CTAA
May 23, 2023

Achieving Financial Sustainability & Meeting Low-No Grant Expectations with Propane Autogas

Stephen Whaley
Propane Education & Research Council

Agenda:

- Steve Whaley - Propane in Transit Overview

- Ryan Zic – ROUSH CleanTech Vehicle Solutions

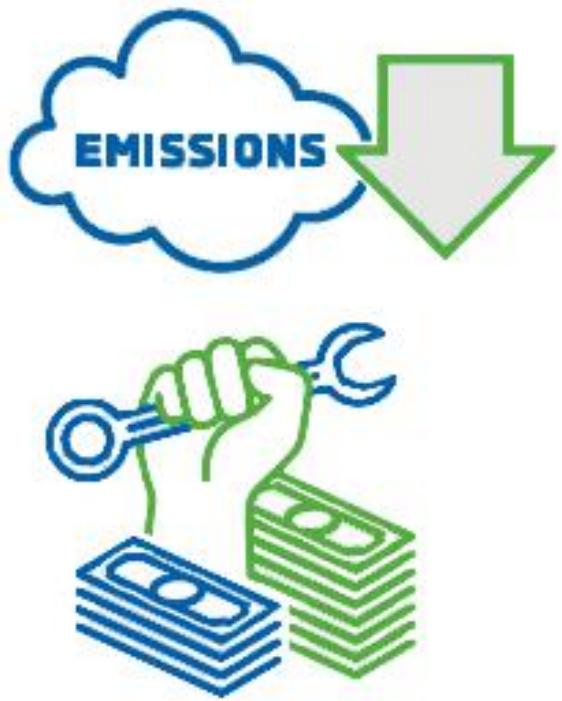
- Mike Whitten– Manchester Transit Authority, New Hampshire

- Daniel Whitehouse – SMART, Detroit, Michigan

- Jill Drury – Charlevoix County Transit – Grant Opportunities

Successful Alternative Energy Adoption

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

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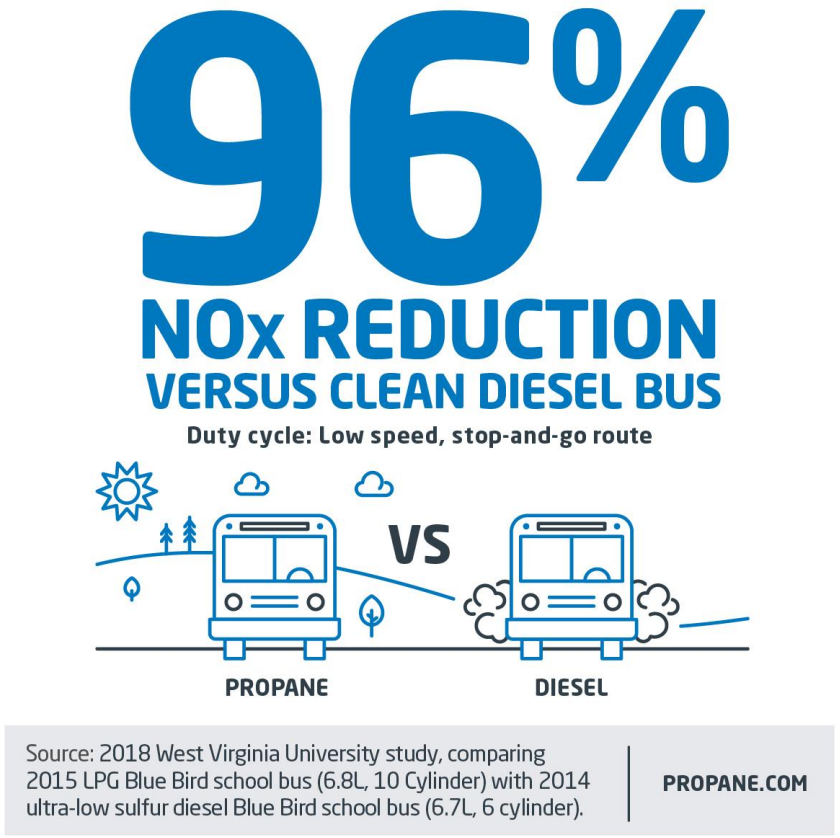
Path to Zero

