will benefit from this workshop. Improving fuel efficiency, air quality and reducing greenhouse gas emissions go hand in hand. The U.S. EPA and diesel equipment companies have been working together to design a wide range of fuel-saving strategies and retrofit equipment. **Participating trucking fleets who install SmartWay packages with Diesel Particulate Filters or Diesel Oxidation catalysts may be eligible for reimbursement.**

### This is a FREE workshop.

Lunch will be hosted by Anheuser-Busch, Caterpillar, Cummins, Engine Control Systems and Fabick.

### How to Register

Participants should register by April 10, 2008, by calling (314) 584-6709 or on the Web at [www.dnr.mo.gov/env/apcp/dieseleretrofitprogram.htm](http://www.dnr.mo.gov/env/apcp/dieseleretrofitprogram.htm).



Missouri  
Department of  
Natural Resources



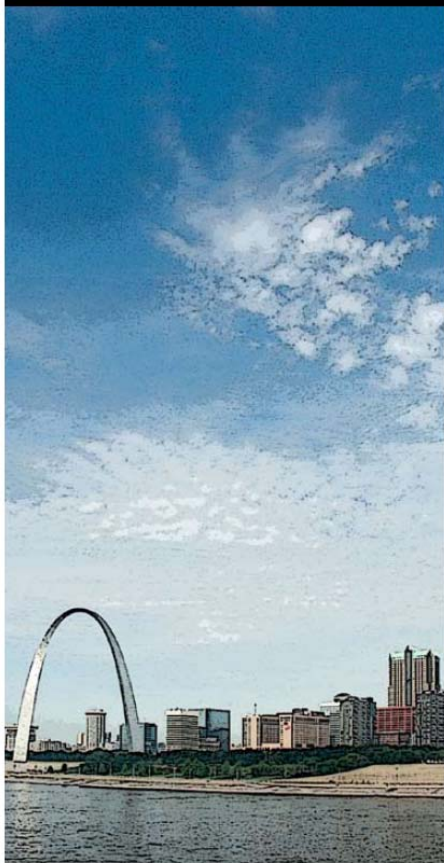
BLUE SKYWAYS  
COLLABORATIVE



Clean Air Project



SmartWay  
Transport Partnership  
U.S. Environmental Protection Agency



## Attachment E: Budweiser Truck Displayed at Workshop



## Attachment F: Publicity

The screenshot shows a website page with a dark background and a yellow and orange gradient at the top. The top right corner features the text "The Business" and a large "LA" logo. Below this is a navigation bar with "HOME" and a date "March 27, 2008". The main content area has a large "DRIVE 18" logo and a "ON RAMP" button. The article title is "Missouri seeks truckers to participate in pilot program". The text of the article is partially visible, mentioning the Missouri Department of Natural Resources and the Grace Hill Clean Air Program. The bottom of the page has a navigation bar with "HomeFront", "On Ramp", "Get Driving", "Entertainment", "Articles", and "News".

**DRIVE 18**

**ON RAMP**

**HOME**

March 27, 2008

### Missouri seeks truckers to participate in pilot program

The Missouri Department of Natural Resources and the Grace Hill Clean Air Program are looking for truckers from the St. Louis area that are interested in participating in a retrofitting pilot program aimed at reducing diesel emissions.

Truckers interested in participating in the Louis Diesel Retrofit Workshop and Expo, 15, at the Anheuser-Busch Visitor Center

The workshop is free and open to anyone quality issues, according to Rebecca Birke Board.

Back :: [Print this page](#) [BOOKMARK](#) [Facebook](#) [Twitter](#)

**St. Louis truckers wanted for pilot program**

The Missouri Department of Natural Resources and the Grace Hill Clean Air Program are looking for truckers from the St. Louis area that are interested in participating in a retrofitting pilot program aimed at reducing diesel emissions.

