



***Clean Energy***<sup>®</sup>

*North America's leader in clean transportation*

# **It's All About the Money**

***Save a Buck a Gallon or More with Natural Gas***

Transport Topics Webinar July 31, 2008

Cleaner – Cheaper – Domestic Natural Gas

# Challenges to the Trucking Industry

- Diesel Fuel
  - High Cost
  - Rapidly Increasing Cost
  - Looming Shortages
- Climate Change & Carbon Emissions
- 2010 Engine Technology Changes (& Cost Increases)

If only there was  
a cheaper fuel,  
a cleaner fuel,  
a fuel made in  
America...

About Clean Energy

Cheaper, Cleaner, Domestic Natural Gas

Vehicular Natural Gas (CNG & LNG) 101

Energy Independence & Economics

Natural Gas Engines & Trucks

## Largest Alternative Transportation Fuel Provider

**250+**  
Fleet  
Customers

**14,000+**  
Natural Gas  
Vehicles

**170+**  
Natural Gas  
Fueling Stations

### Compressed Natural Gas (CNG)



Taxis



Government  
Vehicles



Airport  
Transit

### Liquefied Natural Gas (LNG)



Regional  
Trucking



Public  
Transit



Refuse  
Hauling

## We Provide CNG & LNG Fuel to Fleets

## We Bundle Services to Drive Fuel Sales

- Vehicle OEM relations
- Fleet analysis
- Station design and build
- Station capital
- Station operations and maintenance
- Vehicle financing
- Grant assistance
  - \$100 Million + in Grant Awards



