ROUSH CLEANTECH

WELCOME

Propane Autogas Lunch & Learn

MacAllister Transportation

ROUSH CLEANTECH

Spark Ignited Offering

BLUE BIRD®

ROUSH® CLEANTECH

PROPANE

GAS

CNG

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Your Fuel Options

					
Ease of Adoption	✓	✓	✓		
Energy Independence			✓	✓	✓
NOx Emissions			✓	✓	✓
Fuel Infrastructure	✓	✓	✓		
Cost of Ownership		✓	✓		
Range	✓	✓	✓		
Maintenance		✓	✓	✓	✓
Scalable	✓	✓	✓		
Cold Weather Operation		✓	✓		

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Everyday, propane buses carry over one million students across the U.S.

Over 18,300 propane school buses are on the road

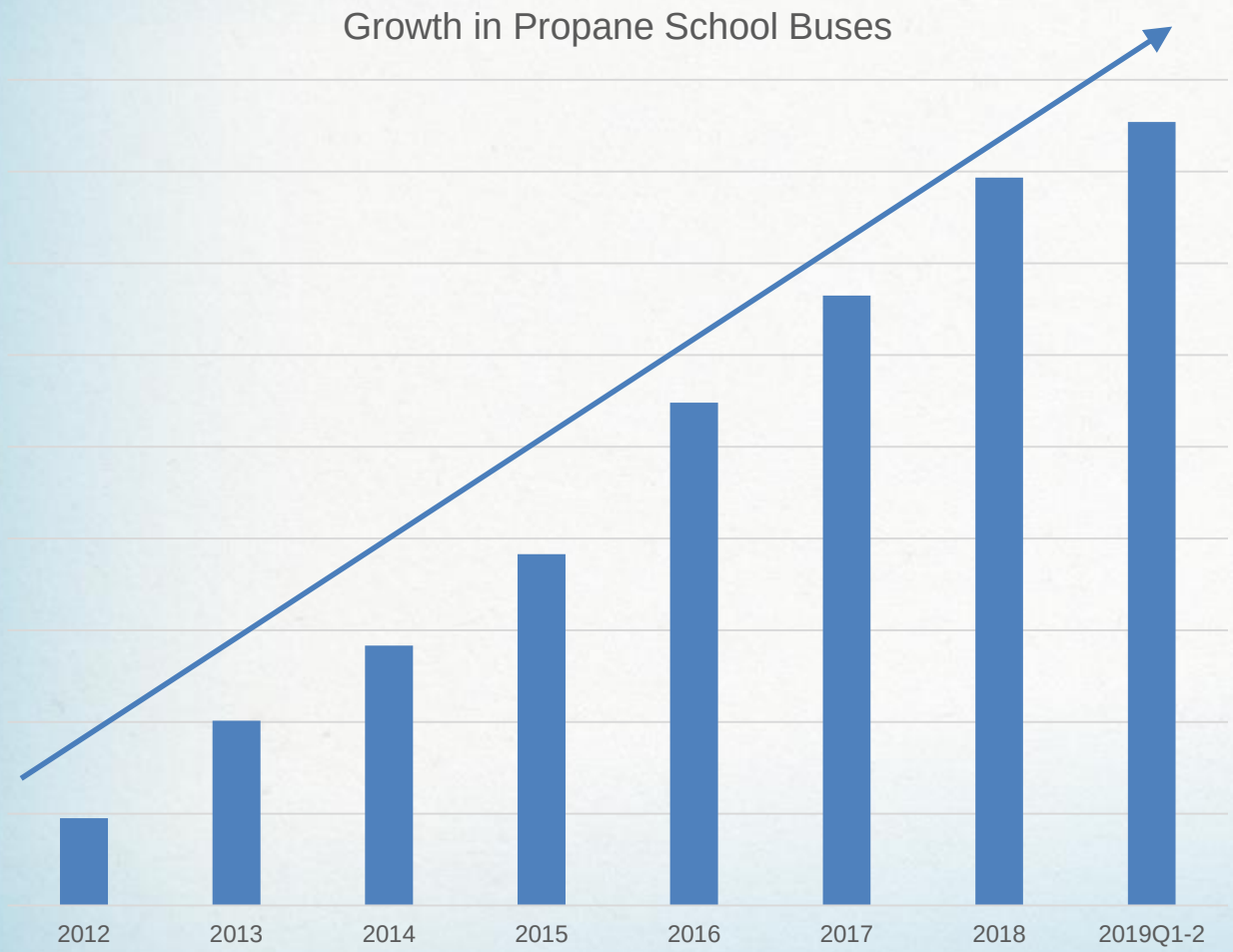
Carrying approximately 1,118,700 students/day

In the fleets of approximately

930 school districts, private schools and bus contractors

Based on IHS-Polk data for new vehicle registrations through June 2019 and Vehicles in Operation registrations through Dec. 2018. There are no registered Type D propane school buses from January 2012 through June 2019 in IHS's new vehicle registration database. Additional buses based on manufacturer information and other publicly available information, which includes buses ordered and/or delivered but not yet registered and buses sold before 2012 which did not include propane fuel type in their Vehicle Identification Number (VIN) and sales data from other public sources. Ridership based on approximately 62 students per Type C bus and 14 students per Type A bus. Double routing and use for extracurricular activities can increase ridership.