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



Total Carbon Intensity of the U.S. Grid = 130

Extraction

Electricity is not naturally occurring, so it must be produced using other resources like gas, coal, or nuclear.

approximately 9.9% CO2 eq emissions

Carbon intensity contribution:

13.6 g/MJ

Generation

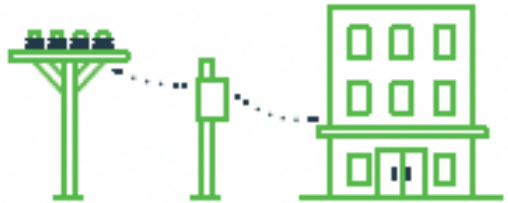
Power plant generates electricity.

Transformer steps up voltage for transmission.

approximately 75.6% CO2 eq emissions

Carbon intensity contribution:

110.8 g/MJ



Transmission & Distribution

The transmission lines carry electricity to transformers, which step down voltage. Electricity is delivered to the charging location.

approximately 4.5% CO2 eq emissions

Carbon intensity contribution:

5.2 g/MJ

Well-to-Wheels Carbon Intensity Comparisons of “Fuel” ($gCO2_{eq}$/MJ)

Propane – 79
(National Average)

Grid Electricity – 130
(National Average)

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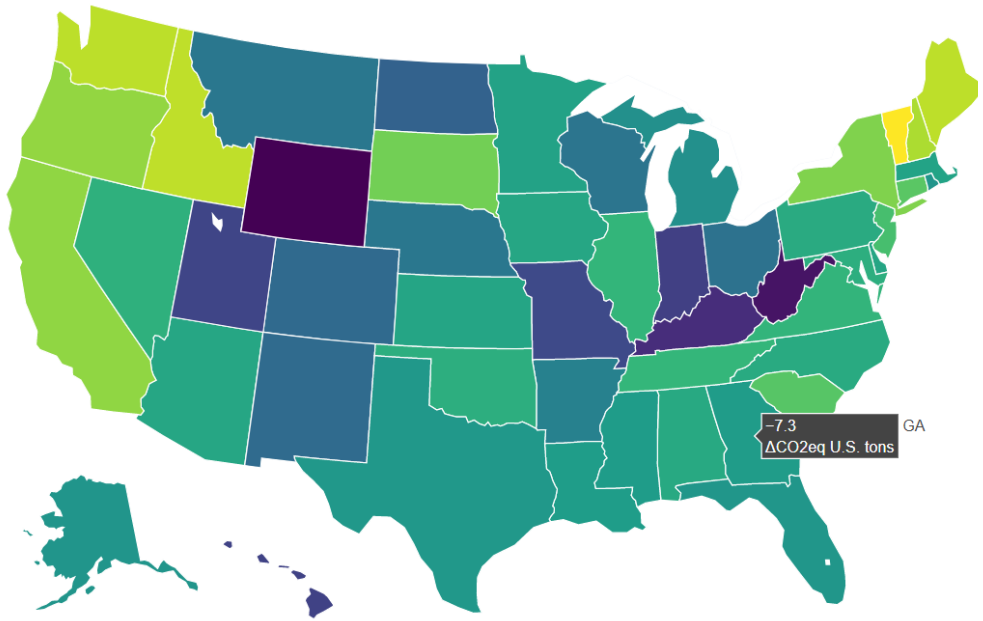
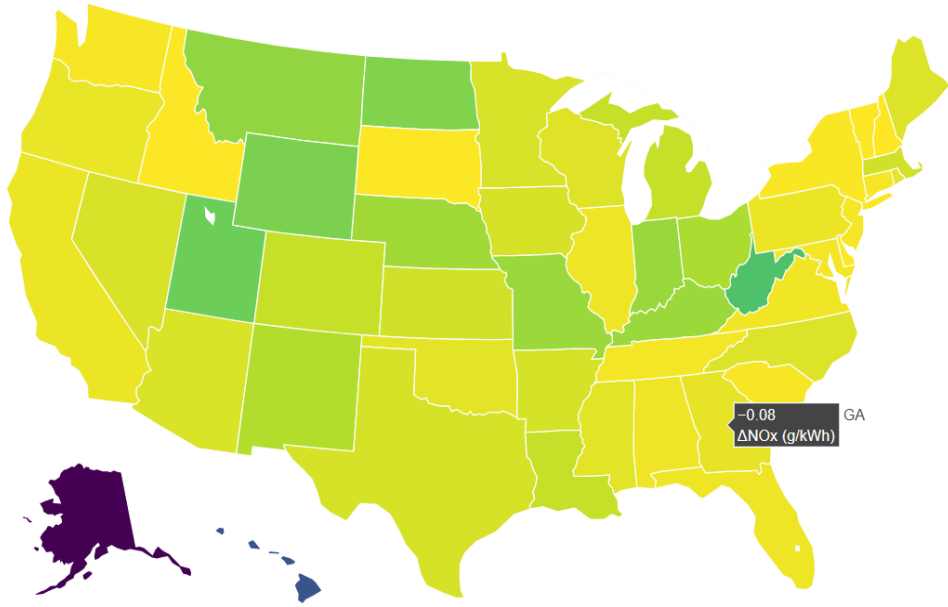
C02 Calculator - Propane vs EV Life Cycle Emissions

