

2021 PROGRAM OVERVIEW

Advanced Clean Transportation Solutions





For almost half a century, Roush has sustained growth in a constantly evolving mobility marketplace. The company is one of fastest growing clean technology companies across the nation.

Roush offers its global customers a level of thinking and passion they cannot find anywhere else.

ROUSH®



ROUSH®
CLEANTECH

ROUSH® Enterprises

INGENUITY ON DEMAND

Solving complex problems through ingenuity, curiosity and tenacity.

INDUSTRIES



MOBILITY



DEFENSE



ENTERTAINMENT



AEROSPACE

ABILITIES



DESIGN



ENGINEERING



PROTOTYPE



TESTING



MANUFACTURING

SATISFIED CLIENTS

Aptiv
Argo.ai
BAE Systems
Bell Helicopter

Blue Bird
BMW
Boeing
Disney

FAAC
Ford
GAC
GM

Google/Waymo
Hardwire
Honda
Hyundai

Isuzu
Navistar Defense
Nissan
Oskosh Defense

Pratt & Whitney
Rivian
SAIC
Sikorsky

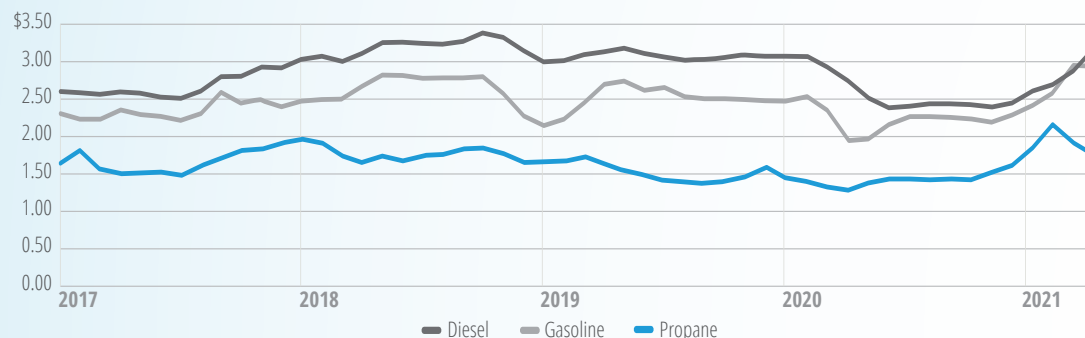
Toyota
Universal Studios
US Army/TARDEC
Volkswagen

PROPANE AUTOGAS

REDUCES...

✓ FUEL COSTS

Propane autogas costs about 40% less than gasoline and 50% less than diesel per gallon — year after year.



✓ EMISSIONS

Standard on the 7.3L, the 0.05 g/bhp-hr propane autogas engine is 75% cleaner than EPA's most stringent emission regulation.

EMISSION CONSTITUENT	OUR CERTIFIED LEVEL	% BELOW STANDARDS*
Formaldehyde (HCHO)	0.00	100% lower
Nitrous Oxide (N2O)*	0.02	80% lower
Particulate Matter (PM)	0.002	80% lower
Methane (CH4)*	0.03	70% lower
Nitrogen Oxide (NOx)	0.05	75% lower
Carbon Monoxide (CO)	5.85	65% lower
Non-Methane Hydrocarbons (NMHC)	0.05	64% lower
Carbon Dioxide (CO2)*	545	11% lower

*Greenhouse gases

*EPA or CARB Standard

✓ MAINTENANCE COSTS

Without the required 14+ diesel components, propane fleets report savings of 30–50% on filters and fluids, and even more on labor and shop space.



✓ TOTAL OPERATING COSTS

The benefit of lower fuel costs and less maintenance adds up to real savings.

TOTAL LIFETIME SAVINGS

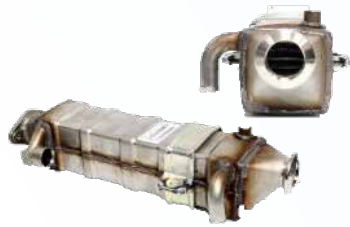
Oil Change Interval	Cost Per Oil Change	Fuel Filter Change
5,000 miles	\$22.50	50,000 miles
Oil Capacity	Lifetime Oil Change Cost	Fuel Filters Cost
8 quarts	\$843.75	\$160.00
Oil Filter Cost	DEF Lifetime Cost	Total Filter Changes
\$5.00	\$9792.25	3

Diesel \$149,180 – Propane \$134,241 = Savings: \$14,939

RECOGNIZE THESE DIESEL COMPONENTS?



