

The California ENERGY COMMISSION

DOCKET

08-ALT-1

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February 18, 2009



Kenworth Truck Company



is a Division of

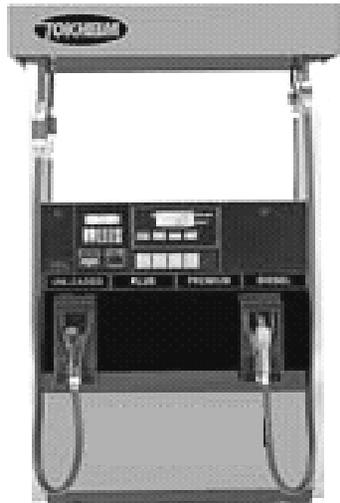


- **Headquarter in Kirkland, WA**
- **An Industry Leader For 80+ Years**
- **Four North American Production Facilities**
- **World's Third-Largest Heavy Truck Manufacturer**
- **Commitment to Quality and Technical Expertise**
- **Industry Leader in “Green Technologies”**

J.D. Power and Associates Heavy Duty Winners

	2003	2004	2005	2006	2007	2008
Over The Road						
Vocational			VOLVO			
Pickup & Delivery						
Service						

2007/10 Emissions Solution

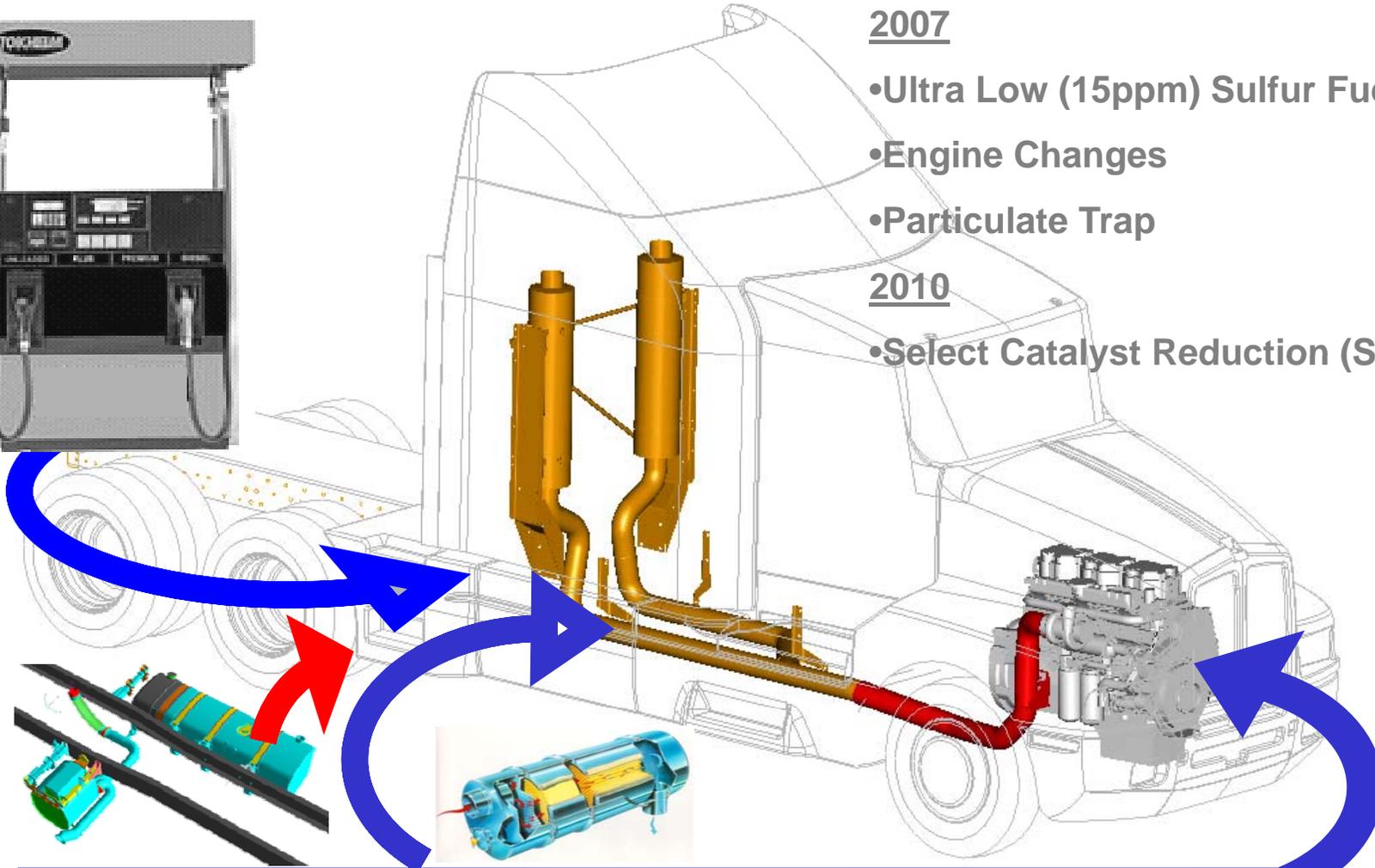


2007

- Ultra Low (15ppm) Sulfur Fuel
- Engine Changes
- Particulate Trap

2010

- Select Catalyst Reduction (SCR)