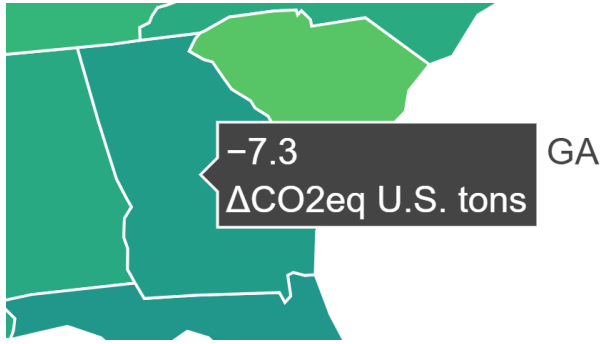
ΔCO2eq between a Medium-Duty Propane and EV (Average grid emissions)
Propane vehicle is better when value is negative and vice-versa
(Hover over a state for value)



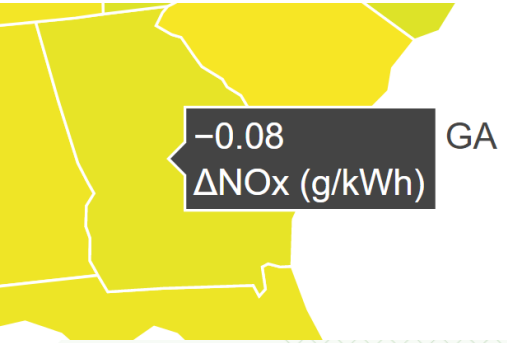
ΔNOx between a Medium-Duty Propane (ultra-low NOx) and EV (Average grid emissions)
Propane vehicle is better when value is negative and vice-versa
(Hover over a state for value)