Charged Air Cooler



EGR Cooler



EGR Valve



Turbo Charger



Dosing Unit



Dosing Control Unit



Dosing Module



SCR Cat with DPF



Heated Supply Line



Block Heater



Assembly for DEF Tank



DEF Tank



NOx Sensors



Sensors & Assemblies

All of these components are eliminated when you switch to propane.

COMMERCIAL VEHICLE OPTIONS

Ford F-53 / F-59

Stripped Chassis
7.3L V8



Tech Specs

EPA & CARB approved
F-53 GVWR: <26,000 lbs.
F-59 GVWR: <22,000 lbs.

Fuel Capacity

LH Saddle	45 gallons usable
Aft Axle	65 gallons usable

Ford F-450 / F-550

Chassis Cab
7.3L V8



Tech Specs

EPA & CARB approved
F-450 GVWR: <16,500 lbs.
F-550 GVWR: <19,500 lbs.

Fuel Capacity

RH Saddle	35 gallons usable
Extended Side Saddle	54 gallons usable
Aft Axle	65 gallons usable

Ford F-650 / F-750

Chassis Cab
7.3L V8



Tech Specs

EPA & CARB approved
F-650 GVWR: <30,000 lbs.
F-750 GVWR: <33,000 lbs.

Fuel Capacity

Single 51" LH Saddle	29 gallons usable
Single 86" LH Saddle	50 gallons usable
Dual 51" Saddle	54 gallons usable*
Aft Axle	65 gallons usable
Left Long, Right Short	74 gallons usable*

*Total gallons usable for dual tanks combined. Contact ROUSH CleanTech for pricing.

Ford E-350

SRW and DRW Cutaway and Stripped Chassis
7.3L V8



Tech Specs

EPA & CARB approved
SRW GVWR: < 10,050 lbs.
DRW GVWR: < 12,500 lbs.

Fuel Capacity

Aft Axle 41 gallons usable

Ford E-450

DRW Cutaway and Stripped Chassis
7.3L V8



Tech Specs

EPA & CARB approved
GVWR: <14,500 lbs.

Fuel Capacity

Aft Axle	41 gallons usable
Extended Aft Axle	64 gallons usable

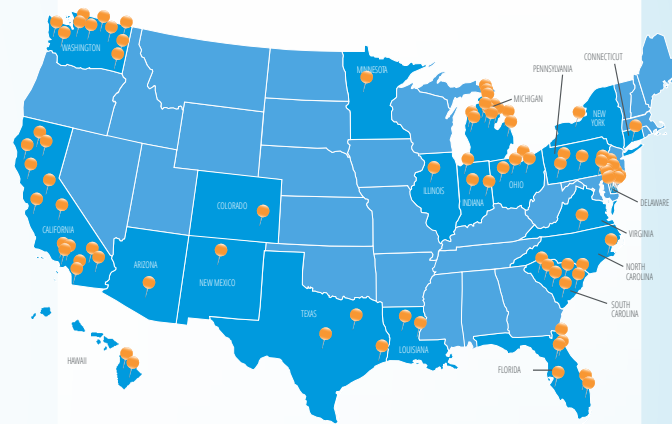
FOR TRANSIT FLEETS



E-350 / E-450

F-450 / F-550

F-650 / F-750



Transit agencies across the U.S. rely on ROUSH for savings, service and reduced emissions.

