



**Product Feature:
Alternative Fuel Infrastructure . . . No Problem**

November 29, 2022





 **SUSTAINABLE
FLEET
TECHNOLOGY**
WEBINAR SERIES 2022

Sessions through December 06, 2022

<https://www.sustainablefleetexpo.com/>



Upcoming Webinar Sessions

- **12/01 SFT Webinar: The Rise of Hydrogen Fuel Cells in Transportation**
- **12/06 Product Feature Webinar: Integrating and Managing Your Fleet Charging Network with Gilbarco Veeder-Root**



Format

- Q&A at the end
- Submit questions and comments to “Panelists”
- Scheduled for 2:00p-3:00p
- Handout
- Recording





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Clean Transportation Program

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Introducing Our Speakers:



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North Carolina Clean Energy

Propane Autogas Vehicle Infrastructure.... No Problem

Jim Bunsey

Propane Education & Research Council

Josh Budworth

Alliance Autogas

Mauricio Morafiallos

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Agenda:

- ***What is Propane? Properties and Characteristics***
- ***Fleet adaptability***
- ***Infrastructure options***
- ***Infrastructure installation***

What Makes an Alternative Energy Adoption Successful?



- Reduced emissions without increasing cost or losing efficiency.
- TCO reduction or ROI realized before the end of the lifecycle.
- Similar (or better) performance than the original fuel without compromising range.
- High-volume supply of energy domestically sourced.

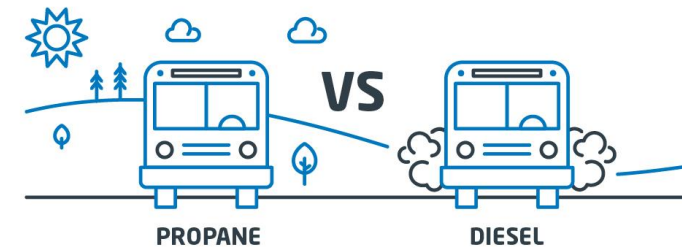
Path to Zero Emissions

- Particulate Matter
 - Virtually zero
- NOX
 - 96% reduction from best in class diesel
 - Certifying to .02, operating at 0.01, full duty cycle
- GHG
 - Newest technologies have 25% reduction

96%

NOx REDUCTION VERSUS CLEAN DIESEL BUS

Duty cycle: Low speed, stop-and-go route



Source: 2018 West Virginia University study, comparing 2015 LPG Blue Bird school bus (6.8L, 10 Cylinder) with 2014 ultra-low sulfur diesel Blue Bird school bus (6.7L, 6 cylinder).

PROPANE.COM

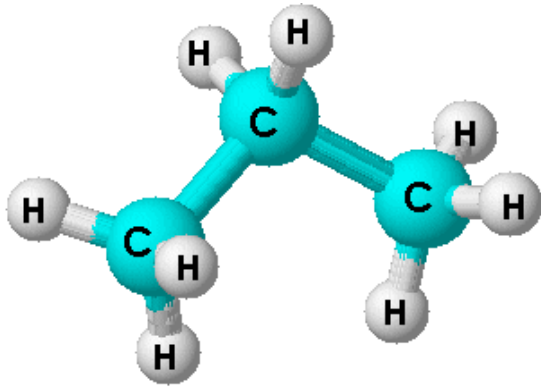
WHAT IS PROPANE?

- Affordable, Clean, American-Made Fuel
 - C_3H_8
 - Byproduct of natural gas processing.
 - 100% Domestic
 - Commonly used for space and water heating, cooking, and as engine fuel.
- Using Propane
 - 48 million Households
 - 900,000 Farms
 - 600,000 Forklifts
 - 25,000 Commercial Mowers

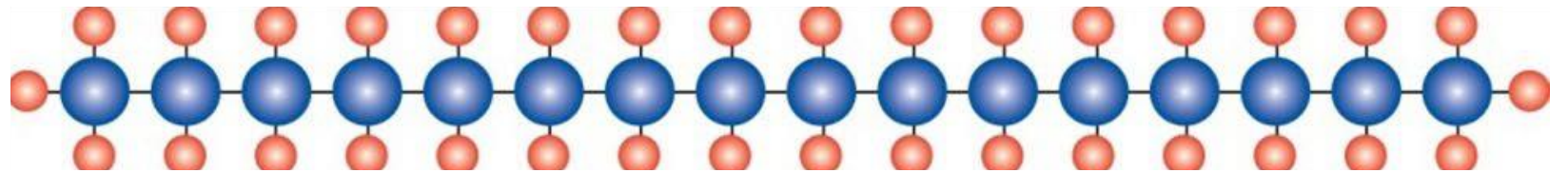
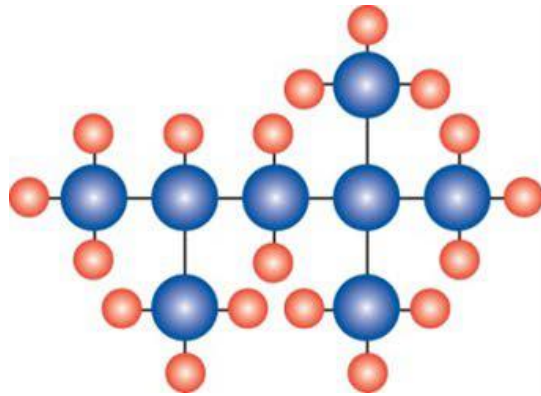
What is Propane?

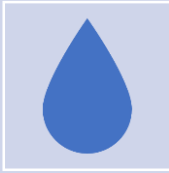
- Liquid state below minus 44 degrees Fahrenheit
- 100 PSI at 60-degree ambient temperature
- Heavier than air
 - No expensive ventilation systems needed for maintenance facilities

What is Propane?



- Low Carbon – Hydrogen Rich Energy





Propane is nontoxic, meaning it does not contaminate air, soil, or water resources.



Propane comes from organic as well as renewable sources.

Renewable Propane Customers

- Coca-Cola
- L'Oréal
- U-Haul
- School Districts
- Municipalities



NEWS

California schools adopting propane-powered buses



BY JESSICA HICE POSTED 09.09.2019

TWITTER

FACEBOOK

EMAIL

In the last decade, numerous California school districts have adopted propane-based school buses in an attempt to eliminate costs and toxic emissions.