CO2 Reductions



N0x Reductions



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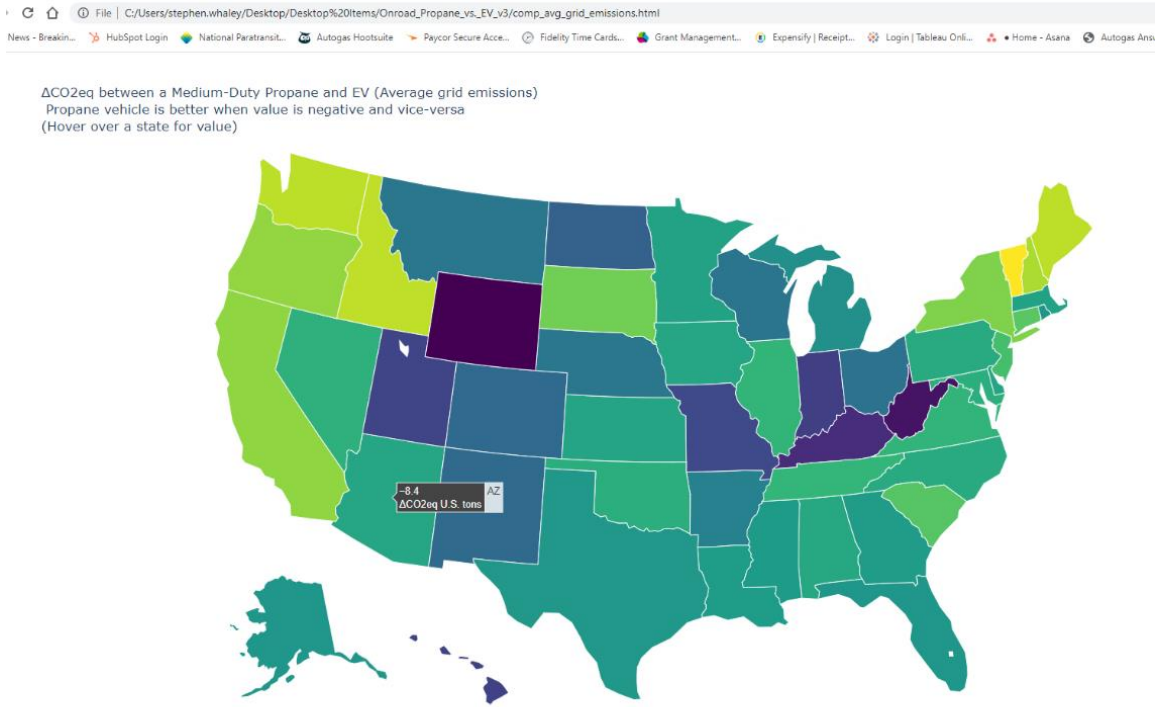
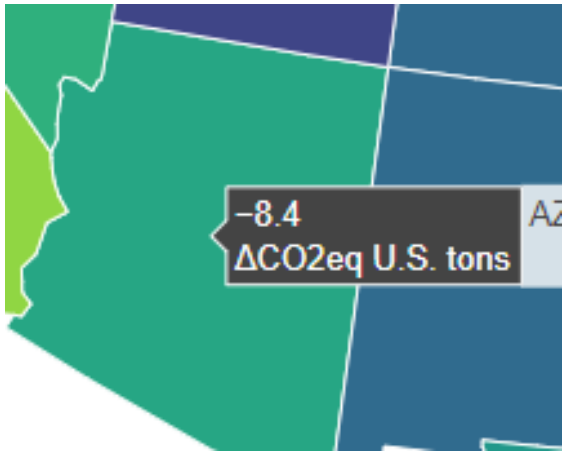
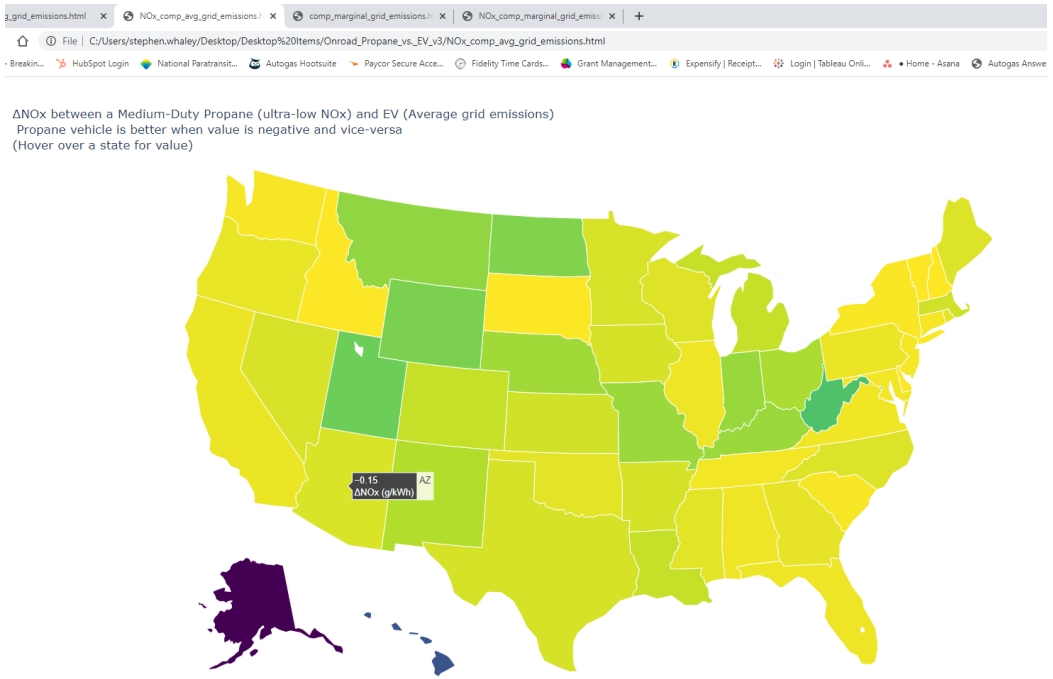
Propane is less than EV Life Cycle Emissions

