



Clean Diesel: Impact on Air Quality & Economic Development

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Diesel Technology Forum*

Overview

- ▶ **The Diesel Industry & What is Clean Diesel?**
- ▶ **What is the Current Status of Diesel in the U.S.?**
- ▶ **What is Diesel's Future in the U.S.?**



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Technology
Forum**

Diesel Technology Forum

Objective:

Increase awareness about clean diesel technology

Membership:

Includes energy companies, engine & vehicle manufacturers and emission treatment companies

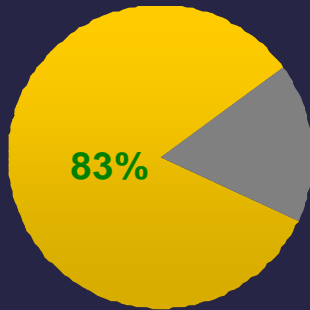
Methods:

Educational materials & outreach events

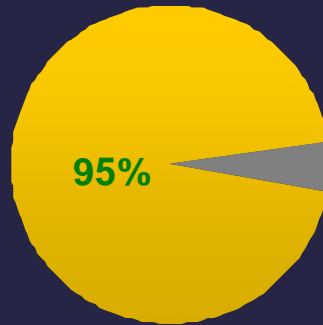


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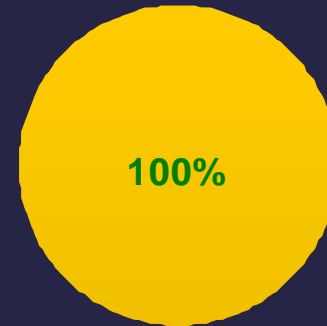
Diesel's Contribution to Key Activities



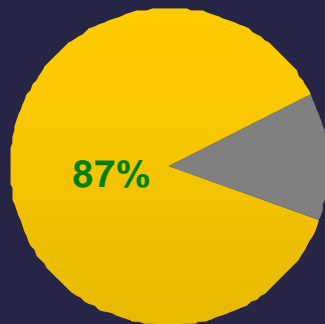
Construction



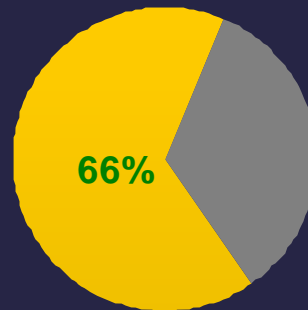
Transit Buses



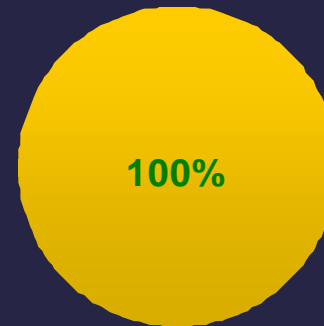
Intercity Buses



Trucking



Agriculture



Railroad Freight Locomotives

What Makes Diesel Different?

Efficiency

*More power using less energy.
No other internal combustion engine in the world is more fuel-efficient.*

Reliability

Unmatched dependability and performance are why the majority of the nation's fire and rescue equipment depend on diesel power.

Durability

Diesel engines are renowned for their durability, able to serve hundreds of thousands of miles or hours of continuous operations without fail.

