

US EPA ARCHIVE DOCUMENT



LIQUID PROPANE AUTOGAS:

Product Introduction & Overview



4.12.12

What We Are Best Known For

ROUSH[®]
CLEANTECH



800.59.ROUSH

ROUSHcleantech.com



Roush Fenway Racing

- Dominant NASCAR Sprint Cup racing team



ROUSH Performance

- Industry leading high performance vehicles



ROUSH Life Sciences

- Setting a new standard in medical equipment design, manufacturing, and engineering



ROUSH Industries

- OEM quality manufacturing, engineering, prototyping, and design capabilities

A white rounded rectangular box containing the ROUSH CLEANTECH logo. The logo consists of the word "ROUSH" in a large, bold, black font, with a thin blue horizontal line underneath it, and the word "CLEANTECH" in a smaller, blue, sans-serif font below the line.

ROUSH CleanTech

- Dedicated to developing quality alternative fuel solutions
- Propane autogas focus
- EPA and CARB certification ability
- Platform customization to suit customer needs
- Reduces operating costs, carbon footprint
- OEM support through Ford and BPN dealers
- Creating opportunities for partner companies
- Using American fuel and American technology



WORLDWIDE OIL DEMAND

Setting The Stage for Alternative
Fuels

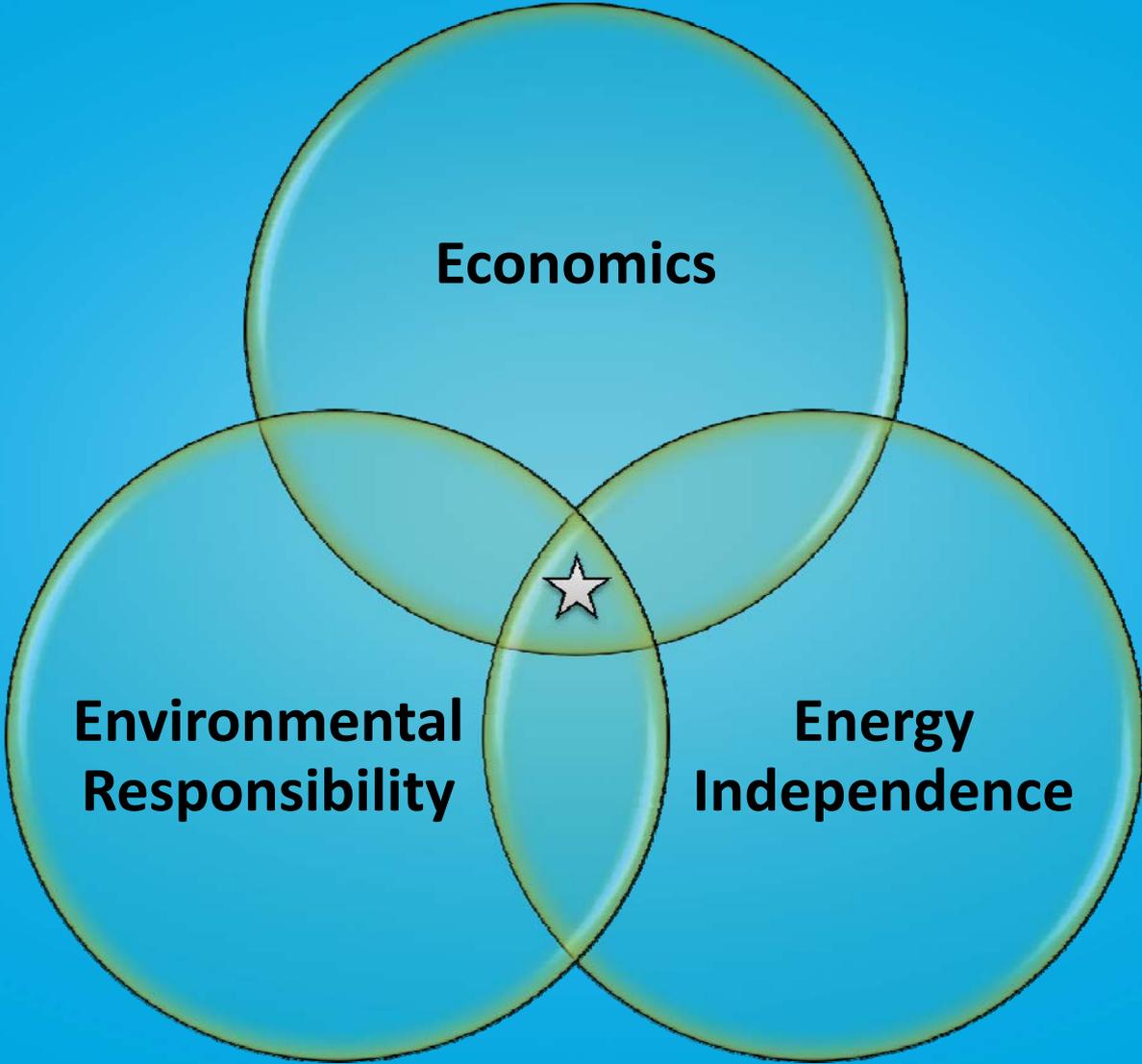
Here's The Truth...