[REQUEST A DEMO](#)

[CALCULATE YOUR SAVINGS](#)

Visit.ROUSHcleantech.com



SCHOOL BUS PRODUCT OVERVIEW

Blue Bird Vision



CONFIGURATION OPTIONS

BODY MODEL	WHEELBASE	PROPANE*	GASOLINE*
BBCV1910	169"	47	45
BBCV2311	189"	69	60
BBCV2508	217"	69	60
BBCV2610	217"	69	60
BBCV2807	238"	69	60
BBCV3011	252"	69	60
BBCV3201	273"	69	60
BBCV3303	273"	69 / 98	60 / 100
BBCV3310	273"	69 / 98	60 / 100
BBCV3507	280"	69 / 98	60 / 100



Tech Specs

EPA & CARB approved
GVWR: 33,000 lbs.
Up to 77 passengers

Fuel Capacity

Short Tank	47 gallons usable
Standard	67 gallons usable
Extended	93 gallons usable



Tech Specs

EPA & CARB approved
GVWR: 33,000 lbs.
Up to 77 passengers

Fuel Capacity

Standard	60 gallons usable
Extended	100 gallons usable

*Tank capacity in gallons. Contact your local Blue Bird dealer at www.blue-bird.com/find-a-dealer for pricing.



ROUSH CleanTech has partnered with Blue Bird since 2012 to bring customers the best-selling propane school buses on the market. The Blue Bird Vision and Micro Bird G5, equipped with our propane fuel system, offer school districts many non-diesel options for school bus transportation.