[HomeFront](#) [On Ramp](#) [Get Driving](#) [Entertainment](#) [Articles](#) [News](#)

## Attachment G: Workshop Agenda



Missouri  
Department of  
Natural Resources



BLUE SKYWAYS  
COLLABORATIVE



### AGENDA ST. LOUIS DIESEL RETROFIT WORKSHOP Anheuser-Busch Visitor Center 12<sup>th</sup> & Lynch Streets April 15, 2008

- 8:00 a.m. Registration and Exhibit Viewing**
- 8:20 a.m. Welcome**  
Jim Kavanaugh, Director, Air Pollution Control Program,  
Missouri Department of Natural Resources
- 8:30 a.m. Diesel Emissions Reduction Overview**  
SmartWay Transport Partnership and Pilot Project  
Mollie Freebairn, MoDNR/APCP
- 9:00 a.m. Heavy-Duty Diesel Idle Reduction Rule**  
Tiffany Campbell, MoDNR/APCP
- 9:20 a.m. Idle-Reduction Strategies**  
Establishing No-Idling Zones  
Lauren Mitchell, Grace Hill Clean Air Program (CAP)

### DIESEL EMISSION REDUCTION TECHNOLOGIES

- 9:40 a.m. Engine Control Systems (ECS)**  
Dana Brewster, Central Region Sales Manager
- 10:00 a.m. Break - Coffee and Exhibits**
- 10:20 a.m. Caterpillar Emissions Solutions**  
Ed Woods, Territory Manager, and Jeff Mayberry, Fabick/Caterpillar
- 10:40 a.m. Cummins Emissions Solutions**  
Judy Murphy, Retrofit Sales, and Chris Lamere, Cummins Mid-South
- 11:00 a.m. Donaldson Filtration Solutions**  
Cory Anderson, Account Manager
- 11:20 a.m. Eaton Corporation – Hybrid Truck Technology**  
William Batten, Director for Government Sales
- 11:40 a.m. Q & A Session - Diesel Retrofit Companies & Trucking Fleet Managers**
- 12:00 p.m. Caribbean Lunch – Provided by the Diesel Equipment Companies**

**AGENDA**  
**ST. LOUIS DIESEL RETROFIT WORKSHOP**

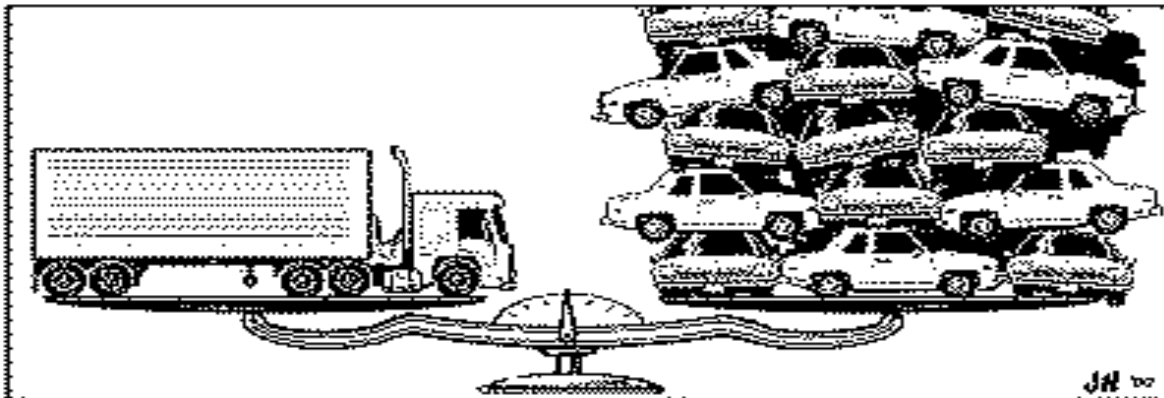
Anheuser-Busch Visitor Center

12<sup>th</sup> & Lynch Streets

April 15, 2008

- Page 2 -

- 1:00 p.m. Diesel Emission Reduction Panel Discussion**  
Moderator - Doug Eller, Grace Hill Clean Air Program  
**Panelists Invited From The Following Organizations:**  
Amy Bhesania, EPA Region 7/Blue Skyways  
Leanne Tippett Mosby, Missouri Department of Natural Resources  
Tim Embree, City of St. Louis Mayor's Office  
Rory Roundtree, City of St. Louis Board of Aldermen  
Susie Schau, St. Louis Asthma Consortium  
Susannah Fuchs, American Lung Association of the Central States  
Bud Getz, Lohr Distributing  
Steve Nagle, East-West Gateway Council of Governments  
John Stier, Anheuser-Busch
- 2:00 p.m. Social Hour – Hosted by Anheuser Busch**  
An opportunity for further information exchange between Fleet Managers, Panelists, Diesel Retrofit Manufacturers, and others in attendance
- 4:00 p.m. Anheuser-Busch Brewery Tour**