The Truth About Oil

By Bryan Walsh (April 9, 2012)

- “Demand for oil is still rising - set to grow 800,000 barrels a day this year despite a still sluggish global economy.”
- “A combination of recession, conservation and improved auto efficiency has helped the U.S. shed demand impressively. But demand in China, India and other developing nations has replaced it.”
- “Last year the average cost for a gallon of unleaded was \$3.51, the highest on record, up from \$2.90 a year before. On March 26 the national average was \$3.90.”
- “Contrary to what the drill-here, drill-now crowd says, oil companies could punch holes in every state and barely make a dent in gasoline prices. Even a more energy independent U.S. can't control prices, not with a thirsty China competing on the globalized oil market.”







WHAT IS PROPANE AUTOGAS?

Clean. Domestic. Abundant. Safe.

What Is Propane Autogas?

Clean

- 24% reduction in Greenhouse Gas (GHG) emissions.
- 20% reduction in Nitrogen Oxide (NOx) emissions.
- 60% reduction in Carbon Monoxide (CO) emissions.

Domestic

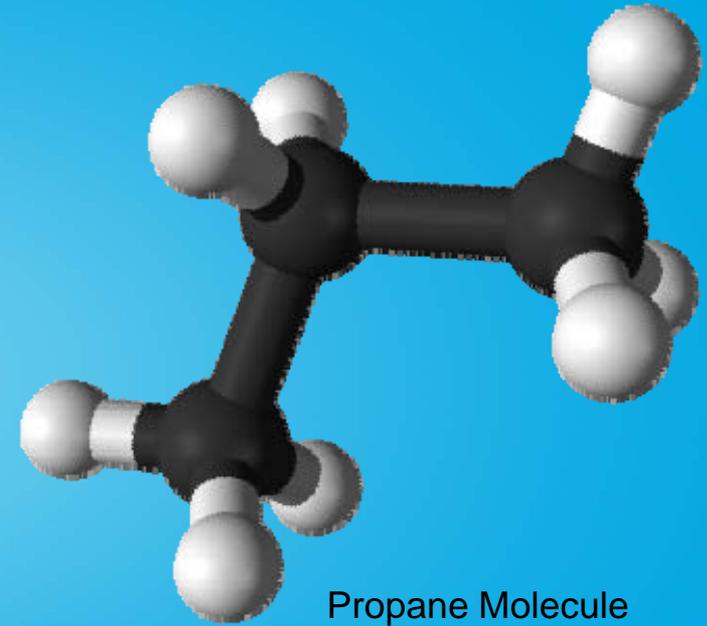
- 90% of propane used in U.S. comes from U.S.
- 7% of propane used in U.S. comes from Canada.

Abundant

- Most refueling infrastructure of any alternative fuel.
- Major natural gas shale found in northeast U.S.
- Powers over 17 million vehicles worldwide.