The propane school bus market is growing



850% increase

approximate amount the propane school bus fleet has grown since 2012

Number of propane school buses is based on registered Type C buses from January 2012 through June 2019 from IHS-Polk data for new vehicle registrations and additional data from manufactures.

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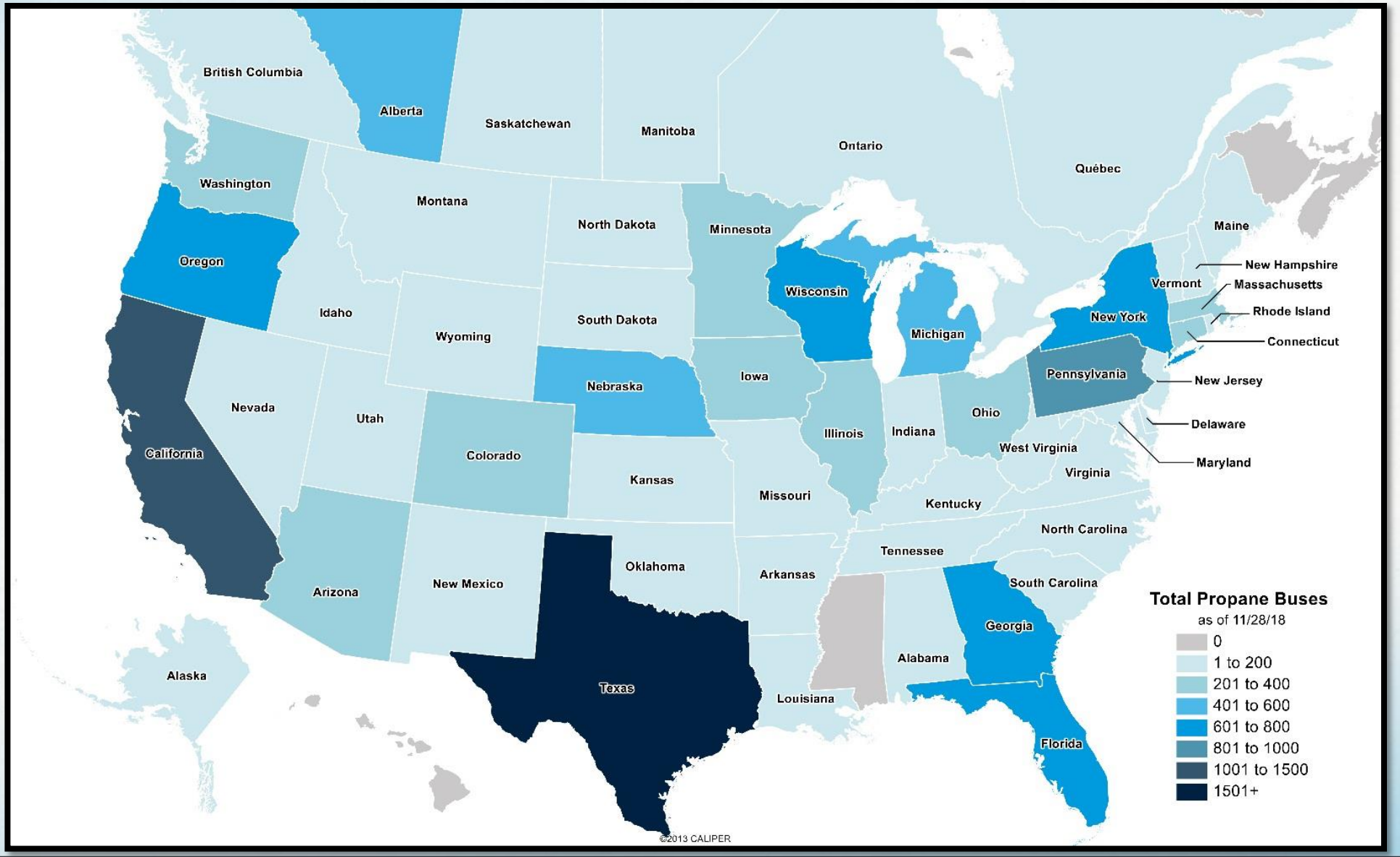
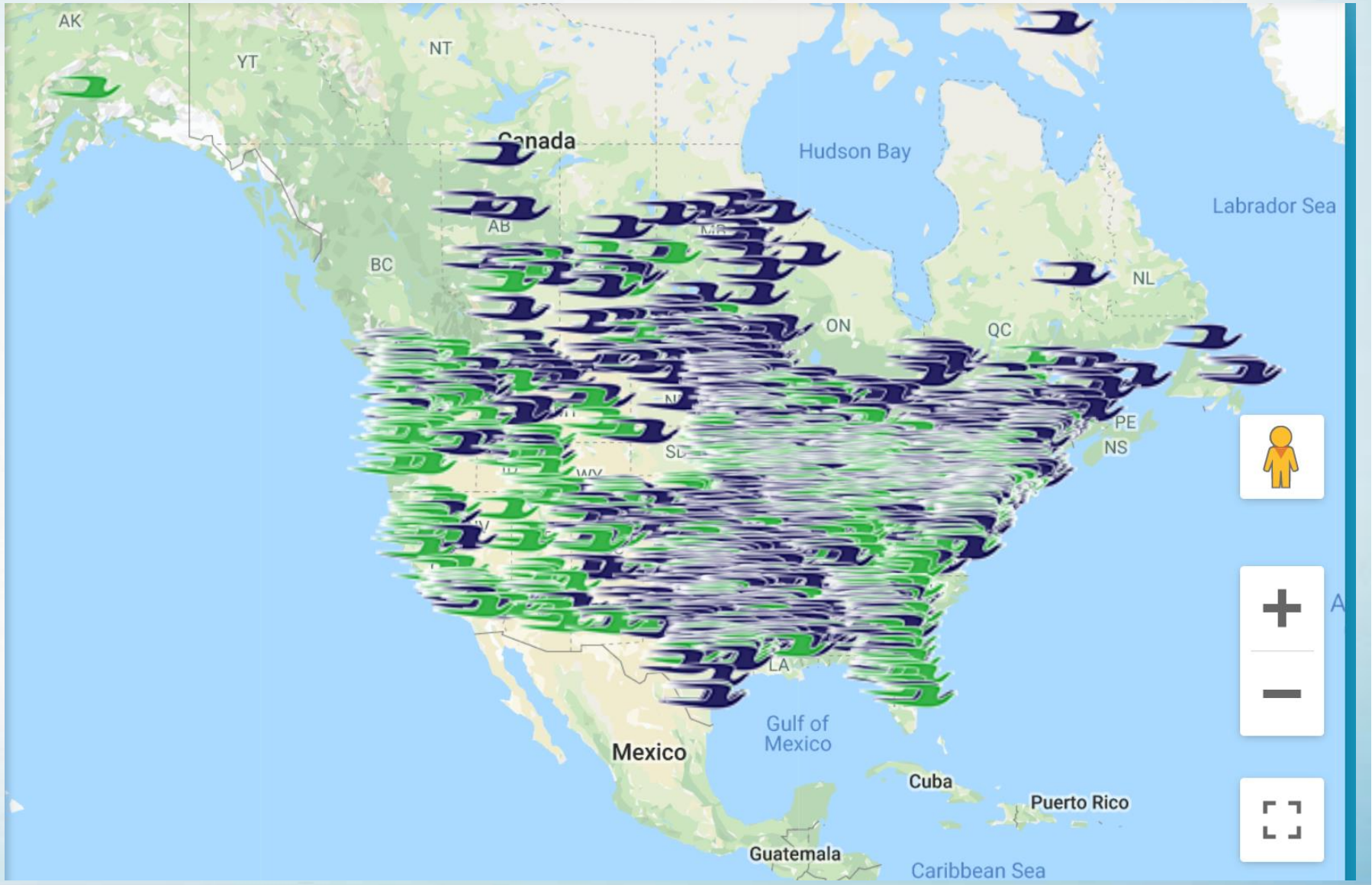
School Bus Propane Deployments



