



# FILLING THE GAP: STRATEGY, TECHNOLOGY, AND PARTNERSHIPS FOR INFRASTRUCTURE DEVELOPMENT

Intermountain Western Alternative Fuel Corridor Convening  
November 6, 2019

# Roush at a Glance

**Michigan-based**

**Privately held**

**Founded in 1976**

**Over 4,000 employees**

**Over 3 million sq. ft. office/development space**

**Primary activities:**

- Engineering
- Testing
- Prototype Development
- Manufacturing
- Motorsports Management

### Backed By Engineering Experts



#### ROUSH Capabilities

- Concept Design & Styling
- Body Engineering
- Chassis Engineering
- Powertrain Engineering
- Prototype Development
- Thermal Systems Engineering
- Electrical/Software Engineering
- NVH Engineering
- Vehicle Engineering
- Data Science
- Testing
- Manufacturing
- Assembly



### Available Products

#### School Buses



**Blue Bird Vision**  
Propane, CNG

**Micro Bird G5**  
Propane

#### Chassis Cabs



**F-450 / F-550**  
Propane, Electric

**F-650 / F-750**  
Propane, Electric

#### Stripped Chassis/Cutaways



**F-350 / E-450**  
Propane

**F-59 / F-53**  
Propane

## Energy Solutions



Propane



Compressed  
Natural  
Gas



Battery  
Electric  
*Coming Soon*

# Roush: 20+ Years ePowertrain Engineering



**1998**  
Ford  
Ranger  
EV



**2005**  
Hybrid  
Escape



**2009**  
Roush  
Rev



**2011**  
Motiv



**2014**  
Google  
Car



**2018**  
Roush  
F650  
BEV



**1999**  
1<sup>st</sup>  
Hybrid  
Trans  
Proto



**2008**  
Fisker



**2011**  
Blink  
Charger



**2012**  
Via  
Motors



**2017**  
Cummins  
Class 7  
Truck



# Key Opportunities: Autogas

- Infrastructure & Refueling: Low cost, scalable, flexible
- Fuel pricing

## Average Price Per Gallon for the week of October 17, 2019

These prices are based on National averages. Please contact your local autogas provider to get exact pricing for your state.

**\$1.32**

Rocky Mountain

**\$1.33**

Gulf Coast

**\$1.40**

Midwest

**\$1.37**

Lower Atlantic

**\$1.46**

Central Atlantic

**\$1.40**

New England

**\$1.31**

West Coast

# Key Opportunities: Autogas

- Evidence manual exists
- Customer success models established
- Autogas is a perfect fit for almost every class 4-7 application NOW

OVER  
**20,000**  
VEHICLES ON THE  
ROAD

OVER  
**ONE**  
**MILLION**  
STUDENTS  
TRANSPORTED DAILY  
ON A PROPANE BUS

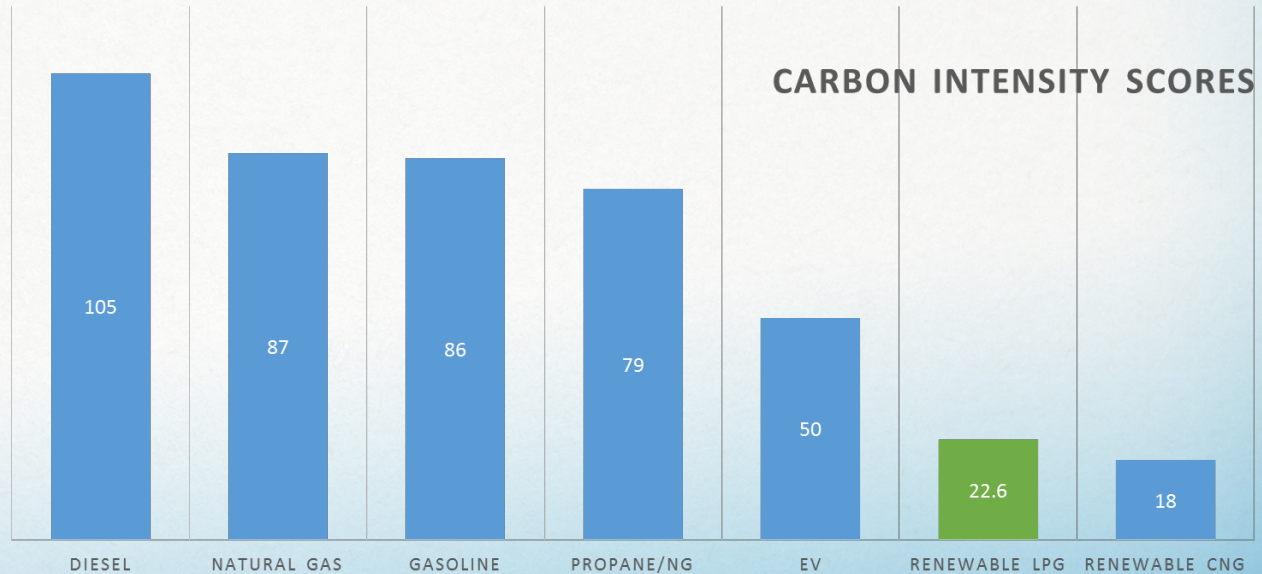
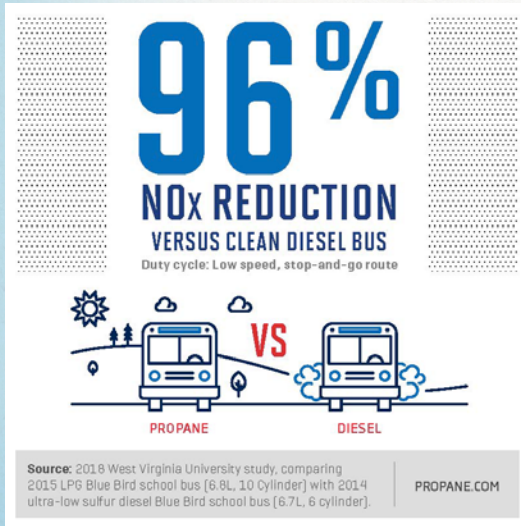
OVER  
**430**  
**MILLION**  
MILES  
ACCUMULATED