**One truck can emit as much pollution as 100 cars!**

## Attachment H: Pilot Project Sign Up



Trucking fleets who install SmartWay packages with Diesel Particulate Filters (DPFs) or Diesel Oxidation Catalysts (DOCs) may be qualified for a Diesel Retrofit Pilot Program and be reimbursed for up to \$4,500.

**Sign Up Here for more information about participating in the St. Louis Diesel Retrofit Pilot Project**

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, ZIP \_\_\_\_\_

Contact Person Name \_\_\_\_\_

Title \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

Please Leave with MoDNR & Grace Hill at Workshop



## Attachment I: Workshop Evaluation

### Summary of Evaluation Forms

#### 2008 Diesel Expo and Workshop

Total Evaluations Received: 23

- 1=Poor (Unsatisfactory)  
 2=Adequate (marginal)  
 3=Good  
 4=Very Good  
 5=Excellent (Above expectation)

#### **Facilities:**

Accommodations	1	2	3	4	5	<b>Avg. 4.913</b>
Food and Beverage	1	2	3	4	5	<b>Avg. 4.434</b>
Hospitality and Registration	1	2	3	4	5	<b>Avg. 4.739</b>
Room set-up	1	2	3	4	5	<b>Avg. 4.826</b>

#### **Logistics:**

Online Registration	1	2	3	4	5	<b>Avg. 4.421</b>
Expo Website (User friendly?)	1	2	3	4	5	<b>Avg. 4.353</b>
Workshop Packet	1	2	3	4	5	<b>Avg. 4.217</b>
Workshop Registration Line	1	2	3	4	5	<b>Avg. 4.381</b>

#### **Presentations:**

How would you rate the overall clarity of the workshop/presentations?	1	2	3	4	5	<b>Avg. 4.174</b>
Do you feel your attendance at the workshop was worthwhile?	1	2	3	4	5	<b>Avg. 4.261</b>
Did you learn anything new at our workshop?	1	2	3	4	5	<b>Avg. 4.565</b>
The benefits of the presentations to my company, organization, non-profit will be	1	2	3	4	5	<b>Avg. 4.261</b>
Would you recommend this workshop to your colleagues?	1	2	3	4	5	<b>Avg. 4.391</b>

#### **Follow up: (Impact on behavior)**

Does your company currently have a "No Idling" policy?	1	2	3	4	5	<b>Avg. 2.778</b>
If not, are you interested in getting a "No Idling" policy and zone?	<b>Yes</b> or No (please circle one)					<b>Yes-10, No-2, Maybe=1</b>

How many diesel engines does your fleet have? **Range 2 to 1500**  
 (#'s Recd.: 37, 2,30, 33, 1500, 140, 65, 65, 350, 350, 100+, 100+, 100+, 0, 150+, 1300 & don't know)

How many are retrofitted? **Range 0-64**  
 (#'s Recd: 0 (9 times), 1 (2 times), 20, 64, N/A for St. Louis Co. attendees, and don't know)

Are you interested in Retrofit and fuel savings technology?	<b>Yes</b> or No	<b>Yes-17, No-0</b>
Are you a Blue Skyways partner?	Yes or <b>No</b>	<b>Yes-4, No-13</b>
Are you a Smartways Transport Partner?	Yes or <b>No</b>	<b>Yes-1. No-16</b>
Would you like to join one of these?	<b>Yes</b> or No	<b>Yes-6, No-3</b>

## Attachment J:

### Form Letter sent to participants

September XX, 2008

Name  
Address  
Town

Dear XX:

This letter is to notify you that you have the opportunity to participate in the St. Louis Diesel Retrofit Pilot Project to reduce diesel emissions in the St. Louis area. This project is funded by the Central States Air Resource Agencies (CenSARA) through a federal grant received from the U.S. Environmental Protection Agency, Region 7. The Missouri Department of Natural Resources Air Pollution Control Program in collaboration with Grace Hill Clean Air Program is administering this project.

