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Why Natural Gas in a Diesel Fleet

Emission Solutions, Inc.
Heavy-Duty Engine Roll-Out

For

Greater Baton Rouge-Alternative energy 2011

April 14 2011





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Why Natural Gas in a Diesel Fleet

- **Problem & Market Drivers**
- **ESI company and Product Evolution**
- **Navistar-ESI Relationship**
- **Cost Analysis: Repower**
- **Applications**



Why Natural Gas in a Diesel Fleet

PROBLEM

- **5 million barrels From OPEC**
 - 70% used in transportation
 - \$1 billion exported per day
 - Two Thirds of our Trade Deficit
 - China will pay or trade for Oil
 - A dangerous lifetime
 - **US pays both-sides of the WAR with Afghanistan & Terrorists**
- **EPA: Emission Mandates**
 - GHG
 - Many counties in moderate to Severe non-attainment
- **Fleet Operational Costs**
 - What energy solution is right

RESOLVE

- **Natural Gas Engines**
 - Cheaper (up to \$2.00/gge less)
 - Proven reserves up to 150 yrs
 - IT IS OURS NOT THEIRS
 - (HOME GROWN)
 - 25% cleaner than diesel (GHG)
 - Renewable (biomethane)
 - Federal/State Incentives
 - Safer than diesel/propane
 - Predictable costs
 - Creates jobs
 - Keeps our money home
 - A cleaner fuel (CH4)
 - Non toxic at the tailpipe



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Company Overview

➤ **Emission Solutions, Inc. (ESI)**

- *Privately Held Texas S Corporation –Founded 1998, Formed Sept, 2002 – Dallas, TX*
- *Develops, Manufactures & Markets CARB & EPA MY2010 OEM, Heavy-Duty, CNG/LNG Engines*
- *Patented Technologies*
- *Navistar-International, Class 6,7 Trucks and School Buses
with DT466e or MaxxForce® DT engines*
- *Food & Beverage Distribution*
- *Municipalities and School Districts*
- *Refuse*
 - *Transits*





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International Truck Initial Production



Phase 1 Product Availability

WorkStar 7300 / 7400 Models
Garland TX Assembly Plant
In Production Today

Phase 2 – DuraStar Product

June Production

IC School Bus Products

TBD

2010 / 2011 Certified Engines

ESI 7.6L Phoenix Engine

TEST	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7	PHASE 8	PHASE 9	PHASE 10
CO	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
CO2	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
HC	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NOx	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
PM	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

(Note: The above table is a simplified representation of the data in the image. The actual image contains a complex table with many more columns and rows.)



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Navistar / ESI Support

- Supports Deployment of Clean Natural Gas Vehicles
- Supports Expansion and Breadth of Clean Vehicle Technologies & Platforms
- Supports Training Requirements For Optimum Customer Support
- Supports Dealership Infrastructure Requirements To Safely Work on New Natural Gas Powered Units





