# 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

*Includes all fuel sources

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

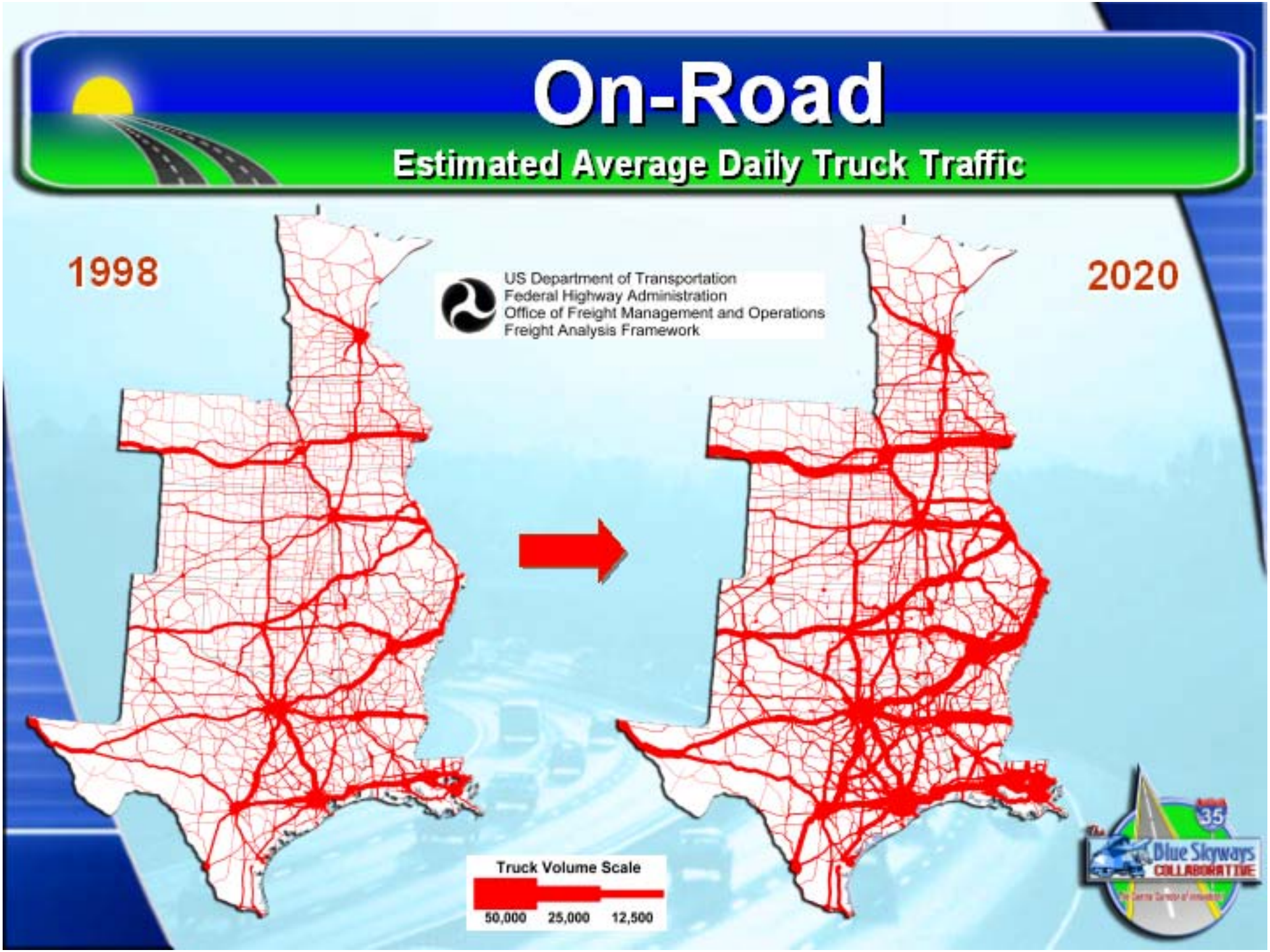
- **CenSARA States' pop.: ~ 50 million**
- **Pop. w/in 10 miles of…**
  - **Interstate: ~29 million**
  - **Rail line: ~47 million**
  - **Major water ports: ~2.4 million**
  - **Major airports:~ 16 million**

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.

NASCO Tri-National Advocacy for Efficient, Secure and Environmentally Conscious Trade & Transportation