Versatility

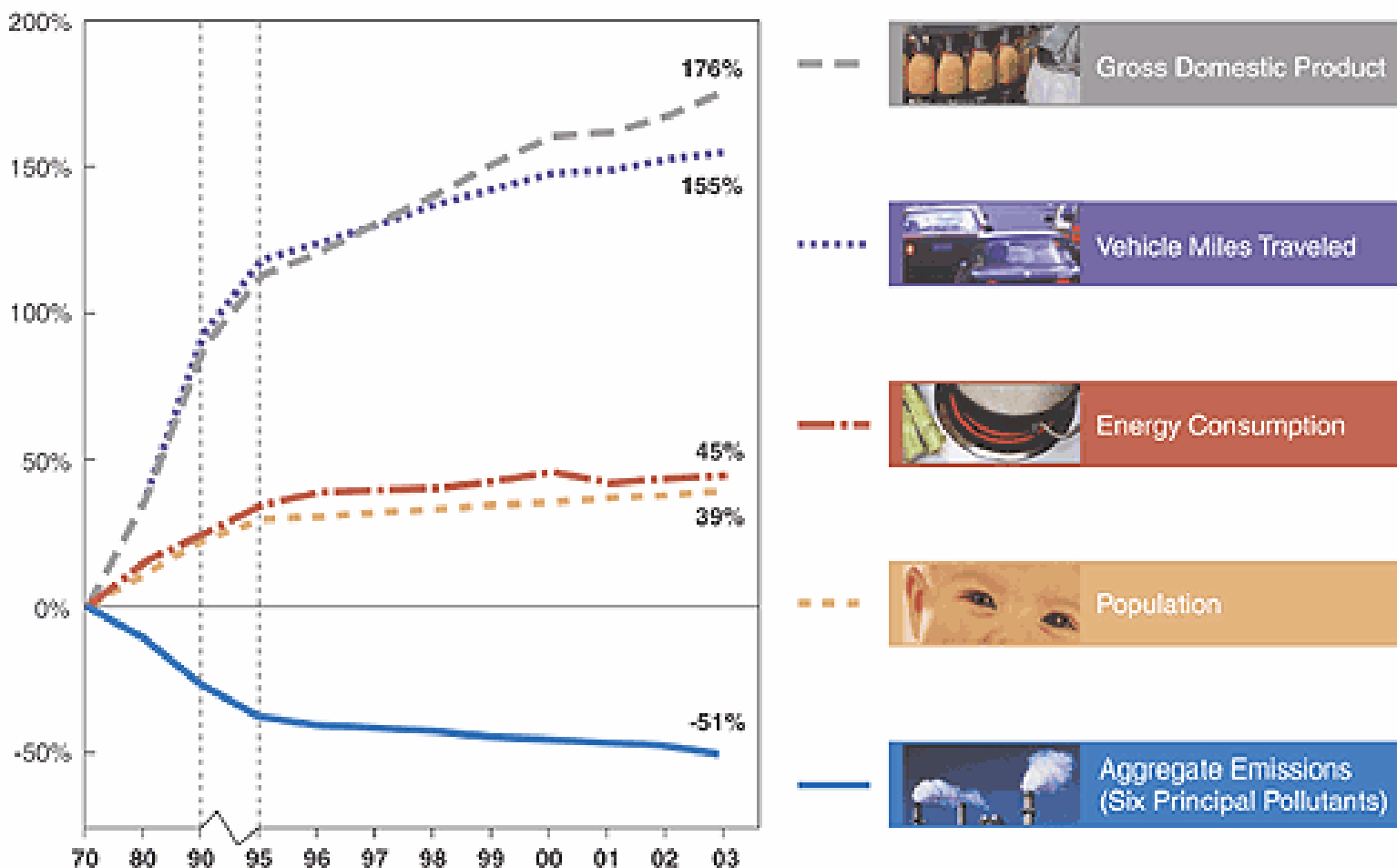
From a 10 horsepower hand-held engine to a 2,500 horsepower mining truck, diesel can power virtually any sized job.

Immediacy

Constantly evolving, diesel is a familiar and proven technology with an existing fueling infrastructure and a 100-year track record of success.

Economic Growth

Comparison of Growth Areas and Emissions

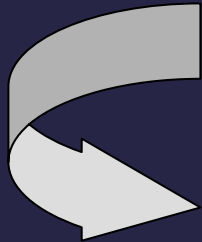


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What Is The Clean Diesel System?

Advanced Engine Technology

*Advanced engine electronic combustion control ,
fuel injection systems, and turbochargers
optimize performance and low-emissions*



Cleaner Diesel Fuels

*Ultra low Sulfur Diesel Fuel
produces lower emissions and
enable advanced emissions
treatment systems
(catalysts and filters)*



Emissions Treatment

*Particulate filters, oxidation
catalysts reduce emissions of
ozone-forming compounds
(NOx and VOCs),
trap and eliminate fine particles*

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Existing Diesel Regulations

▶ Fuel

- Sulfur content of on-road diesel fuel will drop 97% from 500 ppm to 15 ppm in 2006.
- Sulfur content of off-road diesel fuel will drop from 3,000ppm to 500 ppm in 2007 and down to 15 ppm in 2010.