Micro Bird G5



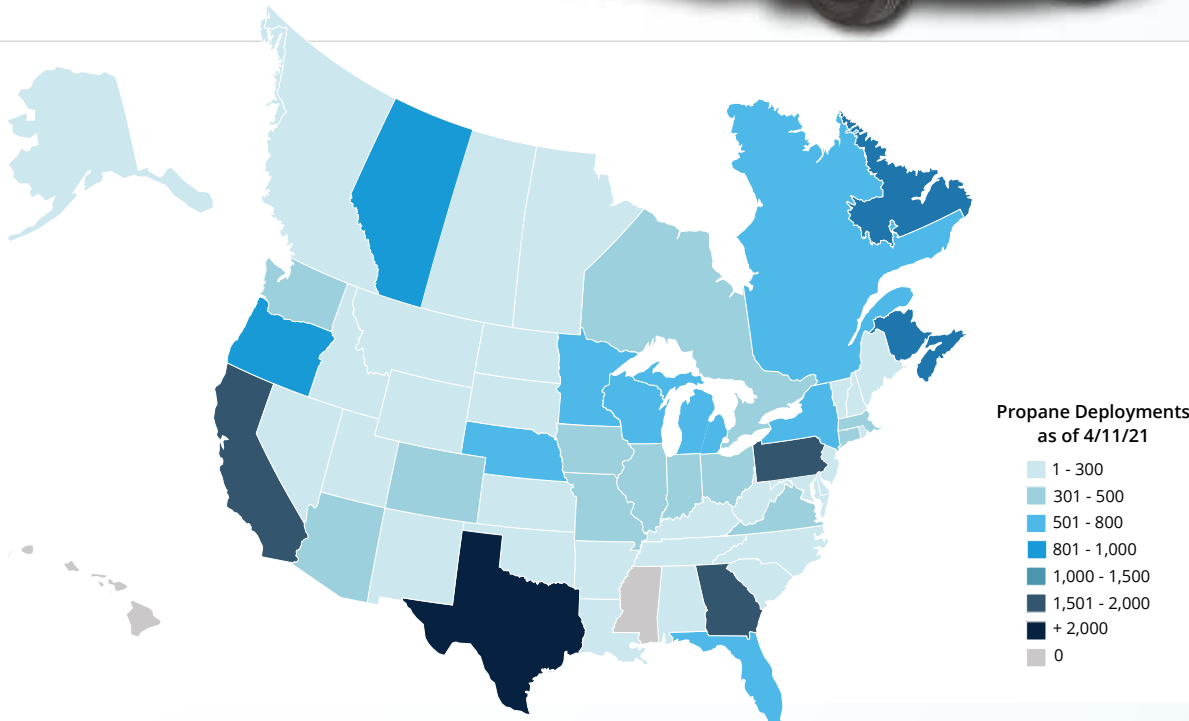
Tech Specs

EPA & CARB approved
GVWR: 14,500 lbs.
Up to 30 passengers

Fuel Capacity

Aft Axle

41 gallons usable



PROPANE SCHOOL BUSES ACROSS NORTH AMERICA

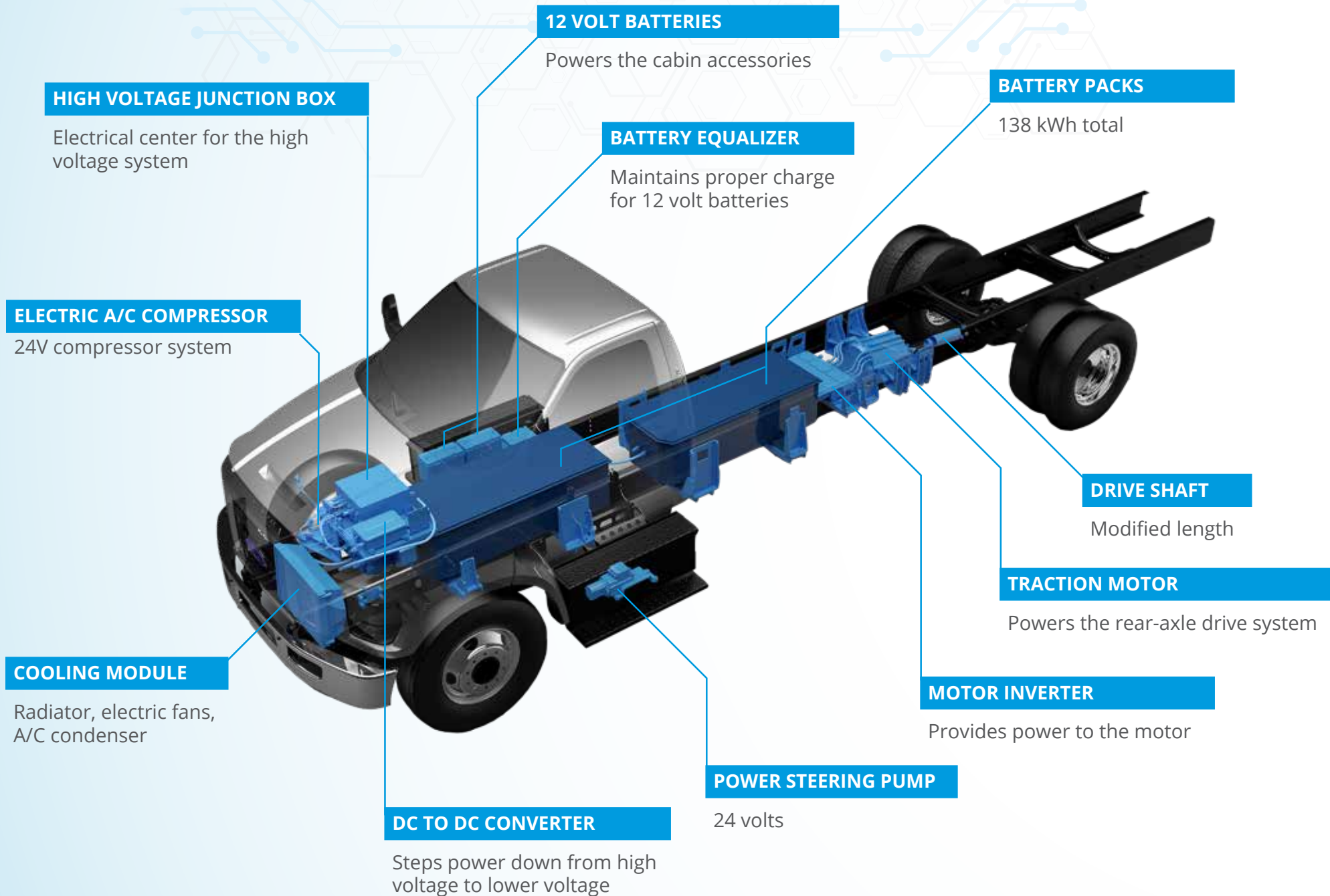
- Over 17,000 Blue Bird propane school buses in North America.
- More than 950 school districts operating Blue Bird propane buses.