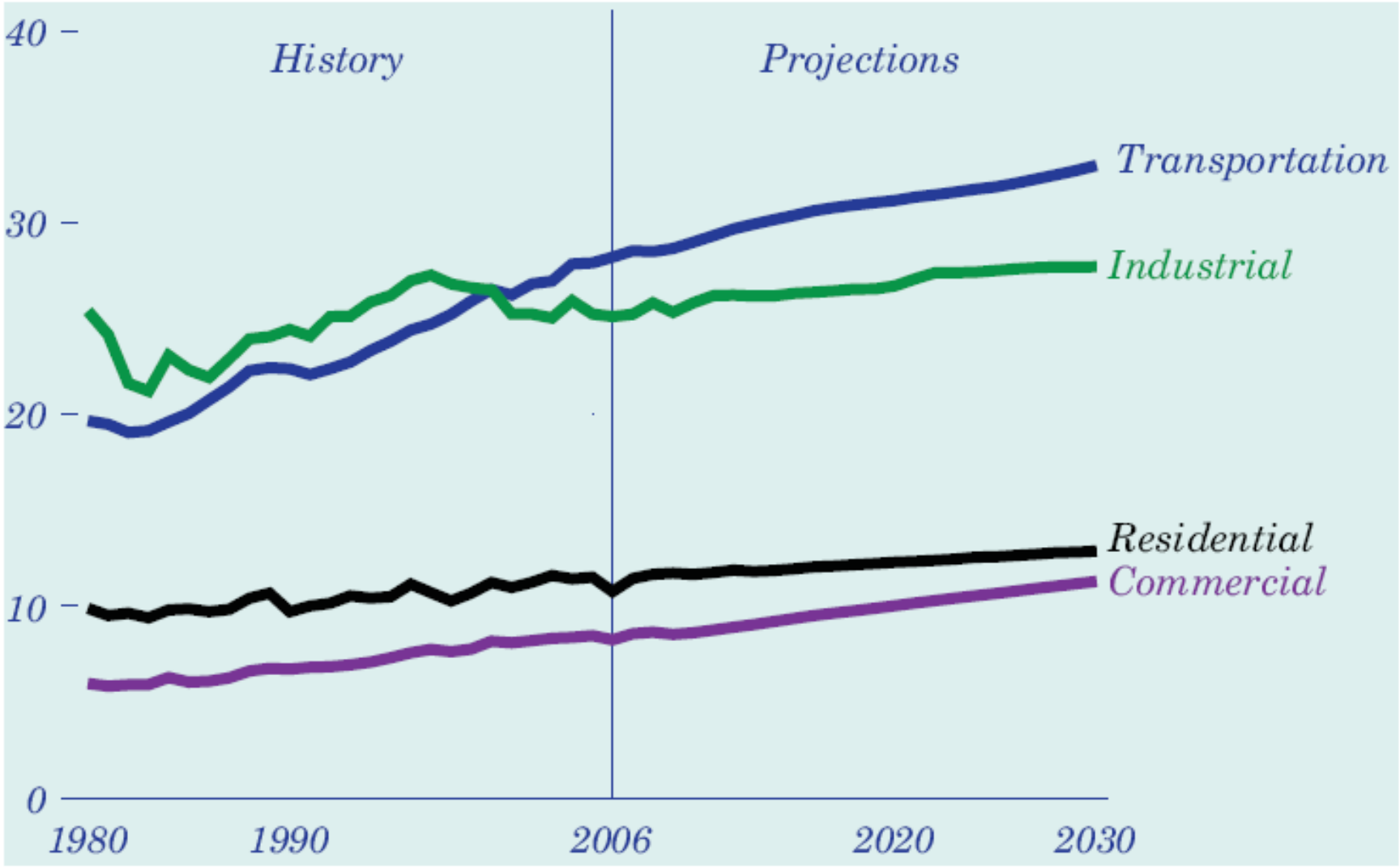
# On-Road

## Estimated Average Daily Truck Traffic



# Energy Information Administration
# Annual Energy Outlook 2008

***Figure 2. Delivered energy consumption by sector, 1980-2030 (quadrillion Btu)***

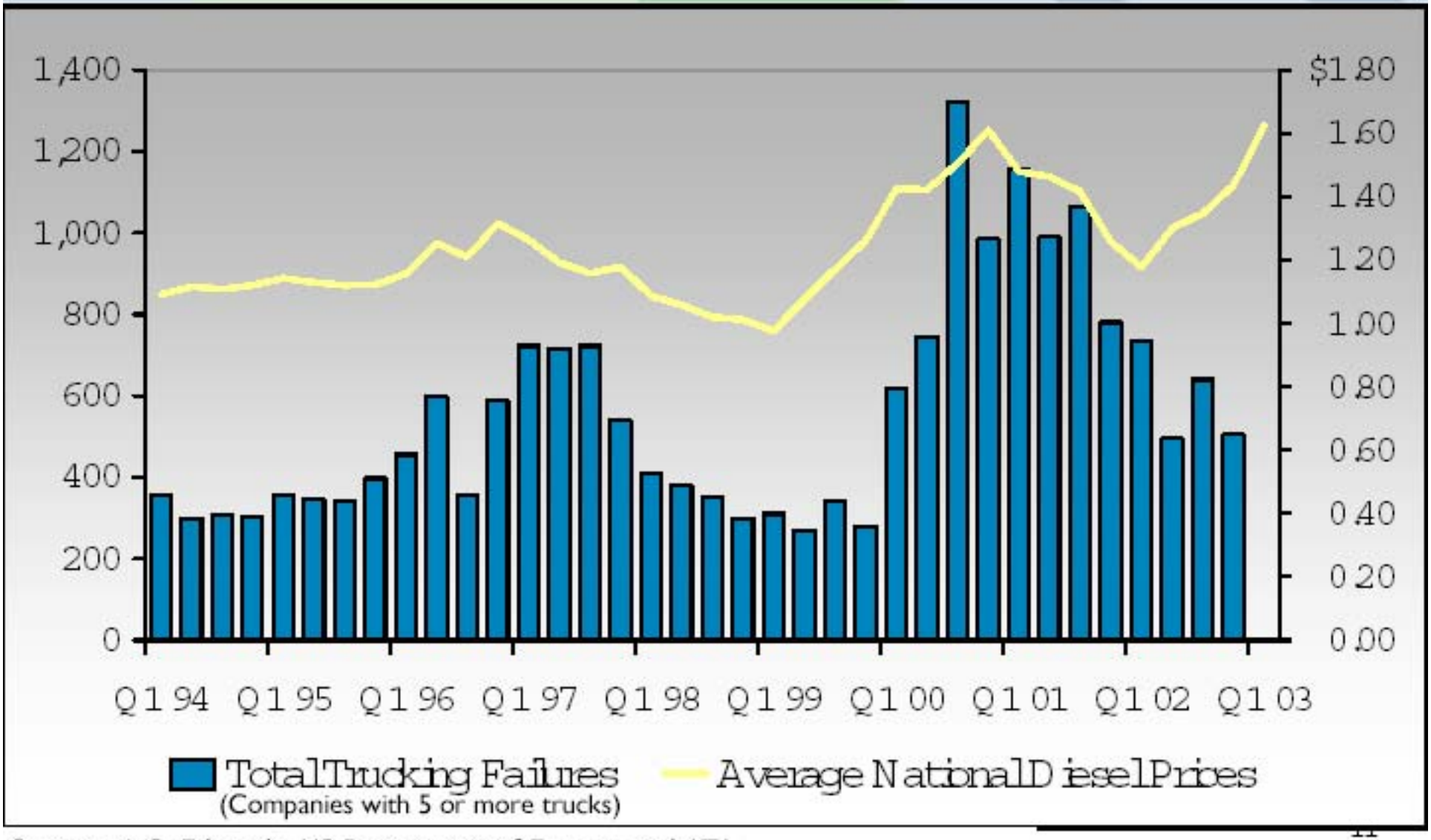


"Lovvy, there's plenty of oil, and if there's not we can just buy some more!"

