PROPANE AUTOGAS

INDUSTRY UPDATE

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Propane is considered a low carbon fuel.
PROPANE INDUSTRY

Propane Education and Research Council
PERC promotes safe, efficient use of odorized propane through investments in research, safety and consumer initiatives (created 1998)

National Propane Gas Association
Membership is comprised of small businesses and large corporations engaged in all segments of the industry from retail marketing and appliances to manufacturers of equipment
~1912-Propane discovered-Dr. Walter Snelling

1913 First Propane vehicle in USA

2006/7 Liquid Propane Injection

2010-Propane Autogas Public Station Development
The majority of the propane used in the USA comes from raw natural gas. (Raw natural gas is about 90 percent methane, 5 percent propane and 5 percent other gases.)

The remainder comes from petroleum during the refining process. (Propane vapors separated from gasoline liquid.)

2011 the USA was a net exporter

Overall: majority from natural gas
PROPANE AUTOGAS AS AN ALTERNATIVE MOTOR FUEL

Close to 200,000 propane vehicles in USA

~17M propane vehicles worldwide

Referred to as “Autogas”

Move in US to use propane autogas for propane used in on-road applications.
WHY PROPANE?

- **Economical**
  - Cost effective (maintenance & fuel cost)
  - **Refueling is the least expensive option**
  - Federal and state incentives

- **Clean**
  - Reduces CO2 emissions by up to 12 percent
    - NOx by up to 20 percent
    - CO by up to 60 percent
  - Overall reduces greenhouse gas emissions by up to 17 percent

- **Safe**
  - Low pressure fuel (100 psig-300 psig)
  - Narrow ignition range (2.15%-9.60%)
LOTS OF PRODUCT OFFERINGS
GM 6.0L AUTOGAS ENGINE

- Available now in a GM 4500 chassis with 159” wb
- Service and Warranty through GM dealerships
- CleanFUEL USA or Bi-Phase Liquid Propane Injection system
GM 4500 CHASSIS

~75 Gallons Total

1. 11” x 77” = ~28 Gallon (longitudinal, underbody)
2. 13” x 34” = behind rear axle, underbody
3. 13” x 34” = ~47 Gallon (behind rear axle, underbody)
4. 11” x 34” = behind rear axle, underbody

(RPO KO7 with LC3 and UFP)
Available to order

Project team: Freightliner Custom Chassis, Thomas Built, GM, Powertrain Integration, CleanFUEL USA, Capacity of Texas

MD chassis, Type C bus, port tractor, step van

- GM 8.0L engine with CFUSA Liquid Propane Injection
- 350-hp / 500-ft/lbs/tq
- 90 usable gallons / 400 mile range
FREIGHTLINER BOBTAIL
Ford E-150 / E-250 / E-350

Model Years: 2009 – 2012

Engine Size: 5.4L V8 (2V)

Applications: All cargo configurations
All passenger configurations
Single rear wheel cutaway

Tank Sizes: Mid-Ship: 25 gallons

Order Availability: Ford Ship Through Conversion Kits

Certification: EPA
CARB
Ford E-450 DRW Cutaway

Model Years: 2009 – 2012

Engine Size: 6.8L V10 (2V)

Applications: Dual rear wheel cutaway
5-speed auto transmission

Tank Sizes: Aft-Axle: 41 gallons

Order Availability: Ford Ship Through Conversion Kits

Certification: EPA
CARB
Ford E-450 DRW Cutaway

Model Years: 2009 – 2012

Engine Size: 6.8L V10 (2V)

Applications: Dual rear wheel cutaway
5-speed auto transmission

Tank Sizes: Aft-Axle: 41 gallons

Order Availability: Now

Certification: EPA
CARB
Ford F-450/550 DRW Chassis Cab

Model Years: 2011 & newer

Engine Size: 6.8L V10 (3V)

