

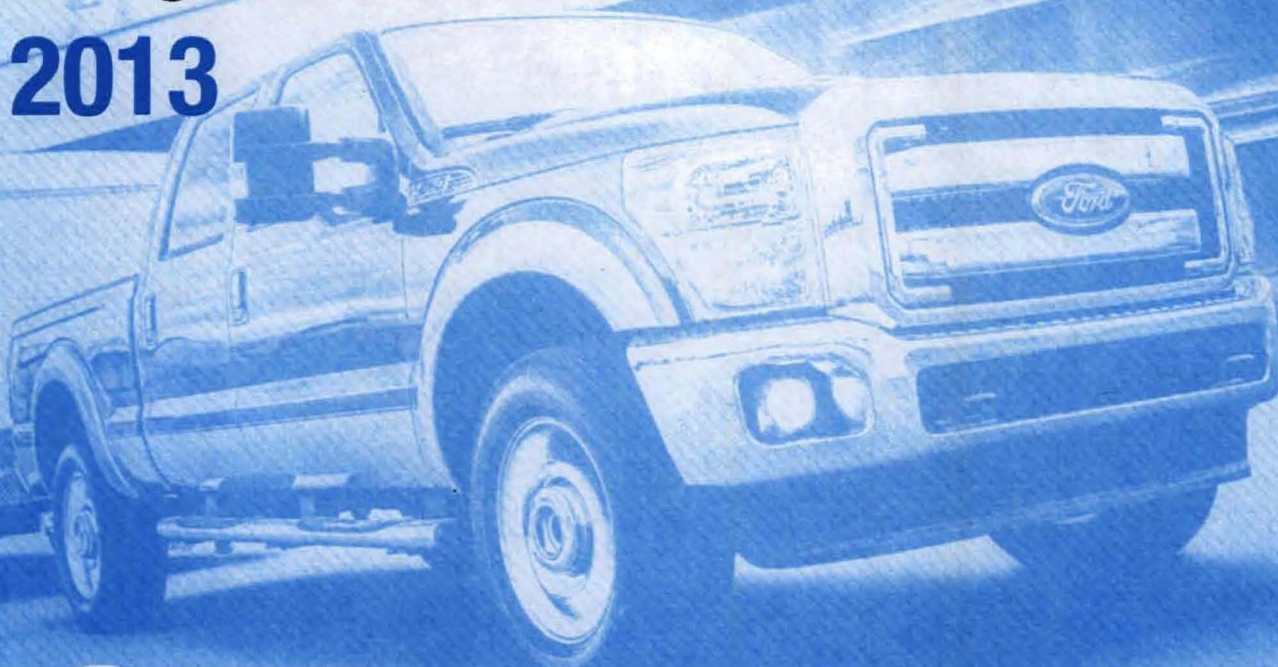
ROUSH[®]
CLEANTECH

PROPANE AUTOGAS



Fuel System
Program Overview

2013



**THE ZERO COMPROMISE
ALTERNATIVE FUEL SOLUTION**

CORPORATE OVERVIEW



Together we put the **customer** first.



Together we make a **quality** product.



Together we live by **process**.



Together we practice **environmental** responsibility.



Together we are **innovative**.

Together we
succeed.

FOR MORE THAN 35 YEARS, Roush Enterprises has been delivering OEM-level engineering, prototyping, testing, manufacturing and assembly services for companies around the globe. Employing more than 4,000 people worldwide, Roush Enterprises offers services for a multitude of industries—motorsports, military, medical, entertainment and performance vehicles.

In 2006, a grant opportunity through the Propane Education and Research Council (PERC) led to the development of a liquid propane autogas fuel system for the Ford F-150 pickup truck. The system was developed to offer the same performance characteristics of a gasoline-powered truck, fueled completely by propane autogas.

Four years later, Roush Enterprises introduced a dedicated division of the company, ROUSH CleanTech, tasked with bringing alternative fueled vehicle products to market for a wide variety of commercial vehicle platforms.