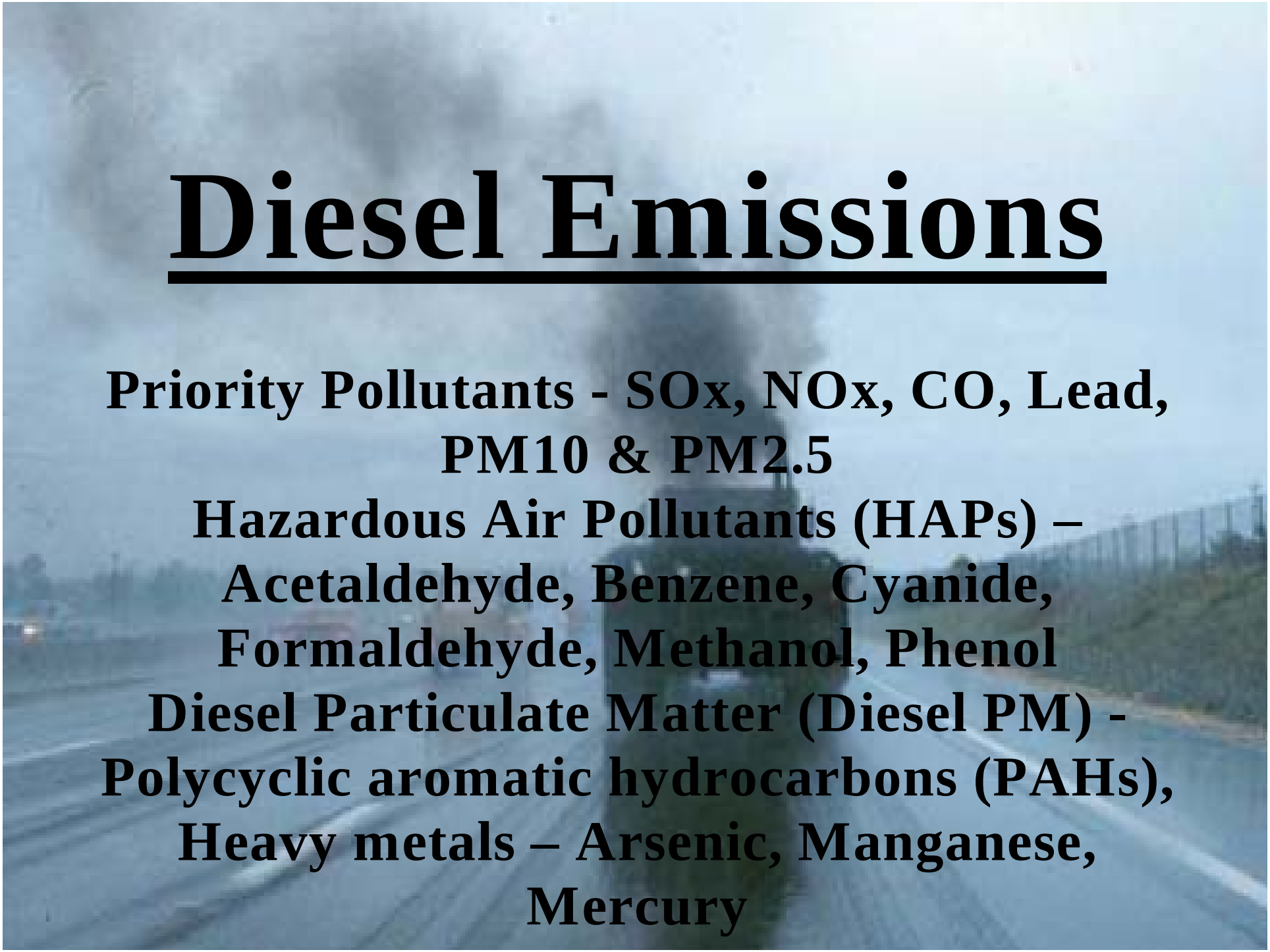
# Fuel Trends

Weekly U.S Retail On-Highway Diesel Prices
Dollars per Gallon
3.30
3.20
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.90
1.80
1.70
1.60
1.50
1.40
1.30
7/28/2003
9/28/2003
11/28/2003
1/28/2004
3/28/2004
5/28/2004
7/28/2004
9/28/2004
11/28/2004
1/28/2005
3/28/2005
5/28/2005
7/28/2005
9/28/2005
11/28/2005
Source: Energy Information Administration