▶ Heavy Duty Engines

- On Road – by 2007 PM emissions reduced to .01 g/bhp-hr and by 2010 NOx to .20 g/bhp-hr. This represents a reduction of 98% from 1998 levels
- Off Road – New Tier 4 regs require 90% reduction in NOx and 95% reduction in PM by 2008

▶ Light Duty Vehicles

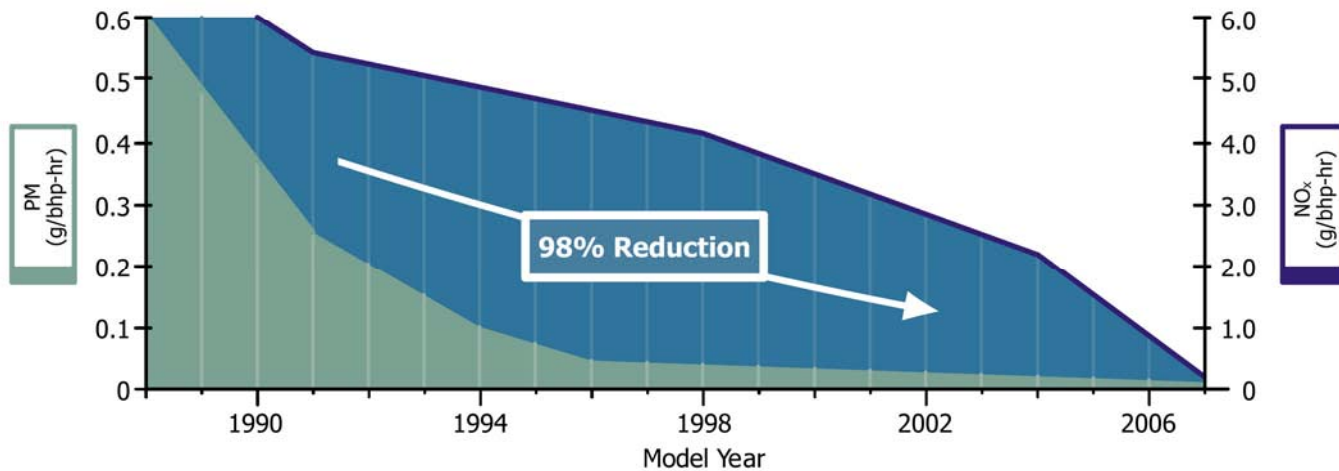
- By 2009, all vehicles regardless of fuel type must conform to same strict emission standards.



Coming in 2007 – Further NO_x & PM Reductions

Continuous Improvement of On-Highway Heavy-Duty Diesel Engine PM and NO_x Emissions

Source: U.S. Environmental Protection Agency



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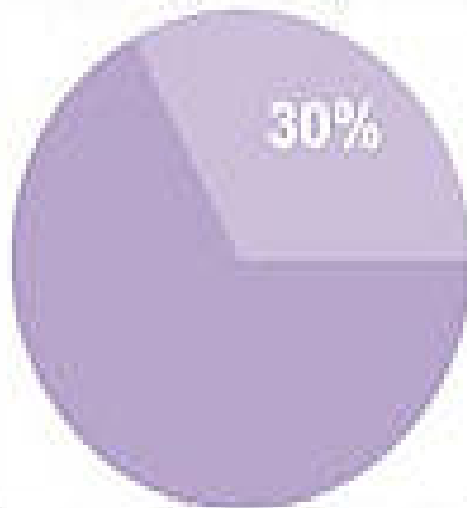
Higher Gasoline Prices Have Meant More Interest in Diesel Technology



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Increasing Light Duty Diesel Use-- Possibilities to Save Energy

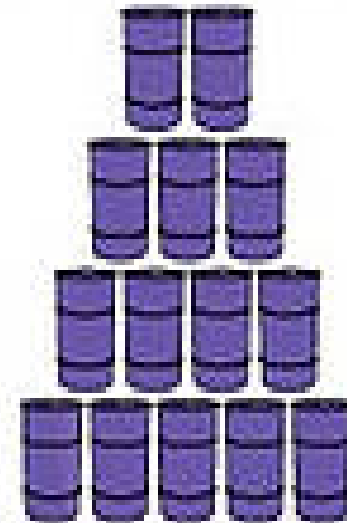
More Clean Diesel
in the Light-duty Market