Tank Sizes: Multiple: 43 gallons
            75 gallons

Availability: Ford Ship Through
             Conversion Kits

Certification: EPA
              CARB

Available: Now
TYPE C PROPANE VISION BY BLUE BIRD

Engine
Overhead Cam V-10, 6.8L 3V V-10

Horsepower: 362 hp @ 4750 RPM
Torque: 457 lb. ft @ 3250 RPM
GVWR: Up to 33,000 lbs.
STUDENT TRANSPORTATION, INC. PLACES LARGEST PROpane-PowerEd SCHOOL BUS ORDER IN INDUstRY HISTORY WITH ENVIRONMENTALLY-FRIENDLY BLUE BIRD VISION SCHOOL BUSES

Blue Bird to supply more than 400 school buses with ROUSH CleanTech propane autogas fuel systems to Student Transportation, Inc. for use in Omaha, Nebraska

OMAHA, Neb. (December 19, 2012) — Blue Bird and ROUSH CleanTech commend the Metropolitan Omaha Education Consortium and Student Transportation, Inc., (STI) for collaborating to deploy more than 400 Blue Bird Propane-Powered Vision school buses. This contract will cost-effectively transport the students of Omaha while reducing exhaust emissions.

Serving Millard and Omaha Public Schools, the contract is the largest transportation agreement in STI’s history. It is also the biggest single order to date of propane buses for Blue
CRASH CAGE
2013 NEW PRODUCT LAUNCHES

Ford F-250 / F-350
6.2L V8
Under bed tank
Extended range tank

Ford F-450
6.8L V10
Stripped chassis

Ford E-450
6.8L V10
Stripped chassis

Ford F-59 & 53
6.8L V10
Stripped chassis

Ford F-450 / F-550
6.8L V10
Aft-cab tank

Ford F-650
6.8L V10
BI-FUEL SYSTEM

Dedicated = one fuel
Bi-Fuel = Either propane or gasoline
Dual Fuel = Both at the same time, usually diesel and propane
COMMERCIAL MOWERS
PROPAINE MOWER ADVANTAGES

- Briggs & Stratton BIG BLOCk™
  32 HP Propane engine delivers a minimum of 30% lower harmful emissions.
- Not a converted gas engine.
- Engine has been EPA and CARB certified.
PERFORMANCE, FUEL EFFICIENCY AND ENVIRONMENTALLY FRIENDLY.

Introducing our new line up of electronic fuel-injected propane walk-behind and riding mowers.
OFF-ROAD OEM PARTNERS

Husqvarna
Kawasaki
BOB-CAT
TORO
ZIPPER
DIXIE CHOPPER
Cub Cadet
KOHLER
CAPACITY
GENERAC
MTD
EnviroGard
SCAG
BRIGGS & STRATTON
SNAPPER PRO
FERRIS

Kubota, Bob-Cat, Zipper, Husqvarna, Ariens/Gravely, and Exmark

- 300 mower dealers
- Up to $2,000 incentive
- Demo propane mower
- Work with propane marketers
The Propane Education & Research Council invites you to enjoy the power and performance of propane mowers and is giving you a cash incentive to track and share data about mower performance through the PERC Propane Mower Incentive Program.

Here’s all you have to do to be eligible for a $1,000 cash incentive for each mower up to a maximum of 25 mowers:

- Buy a qualifying new propane-fueled mower.
- Fill out an application at www.poweredbypropane.org.
- Provide data about the mower during the mowing season, including fuel use, performance, and suggestions for improvement.

Only a limited number of incentives are available, so act now.

For more information on the Propane Mower Incentive research program, get in touch with Alison Dimond at 877-411-3243, ext. 801, or Jesse Marcus at 202-452-8975, or send an email message to mowerincentive@propane.com.
FUELING INFRASTRUCTURE OPTIONS
Installing a propane station is the least expensive alternative even as compared to gasoline or diesel stations

- 4-7 HP electric motor
- No ground water contamination
- Non toxic
- No costly EPA monitoring system
- Low pressure, 100-300 psig
- Low noise
- 2000 gallon skid mounted system with basic dispenser for ~ $30,000…installed!
FUELING CONNECTOR