# Fuel Prices Impact on Industry




Source: A.G. Edwards, US Department of Energy, and ATA



# 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**

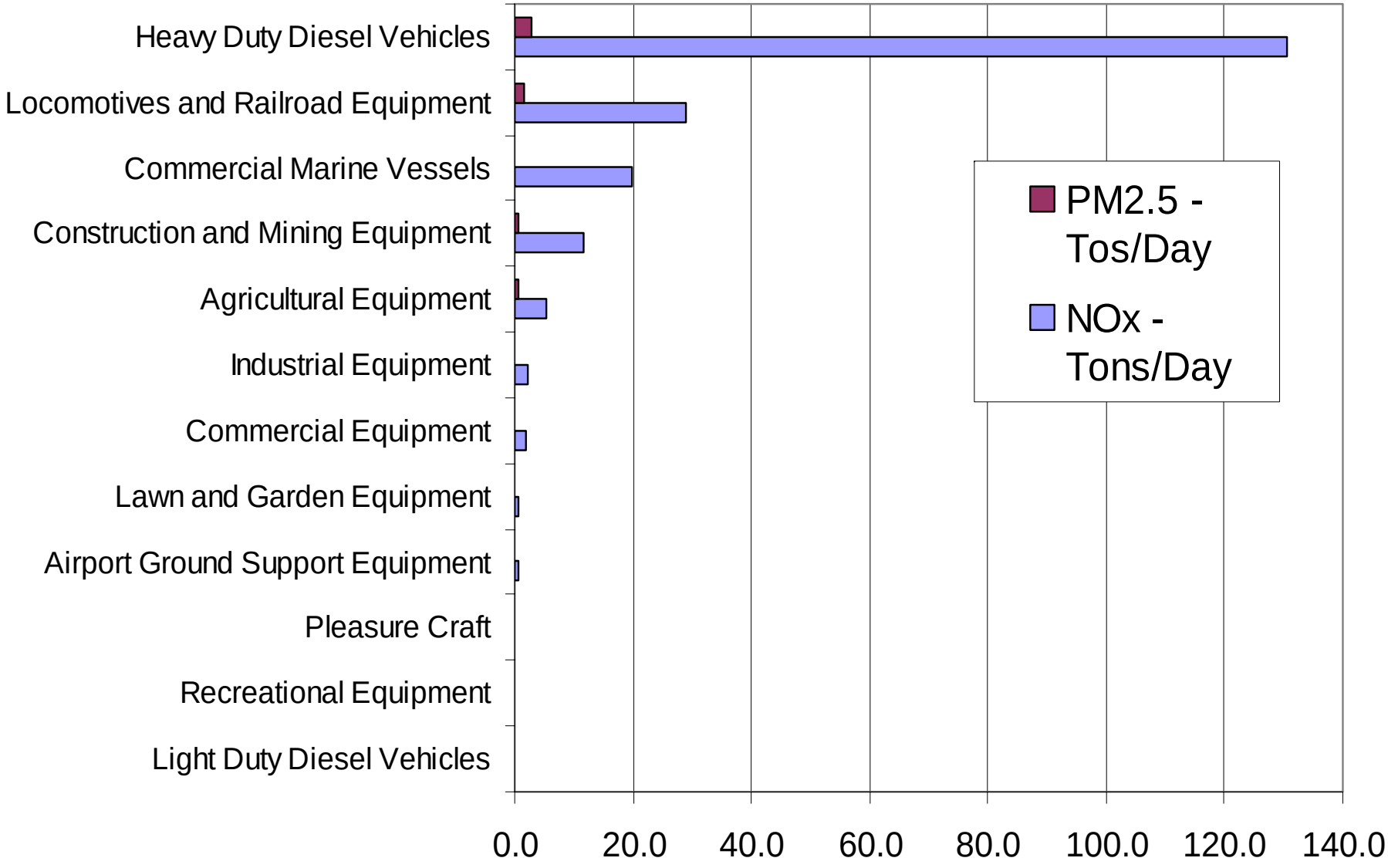
# The lifetime cancer risk from diesel PM exceeds the risks from all other air toxics combined.

## 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 Dieasel Emissions

### 2002 National Emission Inventory (NEI) Typical Summer Weekday Emissions



# 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

Tomorrow's Buses for Today's Children

CLEAN SCHOOL BUS USA

SmartWay Transport Partnership

U.S. Environmental Protection Agency

WEST COAST COLLABORATIVE

Public-private partnership to reduce diesel emissions

MIDWEST CLEAN DIESEL INITIATIVE

Mid-Atlantic Diesel Collaborative

on the route to cleaner air

The Blue Skyways Collaborative

The Central Corridor of Innovation!

*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.*

**The Blue Skyways Collaborative**

- Highways (On-Road)
  - trucks/buses
  - truckstops electrification
  - fleets
- Equipment (Non-Road)
  - agricultural
  - construction
- Fuels
  - biodiesel
  - ULSD/TxLED
- Air/Water/Rail Transportation
  - Marine/River Vessels & Ports
  - Rail/Locomotive Hubs
  - Airports
- Energy
  - Renewable Energy
  - Energy Efficiency
  - Alternative Energy Pathways

SmartWay℠
Transport Partnership
U.S. Environmental Protection Agency

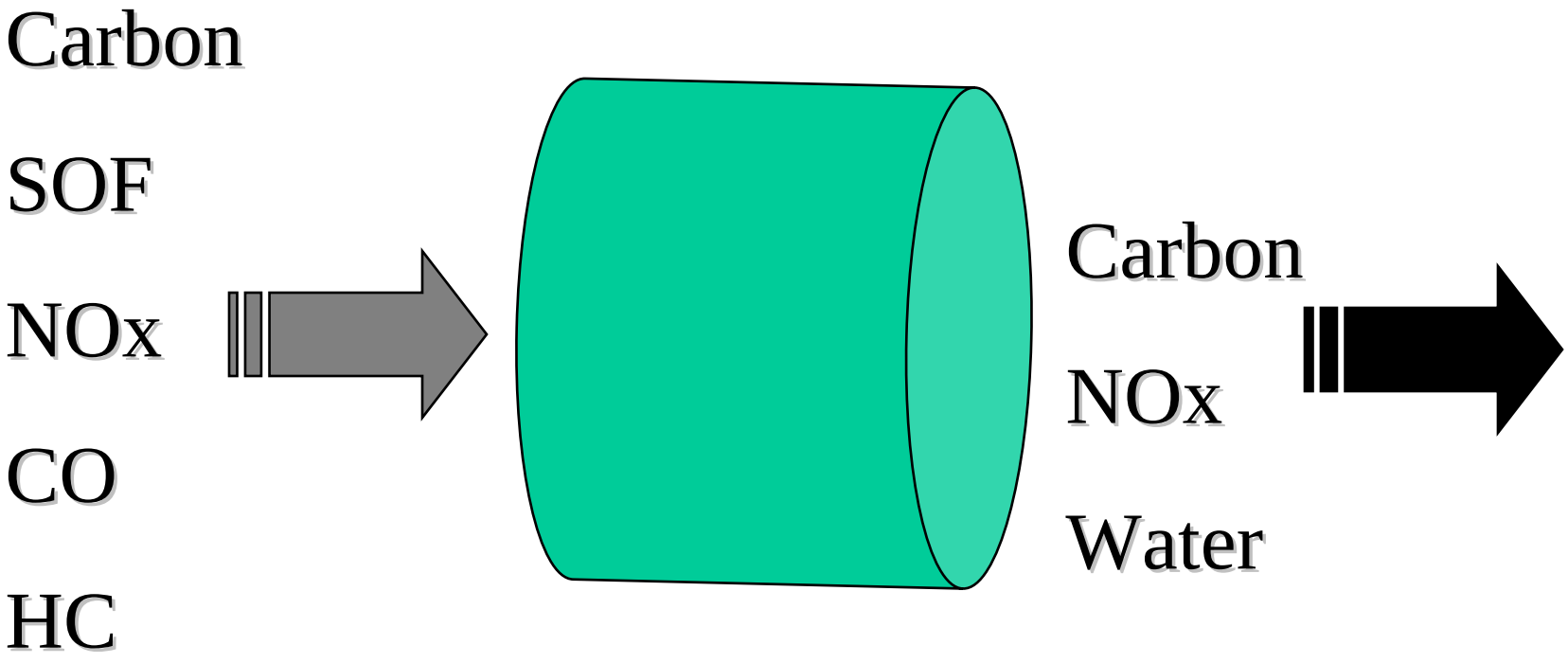
# Technologies and Strategies

# Industrial, commercial, & service fleet trucks will benefit from this workshop:

- Local
- Construction
- Delivery
- Hauling
- Warehousing
- Over-The-Road
- Distribution
- Manufacturing
- Moving
- Municipal Governments