Deployment Progress

- 15,000+ Propane
- 7,000+ Gas



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Our Scorecard

OVER

20,000

VEHICLES ON THE ROAD

ACCUMULATED OVER

1B

BILLION MILES

OVER

900

SCHOOL DISTRICTS

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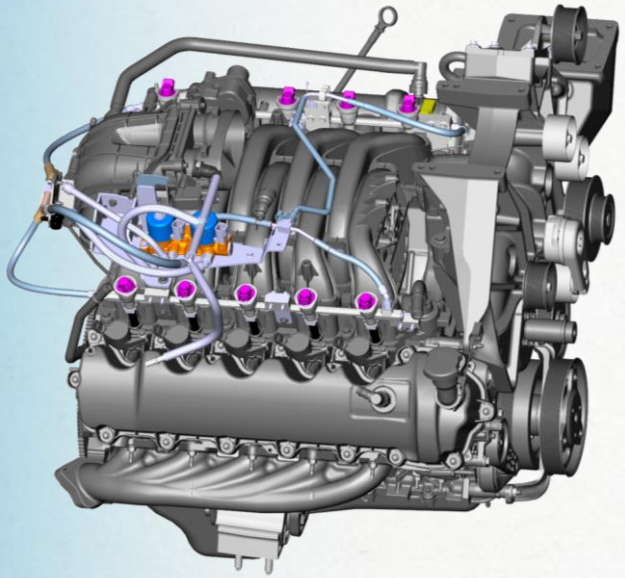
POWERTRAIN

Engine & Transmission

Ford / ROUSH Powertrain & Fuel System



BUILT Ford TOUGH

Ford Windsor Engine Plant

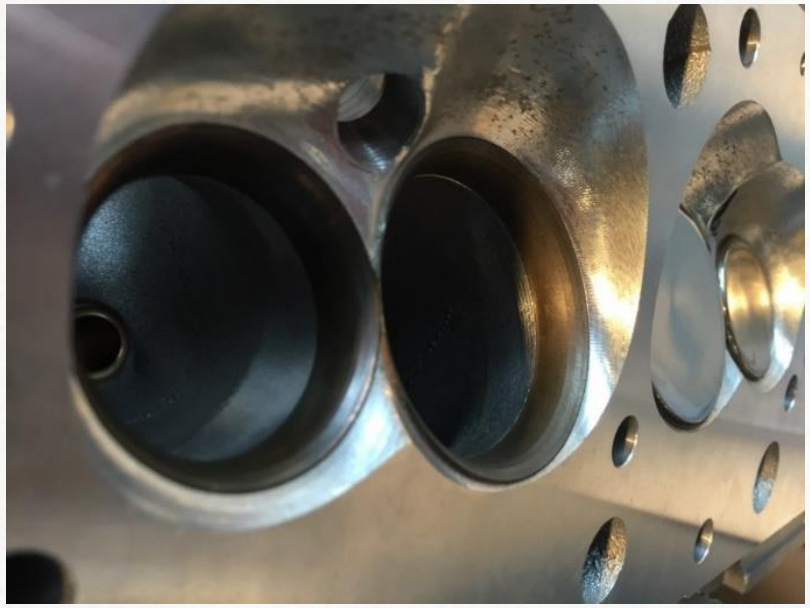
- Production:
  - Over 570 engines / day
  - Over 100,000 engines in 2017

- Only ~ 4.5% of Ford's entire 2015 6.8L V10 engine production will end up in a Blue Bird Vision school bus.

- High Volume Production Benefits:
  - Key in-process checks
  - Production quality
  - Data management / integrity / tracking
  - Improvement in process over time

Ford Purpose Built for Propane

Inconel is a super-alloy that can withstand the higher temperatures and decreased lubricity of propane autogas



Inconel Valve Seats

Ford Sharonville, OH Transmission Plant

- Production:
  - Over 1,300 transmissions / day
  - Over 28,600 transmissions / month
  - Over 340,000 transmissions in 2015

- Less than 0.4% of Ford's entire 2015 6R140 transmission production will end up in a Blue Bird Vision school bus.

- High Volume Production Benefits:
  - Key in-process checks
  - Production quality
  - Data management / integrity / tracking
  - Improvement in process over time

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COST
&
COMPLEXITY

Modern Diesel Technology

- Increasing complexity and cost
- Additional tooling and training
- Challenges with School Bus/Medium Truck duty cycle

Preventative Maintenance

Ford V10
Gas and Propane
7 Quarts

Various Engines
Diesel
17 – 30 Quarts

Increased Inventory

- Gas and propane eliminate the need for DEF and the possibility of putting the wrong fluid in a tank

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The Diesel We Know Today














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Preventative Maintenance

Ford 6.8L V10

Part	Quantity	Price	Total	
Element Air Cleaner	1	$15.75	$15.75	Total $70.94
Oil Spin On Filter	1	$4.11	$4.11	
Element, PSR, 510 Filter	1	$24.90	$24.90	
Mobil Special 5W-20	7	$3.74	$26.18	

Cummins ISB 6.7L

Part	Quantity	Price	Total	
Oil Filter	1	$13.75	$13.75	Total $277.15
Fuel Spin-On Filter	1	$37.90	$37.90	
Power Steering Spin Filter	1	$9.86	$9.86	
Fuel Filter	1	$20.53	$20.53	
Allison Control Filter	1	$8.49	$8.49	
Mobil Fleet 15W-40	18	$2.59	$46.62	
Cleaner, Air Element	1	$140.00	$140.00	