Supports Training Requirements

- **Natural Gas Platforms Require Navistar Dealership Skill Training**

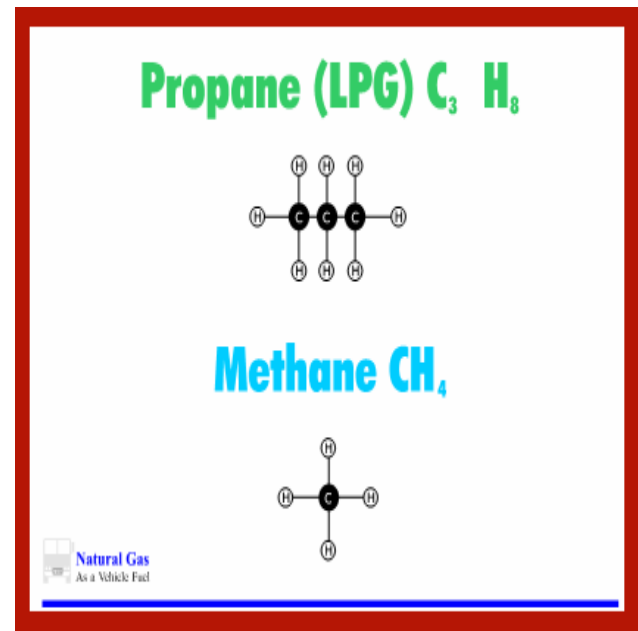
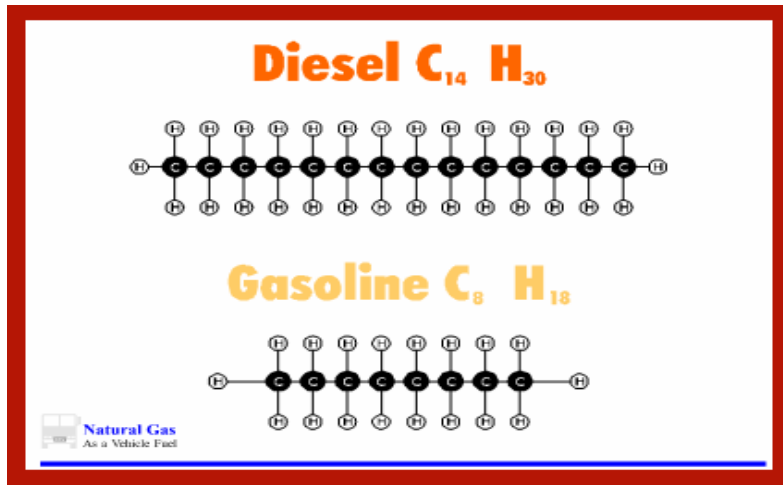
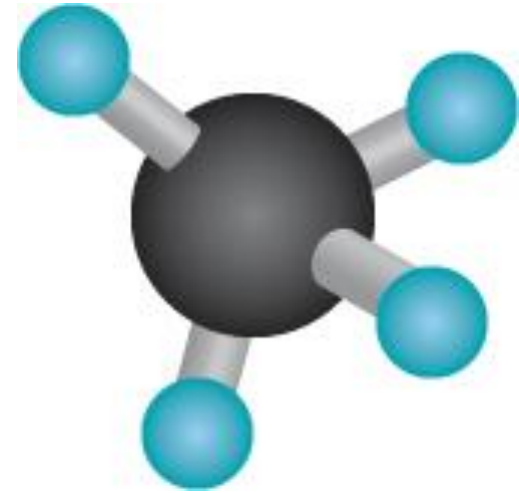
- New technologies require new skills:
 - Service Technician Training
 - Parts Employee Training
 - Supporting documentation creation
 - Parts Cataloging
 - Technical Service Manuals
 - Training Curriculum (Web and hands on)
- Envision utilization of Louisiana based training creators and Community College training support
 - Supports Skilled Louisiana Jobs and Community Colleges





Natural Gas Benefits

- Hydrocarbons, predominantly methane (CH₄)
- High octane rating
- Nontoxic, noncorrosive, and noncarcinogenic
- Not a threat to soil, surface water, or groundwater
- Lower ozone-forming emissions than gasoline
- Extracted from gas and oil wells
- Existing pipeline distribution system