Greater Market Penetration



Less Oil Consumption



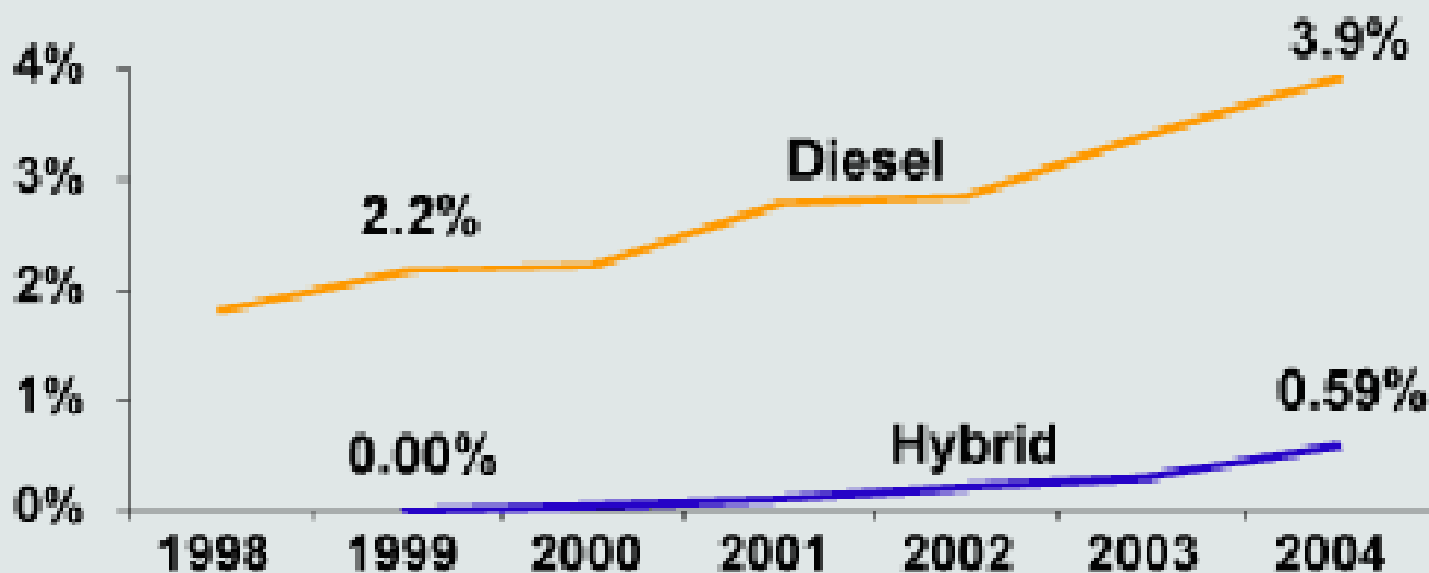
350,000 Barrels per Day Saved



Because of fuel efficiency and performance, diesel engines share of market is growing in US