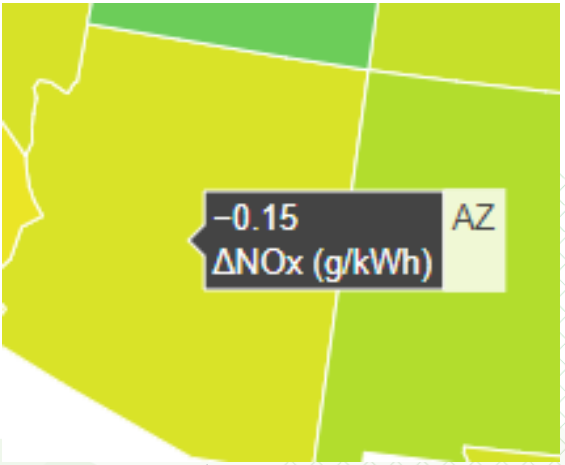


CO2 Reductions



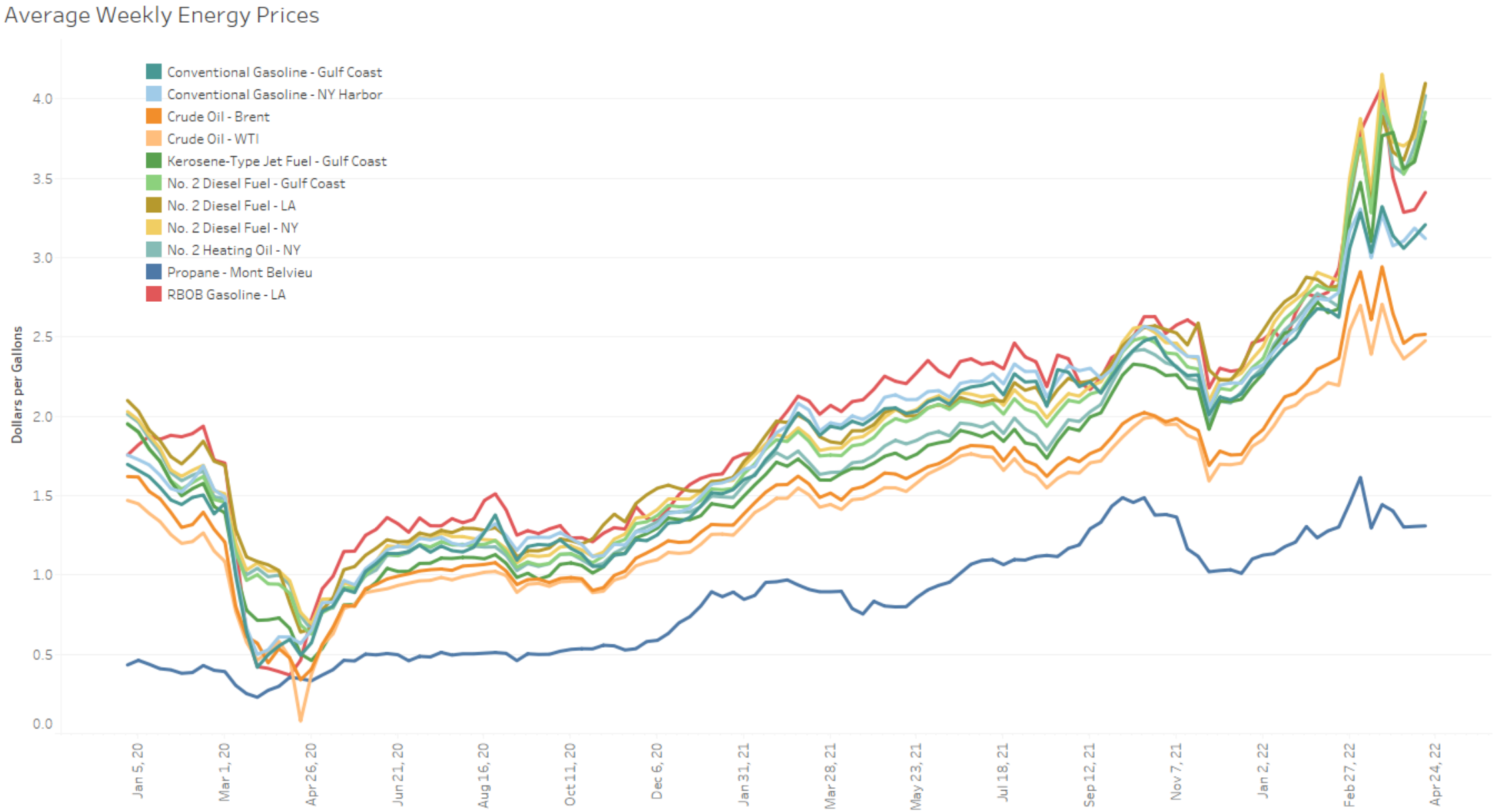


N0x Reductions



Fuel & Maintenance Cost Reductions

US ENERGY PRICE COMPARISON



Today's Propane Autogas

Average Price Per Gallon for the week of May 19, 2023

These prices are based on National averages. To receive a custom quote with your local autogas pricing, contact us today.

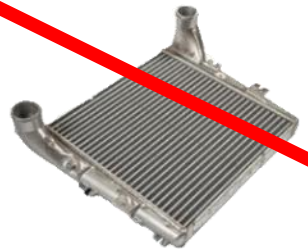
Learn more about the savings and stability of autogas.

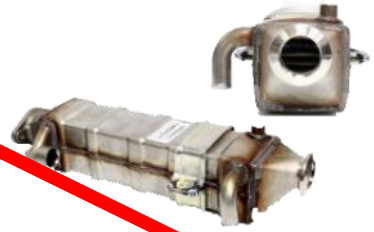
*Autogas price estimates do not reflect the current federal tax credit.

$1.46	$1.56	$1.46	$1.49	$1.35	$1.44	$1.40