Since 2013, the Elk Grove Unified School District near Sacramento has added 16 propane buses to its fleet and expects up to 12 more in the



Alliance
AutoGas

POWERED BY PROPANE

Our technology (overview)

- EPA Certified Bi-fuel systems- will not void factory warranty
- Our systems are engineered for the specific vehicle platform for optimum performance and durability
- We offer several tank options to meet the needs of each specific customer application
- Warranty:
 - < 5,000 miles on odometer- 5 year/100,000 miles
 - > 5,000 miles on odometer- 3 year/36,000 miles

EPA CERTIFICATES

- 323 EPA Certificates of Conformity
- +
- 63 EPA Intermediate Age Notifications
- =
- 386 EPA approvals
- covering
- 1644 vehicle platforms



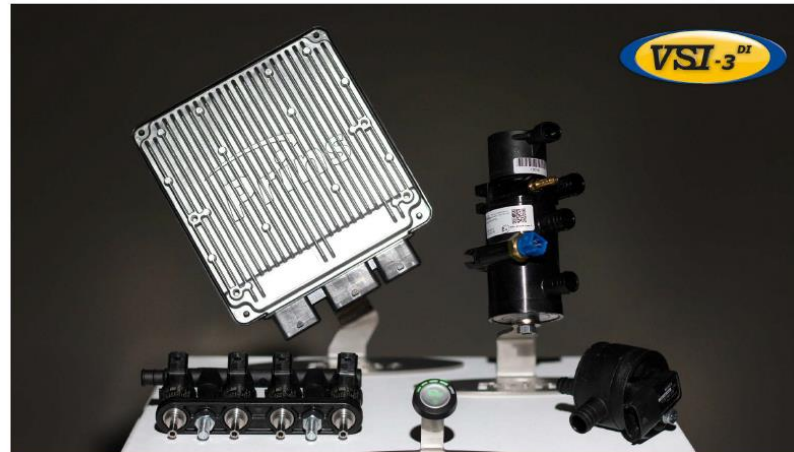
Alliance AutoGas proudly offers an EPA certified bifuel solution, reducing range anxiety for our fleets by allowing them to refuel with either propane autogas or gasoline. Our systems are installed by Certified Conversion Centers with trained autogas technicians to deliver quality results.

With a wide range of vehicle platforms, we handle everything from the conversion technology and infrastructure to refueling, training and maintenance. In addition, we offer our own “plug and play” System, which significantly reduces cost and conversion time.

BENEFITS OF THE PLUG AND PLAY SYSTEM:

- Dramatic CO₂ emissions reduction- helps fleet managers meet and surpass sustainability initiatives for medium and heavy-duty truck fleets
- System is certified with the U.S. Environmental Protection Agency (EPA) and National Fire Protection Association's (NFPA) 58 standards
- Labor time cut in half and conversion costs are significantly reduced
- The conversion system is supported by a 5-year, 100,000 mile warranty
- Zero intrusion on the vehicle's original fuel tank

Our bifuel conversion systems do not void the current warranty on your vehicle, and we also offer our own 5-year, 100,000 mile warranty on our Plug and Play systems just to prove how confident we are.

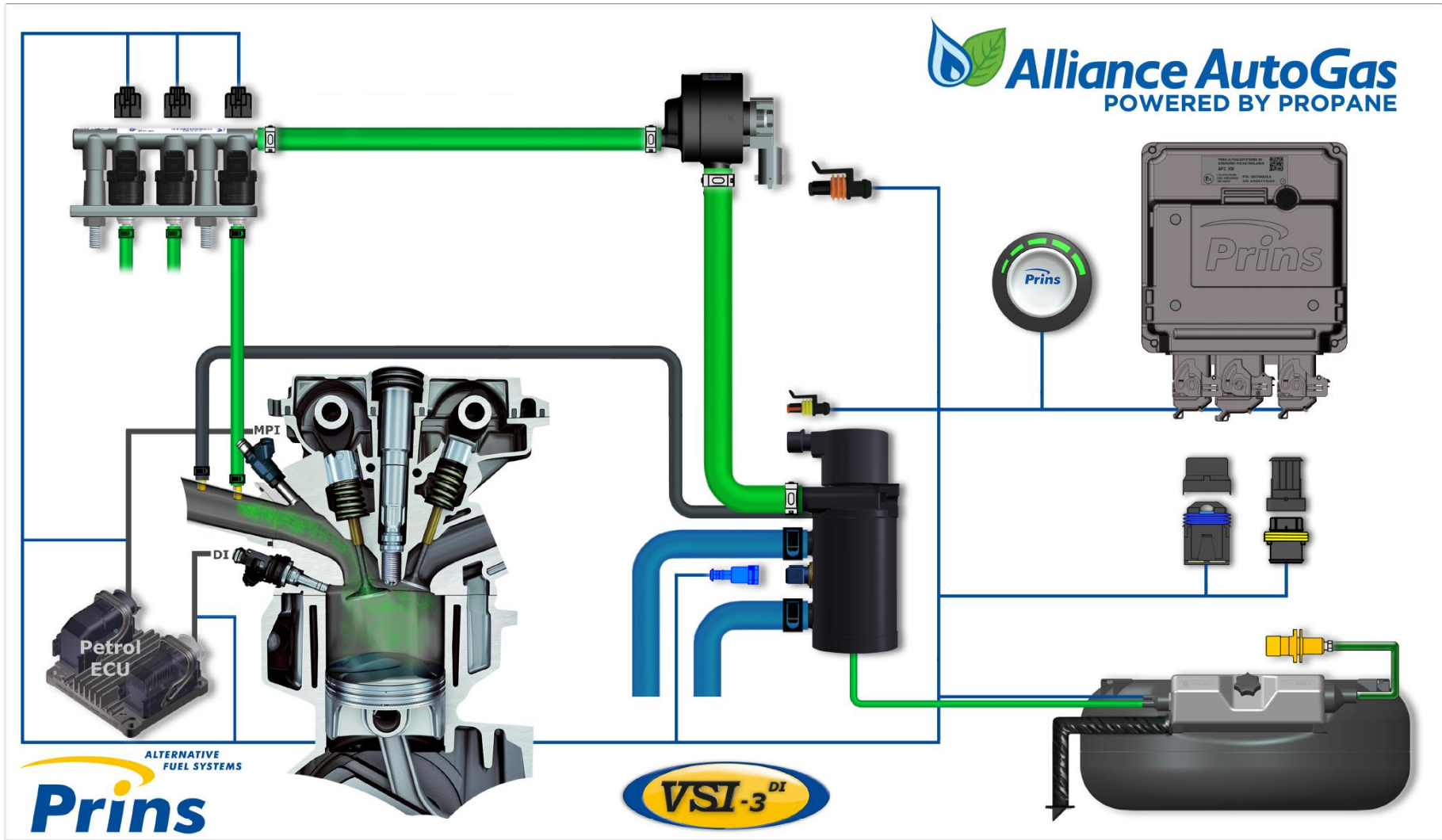


Prins VSI-3 DI: the revolutionary LPG-system
Unique and future proof for latest DI (direct injection) & DI-MPI engines.