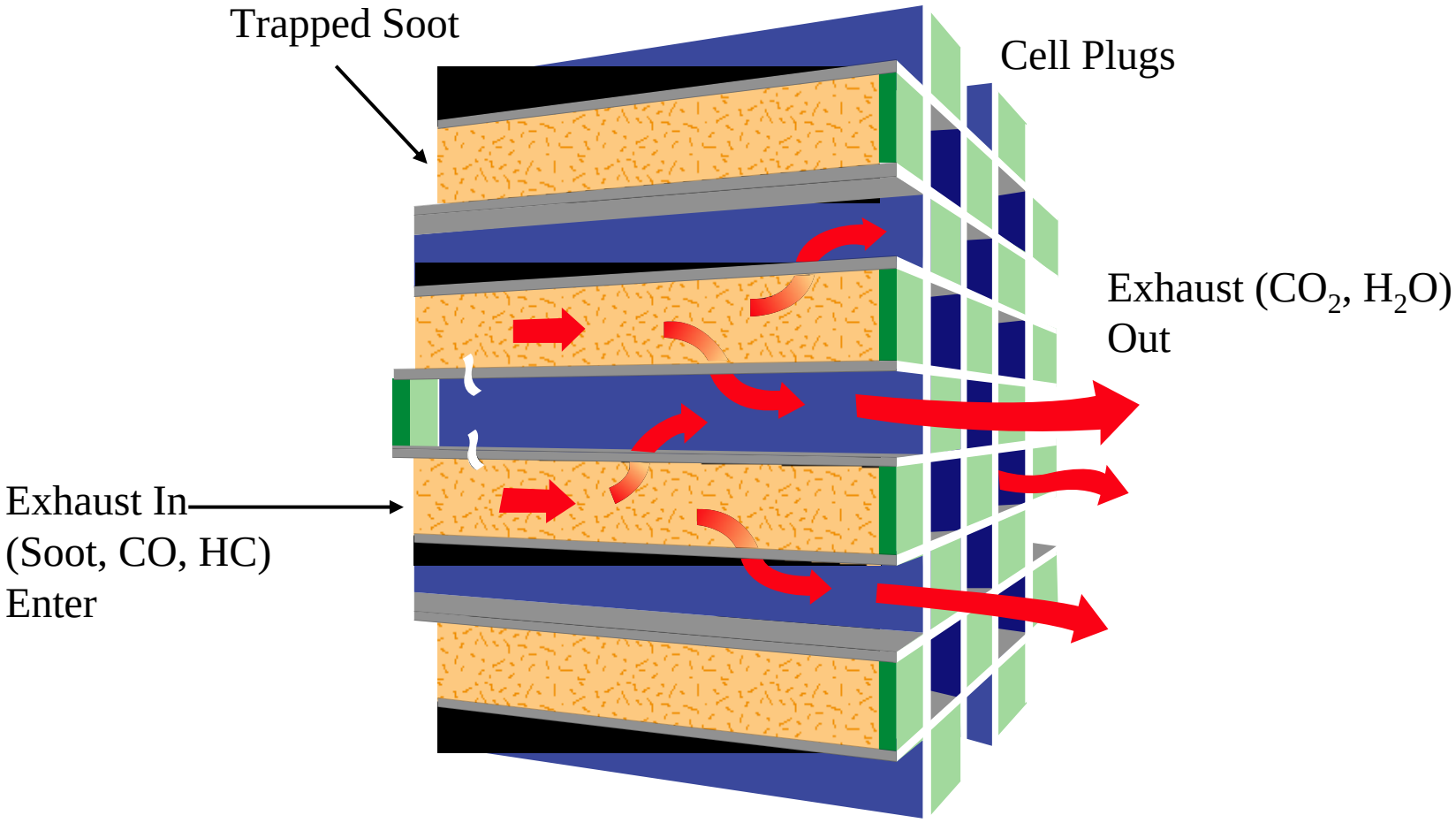
# No-Idling Polices at Loading Facilities

