ST. LOUIS DIESEL RETROFIT WORKSHOP & EXPO
Anheuser-Busch Visitor Center
April 15, 2008
Growing Concerns About Transportation, Fuel Supplies, Air Quality, & Climate Change

**US Oil Consumption**

- Personal Vehicles 40%
- Other Transportation 27%
- Other Sectors 33%

**US Carbon Emissions**

- Other Sectors 68%
- Other Transportation 13%
- Personal Vehicles 19%

Transportation accounts for about 2/3 of oil consumption and about 1/3 of total CO2 emissions.
Freight Transport in the Central States

- CenSARA States’ pop.: ~ 50 million
- Pop. w/in 10 miles of...
  - Interstate: ~29 million
  - Rail line: ~47 million
  - Major water ports: ~2.4 million
  - Major airports: ~16 million
Economists predict U.S. bound international containerized cargo will increase 350% by 2020. United States, Mexico, and Canadian exports to one another and the world are at an all time high.
Figure 2. Delivered energy consumption by sector, 1980-2030 (quadrillion Btu)
"Lovvy, there's plenty of oil, and if there's not we can just buy some more!"
Fuel Trends

Weekly U.S. Retail On-Highway Diesel Prices

Source: Energy Information Administration
Fuel Prices Impact on Industry

Diesel Emissions

Priority Pollutants - SOx, NOx, CO, Lead, PM10 & PM2.5

Hazardous Air Pollutants (HAPs) – Acetaldehyde, Benzene, Cyanide, Formaldehyde, Methanol, Phenol

Diesel Particulate Matter (Diesel PM) - Polycyclic aromatic hydrocarbons (PAHs), Heavy metals – Arsenic, Manganese, Mercury
The lifetime cancer risk from diesel PM exceeds the risks from all other air toxics combined. Diesel exhaust causes lung cancer, cardiovascular diseases and other serious health problems.

- In an inventory of toxic air pollutants in Los Angeles, 70% of the cancer risk was due to diesel emissions.
- A 1998 NIOSH study found: "truckers face a lung cancer risk 10 times higher than OSHA allows."
St. Louis Nonattainment Area - Mobile Source Diesel Emissions
2002 National Emission Inventory (NEI) Typical Summer Weekday Emissions

- Heavy Duty Diesel Vehicles
- Locomotives and Railroad Equipment
- Commercial Marine Vessels
- Construction and Mining Equipment
- Agricultural Equipment
- Industrial Equipment
- Commercial Equipment
- Lawn and Garden Equipment
- Airport Ground Support Equipment
- Pleasure Craft
- Recreational Equipment
- Light Duty Diesel Vehicles

PM2.5 - Tons/Day
NOx - Tons/Day
New Emission Standards for Heavy-Duty Diesel Engines
Beginning in 2004,
Will Achieve 97% Reductions by 2030

However, the diesel engines currently on the road pollute at much higher rates! They can run 1,000,000 miles & last 20 to 30 years...
National Clean Diesel Campaign

REGULATORY: Stricter engine emission standards - Cleaner burning fuels - ULSD

VOLUNTARY:
- Idle reductions
- Retrofits
- Fuel Efficiency

WEST COAST COLLABORATIVE
Public-private partnership to reduce diesel emissions

Mid-Atlantic Diesel Collaborative
on the route to cleaner air
A cooperative, public-private effort to reduce air pollution emissions along major transportation corridors and various sectors including, trucking, locomotive, construction, and ports, with an emphasis on urban areas.
Industrial, commercial, & service fleet trucks will benefit from this workshop:

- Local
- Construction
- Delivery
- Hauling
- Warehousing
- Over-The-Road
- Distribution
- Manufacturing
- Moving
- Municipal Governments
No-Idling Policies at Loading Facilities

ATTENTION DRIVERS:
Overnite Transportation is a member of EPA's SmartWay Transport Partnership.