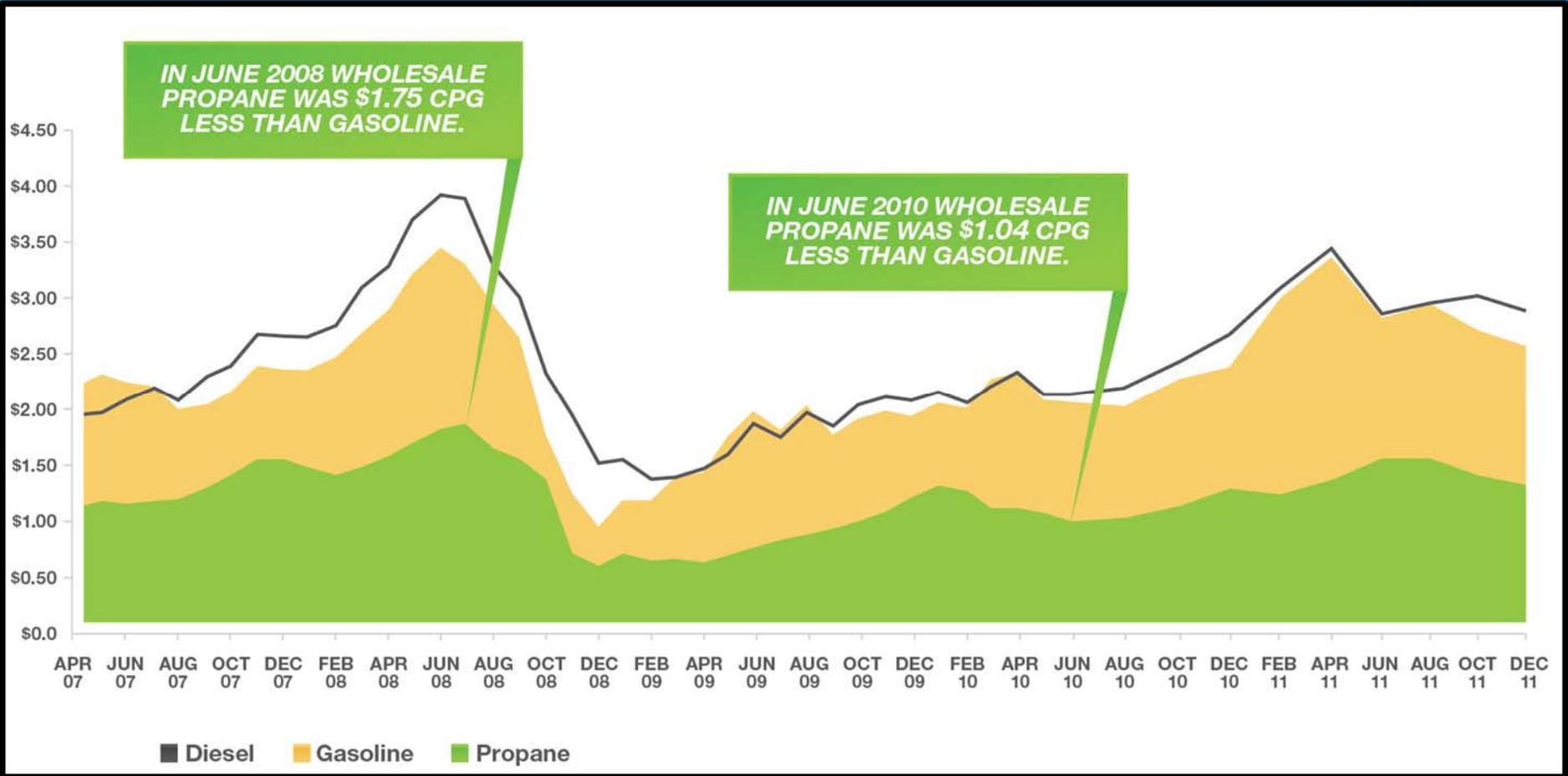
Safe

- Low pressure (~ 200 psig).
- Narrow flammability range.
- Fuel tanks are 20 times more puncture resistant than gasoline.