# Natural Gas for Transportation



***Cheaper***



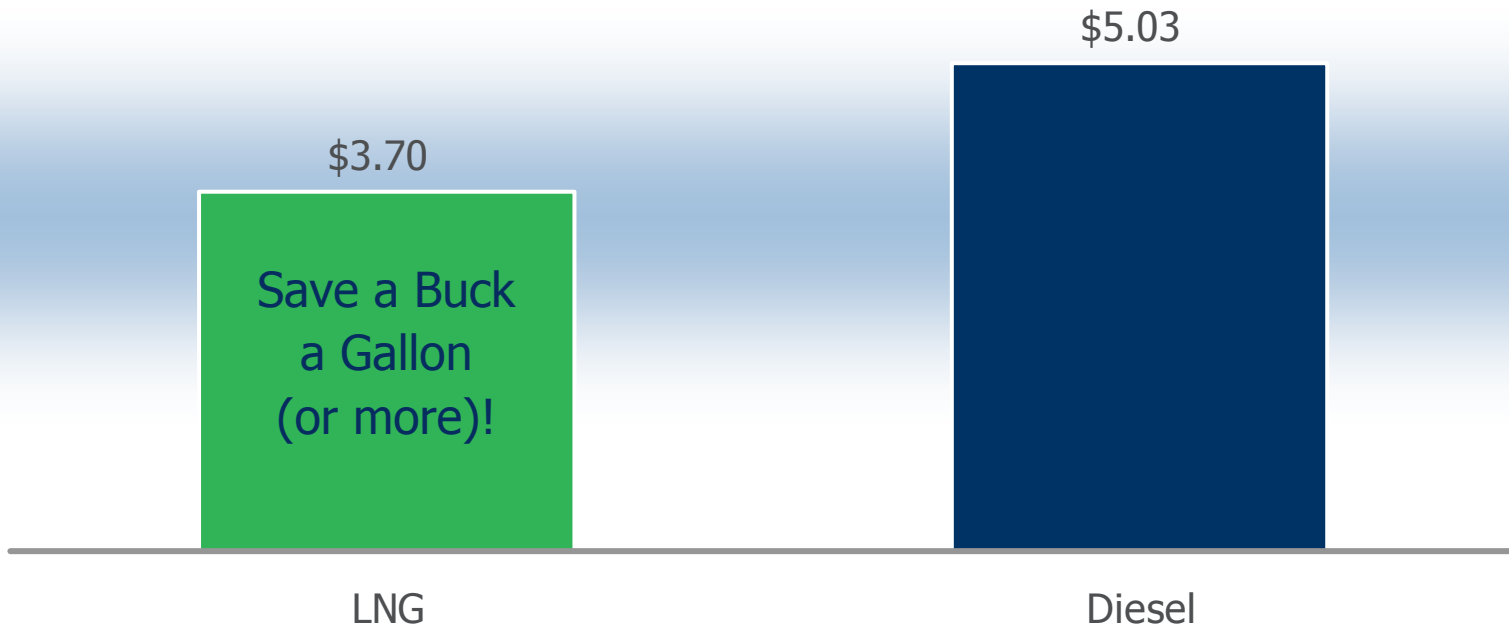
***Cleaner***



***Domestically Available***

# Natural Gas Is The Cheapest Option

## Pump Prices<sup>1</sup> (Equivalent Diesel Gallons Based on Energy Content)

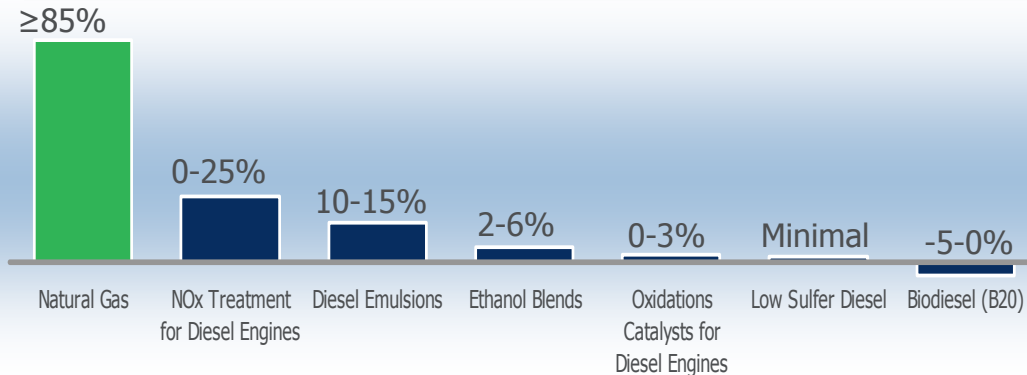


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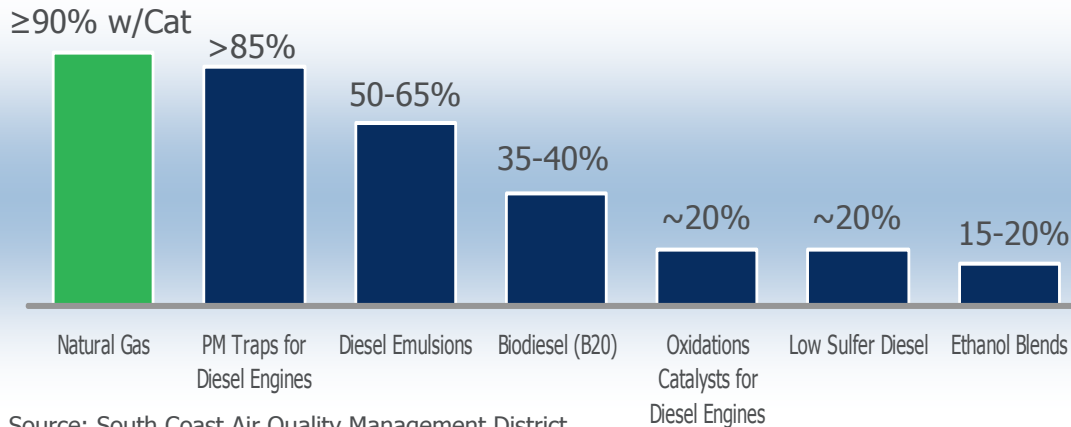
<sup>1</sup> Pricing on 7/7/08. California diesel price from EIA. LNG price from Clean Energy station.

# NGVs Produce Significantly Less Smog and Soot

## NOx Reduction: Less Smog



## PM Reduction: Less Soot



Source: South Coast Air Quality Management District  
2007 Air Quality Management Plan Summit Panel



# Natural Gas Is The Low Carbon Option

## Greenhouse Gas Emissions Reductions<sup>1</sup> (Compared to Heavy Duty Diesel Engines)

23%

Cut Your  
Carbon

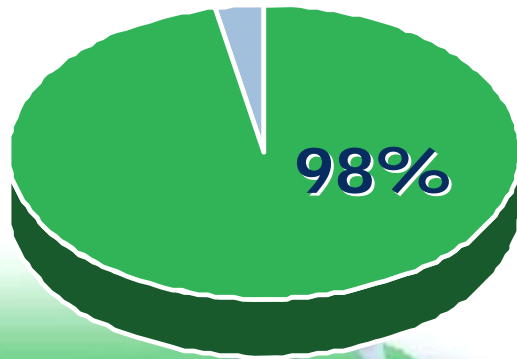
Natural Gas

Note:

<sup>1</sup> Report prepared for the California Energy Commission

# Domestic Natural Gas Is Good for America

## Natural Gas



- Supplied From US and Canada
- Imported

- 80+ Years of Domestic Reserves (Some estimates are as high as 120 years)
- World NG Reserves Estimated at 3x that of Oil
- Why Import Oil When We Have Our Own Energy?



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## Natural Gas Basics

# Compressed Natural Gas (CNG) Basics

- Light duty and medium duty vehicles
- Same fuel that heats homes & used for cooking
- Pipeline gas compressed at the station
- Dispensed similar to gasoline
- Stored in cylinders onboard vehicle
- Not propane! (NG has higher BTU content)



# Liquid Natural Gas (LNG) Basics

- Heavy duty and medium duty vehicles
- Pipeline gas cooled to -260F
- Produced at LNG plants
- Delivered by truck to fuel stations
- More onboard fuel storage than CNG – Greater range at lower weight
- Premium priced vs. CNG



# LNG Production Plants Make the Fuel

Clean Energy's  
Newest LNG  
Plant in Boron,  
California

Opens Fall 2008

\$70 Million  
Investment

160,000 gal/day

Expanding to  
240,000 gal/day  
at end of 2009

1.5 Million  
Gallons Storage



# Fuel Delivered to Stations in Trailers



# Above-Ground Stations Dispense the Fuel

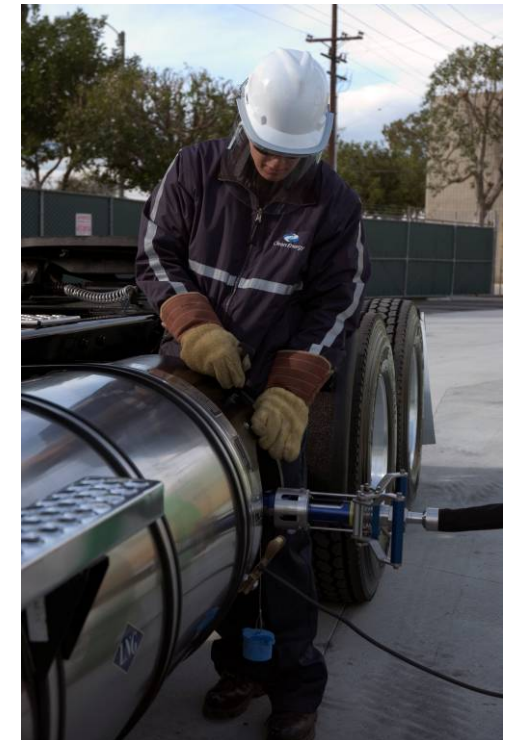


**Carson Truck Station  
Grand Opening Dec-07**

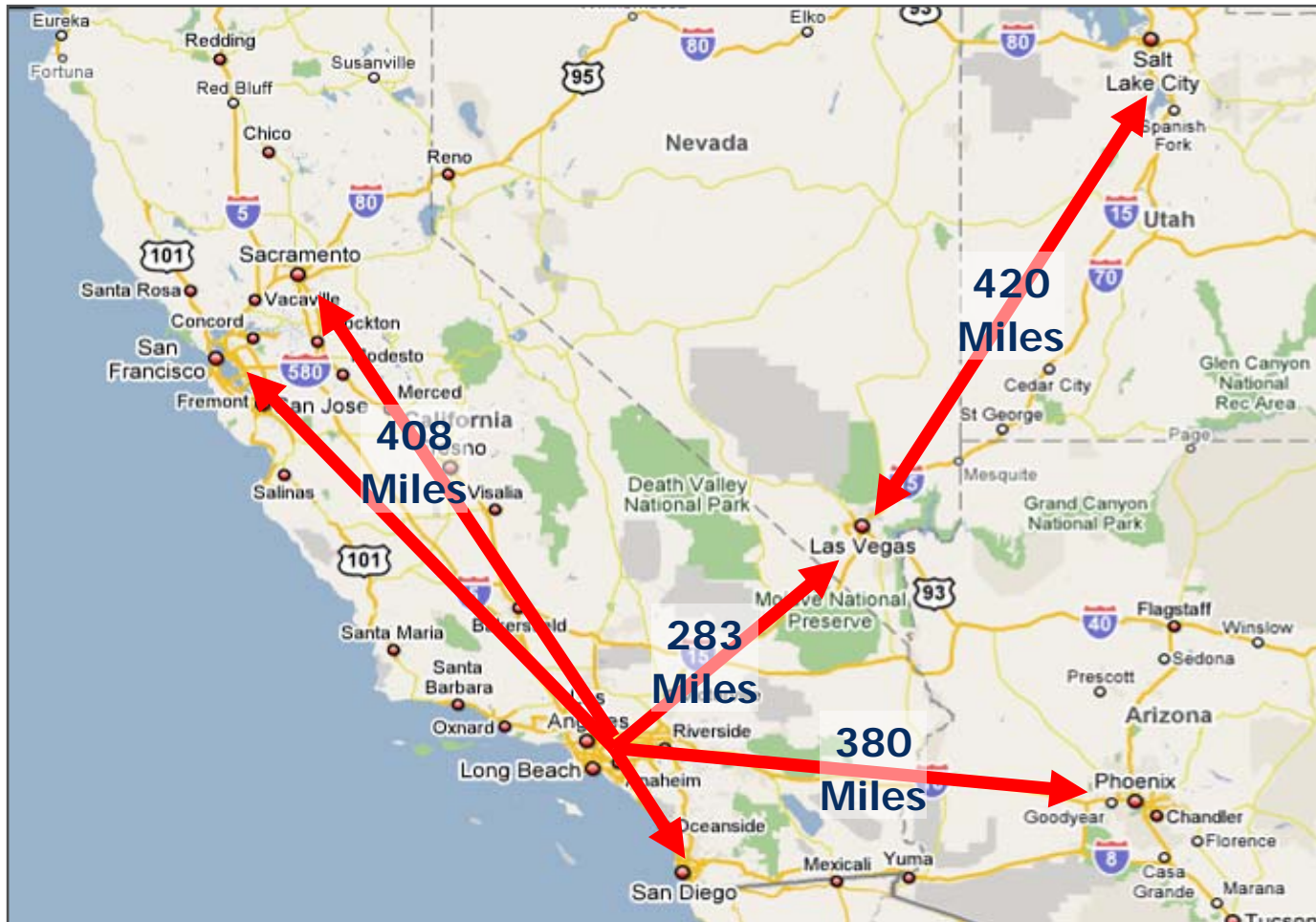


# LNG Truck Fueling

- Fuel dispensed at 20 to 40 gallons per minute
  - Tank fills in a few minutes
- Sealed Dispensing System