REQUEST A DEMO

CALCULATE YOUR SAVINGS

Visit [ROUSHcleantech.com](https://www.ROUSHcleantech.com)

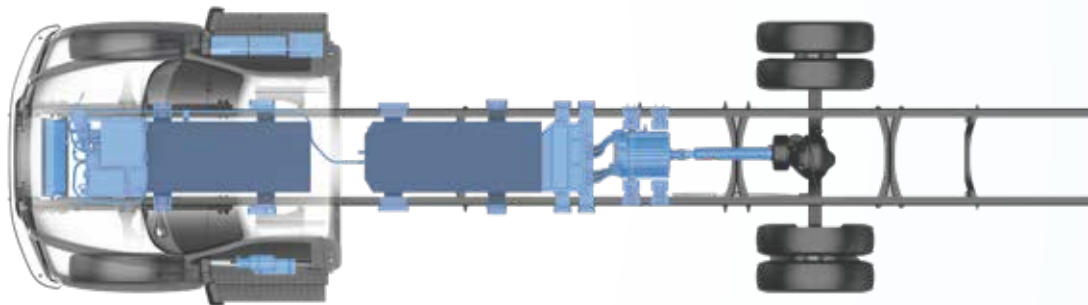
ZERO EMISSION BATTERY ELECTRIC VEHICLE



Ford F-650



Battery Electric Vehicle Side View



Battery Electric Vehicle Top View

ROUSH CleanTech has deployed more than 37,000 alternative-fuel vehicles since 2010. We now bring that expertise and customer success to the electric vehicle market.

Packed with power and performance, our zero-emission, all-electric vehicle is backed by more than 20 years of

electric vehicle engineering expertise from Roush.

ROUSH CleanTech continues to innovate in the advanced clean transportation sector to deliver clean mobility solutions for a more sustainable future.

BATTERY SYSTEM

Energy	138kWh
Voltage	400 V
Battery Design	2 modular battery packs
Chemistry	Lithium Ion (NMc)
Motor Type	DC medium-voltage system
Transmission	Direct drive

CHASSIS SPECS

GVWR	26,000 lbs
Wheelbases	242" / 260" / 281"
Range	100 miles*
Gradeability	17%

*May vary based on GVWR, applications, driver habits and road conditions.



GOVERNMENT AFFAIRS —

Roush's government affairs team helps customers protect value and create new value for ROUSH CleanTech through effective interaction with government and non-governmental organizations.



CATEGORIES OF STRATEGIC FOCUS

FUNDING AND INCENTIVES



PUBLIC POLICY INITIATIVES



STAKEHOLDER ENGAGEMENT

Roush helps customers navigate the complex landscape of both governmental and non-governmental requirements to reduce total cost of ownership.

Roush's government affairs team helps customers and industry partners understand public policy initiatives and how they will **impact research, development and deployment of future technologies.**

Identify and assist with applying for funding opportunities, such as incentives and grant proposals to help optimize fleets financially and operationally by minimizing total cost of ownership.

Maximize stakeholder engagement by leveraging Roush industry relationships to help customers achieve their sustainability and cost objectives.

Work hand-in-hand with Roush's engineering team to **create products and support policies that drive sustainable clean energy technologies** — combating climate change and supporting carbon neutrality.

LIQUID PROPANE AUTOGAS FUEL SYSTEM TECHNOLOGY

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

FUEL RAIL

Our signature anodized aluminum fuel rails 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 fuel tank meets ASME certification standards. It's built 20 times more puncture-resistant than gasoline tanks and is made in the U.S.

FUEL FILL

The design of the industry-standard valve allows for safe passage of liquid propane autogas into the vehicle. It also includes a check valve to prevent fuel leaks.