Based in Livonia, Mich., ROUSH CleanTech is located in a 60,000-square-foot manufacturing facility, at the heart of the Roush Enterprises campus, where our propane autogas fuel systems are engineered and assembled.



ROUSH CleanTech is a Ford QVM certified developer and installer of dedicated propane autogas fuel systems.

Organizations with QVM certification from Ford create the engine calibration, complete the on-dynamometer calibration testing, comply with all Ford engineering requirements and develop a vehicle component package.

LIQUID PROPANE AUTOGAS

Fuel System Technology

The ROUSH CleanTech liquid propane autogas fuel system is seamlessly integrated into the vehicle. Fuel lines follow the OEM routing and the fuel tank generally replaces the standard gasoline tank location. The system delivers propane autogas to the engine in liquid form, ensuring zero compromise in vehicle performance.

FUEL RAIL

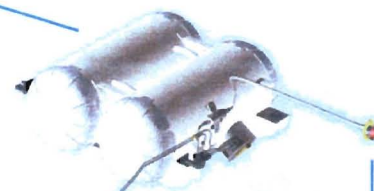
ROUSH CleanTech's signature blue anodized aluminum fuel rail is designed to operate under the varying temperatures of liquid propane autogas.

FRPCM

The Fuel Rail Pressure Control Module improves vehicle start-up times, lowers start-up emissions, and provides consistent power.

FUEL TANK

The propane autogas fuel tank meets ASME certification standards, is 20 times more puncture resistant than gasoline tanks, and is built in the U.S.



FUEL FILL

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

Ford E-450
2013 6.8L V10

RECALIBRATED PCM

The on-board computer that controls the engine is reprogrammed by ROUSH CleanTech to allow the vehicle to operate properly using propane autogas.

FUEL LINES

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

FUEL INJECTORS

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



PRODUCT OVERVIEW

Ford E-150 / E-250 / E-350 2009-2013 5.4L V8

Fuel Capacity

Mid-ship tank: 25 gal. usable

Extended range tank: 46 gal. usable

MSRP

Mid-ship tank: \$11,300

Extended range Tank: \$11,600

Applications

Extended or regular

Cargo van, club wagon

All rear-axle configurations

4-speed automatic transmission

Tech Specs

EPA & CARB Approved

GVWR: <10,000 lbs.

Requires "91G" gaseous fuels prep



Super Ultra Low Emissions Vehicle



Available Now!

* 2013 MY vehicles converted prior to initial sale

Ford E-450 DRW Cutaway 2009-2013 6.8L V10

Fuel Capacity

Aft-axle tank: 41 gal. usable

MSRP

Aft-axle tank: \$15,900

Applications

158" / 176" wheelbase

186" / 190" stretched chassis

Stripped chassis

5-speed automatic transmission

Tech Specs

EPA & CARB approved

GVWR: <14,500 lbs.

Requires "91G" gaseous fuels prep



Available Now!

Ford F-250 / F-350 2012-2013 6.2L V8

Fuel Capacity

In-bed tank: 38 gal. usable

Under-bed tank: 19 gal. usable

MSRP

In-bed tank: \$10,495

Under-bed tank: \$11,450

Applications

4x4 or 4x2

All bed configurations*

All body configurations

All rear axle configurations

(including chassis cab)*

Tech Specs

EPA & CARB approved

GVWR: <13,300 lbs.

Requires "98F" gaseous fuels prep



Available Now!¹

¹: In-bed tank only, under-bed tank available Q3, 2013.

* Under-bed tank requires 8' bed and cannot be installed on chassis cab.

Ford F-450 / F-550 2012-2013 6.8L V10

Fuel Capacity

Aft-cab tank: 50 gal. usable

Shuttle tank*: 67 gal. usable

MSRP

Aft-cab tank: \$15,900

Shuttle tank*: \$21,900

Applications

4x4 or 4x2

All bed configurations

All body configurations

All axle configurations

Tech Specs

EPA & CARB approved

GVWR: 16,500 – 19,500 lbs.