Engine Components: Ford Roush

Ford 6.8L V10

Part	Quantity	Price	Total	
PCV Hoses (2)	1	$43.68	$43.68	
Vapor Management Valve	1	$65.00	$65.00	
Gasket	1	$5.99	$5.99	
Injector Assembly	10	$215.00	$2,150.00	**Total $3,348.04**
Converter Assembly	1	$910.00	$910.00	
Spark Plugs	10	$7.08	$70.80	
O2 Sensors (all 3)	1	102.57	$102.57	

Engine Components: Diesel

Cummins ISB 6.7L

Part	Quantity	Price	Total	
NOx Sensor	1	$480.00	$480.00	
NOx Sensor	1	$560.00	$560.00	
Pressure Sensor	1	$140.00	$140.00	
Doser Injector	1	$290.00	$290.00	
Catalyst Assembly w/ DPF	1	$10,554.11	$10,554.11	
Temperature Sensor	1	$78.90	$78.90	
Temperature Sensor	2	$84.90	$169.80	
Turbo	1	$2,731.20	$2,731.20	
Injector	6	$755.56	$4,533.36	
EGR Valve	1	$590.15	$590.15	
EGR Cooler	1	$923.72	$923.72	
				Total $21,051.24

Full Engine Replacement

Ford 6.8L V10

Part	Price	Core	Total
Ford 6.8L Engine	$7,194.85	$900.00	$8,094.85

Cummins ISB 6.7L

Part	Price	Shipping	Total
Cummins ISB 6.7L	$18,521.98	$400.00	$18,921.98

Cost per Mile to Operate and Total Cost

TCO Inputs (Fuel and Preventative Maintenance Only)		
Fuel	Price / Gallon	MPG
Diesel	$2.75	7.5
Gasoline	$2.25	5.85
Propane	$1.10	4.5
CNG	2.15 (GGE)	5.85
Electric	12.3¢ / kWh	1.4 kWh / mile

ACQUISITION COST					
Acquisition Cost	$80,000.00	$85,000	$78,000	$115,000	$300,000
Vehicle Rebate per Unit			$0.00	$0.00	$0
TOTAL COST OF OWNERSHIP	**Diesel**	**Propane**	**Gasoline**	**CNG**	**Electric**
Lifetime Operational Cost/Bus	**$166,701.46**	**$142,039.25**	**$165,745.50**	**$210,374.40**	**$338,745.00**
Cost per Mile to Operate	$0.39	$0.25	$0.39	$0.42	$0.17