- For a wide range of vehicles equipped with low to high power engines
- Also for vehicles with latest Euro 6D emission technology
- For a high performance and smooth driving experience
- Powerful AFC-3.0 DI computer, eVP-500 LPG reducer, LPG injectors
- Advanced software strategy <5% petrol consumption
- Lowering emissions and fuel costs
- R115/EPA certified



 **Alliance AutoGas**
POWERED BY PROPANE



ALTERNATIVE FUEL SYSTEMS
Prins

VSI-3^{DI}



Prins eVP-500: world's first and only fully electronic LPG reducer
Ensuring correct LPG supply in all operating conditions.

- For direct injection (DI) engines up to 500 HP (370 kW)
- For smooth and optimal driveability performance
- Compact and light weight design; integrated safety pressure relief valve
- Use of smart algorithms to continuously adjust the pressure to system demands
- Replaceable filter; easily accessible from top
- Fully dynamic output pressure; pressure adjustments by software



KEY FACTS



- There are over **24 MILLION VEHICLES RUNNING ON PROPANE AUTOGAS WORLDWIDE**, making Propane Autogas the third most-widely-used automotive fuel in the world. The technology has been tested in every condition and has proven itself in the real world.
- **100% OF PROPANE IN THE U.S. IS PRODUCED IN NORTH AMERICA**, increasing America's energy security.
- **PROPANE AUTOGAS COSTS, ON AVERAGE, 30% LESS THAN GASOLINE**. Even during spikes in the price of crude oil, the relationship between the price of gasoline and Propane Autogas has held steady.
- The American Propane Autogas industry has been building an extensive infrastructure for Propane AutoGas supply and distribution for years; **THERE ARE OVER 70,000 MILES OF PROPANE AUTOGAS PIPELINE IN THE U.S.**, and the current distribution capacity far exceeds current demand.
- **PROPANE AUTOGAS IS A SAFER FUEL THAN GASOLINE OR DIESEL IN CASE OF ACCIDENT**; it's less flammable and nontoxic. Thousands of school buses and taxis in the U.S. have already been converted to Propane Autogas.
- **PROPANE AUTOGAS IS A CLEANER TECHNOLOGY**, burning with fewer polluting by-products -- enabling you to be a better corporate citizen and protect public health.



96% NO_x REDUCTION
VERSUS CLEAN DIESEL BUS
duty cycle: low speed, stop-and-go route

PROpane VS DIESEL

- **PROPANE AUTOGAS PROVIDES THE LONGEST DRIVING RANGE OF ANY ALTERNATIVE FUEL**. Your fleet will not experience any lack of productivity after conversion.
- You can use the same quality trucks you already own, but get higher performance from them by converting them to Propane Autogas, a cleaner fuel that **EXTENDS ENGINE LIFE AND REDUCES NECESSARY MAINTENANCE**.
- You can add brand new OEM Propane Autogas-powered vehicles, or aftermarket conversion systems.
- You can **CONVERT YOUR EXISTING FLEET INTO FLEXIBLE BI-FUEL** (Gasoline/Propane Autogas) vehicles, and take advantage of both fuel sources.

WHY AUTOGAS?



FOCUS ON THE "3 E'S"

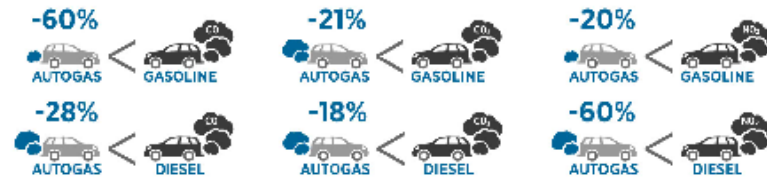
ECONOMICS:

Your bottom line is at the center of our operation. When gas prices go down, so does the price of autogas. In fact, you can count on propane costing about **30% less than gasoline** at any given time. Even during spikes in the price of crude oil, the relationship between the price of gasoline and autogas has held steady. The price volatility of gasoline and diesel can make it challenging to predict your budget costs. Alliance AutoGas can help you solve that problem by locking in your fuel price.



ENVIRONMENT:

When compared to gasoline or diesel, autogas substantially **reduces greenhouse gases** such as carbon monoxide, carbon dioxide, and nitrogen oxide as well as non-regulated emissions including aromatic hydrocarbons, benzene, and sulfur dioxide. Whether improving the environment is a corporate priority, or you recognize that sustainable solutions are on the minds of the American consumer, converting to autogas allows your business to contribute to improvements in the transportation sector.



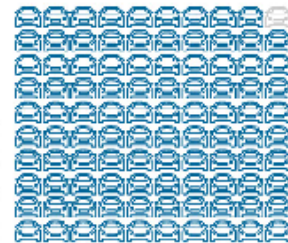
Alliance AutoGas Engineered Systems are certified by the Environmental Protection Agency (EPA).