FUEL LINES

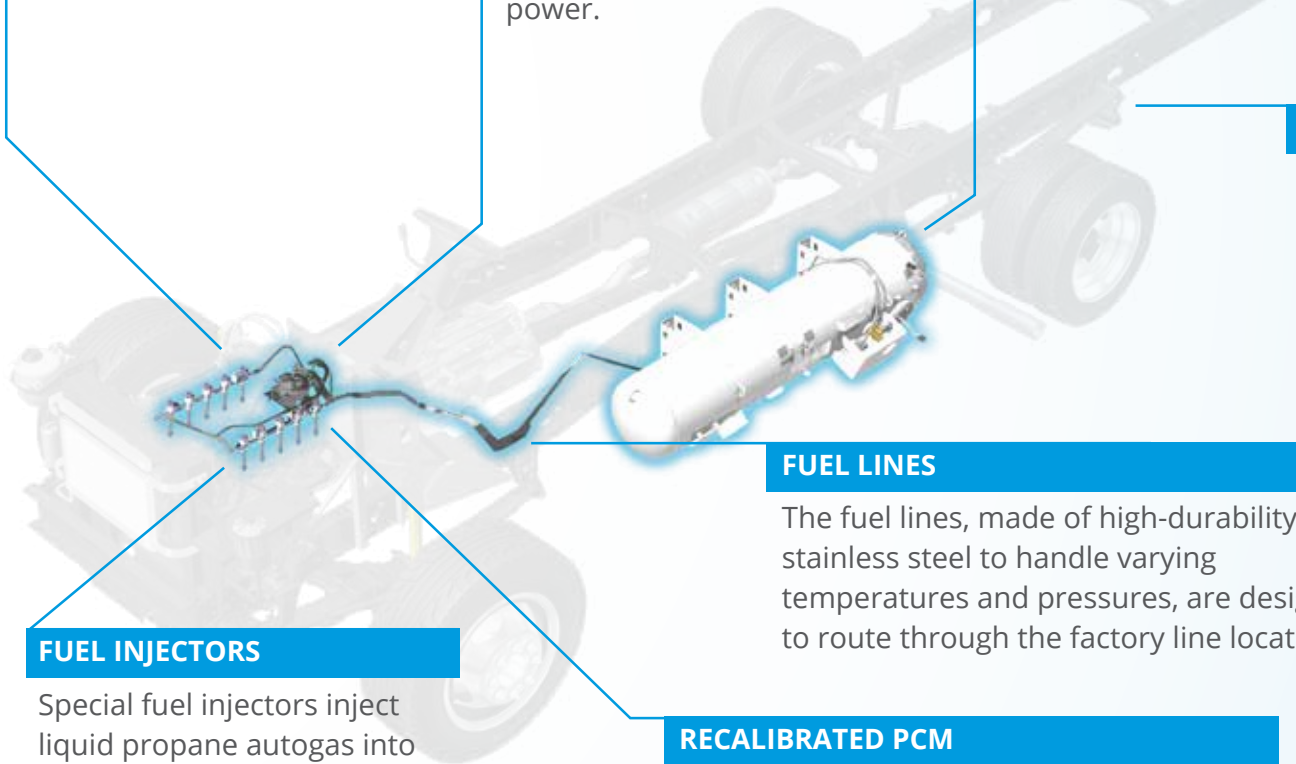
The fuel lines, made of high-durability stainless steel to handle varying temperatures and pressures, are designed to route through the factory line locations.

FUEL INJECTORS

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

RECALIBRATED PCM

We reprogram Ford's on-board computer that controls the engine to allow the vehicle to operate properly on propane autogas.



AFTER SALES SUPPORT



Contact and Support

You can rely on ROUSH CleanTech's in-house Customer Success department after your new vehicles are in operation. Our extensive after-sale customer support includes field service, a call center, warranty assistance, technical publications and training. Our team members are with you every step of the way.



800.59.ROUSH



support@ROUSHcleantech.com



ROUSHcleantech.com/service



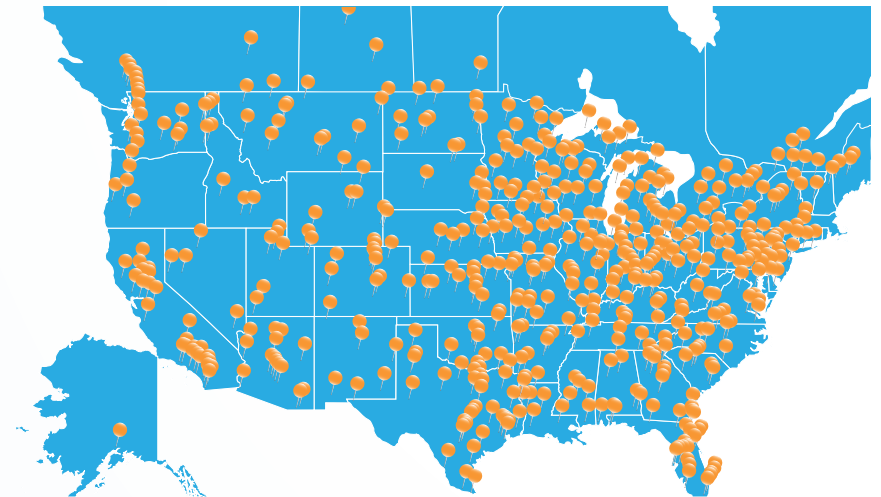
Partners

ROUSH CleanTech partners with Ford, Blue Bird and independent service centers to create a nationwide network of qualified experts.