# Diesel Oxidation Catalysts



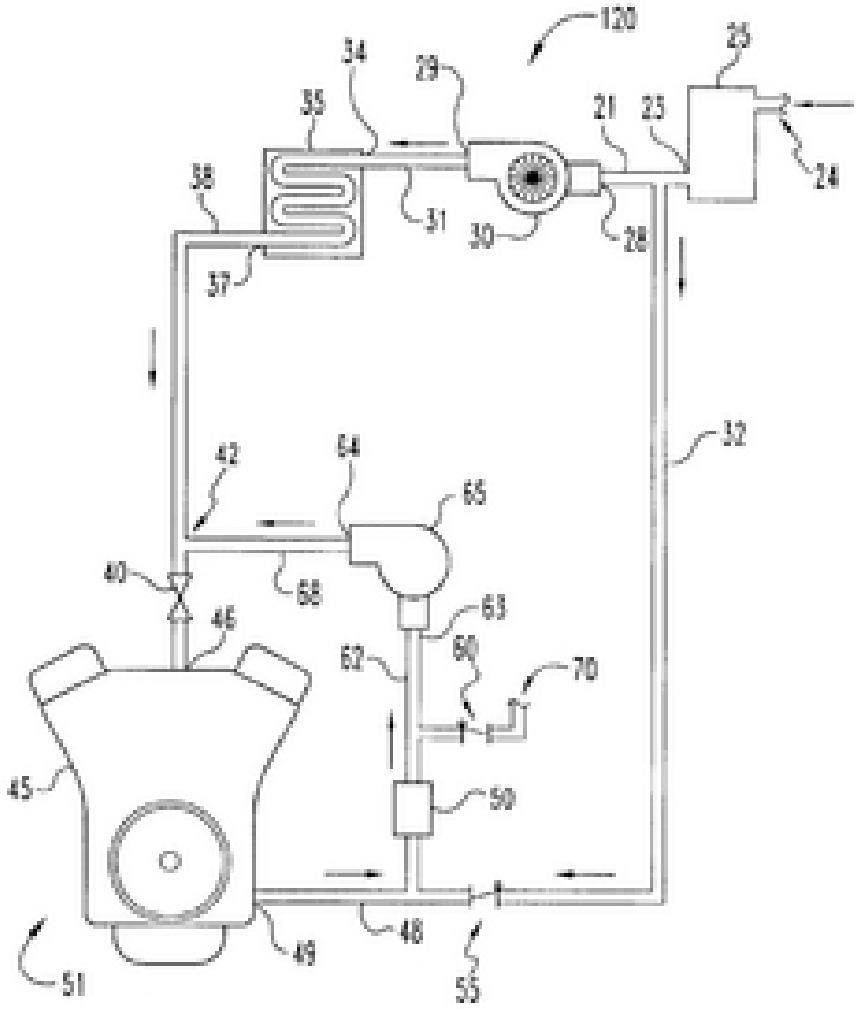

Oxidation catalysts oxidize carbon monoxide (CO), hydrocarbons (HCs) and the soluble organic fraction (SOF) to reduce particulate matter (PM), CO, HCs, and toxic emissions