Electric $0.17

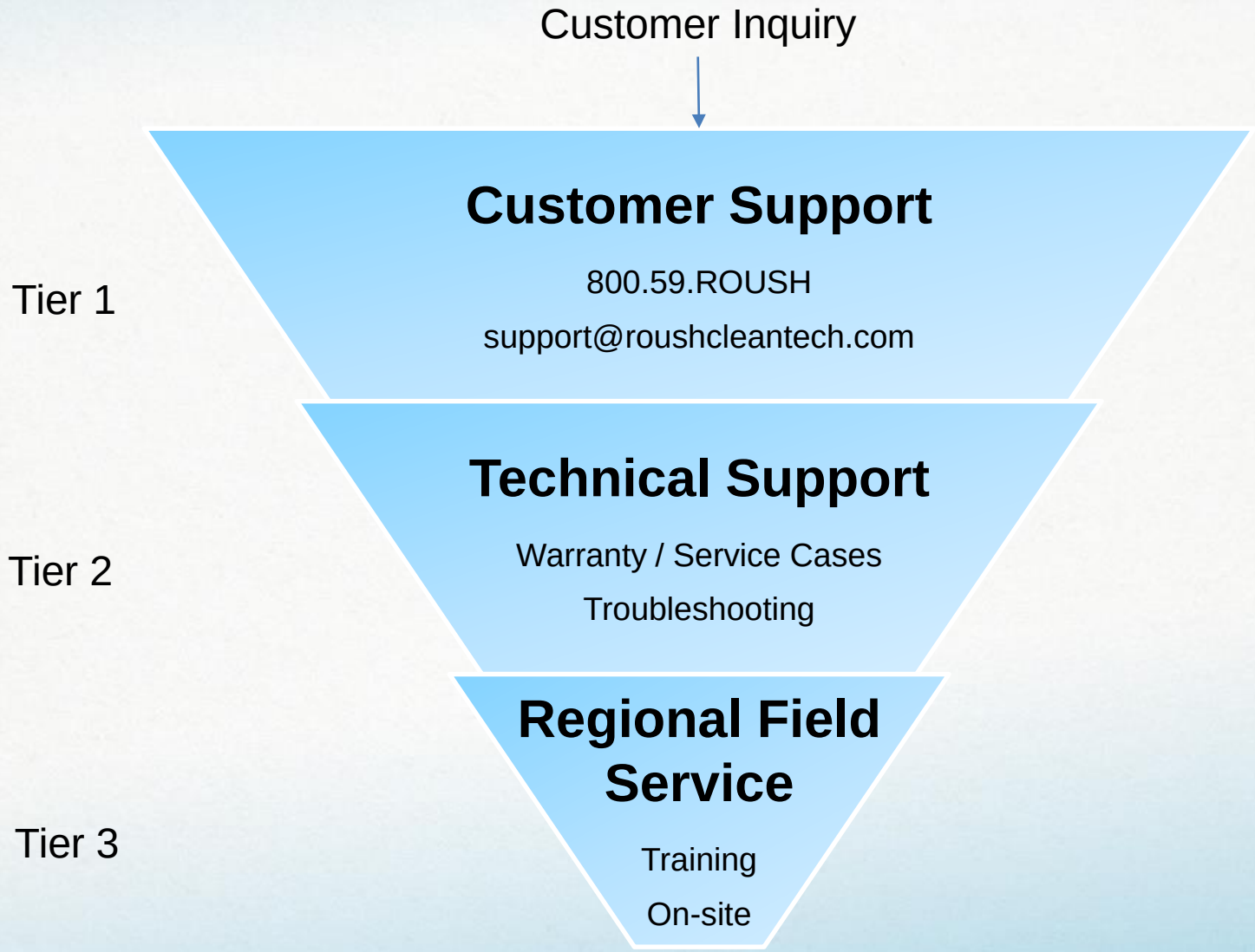
Propane $0.25

Gasoline $0.39

Diesel $0.39

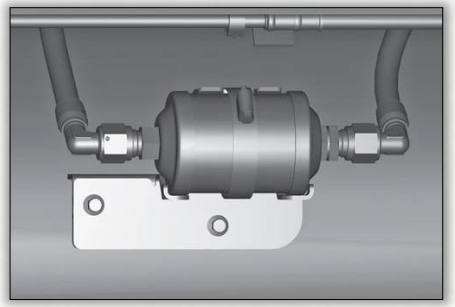
CNG $0.42

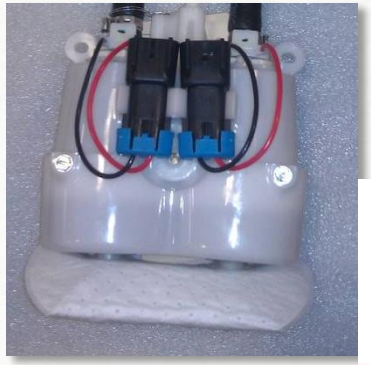
Customer Success



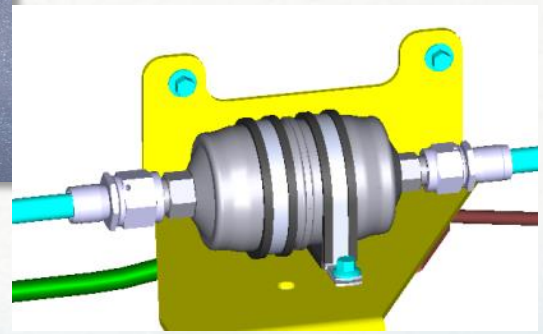
Updated Fuel Filters

- Fuel Fill Filter
  - Prevents contamination during fueling.
  - Located on tank or frame rail.
  - Only maintenance item.
  - Replace every 50,000 miles.
  - Flow direction labeled.





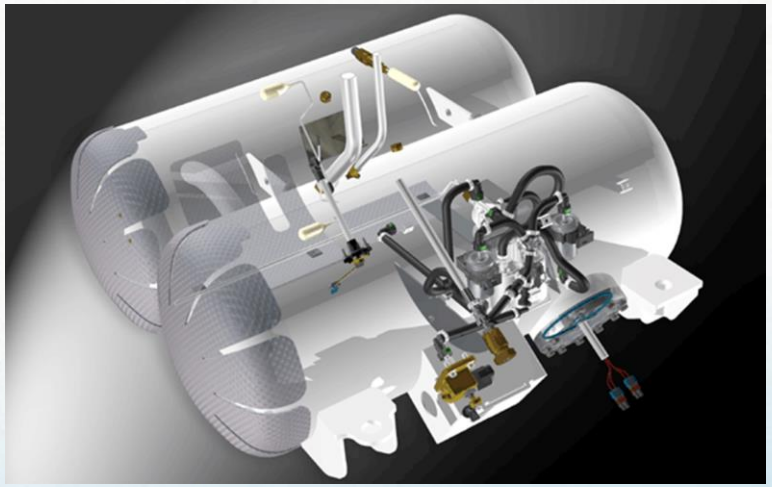
- Fuel Pump Sock Filter
  - Connected to the fuel pumps.
  - In tank.