# Fueling Network Can Easily Span Regions





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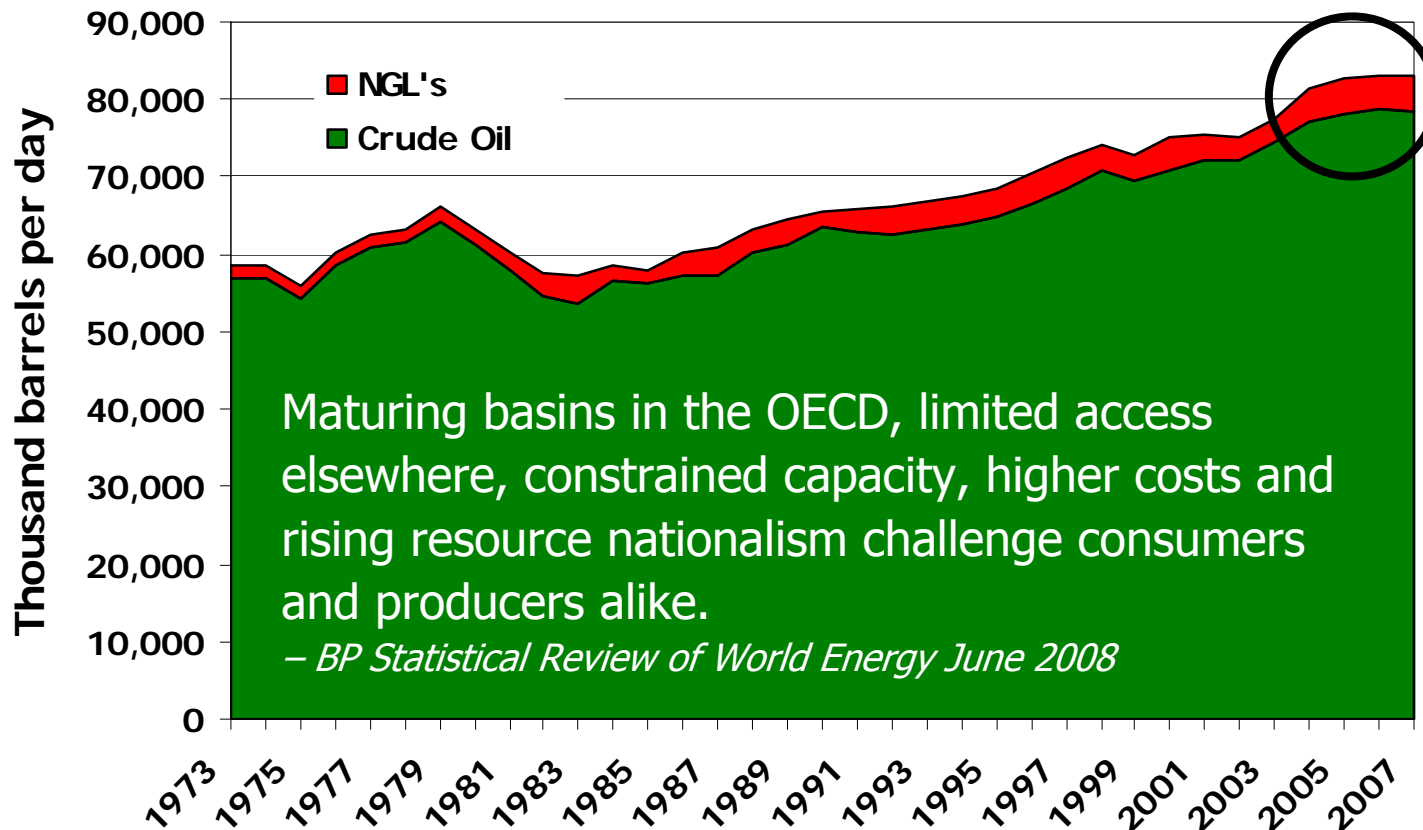
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## Energy Independence & Economics