Requires "98G" gaseous fuels prep



Available Now!²

* Designed, installed, and warranted by Green Alternative Systems.

²: Shuttle tank only, aft-cab tank available Q3, 2013.

PRODUCT OVERVIEW

Blue Bird Vision 2012-2013 6.8L V10

Fuel Capacity

Underfloor tank: 67 gal. usable

Applications

Blue Bird Vision

Blue Bird MFSAB / activity bus

Wheelbase

189" / 217" / 238"

252" / 273" / 280"

Tech Specs

EPA & CARB approved

GVWR: 33,000 lbs.

Up to 77 passengers



Available Now!

Micro Bird G5 2013 6.8L V10

Fuel Capacity

Aft-axle tank: 41 gal. usable

Applications

Micro Bird G5 school bus

Micro Bird G5 commercial bus

5-speed automatic transmission

Wheelbase

158" / 176"

Tech Specs

EPA & CARB approved

GVWR: 14,500 lbs.

Up to 30 passengers



Available Now!

Coming Soon



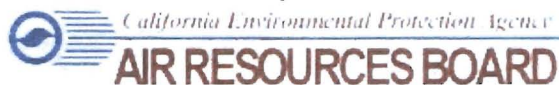
Ford F-59
6.8L V10

Ford F-650
6.8L V10

Ford Transit
3.7L V6

Certification and Compliance

ROUSH CleanTech goes to great lengths to ensure all propane autogas vehicles meet stringent national and state certification requirements for safety and emissions. Beyond compliance with each of the agencies and standards shown below, we conduct our own battery of emissions and safety tests during design of our fuel systems. Quality checks are also performed during build and validation of every fuel system, to ensure customers receive a quality product each and every time.



“ By making the switch to propane autogas, our franchises not only save money and lower our dependence on foreign oil, but also positively impact the environment. This is something each franchisee owner can feel good about.”

Ken Brooks

National Purchasing Manager
SuperShuttle

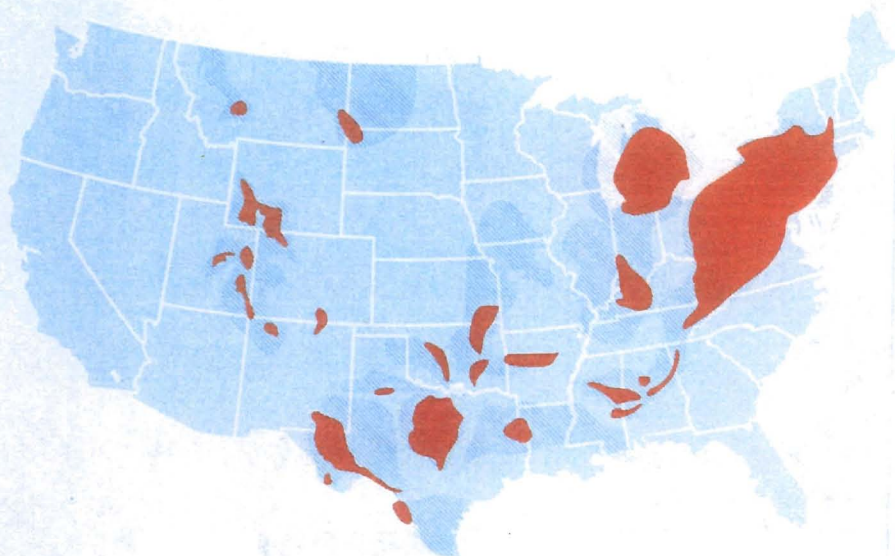
BOOK ONLINE SU



PROPANE

WHERE DOES PROPANE COME FROM?