- Pre-injector Filter
  - Inline filter after the fuel pumps
  - External of fuel tank
  - Replace every 50,000 miles

Updated Fuel Pumps

- Dual fuel pump design for maximum reliability and longevity
- During operation the pump voltage will vary from 7 – 13.5V (Gen 3).
  - Fully variable voltage (Gen 4).
- Each pump is controlled by an Electronic Fuel Pump Relay (EFPR), which are controlled by the PCM.
- The pumps are serviceable through the service port opening on the bottom of the fuel tank.

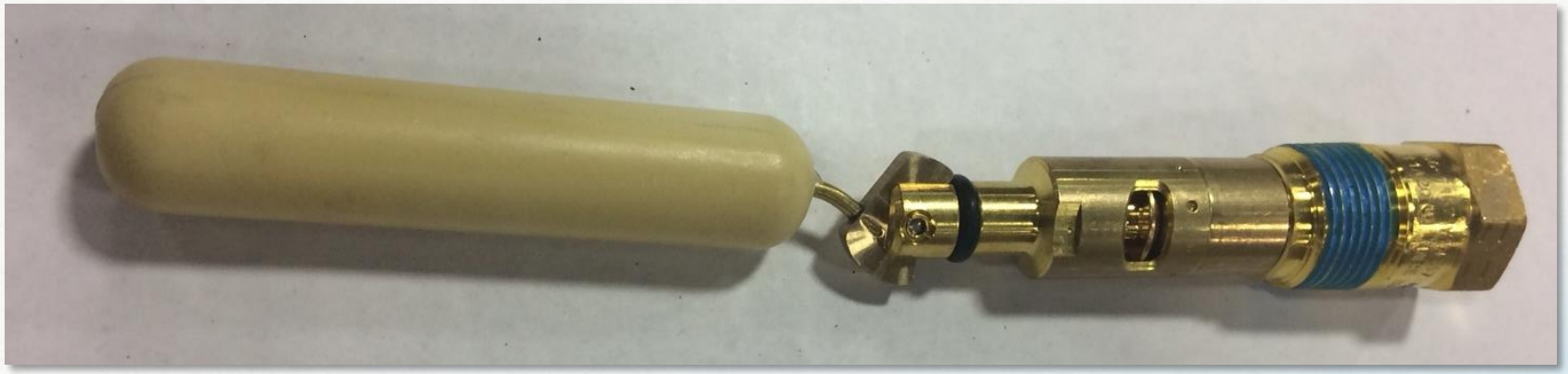


Dual Fuel Pumps

Overfill Protection Device (OPD)

- Moved from the end cap to the top center inboard of the tank.

- Helps provide a more accurate fill when located at the center of the tank.
  - When located at one end or the other of the tank, any degree of grade would cause an incorrect reading.



CONNECTED BUS

CONNECTED VEHICLE PILOT PROGRAM

If you've ever used a service like LoJack in your car or enjoyed listening to Pandora while driving, you've experienced connectivity. This technology continues to expand throughout the transportation market. Eventually it will pave the way to fully autonomous vehicles.

At ROUSH CleanTech, we've launched a data-collecting connected vehicle pilot program. The goal is to connect ROUSH CleanTech vehicles with our Customer Success department to monitor and offer proactive service.

WHAT IS THE PROGRAM?

When you sign up for our free pilot program, ROUSH CleanTech installs a small device in the OBD-II port. The sensor can easily be added to your existing propane vehicles and requires no maintenance or servicing.

The innovative device is about 3" x 3" and plugs in under the dashboard.

WHAT DOES IT DO?

Once installed and operational, the sensor collects important service data:

- GPS information
- Check engine light status
- Diagnostic trouble codes
- Freeze frame data

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DATA FLOW

WHERE DOES THE DATA GO?

The system collects key service information and then is automatically sent and reviewed by the system to offer proactive service. ROUSH CleanTech can then access and pull service information on the vehicle, such as active diagnostic trouble codes, information at key-off and much more.

HOW DOES THIS BENEFIT ME?

The program helps us help you. We want every ROUSH CleanTech vehicle in your fleet to operate at peak performance levels. We understand that vehicle downtime is a major headache that interrupts the valuable service you provide to passengers, drivers and customers.