**US Spends Over \$700 Billion  
per Year to Import Oil**

# The Oil Plateau Is Already Here

Global Oil Production

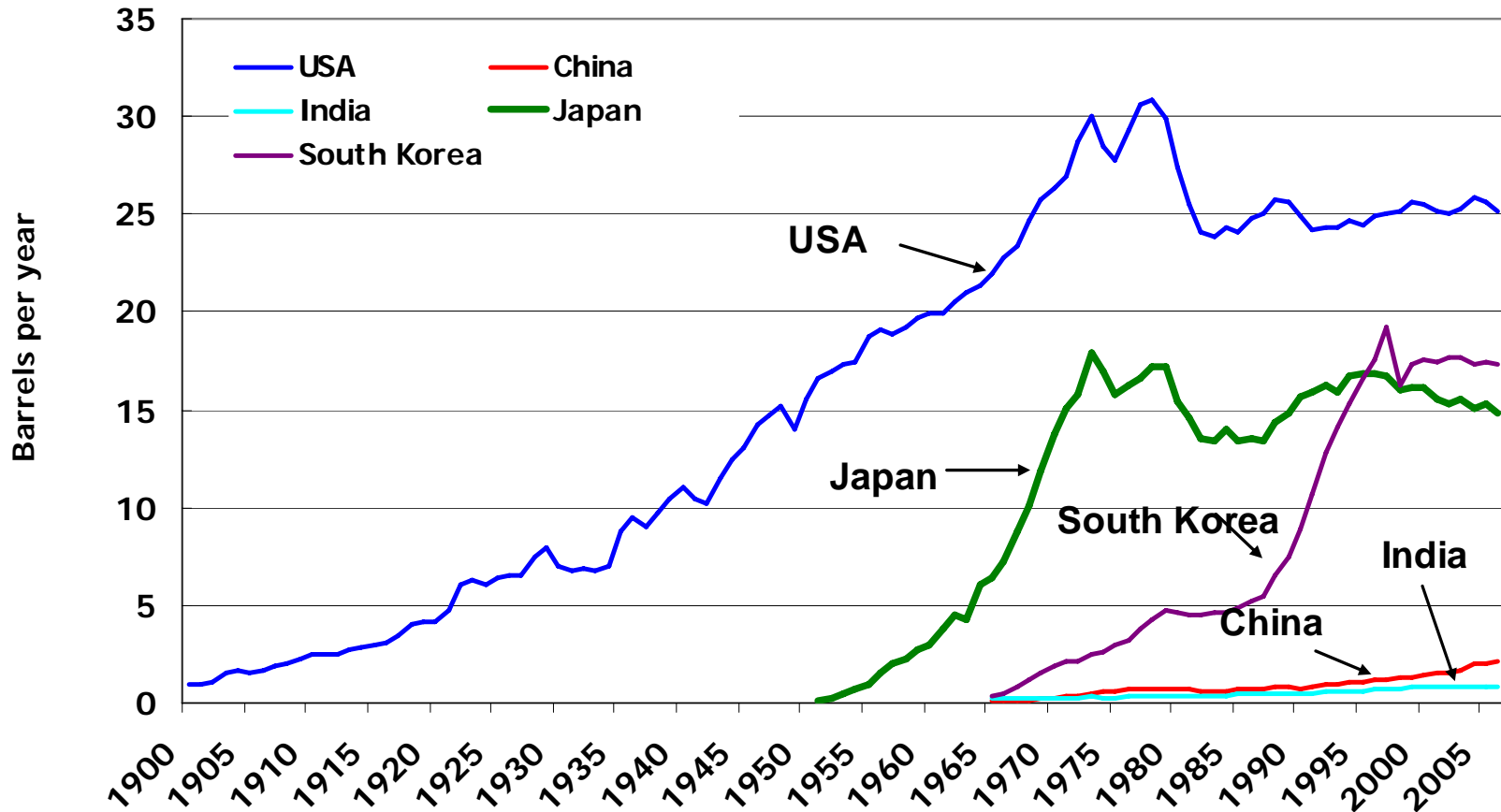


Has crude oil production already reached the plateau?

While the exact timing of peak oil production is subject to considerable debate, the inevitability is not; the U.S. peaked in 1971 with production down 50% since then.

# The World is Nowhere Near Peak Demand!

Per Capita Oil Consumption



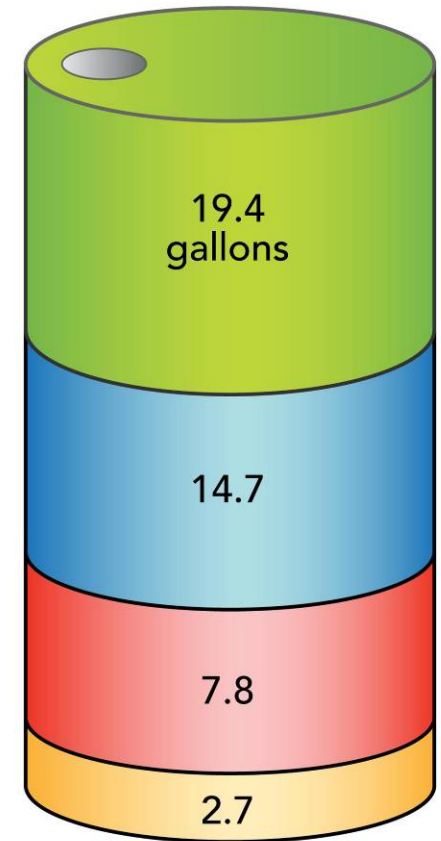
Rising standards of living and industrialization are on the verge of dramatically increasing per capita consumption in key emerging economies

# Refining Crude Oil to Diesel Is Constrained

- A Barrel of Oil Can Only Produce 7.8 Gallons of Diesel
- What Happens when Passenger Cars Use Diesel?
- What Happens when Ships use Diesel Instead of Bunker?