Overnite Transportation has a
NO IDLE POLICY.
Please turn off your engine while on site waiting to be loaded.

ATTENTION DRIVERS:
GREEN MOUNTAIN
IDLE REDUCTION POLICY.
Please turn off your engines while on site awaiting to be loaded/unloaded.

CLEAN AIR ZONE
DO NOT IDLE

THANK YOU FOR HELPING US WORK TOWARDS A CLEANER ENVIRONMENT.
Diesel Oxidation Catalysts

Oxidation catalysts oxidize carbon monoxide (CO), hydrocarbons (HCs) and the soluble organic fraction (SOF) to reduce particulate matter (PM), CO, HCs, and toxic emissions.
Diesel Particulate Filter Technology

Exhaust In (Soot, CO, HC) Enter

Trapped Soot

Exhaust (CO₂, H₂O) Out

Cell Plugs
Closed Crankcase Ventilation (CCV)

http://www.freepatentsonline.com/6892715.html
Direct-Fired Bunk Heaters
Hydraulic Hybrid Technology

Captures the braking energy
Hydraulic Hybrid Technology
Captures the braking energy

Traffic Control Centers
Fleet Modernization Programs

Diesel Oxidation Catalysts

Closed Crankcase Ventilation (CCV)

Diesel Particulate Filter Technology

Direct-Fired Bunk Heaters

No-Idling Polices at Loading Facilities
SmartWay Transport Partners

Headquarters locations of 350+ SmartWay Transport Partners by EPA Region
Trailer Aerodynamics
Single Wide Tires
Auxiliary Power Units
Advanced Truck Stop Electrification
Advanced Truck Stop Electrification

Night Light
Lighted On/Off Button for the screen, so you can find it easily in the dark

120V ShorePower
Inside and Outside your cab for appliances, block/fuel heaters and other accessories

Internet
High-Speed Ethernet Port for Internet on your Computer - Wireless Internet also available

Central Heat & Air
Thermostat controlled filtered air flow, recycled from your cab

Card Reader
Slide your member Card and follow instructions

Built-In Touch Screen Computer
Control your "Home-On-The-Road" and surf the Internet

Built-In Touch Screen Computer
Control your "Home-On-The-Road" and surf the Internet

Help
Available 24x7. On-Screen Context-Sensitive Help or dial 611 from your cab phone or 800-738-7024 from any phone

Go Buttons
One-Touch Access to Main Functions

USB Ports
Use a keyboard, mouse or other USB devices

Telephone
Plug in a regular phone for incoming and outgoing calls

Television
Connect your TV with standard COAX cable for Premium Satellite TV
Available Technology:

Idle Reduction
Idle Reduction technology explained Auxiliary Power Unit / Generators Battery Systems Fuel Operated Heaters Thermal Storage Systems

Aerodynamics
Aerodynamics technology explained Tractor Aerodynamics Trailer Aerodynamics Single Unit Truck Aerodynamics

Wheels / Tires
Wheels / Tires technology explained Automatic Tire Inflation Low Rolling Resistance Tires SmartWay Certified Tractors SmartWay Certified Trailers
## Overview of Fuel-Saving and Emission-Reduction Technologies