Propane was discovered in 1910 by Dr. Walter Snelling, a chemist and explosives expert for the U.S. Bureau of Mines. About 90% of propane consumed in the United States is domestically produced, and an additional 7% comes from Canada. Propane is a by-product of natural gas processing and petroleum refining. The processing of natural gas involves removal of methane, butane, propane and heavier hydrocarbons. The oil refineries produce propane, butane and other gases as a by-product during crude oil refining.



To the left is a map that shows the vast deposits of shale available for use in the United States for natural gas and propane processing.



Basins



Shale Gas Plays

Refueling Infrastructure

READILY AVAILABLE

Propane autogas is the third most common engine fuel in the U.S. and the world. With a national infrastructure already in place, finding publically accessible refueling is easy. ROUSH CleanTech can help.

EASY TO USE

Refueling a propane autogas powered vehicle is just like refueling with gasoline or diesel, with one exception. The refueling process is "closed," meaning a seal is made between the refueling nozzle and the vehicle's fuel-fill port. No more refueling spills – a significant source of groundwater pollution with other fuels.

INEXPENSIVE TO INSTALL

Propane autogas refueling is less expensive than other refueling systems, giving you the flexibility to refuel right at your place of business. Many propane marketers will install infrastructure at little- to no-cost to you.

MANY SHAPES AND SIZES

Refueling tanks can be installed in a variety of shapes and sizes, depending on space and volume needs.





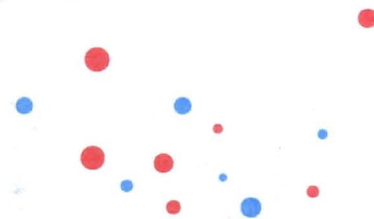
Propane is
**DOMESTICALLY
PRODUCED**

91% comes from
the US
of that
70% comes from
natural gas
production

Octane Rating
of
105



Nontoxic and
insoluble in water



Released as a gas,
so it doesn't spill,
pool or leave a residue

Propane vs. Gasoline

Emissions ¹

Costs



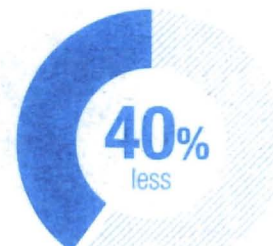
greenhouse gases



nitrogen oxide

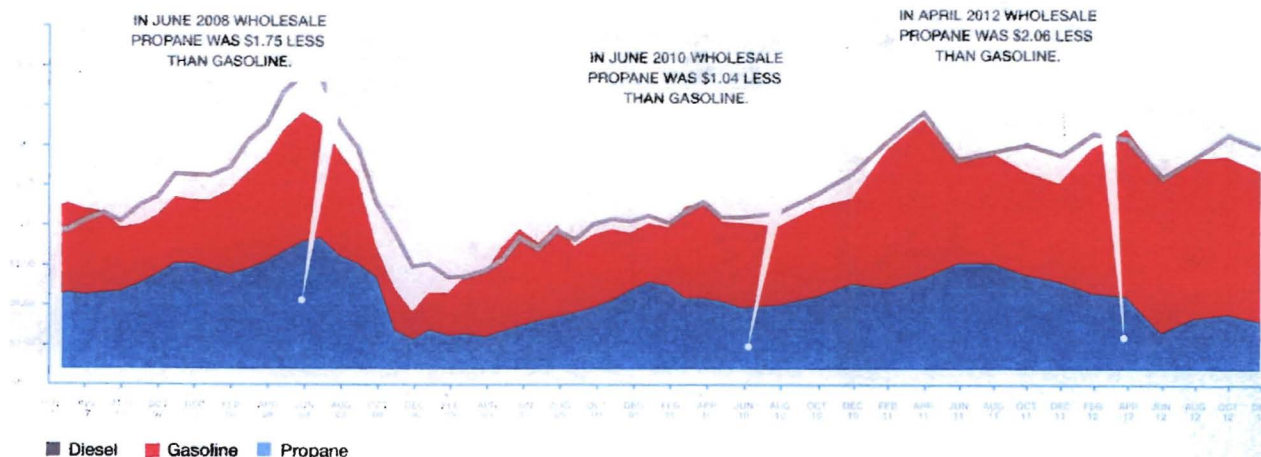


carbon monoxide



per gallon

Wholesale Price Comparison



ORDER TO DELIVERY PROCESS

1 ORDER THE VEHICLE

Check applicable body codes.
Check applicable wheelbase.
Order gaseous fuels prep engine package.
Enter ship-thru code.
Dealer places order through Ford.