As we continue to evaluate this pilot connective vehicle program, our goals are to help with:

- **Reduce vehicle downtime.** We obtain basic diagnostic information automatically when a check engine light illuminates.
- **Failure predictions.** By monitoring key indicators, the system can help us predict failures before they happen.
- **Quick response**. We will proactively reach out to your service center if a case hasn't been created yet for your vehicle.

APPLY TODAY

To apply for the pilot program or learn more, please contact your ROUSH CleanTech sales representative.

ROUSH CLEANTECH 800.59ROUSH ROUSHCLEANTECH.COM

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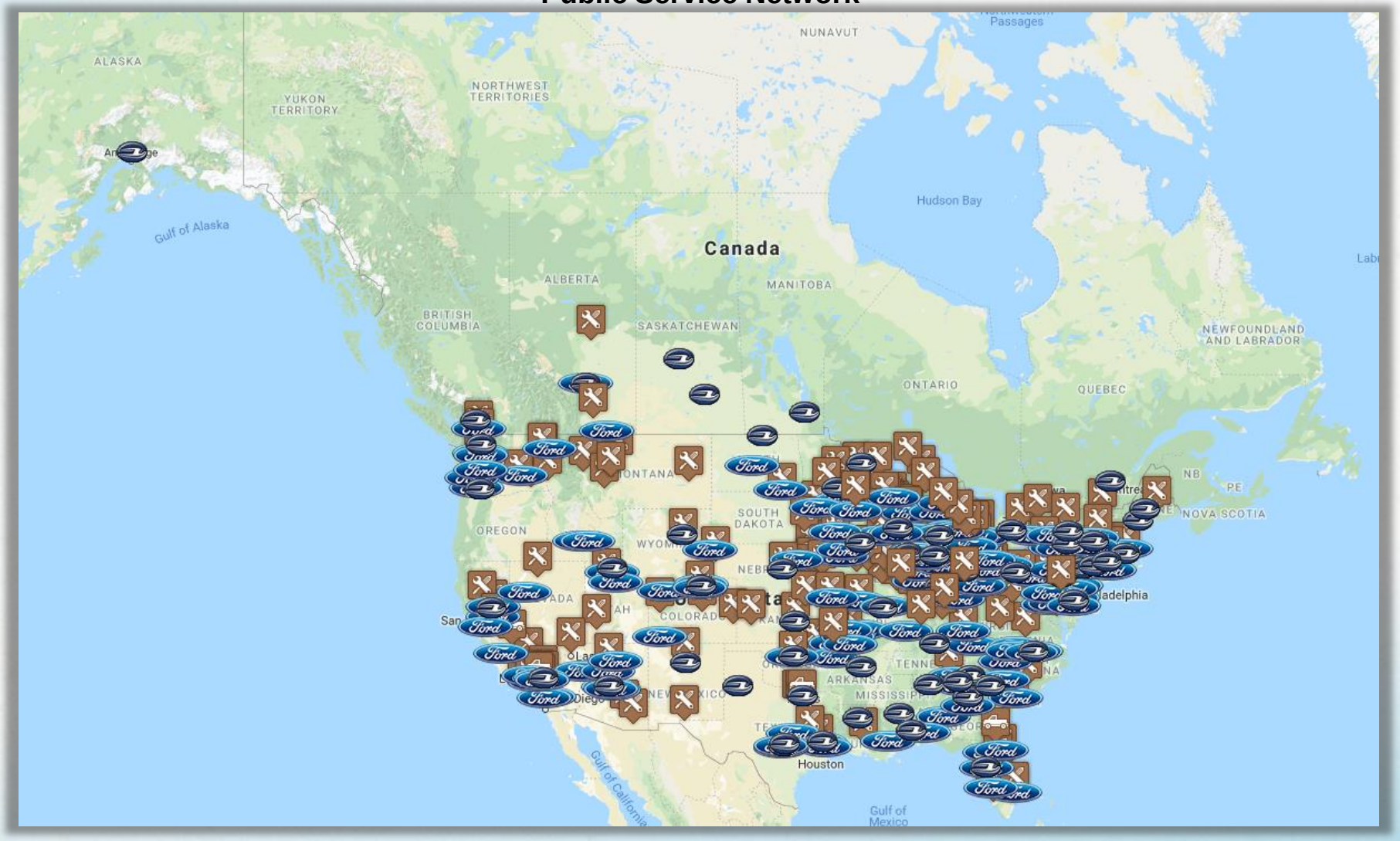
Field Service

Public Service Network



Over 700 public service locations throughout North America

Alt Fuel Consideration Summary

- ☑ Simple and Robust Design
- ☑ No Duty Cycle Compromise
- ☑ Economical Operation
- ☑ Safe by Composition and Design
- ☑ Environmentally Responsible from Well to Wheels