Service Network

We support our partners by providing technical support and contact center assistance. We make sure that each of our partners are properly equipped with the tooling, training and service diagnostic information to effectively service and maintain the ROUSH CleanTech fuel system with our expanding service network. Our team's mission is to help you diagnose any issues that may arise and get your vehicle back on the road as quickly as possible.



ROUSH CleanTech offers an expanding service network with more than 700 locations across the country.



Training and Technical Publications

ROUSH CleanTech offers a variety of propane autogas system training options instructed by one of our expert trainers, a field service engineer or online. Our training library gives customers the flexibility to complete the program at their own pace. If additional training is needed after going through our online training program, we can send a ROUSH CleanTech training expert to complete on-site training.

Technical publications are available on our website at no charge. You can find regularly updated service and diagnostic manuals, wiring schematics and more on our Service web page at **ROUSHcleantech.com/service**.

FACTORY TECHNICIAN WORKSHOPS provide hands-on training to service centers and customers at our Livonia, Michigan, location. To register for one of our Factory Technician Workshops, please visit the Service tab on the ROUSH CleanTech website.



ON-SITE TRAINING depends on a customer's needs and experience with ROUSH CleanTech vehicles. On-site training ranges from a two-hour Vehicle Overview to a full-day Advanced Diagnostics Training.



INTERACTIVE SCENARIOS

- Utilizing new technology, we are creating scenario-based training, allowing you to perform service tasks, run diagnostic tests and troubleshoot vehicle issues.
- We release new interactive training modules throughout the year.



ONLINE TRAINING

- Propane Properties and Safety
- Propane Fuel System Overview
- Diagnostics
- Interactive Scenarios

VIDEOS



- Repair and Diagnostic Videos
- News Updates
- "How to" Videos
- Fuel and Driving Demonstrations

TECHNICAL PUBLICATIONS



- Service Manuals
- Diagnostic Manuals
- Repair and Service Procedures
- Special Service Messages

SATISFIED CUSTOMERS FOR MILES...

...A BILLION OF THEM, ACTUALLY

SCHOOL BUS FLEETS



"We are reducing our transportation costs with propane buses and the savings will be reallocated to other transportation initiatives. Our taxpayers will be able to observe our goal to reduce pollution and operating costs, which saves dollars in the end."

- Diana Mikelski, Director of Transportation



"Even if you ignore the financial benefit to the school district of \$1.3 million savings per year just on the fuel side, I think the environmental aspect of it is important to a lot of people, especially to parents of young children."

- Brian Woods, Superintendent

TRANSIT FLEETS



"You'll get an immediate payback in lower fuel costs and a healthier environment. We're reaping the benefits of it on a daily basis. Now we have cost savings on the fuel, lower maintenance costs, and are helping make a positive impact on the environment."

- Keith Taylor, Director of Maintenance



"When you can do something that helps you to make positive changes to the environment and saves you money, that's something you ought to jump on. MTS will save about \$5.8 million over the five to seven-year lifecycle of the vehicles and reduce the carbon intensity by 71 percent."

- Ron Roberts, Vice Chairman

COMMERCIAL FLEETS



"Propane-powered vehicles are much quieter than equivalent diesel-powered vehicles, which leads to higher driver satisfaction. We deliver across the U.S., in various climates, conditions and terrains, and our drivers are excited about the ROUSH CleanTech-powered E-450 chassis."

- Ron Moore, VP Warehouse & Fleet Operations



"ROUSH CleanTech provided our company mechanics with training at no cost and continues to support all our locations on additional training needs. Where hands-on training was a better fit for us, they were quick to support with field technicians that work on these trucks daily. The training program with ROUSH CleanTech has been a big success within our team."

- Eric McCann, Senior Technical Fleet Manager