ENERGY SECURITY:

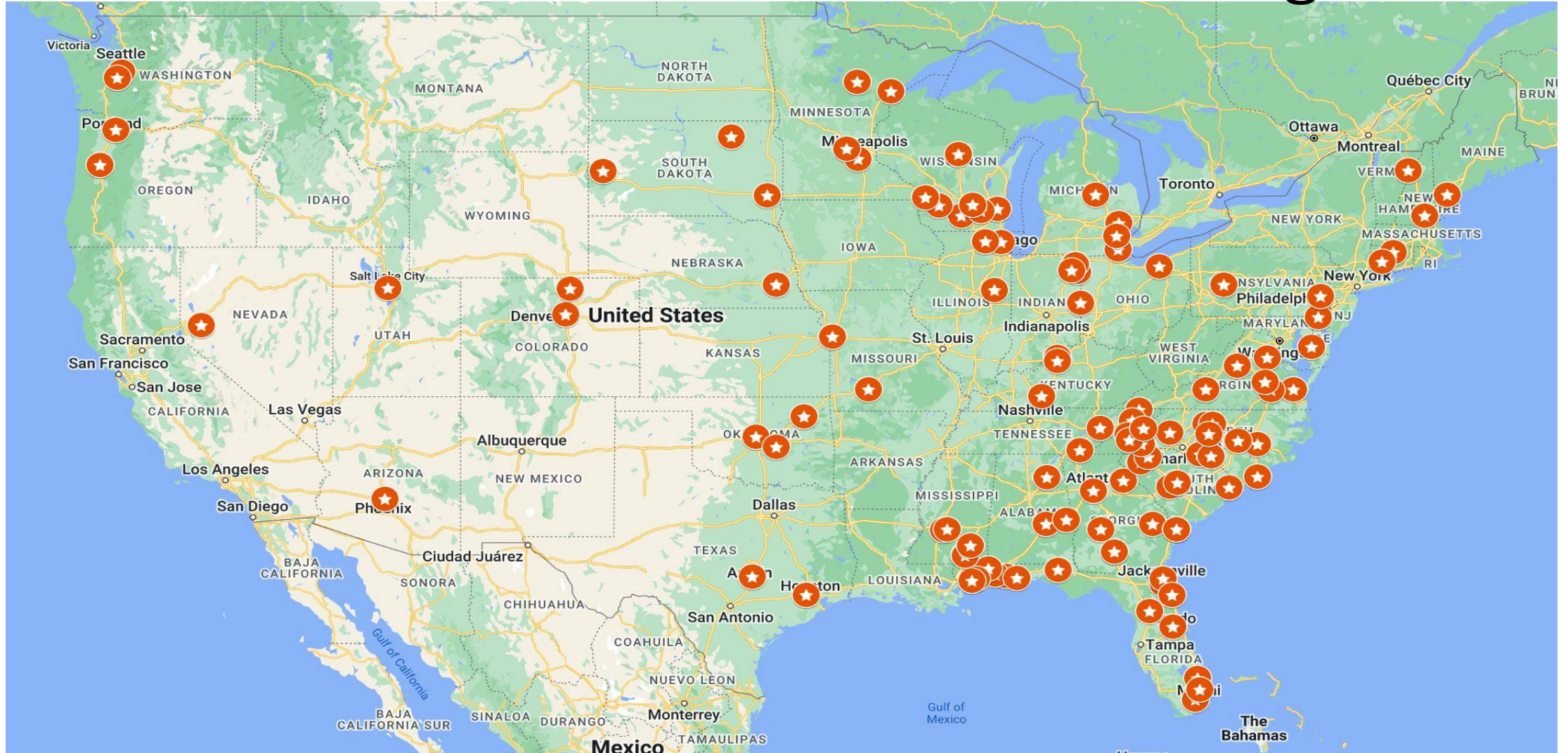
Autogas is an **American-made fuel**. Using autogas lowers our dependence on foreign oil and keeps costs down.

99%

of propane autogas used in the U.S. is produced in **North America**



Alliance AutoGas has 126 Service and Conversion Centers and Growing



FORD EXPLORER



AUTOGAS SYSTEM SPECIFICATIONS

- 3.5 or 3.7 V6 Engine from Ford AWD, FWD, Interceptor
- EPA Certified
- 12 Gallon Spacesaver Tank w/ Optional Storage System
 - Other Tank Options:
 - 19 Gallon Extended Range
 - 12 Gallon (Spare Tire Delete)
*Non-Pursuit Use Only
- Standard Remote Filler
- Original Ford Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Deluxe Plug & Play System
 - Custom Wire Harness & Break out Connector
 - Injector Cups Ensures Proper Fuel Delivery
 - Custom Engine Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets



FORD TRANSIT



AUTOGAS SYSTEM SPECIFICATIONS

- 3.7 V6 Engine from Ford
- All GVWs, Trim Levels, DRW, EL, and Wheel Bases Available
- Passenger, Cargo, CutaWay, Cab Chassis
- EPA Certified, CARB (Pending)
- 21 Gallon Useable Underbody Tank Standard
Other Tank Options:
 - 38 Gallon Interior Mount
 - 16 Gallon (Activity Bus)
 - 24 Gallon Underbody (DRW)
- Standard Remote Filler
- Original Ford Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Deluxe Plug & Play System
 - Custom Wire Harness & Break out Connector
 - Injector Cups Ensures Proper Fuel Delivery
 - Custom Engine Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets

UPFITS SUPPORTED

- SERVICE/UTILITY BODY
- DELIVERY
- FLATBED/STAKE
- SHUTTLE BUS
- SCHOOL ACTIVITY BUS
- EXECUTIVE LIMO





AUTOGAS SYSTEM SPECIFICATIONS

- 5.0 PFDI V8 Engine or 3.3 PFDI V6 Engine from Ford
- All Cab Styles, Bed Lengths, Trim Levels, and Wheel Bases Available
- EPA Certified
- 21 Gallon Useable Underbody Tank Standard
Other Tank Options:
 - 38 Gallon Bed Mount (all bed lengths)
 - 48 Gallon Bed Mount (6.5' & 8' bed only)
- Standard Remote Filler
- Original Ford Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Only partially PnP, soldering required
 - Custom Wire Harness
 - Injector Cups Ensures Proper Fuel Delivery
 - Custom Component Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets





AUTOGAS SYSTEM SPECIFICATIONS

- 6.2 V8 Engine from Ford
- All GVW Under 10,000#, Trim Levels, and Wheel Bases Available
- EPA Certified
- 21 Gallon Useable Underbody Tank Standard
*Cab Chassis Units Cannot Accommodate Underbody Tank
- Other Tank Options:
 - 38 Gallon Bed Mount
 - 28 Gallon Under Tool Box
 - 26 Gallon Outside Frame Mount
- Standard Remote Filler
- Original Ford Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Deluxe Plug & Play System
 - Custom Wire Harness & Break out Connector
 - Injector Cups Ensures Proper Fuel Delivery
 - Custom Engine Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets

UPFITS SUPPORTED

- SERVICE/UTILITY BODY
- DELIVERY
- FLATBED/STAKE
- DUMP
- REFUSE
- VENDING





AUTOGAS SYSTEM SPECIFICATIONS

- 7.3L V8 Engine from Ford
- All GVW, Trim Levels, and Wheel Bases Available
- EPA Certified, CARB (Pending)
- 38 Gallon Frame Mount Tank Standard
- Standard Remote Filler
- Original Ford Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Deluxe Plug & Play System
 - Custom Wire Harness
 - Custom Component Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets

UPFITS SUPPORTED

- DELIVERY
- BEVERAGE
- CRANE/BOOM
- FLATBED/STAKE
- TOW
- DUMP
- REFUSE



FORD F650/F750



AUTOGAS SYSTEM SPECIFICATIONS

- 7.3L V8 Engine from Ford
- All GVW, Trim Levels, and Wheel Bases Available
- EPA Certified
- 38.0 Useable Frame Mount Tank Standard (Other Custom Options Available)
- Direct or Remote Fillers Available
- Original Ford Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Deluxe Plug & Play System
 - Custom Wire Harness
 - Custom Component Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets

UPFITS SUPPORTED

- DELIVERY
- BEVERAGE
- FLATBED/STAKE
- TOW
- DUMP
- REFUSE
- BUS
- BULK FUEL



CHEVROLET EXPRESS GMC SAVANNA



AUTOGAS SYSTEM SPECIFICATIONS

- 6.0L & 6.6L V8 Engine from GM
- All GVWs, Trim Levels, DRW, and Wheel Bases Available
- Passenger, Cargo, CutaWay, Cab-Chassis
- EPA Certified
- Standard tank options:
 - 24 Gallon (shuttle)
 - 38 Gallon (Box Truck)
- Other Tank Options:
 - 48 Gallon (Large Box truck)
- Original GM Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Deluxe Plug & Play System
 - Custom Wire Harness
 - Custom Engine Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets

UPFITS SUPPORTED

- SERVICE/UTILITY BODY
- DELIVERY
- FLATBED/STAKE
- SHUTTLE BUS
- SCHOOL ACTIVITY BUS
- EXECUTIVE LIMO



CHEVROLET SILVERADO HD SIERRA HD



AUTOGAS SYSTEM SPECIFICATIONS

- 6.0L & 6.6L V8 Engine from GM
- All GVWs, Trim Levels, DRW, and Wheel Bases Available
- Passenger, Cargo, CutaWay, Cab-Chassis
- EPA Certified
- Standard tank options:
 - 21 Gallon (standard pickup)
 - 38 Gallon (Utility Body)
- Other Tank Options:
 - 48 Gallon
- Original GM Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Deluxe Plug & Play System
 - Custom Wire Harness
 - Custom Engine Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets

UPFITS SUPPORTED

- SERVICE/UTILITY BODY
- DELIVERY
- FLATBED/STAKE
- ROADSIDE
- RECOVERY/TOWING



ISUZU NPR, NPR-HD, NQR & NRR



AUTOGAS SYSTEM SPECIFICATIONS

- 6.0L & 6.6L V8 Engine from GM
- All GVWs up to 25,500 lbs. ,Trim Levels, DRW, and Wheel Bases Available
- Cab-Chassis Class 3, 4 & 5 trucks
- EPA Certified
- Standard tank options:
38 Gallon (Most configurations)
- Other Tank Options:
 - 48 Gallons
- Original Isuzu Warranty Remains in Place
- Alliance AutoGas 5 year 100,000 Mile Warranty Available
- Primary Fuel: LPG Secondary Fuel: Gasoline
- Deluxe Plug & Play System
 - Custom Wire Harness
 - Custom Engine Brackets
 - No Field Calibrations
- Nationwide Network of Trained Service Technicians
- Frequent Customized Service Training For Fleets

UPFITS SUPPORTED

- SERVICE/UTILITY BODY
- DELIVERY/BOX TRUCK
- FLATBED/STAKE
- TOWING





Propane Vehicle Fueling Infrastructure

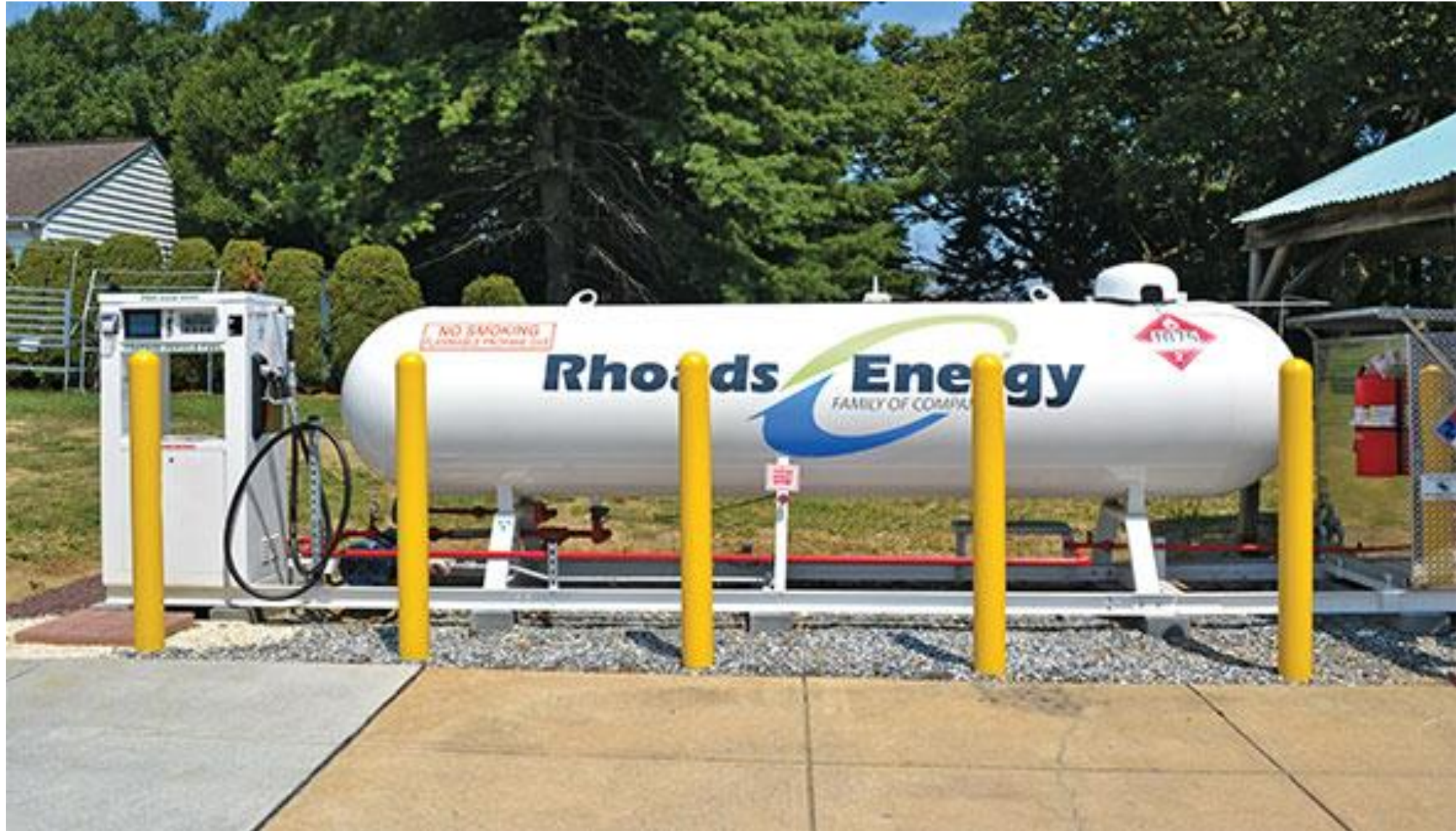
Fueling Infrastructure – Mobile Refueling