## Product Breakdown From a 42-Gallon Barrel

- Gasoline
- Other Products (Including jet fuel, LPG, heavy fuel oil)
- Diesel
- Other Distillates (heating oil)



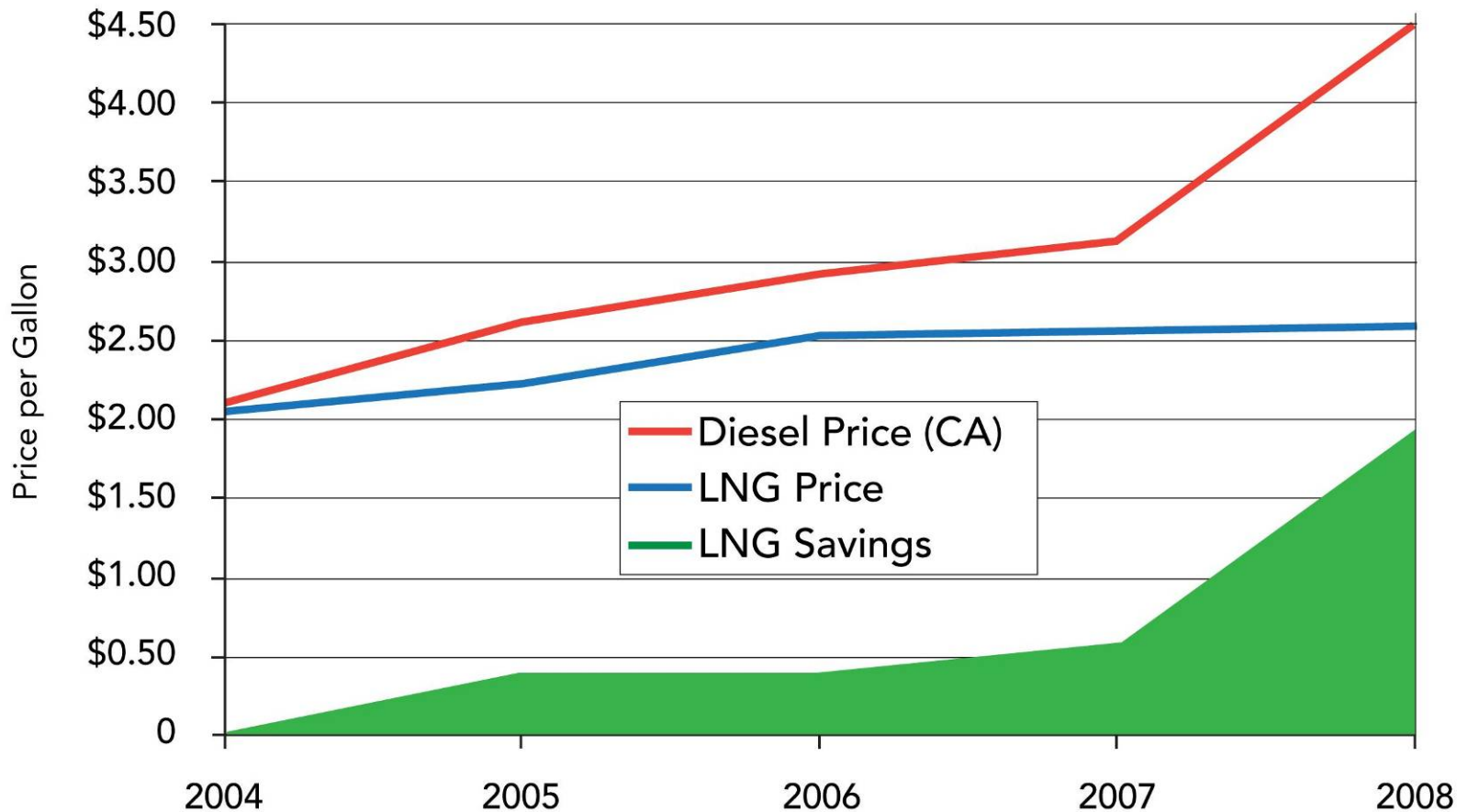
Courtesy of Transport Topics

# Meanwhile, Natural Gas Fuel Savings Climb



## Diesel Price vs LNG Price

Diesel pricing from the Energy Information Administration  
LNG pricing from large volume long-term LNG contracts





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**Natural Gas Engines & Trucks  
Ready to Deliver Today**