If you decide to participate, you can be reimbursed up to \$4,500 for the cost of the equipment and installation of the approved SmartWay emission reduction and fuel saving equipment. Enclosed, you will find an application packet for this project and the requirements to participate. I will be contacting you to answer any questions you may have and to explain the project in more detail. Also, I will be happy to assist you with filling out the application and to discuss the benefits of the SmartWay program.

I look forward to working with you in a joint effort to save fuel and reduce harmful diesel emissions in the St. Louis area. If you have any questions, please do not hesitate to contact me (314) XXX-XXXX.

Sincerely,

Lauren Mitchell, MSW  
Grace Hill Clean Air Project

Attachments

# St. Louis Diesel Retrofit

## Project Requirements

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### AVAILABLE USE OF FUNDS:

Participants will be reimbursed up to \$4,500 for the equipment cost and installation of either a diesel oxidation catalyst (DOC) or a diesel particulate filter (DPF) for an on-road diesel truck. If the participant's funding is not totally expended, the remaining funds maybe used towards the purchase and installation of other U.S. Environmental Protection Agency (EPA) approved SmartWay diesel emission reduction equipment on the retrofitted truck. Alternatively, any remaining funding could also be used to purchase a DOC or DPF for another on-road truck.

For additional information on SmartWay Fuel-Saving Strategies, Diesel Emission Reduction Retrofit Equipment, and Idling Reduction Technologies please review the following websites below or give us a call at (314) 584-6856. Ask for Lauren Mitchell, MSW- Idle Project Coordinator.

#### SmartWay Upgrade Kits -

<http://www.epa.gov/smartway/transport/what-smartway/upgrade-kits-tech.htm>

#### SmartWay Technologies & Strategies -

<http://www.epa.gov/smartway/transport/what-smartway/carrier-strategies.htm>

### PARTICIPANT REQUIREMENTS:

- Participant must be a St. Louis located fleet owner/operator; and all truck(s) must be legally registered in Missouri.
- Participant must establish no-idling zones at their facility; Participant will be provided a "No-Idling Zone" sign to install on their property.
- Participant must have all equipment **installed by December 31, 2008**
- Participant must register with the Department of Natural Resources, as a vendor, (this **MUST** be done in order to be reimbursed). Vendor Input Form can be found online at [http://oa.mo.gov/acct/pdf/files/vendor\\_input\\_form.pdf](http://oa.mo.gov/acct/pdf/files/vendor_input_form.pdf).
- Participant must provide a one (1) to two (2) month log of vehicle gasoline usage (preferably 1 month before if time allows, & one (1) month after retrofit installation), with odometer readings, diesel purchases and mileage (mpg) for each truck receiving retrofit equipment. Log sheets will be provided.

**Note: To become a member of the U.S. EPA SmartWay Program log on at [www.smartway.gov](http://www.smartway.gov).**

# St. Louis Diesel Retrofit

## Project Application

### SECTION 1 – PARTICIPANT INFORMATION

Company/Owner-Operator Name \_\_\_\_\_

Contact Person \_\_\_\_\_

Title \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Email Address \_\_\_\_\_

### SECTION 2 – FLEET INFORMATION

Number of diesel trucks in fleet \_\_\_\_\_

Does your company currently have no-idling or time limited idling zones? Yes or No

Are Idle-reduction practices required or encouraged while on the road? Yes or No

U.S. EPA SmartWay member: \_\_\_\_ Yes \_\_\_\_ No (SmartWay membership is not mandatory.)

Indicate approximate number of emission reduction equipment already installed in fleet:

\_\_\_\_ Bunker Heater      \_\_\_\_ Van aerodynamics      \_\_\_\_ Crankcase Ventilation

\_\_\_\_ Battery Air Conditioner      \_\_\_\_ Trailer Aerodynamic.      \_\_\_\_ DOC

\_\_\_\_ Auxiliary Power Unit      \_\_\_\_ Single-Wide Tires      \_\_\_\_ DPF

\_\_\_\_\_

(Indicate other diesel retrofit equipment)