Temporary Refueling Set-up



Standard Private Station



Advanced Private Station



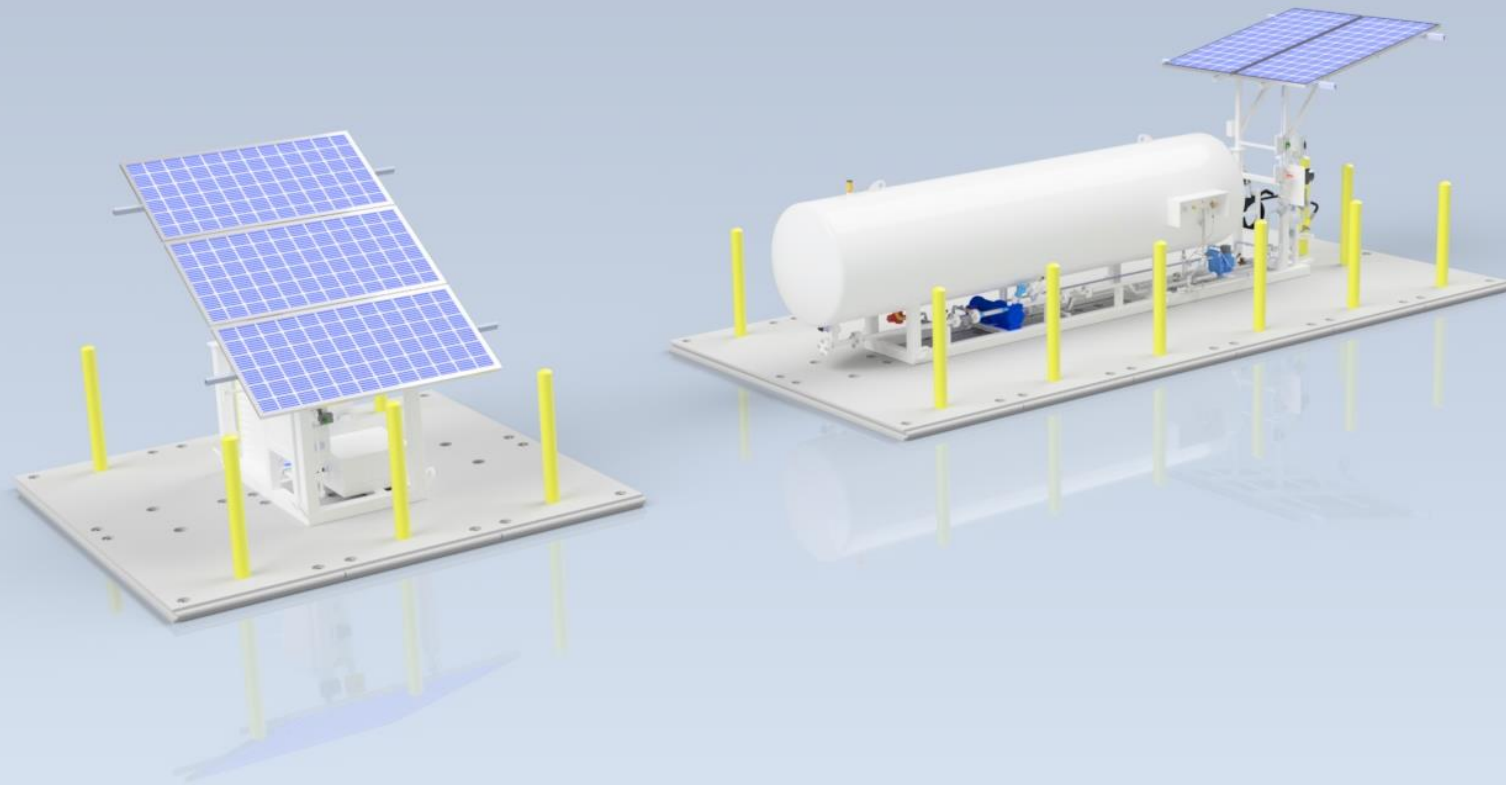
Off the Grid Stand-Alone Station



Off the Grid Stand-Alone Station

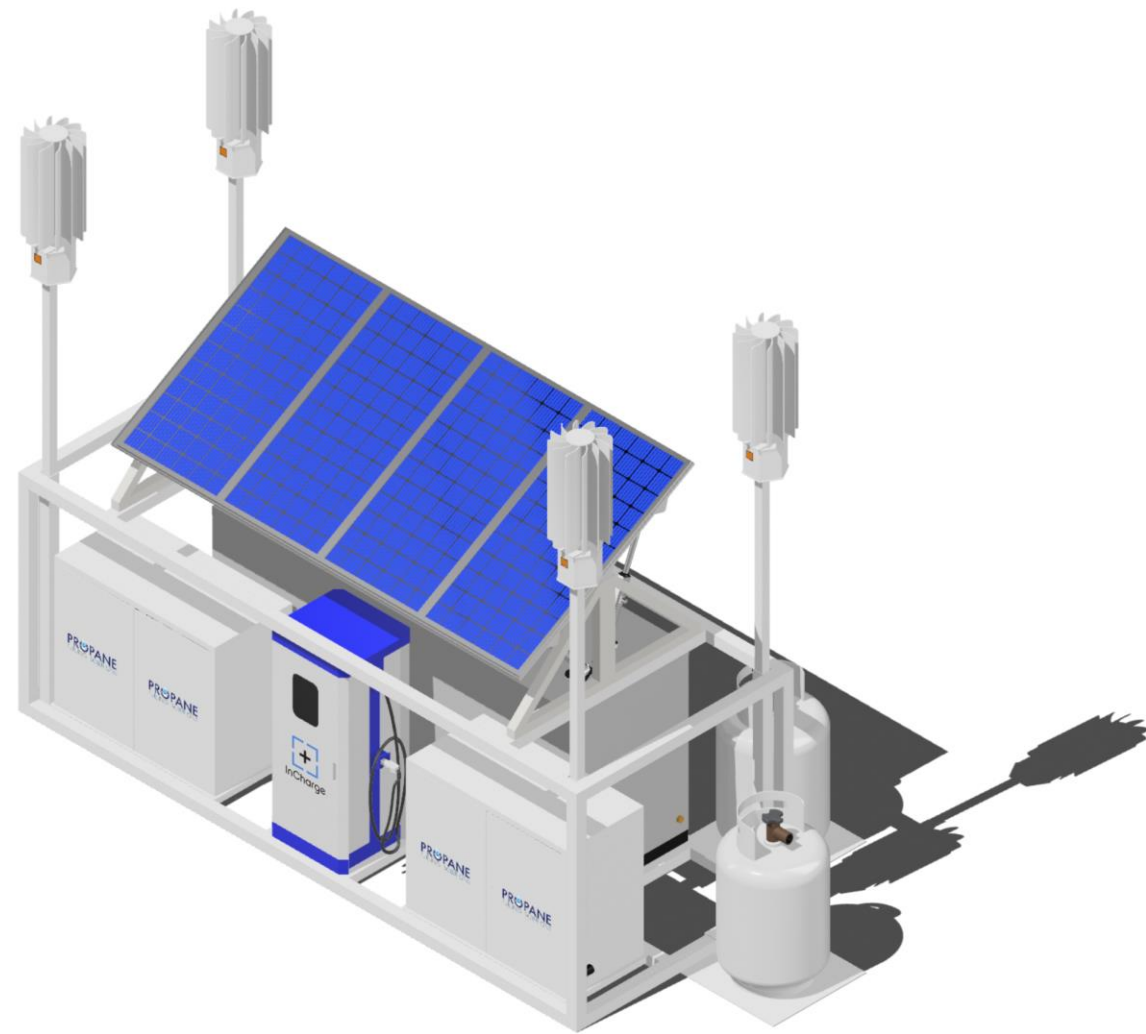










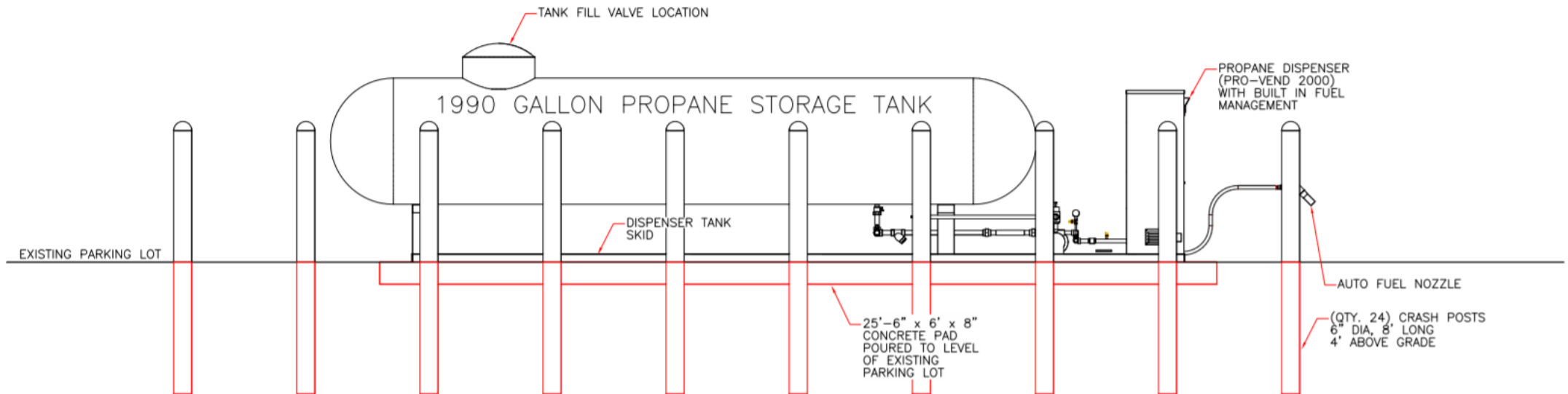




Station Equipment

Permanent, standard on-site refueling station includes:

- Concrete foundation
- Large capacity fuel tank(s)
- Pump
- Dispenser(s) with meters
- Crash protection



Station Costs

ADVANCED PRIVATE STATION

SUPPLIER OWNED

\$5,000 - \$75,000

(Site prep)

YOUR COST

FLEET OWNED

\$60,000 - \$225,000

(Infrastructure)

\$5,000 - \$75,000

(Site prep)

YOUR COST



STANDARD PRIVATE STATION

SUPPLIER OWNED

\$1,500 - \$15,000

(Site prep)

YOUR COST

FLEET OWNED

\$20,000 - \$60,000

(Infrastructure)

\$1,500 - \$15,000

(Site prep)