OVER  
**850**  
SCHOOL DISTRICTS



# Key Opportunities: Autogas

- Near-zero propane engines & renewable propane: Addresses urban air quality challenges **today** & provides opportunity to address climate goals
- “Ease of deployment” compliments resiliency, environmental & social justice efforts




# Key Barriers & Opportunities: Autogas

- Autogas opportunities are mainly fleet focused today (versus consumer) and key vocational growth opportunities are medium-duty
- Autogas pricing models published aren't representative of fleet pricing realities
  - Education & training important to ensure marketers approach autogas market different
- Autogas supply & distribution different than natural gas & electric; much more competitive and collaboration models different amongst industry
- More inter-disciplinary, multi-stakeholder collaboration is needed
  - Maybe propane advantage of being “easy” is actually a disadvantage?



## Key Opportunities: Autogas



**DON'T LOSE SIGHT  
OF THE FOREST  
FOR THE TREES.**

*Mature and cost-effective technology exists today and is proven that can help address air quality, resiliency and environmental/social justice goals immediately in vocations that use a lot of energy and produce a lot of pollution.*

*And, innovation and investment will continue to develop autogas market opportunities that help meet decarbonization goals.*

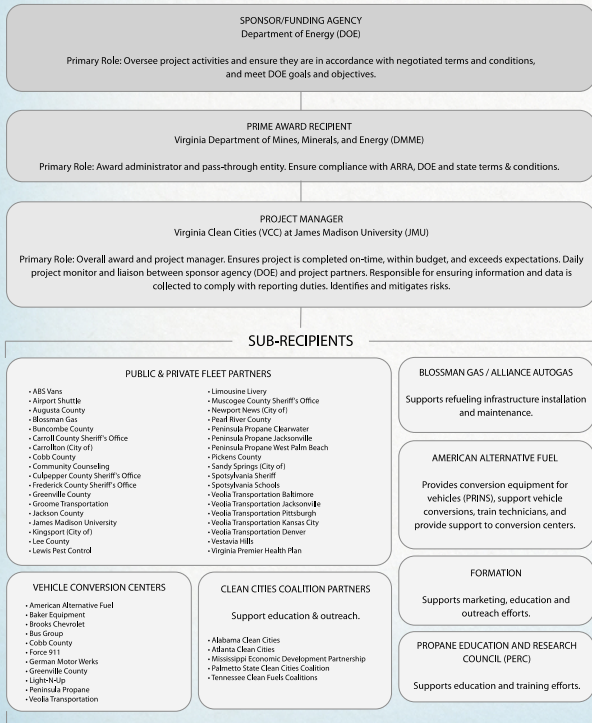
# Key Opportunities: Autogas



*We all have the same  
goal!*

*There's more than  
enough opportunity  
for us all.*

## SOUTHEAST PROPANE AUTOGAS DEVELOPMENT PROGRAM ORGANIZATIONAL CHART



Successful models exist. There is potential for improvement and replication versus reinventing the wheel.

## *Southeast Propane Autogas Development Program Summary:*

- 10 southeast states
- Converted nearly 1,200 public and private fleet vehicles from gasoline to propane Autogas
- Implemented more than 30 propane autogas refueling stations throughout the southeast U.S.
- Displaced an estimated 1.2 million gallons of gasoline annually
- Eliminated an estimated 6,000 tons or more of carbon dioxide
- Created dozens of jobs

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