**SECTION 3 – EQUIPMENT TO BE INSTALLED**

Vehicle Description and ID Number (VIN)	Engine Year	Type of Emission Reduction Equipment: such as DOC, DPF, CCV, Bunk Heater, etc.	Equipment Cost	Installation Cost	Total Amount to be Reimbursed
<b>Total Cost To Participant:</b>					
<b>Total amount to be reimbursed: (Cannot exceed \$4,500)</b>					

**SECTION 4 – PARTICIPANT CERTIFICATION STATEMENT**

**I certify to the best of my knowledge that the information in this application is true and correct. I am a legally authorized signatory or designee for the submittal of this information, and any other required information on the behalf of the participant.**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

**Please return the completed application to:**

**Douglas Eller, Program Director  
Grace Hill Settlement House-Clean Air Project  
2600 Hadley Street  
St. Louis Missouri, 63106  
(314) 584-6703 (314) 584-6907**

## Attachment K

CenSARA / Blue Skyways St. Louis Diesel Emission Reduction Pilot Project  
 Price Range Estimates on DOCs, DPFs, DMFs, CCVs, & NOx Engine Reflash  
 EPA website on diesel retrofit contacts at <http://www.epa.gov/otaq/retrofit/contacts.htm>:

COMPANY	DOC	DPF & Partial DPF	CCV	NOx Engine Reflash	APU
<b>Engine Control Systems (ECS)</b> <a href="http://www.enginecontrolsystems.com">www.enginecontrolsystems.com</a> Dana Brewster 9436 Ravenna Road Chardon, Ohio 44024 (440) 840-2511 Office/Cell (440) 286-1660 Fax <a href="mailto:dabr@enginecontrolsystems.com">dabr@enginecontrolsystems.com</a> Dana will arrange St. Louis Install	<b>DOC-20%</b> \$600-\$1100 PM- 20% HC 60% CO 30% <b>DOC-40%</b> \$850-\$1300 PM- 40% HC 70% CO 40%	<b>DPF</b> \$6200-\$7500 PM 90% HC 85% CO 75%	<b>CCV</b> \$350-\$500 PM 100%  <b>DOC 40%+CCV</b> \$1200-\$1800 PM- 40% HC 75% CO 60%	Not available	Not available
<b>Donaldson</b> <a href="http://www.donaldson.com">www.donaldson.com</a> Cory Anderson 952-887-3779 <a href="mailto:Cory.Anderson@Donaldson.com">Cory.Anderson@Donaldson.com</a> St. Louis Installer: <b>Truck Centers</b> Tim Stellhorn 1-800-325-8809	<b>DOC-20%</b> \$800-\$1,300 + \$200 installation	<b>DPF-85-90%</b> \$7,000-\$9,500 + \$300 installation  <b>DMF-70%</b> \$5,200 + \$200 installation	<b>Spiracle CCV</b> \$380 + \$300 installation	Not available	Not available
<b>Fabick/Caterpillar</b> Jeff Mayberry  One Fabick Drive Fenton, MO 63026 (636) 680-1337 direct  (800) 845-9188 toll free (636) 349-9272 fax <a href="mailto:jeff.mayberry@johnfabick.com">jeff.mayberry@johnfabick.com</a> <a href="http://www.fabickcat.com">www.fabickcat.com</a>	<b>DOC</b> 200-600 HP  \$1000--\$9000 PM reduction up to 20% Carbon monoxide- 85% Hydrocarbon- 69%	<b>DPF</b> Thomas Bus Ap. Assembly cost - \$8500-\$10,500 Install kit \$200 plus labor PM, CO, HC reductions up to 90%	<b>CCV</b> Not available	<b>NOx Engine Reflash</b> \$200 (About)	<b>APU</b> About \$8,000 parts and labor
- <b>Cummins MidSouth</b> Steve Dodson 7210 Hall St. St. Louis, MO 63147 Phone: (314) 389-5400 Fax: (314) 389-9671 <a href="http://www.cummins.com">http://www.cummins.com</a> <a href="mailto:george.p.choulas@cummins.com">george.p.choulas@cummins.com</a>	<b>DOC</b> 1500-3000	<b>DPF</b> \$1,500 - 13,800 installed Partial \$3-5,000	<b>CCV</b> \$300	<b>NOx Engine Reflash</b> \$350	<b>APU</b> \$12,000 + labor