Share of Light-Vehicle Sales

Fig. 1



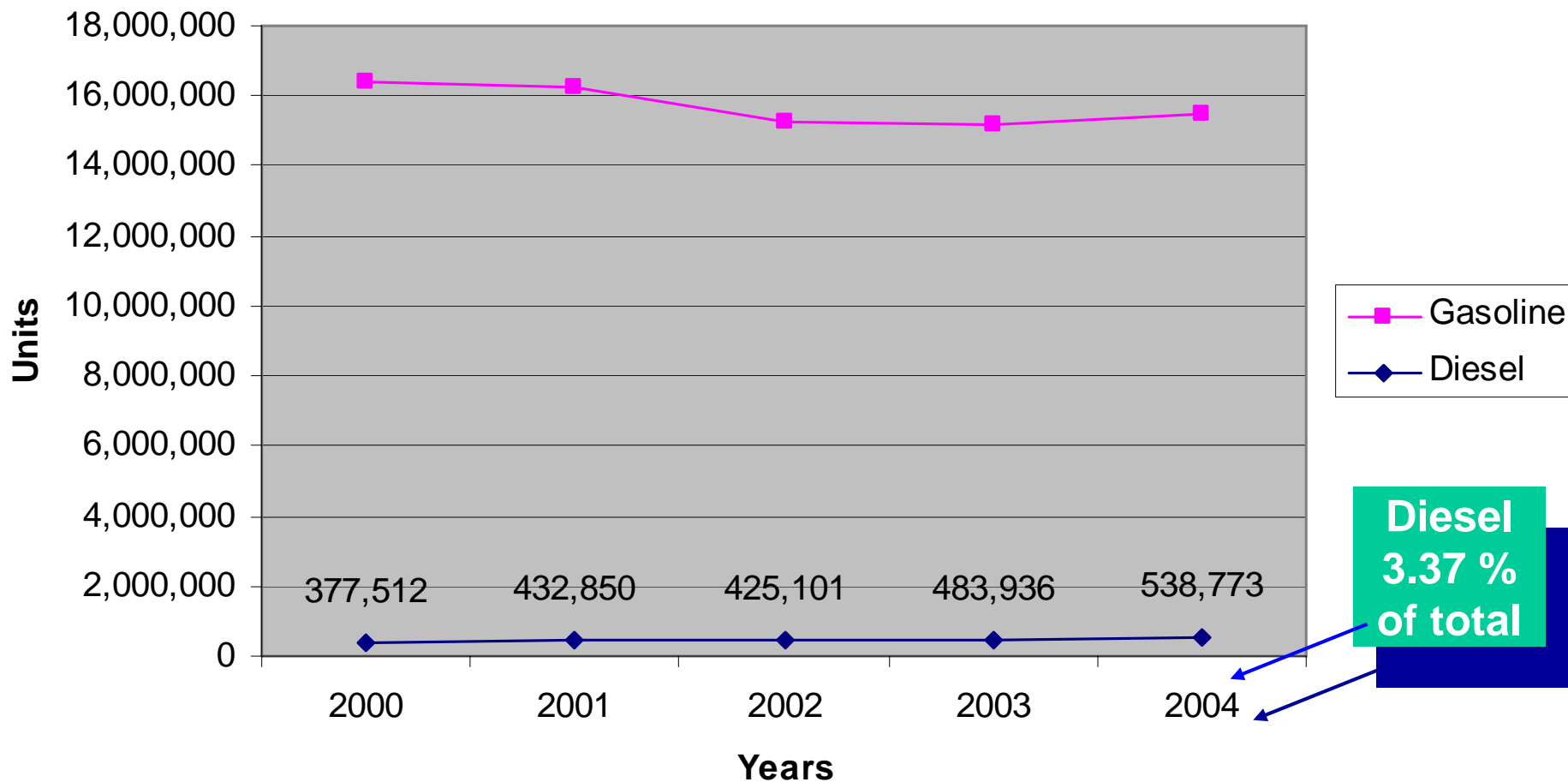
Source: J.D. Power and Associates, Global Forecasting estimate and Hybrid Vehicle Outlook, 2004 Q1, Power Information Network (PIN), LLC



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But still, Diesels are a Small Percentage of Overall vehicle sales

Diesel vs. Gasoline Registrations (Polk 2005)



Clean Diesel Cars, Trucks and SUVs Poised for Comeback in the USA: *Why?*

- ▶ **Technology vastly improved from past**
 - Fuel economy - *20-40 percent better*
 - More consumer friendly - noise, smoke, odor
 - Performance - *faster acceleration than gasoline*
 - Diesels require no sacrifice in performance/utility - towing, hauling, etc.
- ▶ **Good progress on meeting more stringent emissions challenges**
 - Gasoline-diesel equivalent standards 2004-2007;
 - Cleaner diesel fuel available -- mid-late 2006
- ▶ **Increasing consumer and societal demands**
 - Sustained higher gasoline prices
 - Reliance on imported oil, energy conservation
 - Need for near-term energy conservation strategy prior to wide scale adoption of fuel cells/hydrogen in 2050 (*National Academy of Science, 2004*)
 - Global warming



For More Information:

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