2 ORDER THE FUEL SYSTEM

Determine tank configuration.
Dealer places order through ROUSH CleanTech or distribution partner.

3 FORD BUILD PROCESS

Ford builds vehicle.
Ford delivers vehicle to ship-thru location.

4 SHIP-THRU BUILD PROCESS

Complete standard upfit.
Complete propane autogas upfit.
Vehicle re-enters Ford shipping.

5 VEHICLE DELIVERY

Vehicle is delivered to destination for final customer delivery.

ORDERING

Ordering is easy.

See our step by step guide to the left.

UPFITTING PARTNERS



ADRIAN STEEL

Cargo Management Solutions for Commercial Vehicles



SINCE 1848



Truck and Utility Equipment



FEDERAL TAX CREDITS

Two tax credits are available to help convert to propane autogas: a \$.50 per gallon fuel tax credit for propane used in motor vehicles, pumped through on-site refueling stations; and an infrastructure tax credit of 30%, up to \$30,000 to offset the cost of installing a refueling station on-site.

GRANTS & INCENTIVES

Many states offer a number of grants and incentives to help encourage the adoption of propane autogas as an alternative fuel. Incentives change frequently, but the Department of Energy maintains a website that shows what's available by state.



U.S. DEPARTMENT OF
ENERGY

FOR MORE INFORMATION, VISIT: www.afdc.energy.gov/laws/

FINANCING OPTIONS

Ford Motor Credit Financing is available for ROUSH CleanTech propane autogas powered Ford E-series vans and wagons and Ford F-series pickup trucks and chassis cabs.

SERVICE NETWORK

ROUSH CleanTech maintains a dedicated Field Service & Operations team that is tasked with training and educating customers with propane autogas vehicles, maintenance and service requirements.

This team offers a robust service and warranty support program, including comprehensive web-based training courses, issue resolution processes, technical support and an efficient claims process.

WARRANTY COVERAGE

Vehicles powered by the ROUSH CleanTech liquid propane autogas fuel system are covered by a ROUSH CleanTech limited warranty and warranties conforming to both Federal Environmental Protection Agency (EPA) and California Air Resources Board (CARB) regulations. Ford's base OEM warranty is also maintained for those vehicles equipped with the gaseous fuels engine prep package.

ROUSH CleanTech offers an expanding best-in-class service network with over 144 locations across the country.



For more warranty and service information:

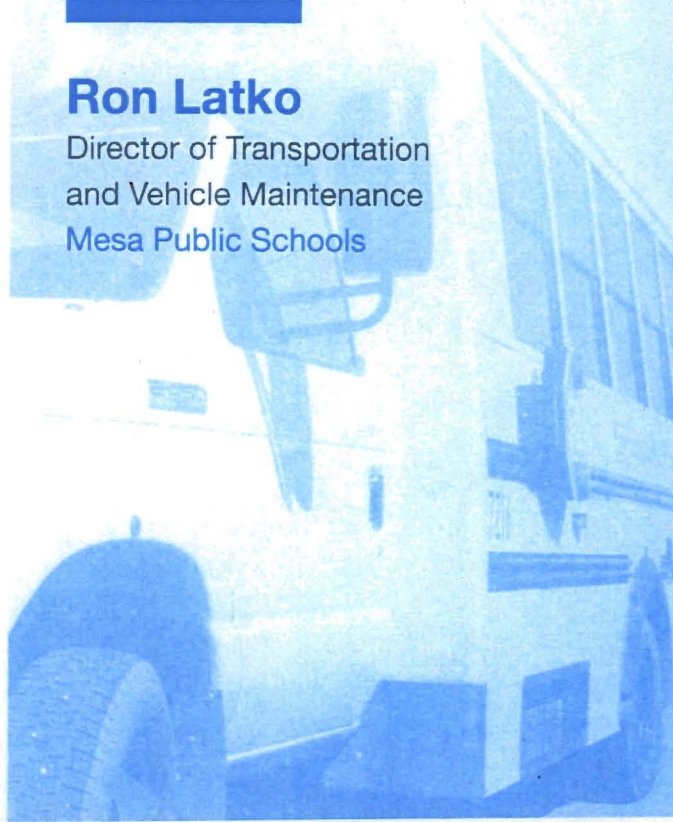
Visit ROUSHcleantech.com/Service

Call our toll-free technical hotline at 800.59.ROUSH

“ *I'm conservative when I run numbers, and the savings were amazing. Not only with fuel and maintenance, but the initial upfront costs were also considerably cheaper than comparable diesel-powered buses would have been. We're saving a total of 32.6 cents per mile with propane autogas.* **”**

Ron Latko

Director of Transportation
and Vehicle Maintenance
Mesa Public Schools



SAVINGS CALCULATOR 2013 Ford E-150

Capital Costs	Gasoline (5.4L V8)	Propane (5.4L V8)	Savings (Costs)
Base Ford Vehicle Purchase Price	\$30,945	\$31,260	
ROUSH Propane Conversion	\$0.00	\$11,300	
State or Federal Incentive	\$0.00	\$0.00	
Total Capital Savings (or Investment)	\$30,945	\$42,560	\$11,615.00
Operating Costs	Gasoline (5.4L V8)	Propane (5.4L V8)	Savings (Costs)
Total Vehicle Life (miles)	200,000	200,000	
Average Miles Per Gallon ¹	11.0	9.35	
Gallons of Fuel Over Lifetime	18,181.82	21,390.37	
Fuel Price (per gallon) ²	\$3.60	\$1.90	
Fuel Tax Credit / Gallon ³	\$0.00	\$0.50	
Adjusted Fuel Price / Gallon	\$3.60	\$1.40	
Total Fuel Savings (or Costs)	\$65,454.55	\$29,946.52	\$35,508.03
Miscellaneous	Gasoline (5.4L V8)	Propane (5.4L V8)	Savings (Costs)
Maintenance Rate (per mile)	\$0.30	\$0.015	
Maintenance Costs	\$6,000	\$3,000	
Fuel Loss From Pilferage / Theft	\$500	\$0.00	
Total Misc. Savings (or Costs)	\$6,500	\$3,000	\$3,500
Gross Vehicle Lifetime Savings (Loss)			\$39,008.02
Net Vehicle Lifetime Savings (Loss)			\$27,393.02

Assumptions:

1 - MPG ratings for gasoline and propane vehicles are estimates. Variations in MPG should be expected when operating a vehicle that is towing, hauling, or being driven in various city / rural applications.

2 - Gasoline price is 2012 national average source: AAA. Propane price is an estimate based on fleet size and will vary based on consumption.

3 - Calculation assumes the customer is a for-profit entity with federal liability and expenses paid from their own refueling infrastructure. Consult a tax advisor for more information.

4 - A 50% reduction in maintenance costs by running a vehicle on propane, compared to gasoline. A factor the Texas Railroad Commission uses in their calculations when considering an alternative fuel conversion.

How many years will the vehicle be used?

6

Number of years to break even:

1.8

“ With an estimated six-year vehicle life, we have two to four years of positive return on each vehicle investment. We couldn't be more pleased with how propane autogas is performing for us. **”**

Tom Armstrong

Director of Fleet

ThyssenKrupp Elevator Americas



Available on the
App Store

Download the ROUSH CleanTech savings calculator app for free to see how much you can lower your emissions and operating costs by switching to propane autogas.

800.59.ROUSH

ROUSHcleantech.com