# Diesel Particulate Filter Technology



**Tokyo Traffic Control Center**

# Closed Crankcase Ventilation (CCV)



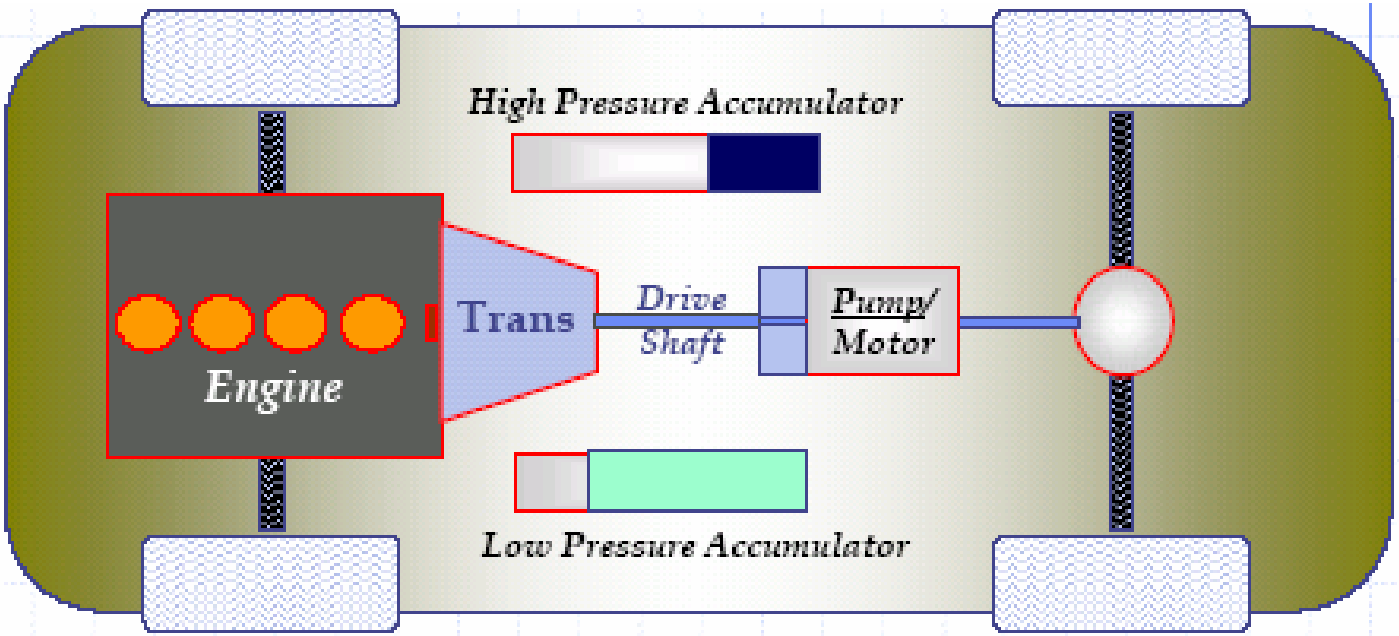

http://www.freepatentsonline.com/6892715.html

# Direct-Fired Bunk Heaters

# Hydraulic Hybrid Technology

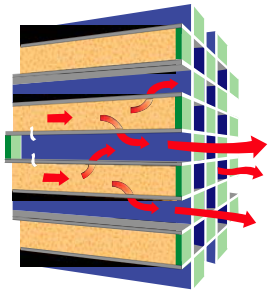
## *Captures the braking energy*

***Mild***
*Hydraulic Hybrid (Parallel)*



## No-Idling Polices at Loading Facilities

## Diesel Particulate Filter Technology

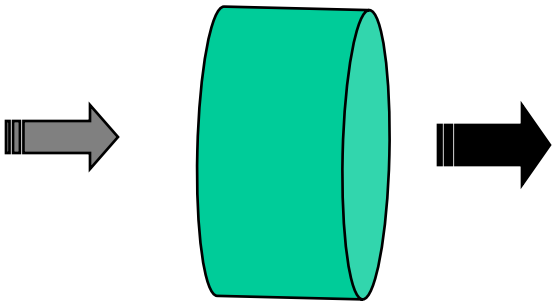


## Direct-Fired Bunk Heaters

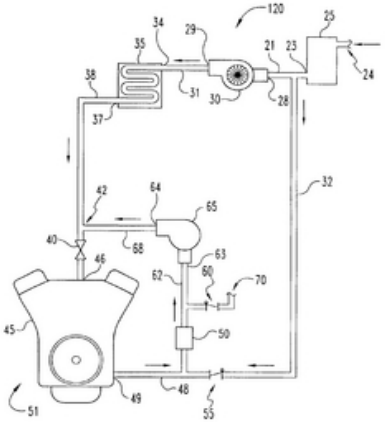
## Traffic Control Centers

## Fleet Modernization Programs

## Diesel Oxidation Catalysts

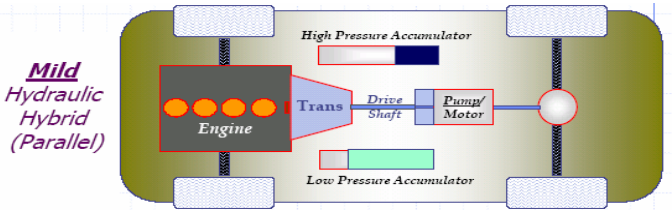


## Closed Crankcase Ventilation (CCV)



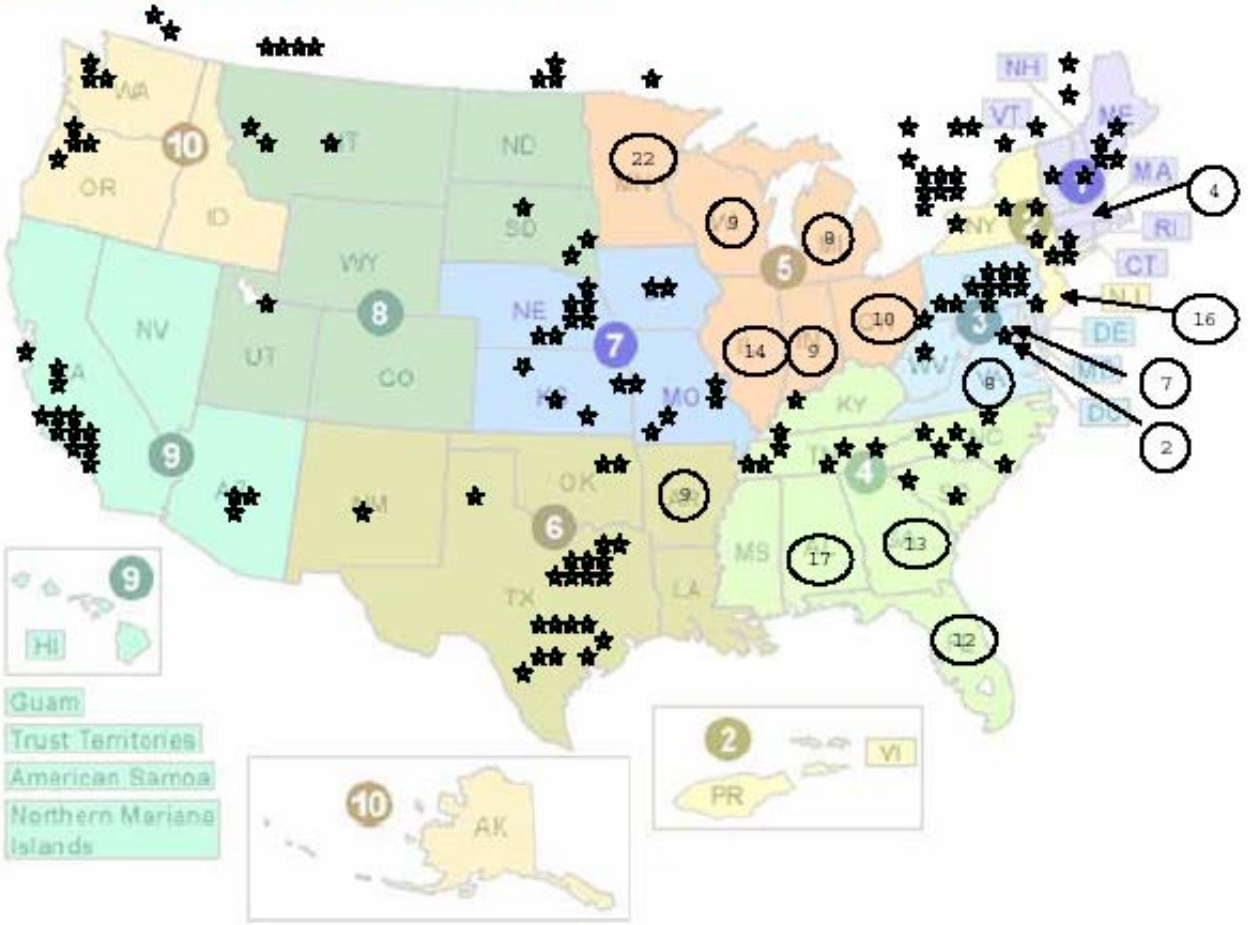
## Hydraulic Hybrid Technology

***Captures the braking energy***



# SmartWay Transport Partners

Headquarters locations of 350+ SmartWay Transport Partners by EPA Region



# SmartWay Transport Partners

# Van Aerodynamics

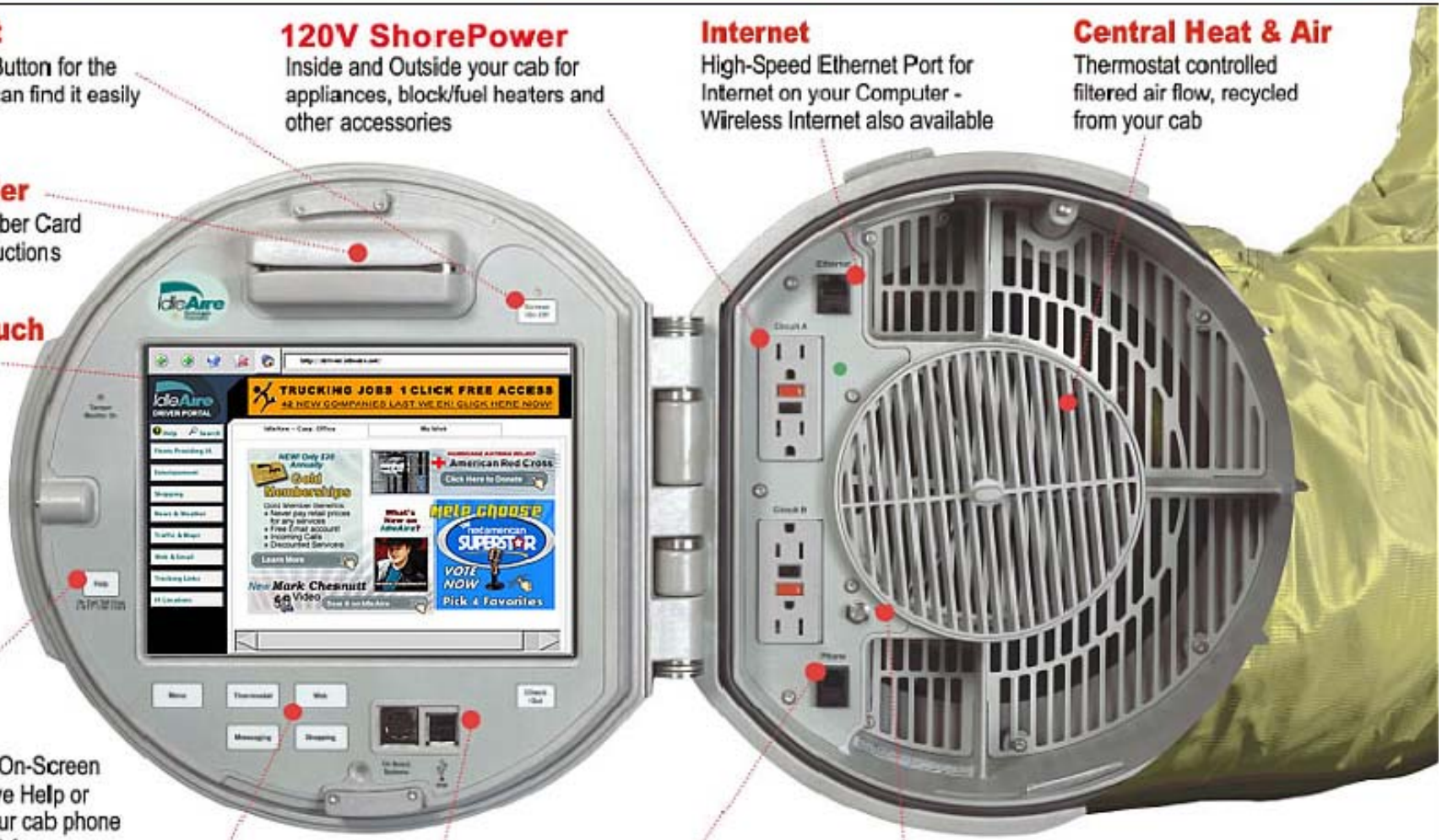
# Trailer Aerodynamics

# 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

**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

# Intermodal Shipping

http://www.smartwayfinancecenter.com/

**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 TractorsSmartWay Certified Trailers

# Overview of Fuel-Saving and Emission-Reduction Technologies

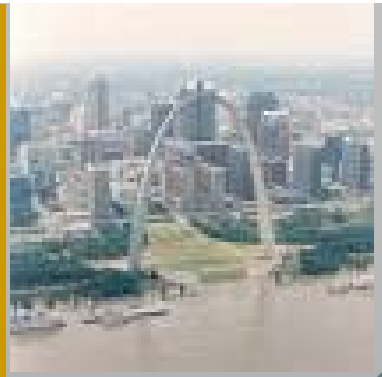
**Disclaimer:** The benefits described in this document are estimations only, and are based on a number of assumptions. Actual fuel savings and emission reductions may be higher or lower, and will depend on a variety of factors, including equipment type, driver performance, distances traveled, vehicle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

| Technology | Description | Cost | Benefits[1] |
|---|---|---|---|