SCR

Particulate Trap

Engine

***EPA Emission Regulations
On-Highway Diesel Engines***

90%

Reduction

1994 - 2010

NO_x + NMHC g/hp-hr

Evolution of the Green Brand





LNG

Natural Gas T800



Kenworth T800 GX

Program:

- **Only Truck OEM To Offer In-Plant Installation of LNG Technology**
- **Exclusive Supplier Relationship with Westport**
- **Production Began in 2008**
- **Over 150 trucks deployed in 2008**

Scope:

- **Target Applications: Ports/Drayage, Municipal, P&D, Regional Haul and Vocational Trucks and Tractors**
- **T800 w/ ISX**
- **Standard and Extended Day Cab, 38" AeroCab**
- **Manual Transmissions Only**
- **Fuel Tank Size and Location, Exhaust Configuration and Battery Box Locations to be Defined**



Liquefied Natural Gas T800

- **ISX Foundation**

- Engine Control Unit
- LNG/Diesel Injectors
- LNG Fuel Tanks

- **LNG Benefits**

- 95% Diesel Reduction
- 20% Greenhouse Gas Reduction
- 33% NOx Reduction
- 97% North American Supply
- Lower Cost Than Diesel



WESTPORT LNG SYSTEM for HEAVY-DUTY TRUCKS

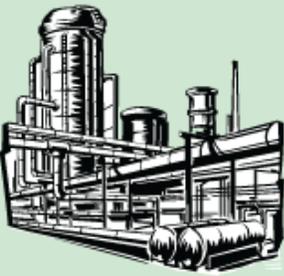
- Liquefied natural gas (LNG) system for heavy-duty trucks
- Class-leading emissions performance
- Maintains equivalent horsepower, torque, and efficiency to a diesel-fueled engine
- Fuel economy is matched to diesel on an energy equivalent basis



1st In-Plant LNG Production
Kenworth Plant - Renton, WA.
April, 2008



LNG Heavy-Duty Truck Well to Wheel GHG Emissions (CA)

	Extraction	Processing	Fueling, transportation and storage	Emissions at end use	Total life cycle
Natural gas (LNG)	 447	 1397	 259	 7954	10,057 gCO ₂ eq/dge
Diesel	 888	 1480	 336	 9966	12,669 gCO ₂ eq/dge

Source: TIAX LLC Study Commissioned by Westport and Clean Energy (June 2008) and CARB (2008) *Detailed California-Modified GREET Pathway for Ultra Low Sulfur Diesel (ULSD) from Average Crude Refined in California*

21% reduction

Westport Heavy Duty

Benefits of an HPDI LNG Fuel System

- Provides a better solutions for the environment and our country
 - 33% better in NOx reduction
 - GHG 20% less than diesel
 - Reduce our dependency on foreign oil

- Provides a lasting improvement to the quality of life in the South Coast port area:
 - NOx reduction advantage over 7-year period
 - One LNG truck = 3.6 tons
 - 8,000 LNG trucks = 28,800 tons
 - GHG reduction over a 7-year period
 - One LNG truck = 196 tons
 - 8,000 LNG trucks = 1,568,000 tons

Kenworth LNG Trucks Servicing So Cal

- **HayDay Farms**
- **Border Valley**
- **Calco**
- **TTSI**
- **Green Fleet Systems**
- **Southern Counties Express**
- **JBA**
- **Trimac**
- **Pepsi**
- **City of LA**
- **Lax**
- **LA County Sanitation**
- **City of Anaheim**
- **Cascade Sierra/SSA**





30% - 50%

Fuel Economy Increase



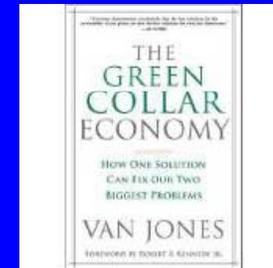
Early Adopters

Single Axle Tractor



Green Collar Job Creation

- **Significant Green Collar Job Creation**
 - Over 1230 green collar jobs in southern California for every 1,000 Kenworth LNG trucks put into service
 - If the Ports proceed with the total CTP 50% alternative fuels replacement of 8,400 trucks, this could generate over 10,300 direct jobs in the Los Angeles area
- **Westport**
 - Field service and support –currently employs 10 people, an expansion would be required if port project materializes
 - Maintenance – Long Beach College tech training program – skills development
 - Parts and inventory support – Maintenance of large inventory to support LNG trucks
- **Partners**
 - Kenworth Truck Company – Final build, test and commissioning
 - Inland Kenworth – Ongoing support, preventative maintenance and service
 - Cummins Cal Pacific – engine support and service
 - Clean Energy - Fuelling infrastructure build and support



"A transition to a clean energy economy will create hundreds of thousands of American jobs in the near term while also stimulating long-term business opportunities for American entrepreneurs, reduce our vulnerability to volatile, global fossil fuel prices, and mitigate the widespread economic impacts of climate change," said Carol Werner, executive director of the Environmental and Energy Study Institute (EESI).

A close-up photograph of a Kenworth truck's front grille. The grille is made of a silver-colored metal mesh. In the center of the grille is a prominent Kenworth logo. The logo is a shield-shaped emblem with a red background and a silver border. Inside the shield, the letters 'K' and 'W' are stacked vertically in a silver, stylized font. The top of the shield has a series of vertical bars, and the bottom has three vertical stripes. The background of the image is a solid blue color.

KENWORTH.
The World's Best.