

Next-Generation Propane Powered Vision



Powered by:

ROUSH
CLEANTECH



 **BLUE BIRD**
A heritage of looking ahead.

Agenda



- ❖ Your Blue Bird Propane Powered School Bus
- ❖ Product Overview
- ❖ Environmental Impact
- ❖ Safety
- ❖ Cost Savings
- ❖ Service/Maintenance

ROUSH[®]
CLEANTECH





Your Blue Bird Propane Powered School Bus

ROUSH
CLEANTECH



A heritage of looking ahead.

Your Blue Bird Propane Powered School Bus



- ❖ Propane powered school buses represented almost 20% of Blue Bird's TOTAL production in 2018
- ❖ Up to 40% quieter operation than diesel
- ❖ Greatly improved cold starting compared to diesel
- ❖ Quicker passenger compartment heating
- ❖ Significantly reduced fuel and maintenance cost
- ❖ Lowest emission bus on the market today
- ❖ Propane is domestically produced





Are propane school buses built for the cold?



Your Blue Bird Propane Powered School Bus



- ❖ Starts in -50° F temperature
- Diesel begins to gel at 23° F
- ❖ Diesel will no longer flow as a fluid at -9° F

- ❖ Liquid Injection

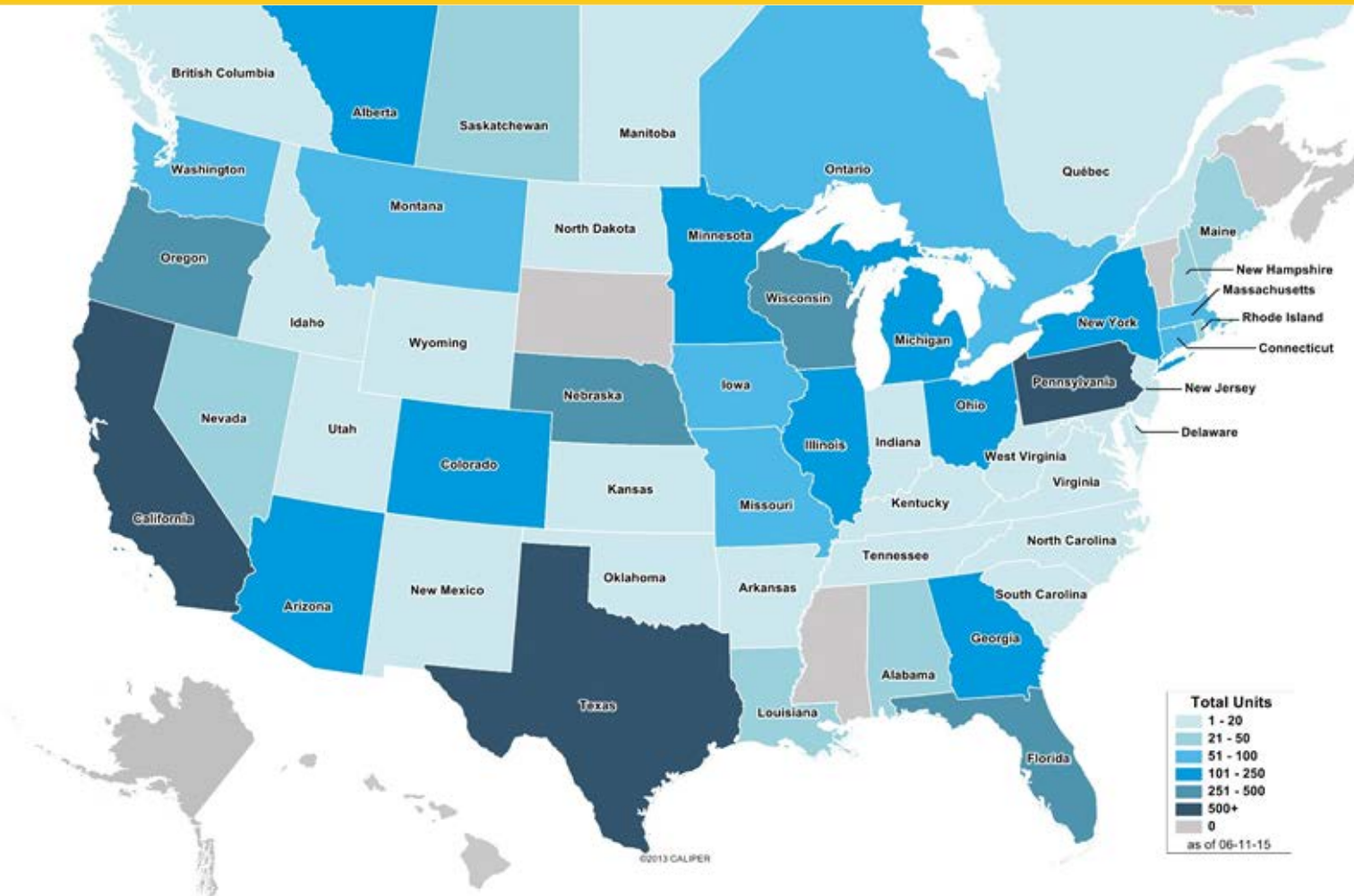
- ❖ Does not require a block heater (saves electricity!)