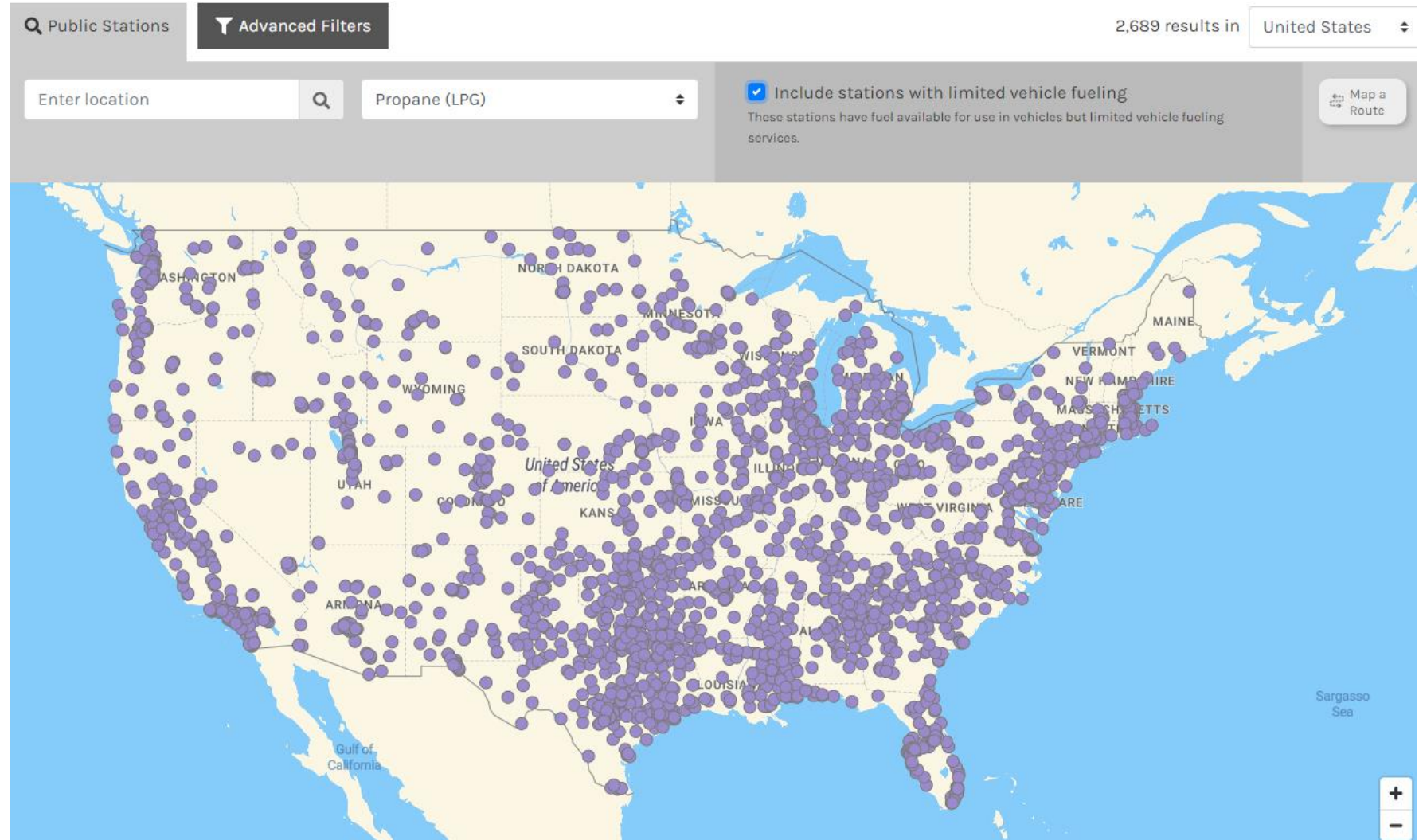
YOUR COST

Refueling Options and Upgrades

- Credit card reader and printer
- Hose retractor
- Quick connect (Euro) nozzles
- Fuel management system
- Third party fuel management system connections
- Vertical and horizontal tanks ranging from 1,000 to 30,000 gallons
- Temporary, portable refueling solutions
- Awning, safety and barricade options



Dept of Energy Alt Fuel Station Locator



Station Installation Steps

STEP 1 >

Develop a detailed plan for your size of fleet

- Available space
- Traffic flow requirements
- Expected growth

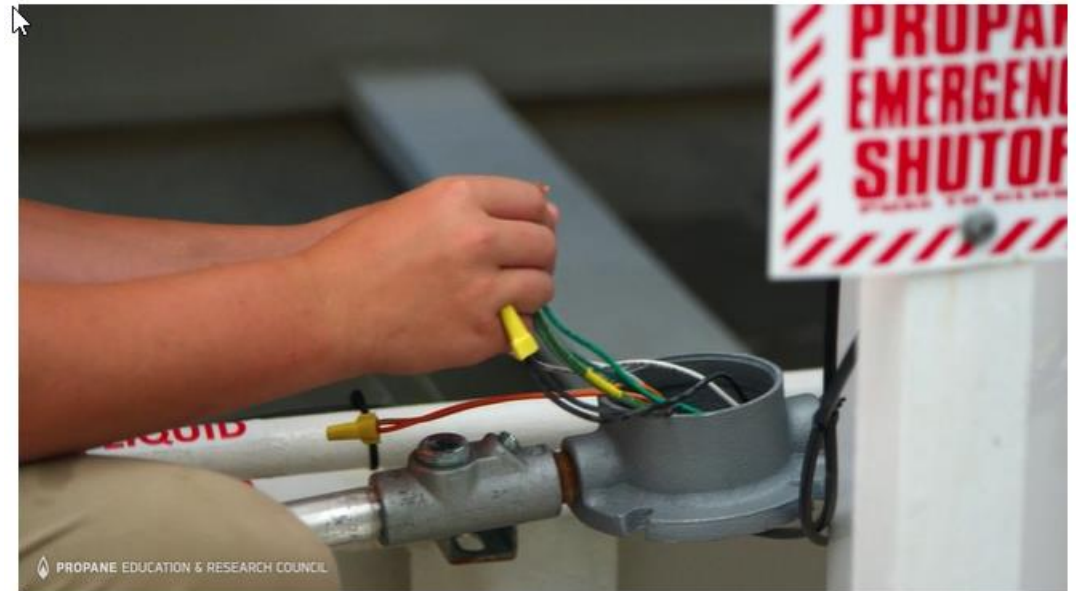


Station Installation Steps

STEP 2 >

Create a project timeline

- Design and engineering
- Permitting
- Site preparation
- Electrical work
- Data management development



Station Installation Steps

STEP 3 >

Installation

- Concrete pad
- Skid and propane tank
- Electrical
- Crash protection



Station Installation Steps

STEP 4 >

Final checks

- Test gas
- Safety checks: pumps, nozzles, plumbing, hoses



www.propane.com/for-my-business/fleet-vehicles/





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