| Idle Reduction Device – Bunk Heater | Small, lightweight, diesel fuel-fired device mounted in the cab that provides heat for cab comfort. Does not include any air conditioning capabilities. | Approx. $1,000 | Approx. 5% fuel savings assuming 1,200 hours idling per year.<br><br>Additional reduction in engine wear-and-tear. |
| Idle Reduction Device – Auxiliary Power Unit | Small diesel-powered generator mounted outside the cab that provides heat, air-conditioning, and electrical power to run appliances. | Approx. $6,000 - $8,000 | Approx. 8% fuel savings assuming 2,400 hours idling per year.<br>Additional reduction in engine wear-and-tear. |
| Single Wide Tires | 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. | Approx. $3,000 | Approx. 4% fuel savings. |
| Trailer Aerodynamics | Fairings added to the front and underside of the trailer to reduce drag. | Approx. $2,400 | Approx. 5% fuel savings. |
| Emission Control Device – Oxidation Catalyst | A device added to the tractor's exhaust system to reduce the emissions of particulate matter and other pollutants. | Approx. $1,000 | Approx. 20 – 50% reduction in particulate matter. |

# St. Louis Diesel Emission Reduction Pilot Project

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

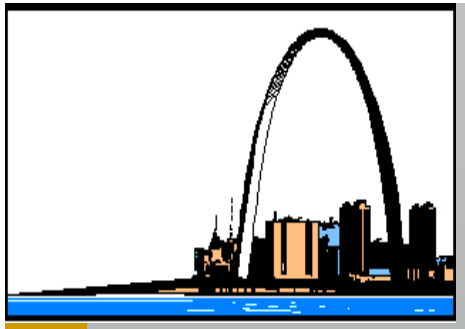
- Missouri Department of Natural Resources
- Grace Hill Clean Air Program
- Newly recruited Blue Skyways / SmartWay trucking companies, industries, partners and independent truckers.



# 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.

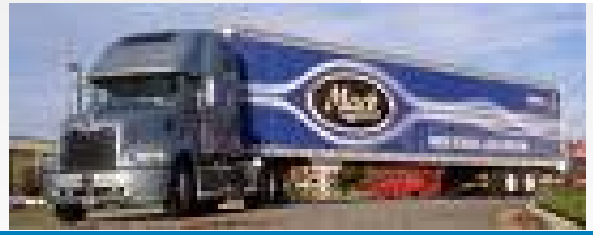
# St. Louis Diesel Emission Reduction Pilot Project

## *BENEFITS*

- 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*



*Cory Anderson*

Donaldson
*Filtration Solutions*

*Bill Batten*

*Judy Murphy*

*Ed Woods*

CATERPILLAR®

FABICK CAT

*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