- ❖ Cabin heats MUCH quicker

- ❖ Brandon winter runs
 - In-city lift bus route
 - Ambient temp: Start -24° F End -11° F
 - Wind chill: Start -47° F End -34° F
 - Cabin temp: 69° F within 20mins
 - Propane - Temp dropped to 44° F, but recovered to 73° F within 8mins
 - Diesel - Temp dropped to 17° F and took over twice as long to recover



Your Blue Bird Propane Powered School Bus



15,000 Propane Powered Blue Bird Visions on the road today





Product Overview

ROUSH
CLEANTECH

 **BLUE BIRD**[®]

A heritage of looking ahead.

Product Overview



Model Years

2020

Engine Size / Manufacturer

6.8L V10 (3V) Ford Engine with exclusive ROUSH
CleanTech Propane Fuel System

Applications

169" / 189" / 217" / 238" / 252" / 273" / 280"
wheelbase configurations

6-speed FORD automatic transmission

Fuel Tank Capacity

Short: 50 gallons (47 usable)

Mid-Ship: 70 gallons (67 usable)

Extended Range: 100 gallons (93 usable)

Technical Specifications

EPA and CARB approved

GVWR: 33,000 lbs

Up to 77 passengers

Blue Bird Vision (Type C)



ROUSH
CLEANTECH

Product Overview



Model Years

2019

Engine Size / Manufacturer

6.8L V10 (2V) Ford Engine with exclusive ROUSH CleanTech Propane Fuel System

Applications

158" / 176" wheelbase configurations

5-speed automatic transmission

Fuel Tank Capacity

Aft-Axle: 41 gallons

Technical Specifications

EPA and CARB approved

GVWR: 14,500 lbs

Up to 30 passengers

Micro Bird G5

(Type A)

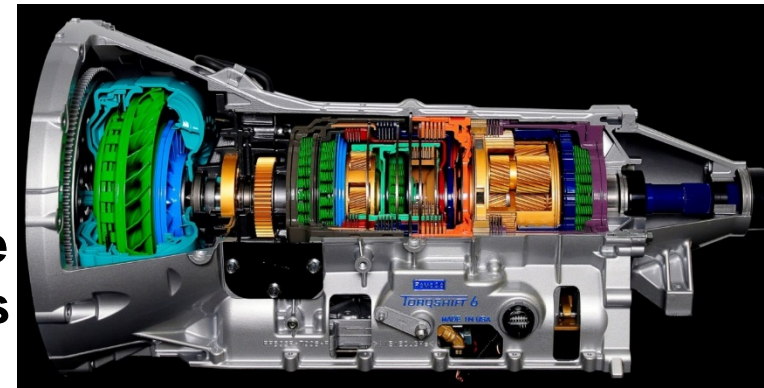


ROUSH
CLEANTECH

The FORD Connection



- FORD 6.8L V10 engine
 - Over 1.7 million produced
 - Produced in Windsor ONT
 - 3 Valves per cylinder
 - Upgraded with premium valves, valve seats, and larger oil pump to meet Blue Bird's needs
-
- FORD 6R140 HD Transmission
 - Capable of up 900 ft-lbs torque
 - Blue Bird 6.8L produces 457 ft-lbs
 - Durability tested to 350,000 without issue
 - Tested at 900 ft-lbs input to 250,000 miles





Environmental Impact

What is NO_x?
Should I be concerned?



ROUSH
CLEANTECH

 **BLUE BIRD**[®]

A heritage of looking ahead.



- ❖ **NO_x is a general term for the nitrogen oxides that are most relevant for air pollution**
- ❖ **These gases contribute to the formation of smog and acid rain**
- ❖ **Can cause respiratory diseases such as emphysema and bronchitis**
- ❖ **Can cause the formation of ozone, intensifying global warming**
- ❖ **NO_x are regulated under federal air quality standards because they are known to harm human health and the environment.**





- ❖ Propane autogas results in an estimated 80% reduction in smog producing hydrocarbon emissions compared with diesel-fueled vehicles
- ❖ Blue Bird Propane Vision school buses are certified to 0.02 g/bhp-hr, which is 90 percent cleaner than the EPA's current emissions standard.
- ❖ Ten Blue Bird Vision Propane buses emit less NOx than one diesel school bus certified at the current standard.
- ❖ 100 Blue Bird Vision Propane buses emit less NOx than one diesel school bus manufactured before 2007.





Safety



ROUSH
CLEANTECH



A heritage of looking ahead.