**Disclaimer:** The benefits described in this document are estimations only, and are based on a number of assumptions. Actual fuel savings and emission reductions may be higher or lower, and will depend on a variety of factors, including equipment type, driver performance, distances traveled, vehicle speed, etc.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Description</th>
<th>Cost</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Idle Reduction Device – Bunk Heater</td>
<td>Small, lightweight, diesel fuel-fired device mounted in the cab that provides heat for cab comfort. Does not include any air conditioning capabilities.</td>
<td>Approx. $1,000</td>
<td>Approx. 5% fuel savings assuming 1,200 hours idling per year. Additional reduction in engine wear-and-tear.</td>
</tr>
<tr>
<td>Idle Reduction Device – Auxiliary Power Unit</td>
<td>Small diesel-powered generator mounted outside the cab that provides heat, air-conditioning, and electrical power to run appliances.</td>
<td>Approx. $6,000 - $8,000</td>
<td>Approx. 8% fuel savings assuming 2,400 hours idling per year. Additional reduction in engine wear-and-tear.</td>
</tr>
<tr>
<td>Single Wide Tires</td>
<td>Traditional dual tires are replaced with one single wide tire and aluminum wheel. Can be applied to all tractor and trailer tire positions except for the steer tires.</td>
<td>Approx. $3,000</td>
<td>Approx. 4% fuel savings.</td>
</tr>
<tr>
<td>Trailer Aerodynamics</td>
<td>Fairings added to the front and underside of the trailer to reduce drag.</td>
<td>Approx. $2,400</td>
<td>Approx. 5% fuel savings.</td>
</tr>
<tr>
<td>Emission Control Device – Oxidation Catalyst</td>
<td>A device added to the tractor’s exhaust system to reduce the emissions of particulate matter and other pollutants.</td>
<td>Approx. $1,000</td>
<td>Approx. 20 – 50% reduction in particulate matter.</td>
</tr>
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St. Louis Diesel Emission Reduction Pilot Project

A grant from CenSARA/ BSC will fund a collaboration between:

• Missouri Department of Natural Resources
• Grace Hill Clean Air Program
• Newly recruited Blue Skyways / SmartWay trucking companies, industries, partners and independent truckers.
St. Louis Diesel Emission Reduction Pilot Project

*Diesel Exhaust & Children’s Health*

- Heavy truck traffic in the industrialized regions along I-70, I-55, the Mississippi riverfront, and nearby residential areas.

- Diesel emissions of fine particulate matter (PM2.5), SOx, NOx, VOC, and hazardous air pollutants (HAPs) throughout St. Louis area.

- In residential areas of St. Louis City, the rate of asthma in children is almost three times the national average.
St. Louis Diesel Emission Reduction Pilot Project

This demonstration will showcase the retrofitting of older trucks with:

• Diesel PM filters, diesel oxidation catalysts, auxiliary power units (APUs), streamlining attachments, single-wide tires, NOx engine reflash, crankcase ventilation

• Idle-free zones will be established by participating companies.

• Advanced new diesel engine technology such as the Hydraulic Hybrid will be tested, if available.
A SmartWay presentation will be held by Grace Hill and MoDNR to recruit trucking fleets from industries with fleets of trucks & trucking companies.

- Plans are to retrofit five trucks, one in each of five trucking fleets, with SmartWay packages.
- SmartWay packages pay for themselves in terms of fuel savings, over and above the diesel emission reductions they are designed to achieve.
- Fleet owners will be so pleased with the fuel savings and cleaner emissions, that they may retrofit the rest of their fleets.
St. Louis Diesel Emission Reduction Pilot Project

BE NE FI TS

• A full-scale program could achieve up to 90 percent reductions in diesel PM, NOx, VOC, and HAP emissions by retrofitting all pre-2007 trucks.

• Increased fuel efficiency with fuel cost savings of up to 40 percent, and an equivalent reduction in greenhouse gas emissions.

• Fuel savings will be tracked and emission reductions achieved by the campaign will be documented in the final report.
Acknowledgements:

Dana Brewster

Bill Batten

Judy Murphy

Ed Woods

Cory Anderson

Jeff Mayberry
Acknowledgements:

Calvin Ku
Terry Rowles
Wendy Vit
Jo Ann Saunders
Carolyn Kliethermes
Rebecca Birke
David Lamb
Jim Kavanaugh

Doug Eller
Lauren Mitchell
Carissa Clark

Susie Schau
St. Louis Regional Asthma Consortium

Amy Bhesania
Buddy Polovick

Erica Fendler
Melissa Wade

City of St. Louis
The Oil Habit