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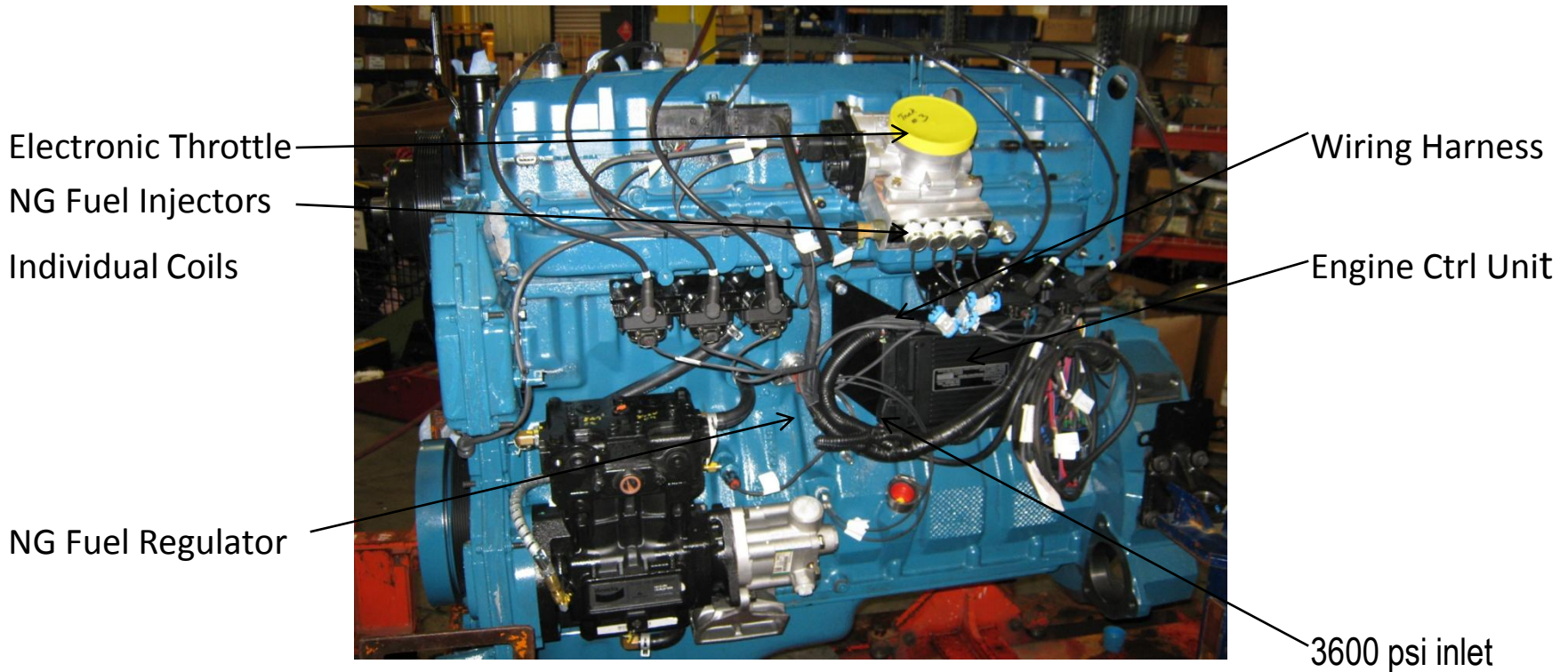
ESI Phoenix NG Heavy-Duty Engines

- **Current engine(s)**
 - 7.6 L (up to 300hp, 860 lb-ft torque)
- **Under development**
 - 7.3 L (up to 250hp, 425 lb-ft torque) RTS Aug 2011
 - 9.3 L (up to 375hp, 1280 lb-ft torque) RTS Jan 2012
 - 13 L (up to 475hp, 1700 lb-ft torque) RTS IVQ 2012



Technology Summary (Simple)

U.S. Patent # 6,910,269 B2, Dated June 28, 2005 (19 Claims and 7 Drawings)



New MY2011 ESI0326 Phoenix 7.6 L CNG Engine
300hp, 900 lb-ft torque



Technology Summary (Simple)

U.S. Patent # 6,910,269 B2, Dated June 28, 2005 (19 Claims and 7 Drawings)



REPOWER: MY 2011 esi0308 7.6 L CNG Engine
280hp, 860 lb-ft torque



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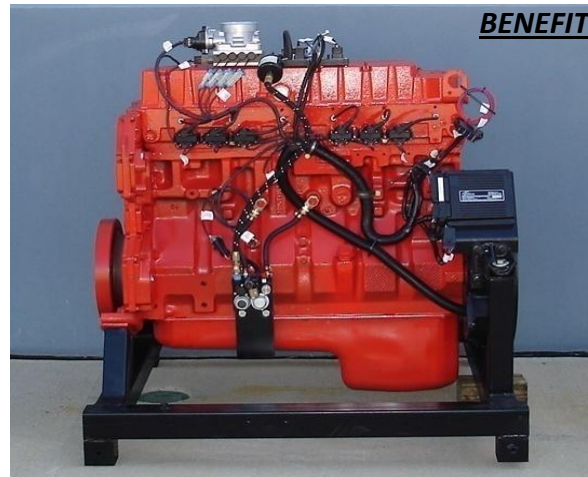