# Cummins ISX-G Engine from Westport Same Performance as ISX Diesel!



- 15 Liters
- Compression Ignition
- 400 HP
  - 1450 lb-ft torque @ 2,000 RPM
- 450 HP
  - 1650 lb-ft torque @ 2,000 RPM
- 80,000+ GVW
- Manual Transmission
- LNG Fuel
  - 55 or 110 Equivalent Diesel Gallon Tanks
- Emission Benefits over New Diesel
  - 33% Lower NOx (0.8 grams vs. 1.2)
  - Minimal Diesel PM
  - Over 20% Smaller Carbon Footprint
- \$28,800 Federal Tax Credit



Kenworth T800



Peterbilt 386 & 388

# ISL-G Engine from Cummins-Westport 2010 Compliant Today – No DPF or SCR!



- 8.9 Liters
- Spark Ignited
- Performance Rivals Diesel
- 250 to 320 HP
- 660 to 1000 lb-ft Torque
- 66,000+ GVW
- Automatic Transmission
- LNG or CNG Fuel
  - Store up to 110 Equivalent Diesel Gallons
- Emission Benefits Over New Diesel
  - 83% Lower NOx (0.2 grams vs. 1.2)
  - No Diesel PM
  - Over 20% Smaller Carbon Footprint
- \$32,000 Federal Tax Credit



Sterling LT8500



Peterbilt 320 & 384



Autocar

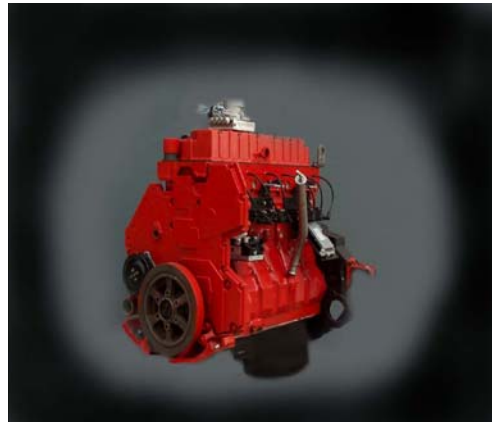


Capacity Yard tractor

# Phoenix NG Engine from Emissions Solution Inc. Natural Gas Upfit of International DT-466 Engine



- 7.6 Liters
- Spark Ignited
- 175 to 265 HP
- 460-820 lb-ft
- 32,000 GVW
- LNG or CNG Fuel
- Emissions Benefits over New Diesel
  - 33% Lower NOx (0.8 grams vs. 1.2)
  - No Diesel PM
  - Over 20% Smaller Carbon Footprint
- \$32,000 Federal Tax Credit



Coming Soon:  
DT-570 9.3L, 350 HP, 1200 lb-ft  
DT-530 8.6L, 330 HP, 1100 lb-ft



# Baytech GM and Isuzu Trucks

## CNG Models Currently Available 2008/2009 Model Years

- 8.1L GMC/Chevy C6500/C7500C/8500 Truck
- 8.1L GMC/Chevy C4500/C5500 Truck and Shuttle Bus
- 8.1L Workhorse Chassis
- 6.0L\* Chevy Express/GMC Savana 4500 Cutaway Van
- 6.0L\* GMC/Chevy W4500 & Isuzu NPR HD
- 6.0L\* Workhorse Chassis (over 14,000 lb GVWR)

\*2009 Model Year only

## Additional CNG Models Planned for 2009 Model Year

- 6.0L Chevy Express/GMC Savana Van & Cutaway Van
- 6.0L GMC Sierra/Chevy Silverado 3500HD Chassis Cab
- 6.0L Sierra/Silverado 2500HD/3500HD Pickup
- 6.0L GMC/Chevy W3500 & Isuzu NPR
- 6.0L Workhorse Chassis (under 14,000 lb GVWR)



**C4500/5500/6500/7500/8500**



**GM W4500/ Isuzu NPR HD**



Pictured: 2009 Express 4500 Cutaway

**Express/Savana 4500 Cutaway Van**

# Let's Go – Cure Oil Addiction Today!

- Natural Gas Fuel Is:
  - Cheaper
  - Cleaner
  - Lower Carbon
  - Made in America
  - Abundant
- Trucks Are Available
- Save a Buck – or More!

Thank You for Attending  
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