Propane Molecule
(C₃H₈)

Average Price of Propane



What Is Propane Autogas?

On-Site Refueling:



Ford Michigan Assembly Plant (MI)



AmeriGas Propane Tank



Shell (AZ)



La Pine School District (OR)



ROUSH CleanTech (MI)



Heritage Propane Tank



PRODUCT OVERVIEW:

**Pickups | Vans & Wagons | Cutaway Vans
Chassis Cab | School Bus**

Liquid Propane Autogas Vehicles

- Light & medium duty Ford trucks & vans, school bus.
- Factory Ford warranty maintained.
- No loss of HP / torque / towing capacity.
- Serviceable with existing diagnostic equipment.
- EPA & CARB Certified.



Ford E-150 / E-250 / E-350

Ford E-350 SRW Cutaway

Ford E-450 DRW Cutaway

Ford F-450 / F-550

Blue Bird Vision School Bus

Target Markets

Construction / Plumbing / HVAC
Propane Marketers / Distributors
Truck Rental / Moving
Telecommunications
Food & Beverage
Medical / HME
Transportation
Landscaping
Government
Agriculture
Railroad
Schools
Utilities



Ford F-650

6.8L V10 (3V)



Ford F-650

Ford F-59 Strip Chassis

6.8L V10 (3V)



Ford F-59 Strip Chassis

Ford Transit

3.7L V6



Ford Transit

Ford F-150

3.7L V6

Liquid Propane Autogas Fuel System

FRPCM

The Fuel Rail Pressure Control Module ensures consistent vehicle performance and power on-demand.

Fuel Rail

ROUSH CleanTech's signature blue anodized aluminum fuel rail is designed to operate under varying temperatures of liquid propane

Fuel Fill

Industry-standard valve designed to allow for safe passage of liquid propane into the vehicle. Includes a check valve to prevent fuel leaks.

Fuel Tank

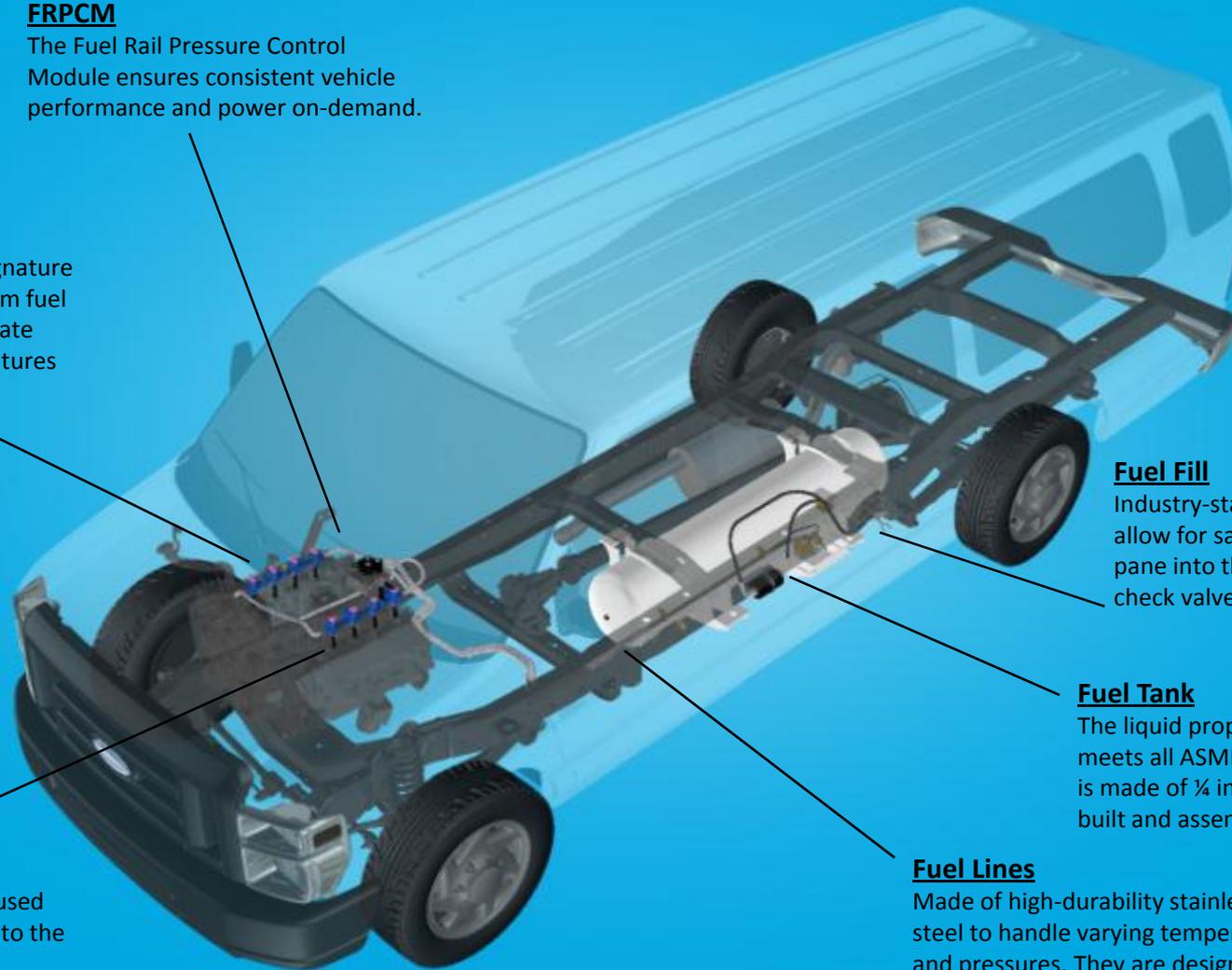
The liquid propane autogas fuel tank meets all ASME certification standards, is made of ¼ inch thick steel, and is built and assembled in the USA.