Tank Crash Testing



- ❖ Followed CMVSS 301.1 protocol
- ❖ 4,000 lbs @ 40 MPH
- ❖ Angled side and rear impact
- ❖ 220 PSI tank pressure
- ❖ No leakage or no pressure drop in 30 minute test



ROUSH
CLEANTECH

Fuel System



- ❖ Fuel tank capacities of 50, 70 and 100 gallons
- ❖ Carbon steel shell
 - 20 times more puncture resistant than gasoline or diesel tanks
 - Twice the required thickness for ASME Certification
- ❖ Dual fuel pumps for added reliability
- ❖ 350 psi maximum fuel rail working pressure
- ❖ Tank burst pressure = 4 times working pressure



ROUSH
CLEANTECH



Cost Savings



A heritage of looking ahead.

Cost Per Mile Propane vs Diesel



- ❖ Some districts are reporting saving \$.34 A MILE over the cost of diesel
- ❖ If you drive 12,000 miles per year and operate for 15 years...
 - One bus saves \$4,080 in one year
 - ❖ One bus save \$61,200 in it's lifetime
- ❖ Fleets are locking in propane for as low as \$1.10 a gallon
- ❖ This cost savings does not include possible federal rebate incentives



ROUSH
CLEANTECH



Service/Maintenance



ROUSH
CLEANTECH



A heritage of looking ahead.

Maintenance Savings Over Diesel



- ❖ Eliminates the need for costly diesel SCR systems
- ❖ Eliminates the need for a Turbocharger and Intercooler
- ❖ Eliminates EGR systems
- ❖ Eliminates DEF Fluid and components
- ❖ 7 Quarts crankcase oil vs 21-34 quarts in a diesel

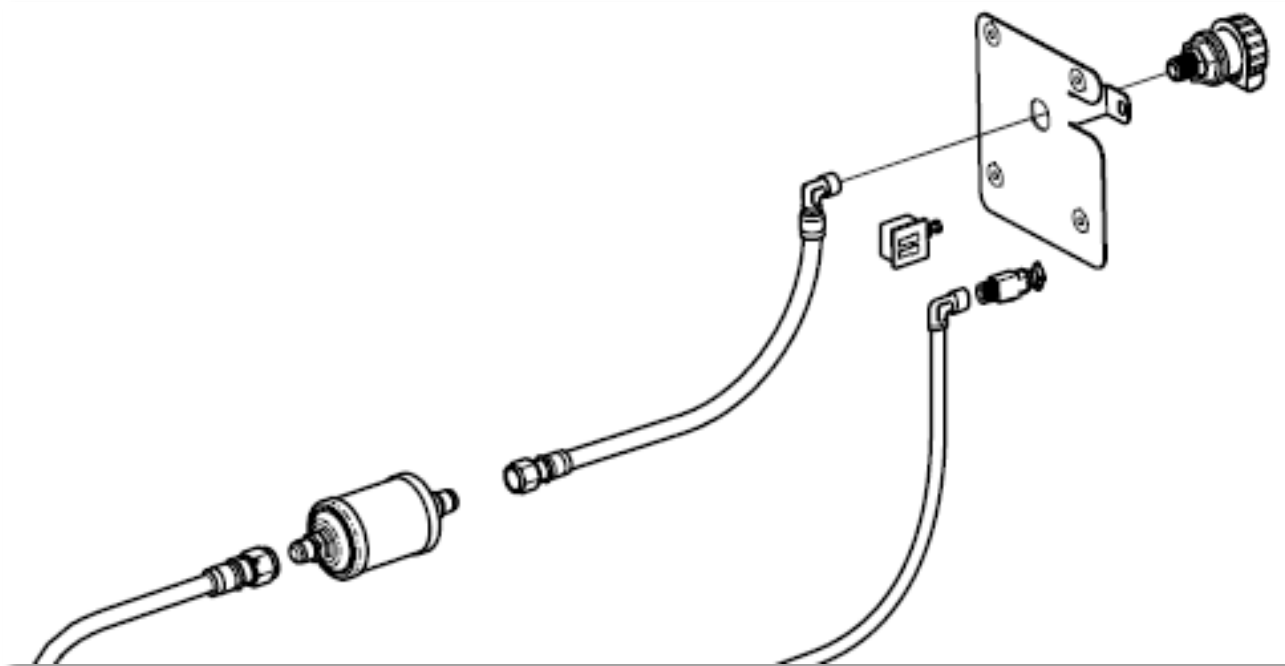


ROUSH
CLEANTECH

Preventative Maintenance



- ❖ 7 Quart Oil Change at 5,000 miles
- ❖ Spark Plug change at 100,000 miles
- ❖ In-line fuel filter change at 50,000 miles



THANK YOU!



Questions



ROUSH
CLEANTECH

 **BLUE BIRD**

A heritage of looking ahead.