ENGINE SIMPLICITY

- 1) Throttle Body
- 2) One Coil per Spark plug
- 3) 45 lb passive three way catalyst
- 4) No EGR
- 5) Simple CNG regulator
- 6) Open System ECU Software
- 7) Simple wiring harness
- 8) For replacement or new chassis

BENEFITS:

- 1) IRS authorized VETC (\$32,000)
- 2) Eligible for Fed/State Funding
- 3) Lowest NOx+NMHC= 0.18 g/bhp-hr
- 4) Best Power:weight ratio in its class
- 5) Extended life cycle (10 years)
- 6) No major tools or training required
- 7) No service center changes
- 8) Less Service Intervals, fuel savings





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CNG Fueling Options

Time-Fill Fueling

Good for centrally-based fleets with consistent schedules
CNG is dispensed slowly, often overnight
Lower cost investment

Fast-Fill Fueling

Fueling takes place in minutes
Necessary for public-access stations
Good for vehicles with little downtime

Combo-Fill Fueling

Time-fill and fast-fill
More flexibility in fueling





PROPOSED: The tax provisions at issue include:

Restoring and expanding the natural gas-fueled vehicle income tax credit, which would make:

Dedicated natural gas-fueled vehicles eligible for a credit equal to 80% of the vehicle's incremental cost (up to a cap based on the vehicle's weight class, ranging from \$8,000 to \$64,000).

Bi-fuel and *dual-fuel* natural gas-fueled vehicles eligible for a credit equal to 50% of the above cap.
The credit, which expired on December 31, 2010, effective for five years.

Extending the alternative fuel credit for purchase of natural gas, which would extend the existing 50 cent per gasoline-gallon-equivalent fuel tax credit—set to expire December 31, 2011—for five years.

Extending the natural gas vehicle refueling property credit, which would:

Extend the natural gas vehicle refueling property tax credit—set to expire December 31, 2011—for five years.

Increase this credit from 30% or \$30,000 to 50% or \$100,000 per CNG or LNG station.

Allowing the natural gas vehicle and fueling infrastructure tax credits to count against the AMT provisions and making them transferrable.

Providing a series of incentives for OEMs to produce NGVs in the United States.



Repower Cost Analysis*

- **7 Year cumulative fuel Savings (30 units)**
 - **With 50 cent fuel Rebate: \$1,213,279**
 - **Without 50 cent fuel Rebate: \$ 964,954**

- **First Year cumulative Fuel Savings (30 units)**
 - **With 50 cent fuel Rebate: \$173,326**
 - **Without 50 cent fuel Rebate: \$137,851**



Budgetary Repower Cost*

- **Turn Key Solution (2004 - 2010) – \$58,000**
 - ROI without incentives: > 7 years
 - ROI with incentives: <1.0 year
 - Fuel, state/federal tax credits, funding

*** Local leasing entities can help offset capital costs**



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**ENBRIDGE GAS, Toronto, Canada, MY 2010 International Truck 4300 series
Powered My 2010 ESI Phoenix NG 7.6 L dedicated CNG engine**



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Silver Eagle Distributors LLP - Houston
World's largest AB Distributor
MY1999 Tractor Powered by MY2006 ESI 7.6 L CNG Engine



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**MY2010 INTERNATIONAL WORKSTAR
POWERED BY FACTORY INSTALLED
ESI 7.6 L CNG ENGINE**



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**Tulsa School District (first of 140 units)
Powered with ESI 7.6 L CNG engine
December 2010**



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**Tulsa Public Schools Transportation
Bus 3601**



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**Clear Creek ISD, MY2005 IC Bus Repower (44 units)
With ESI 7.6 L CNG Engine
November 2010**



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- Mansfield ISD RE Pushers 2002 (6 units)





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**MY 2000 IC Bus Chassis with DT466E (6 units)
Powered by MY2010 ESI 7.6 Liter dedicated CNG Engine**



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**Santa Fe ISD, T444E (v-8) Repower
with ESI 7.3 L CNG Engine (v-8)
June – Nov 2011 (20 units)**



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Thank You for your interest
In helping our Country
Keep our dollars at home.