Fuel Lines

Made of high-durability stainless steel to handle varying temperatures and pressures. They are designed to route through the factory line locations.

Fuel Injectors

Special fuel injectors are used to inject liquid propane into the cylinders for ignition.





RETURN ON INVESTMENT

A Positive Return, Even Without
Government Incentives

2012 Ford F-450 Chassis Cab

	Diesel (6.7L V8)	Propane (6.8L V10)	Savings or (Cost) to Convert
Capital Costs			
Base Ford Vehicle Purchase Price	\$ 41,225.00	\$ 33,865.00	
ROUSH Propane System Conversion Price		\$ 21,000.00	
Total Capital Savings or Investment to Convert:	\$41,225.00	\$54,865.00	\$ (13,640.00)
Operating Costs (fuel)			
Total Vehicle Life (miles)	200,000	200,000	
Average Miles per Gallon*	8.5	7.0	
Gallons of Fuel Used Over Life of Vehicle	23,529	28,571	
Fuel Price (per gallon)**	\$ 4.10	\$ 2.25	
Total Fuel Savings or Cost Over Life of Vehicle:	\$ 96,470.59	\$ 64,285.71	\$ 32,184.87
Operating Costs (misc.)			
Maintenance Rate per mile (tune-ups, oil, engine life, etc.)	\$ 0.030	\$ 0.030	
Maintenance Costs	\$ 6,000.00	\$ 6,000.00	
Fuel Loss from Pilferage & Theft (\$100 per year)	\$500.00	\$0.00	
Total Misc. Savings or Costs Over Life of Vehicle:	\$6,500.00	\$6,000.00	\$ 500.00



Gross Vehicle Lifetime Savings or Loss: \$32,684.87

Net Vehicle Lifetime Savings or Loss: \$19,044.87

Number of Years Vehicle is in Use: 4

Number of Years to Break Even: 1.67

Industry: Student Transportation

Location: Mesa, AZ

Vehicles: 27 Blue Bird Vision School Bus

By The Numbers:

- **\$136,000** per year saved in fuel costs.
- **\$.326** per mile reduced operating costs.
- **\$1.31 / gallon** for propane autogas.
- **\$3.54 / gallon** for diesel.





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