New England	Central Atlantic	Lower Atlantic	Midwest	Gulf Coast	Rocky Mountain	West Coast

Today's Diesel

EGR cooler





DEF Pump

DEF tank

SCR mixer

DEF heater

DOC, DPF, SCR catalyst.
Complex - regen required.

Multiple external sensors – DEF quality – DPF soot loading

Complex vehicle side wiring

The Future of Diesel:

2010

Figure 1. EPA 2010 aftertreatment system layout.

.2 NOx

2024

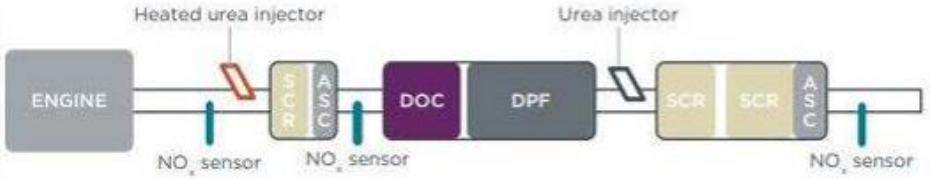


Figure 3. Potential aftertreatment configuration (No. 2) of a CARB 2024 compliant system.

.05 NOx

2027

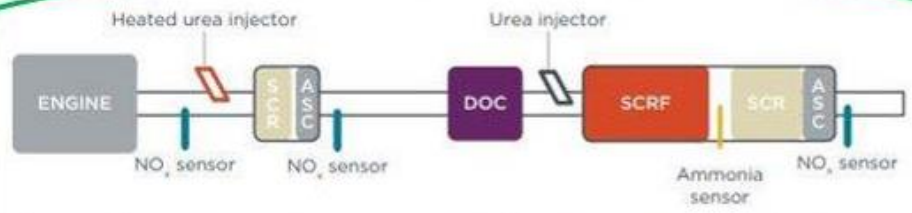


Figure 5. Aftertreatment configuration 2 to meet CARB 2027 standards under FTP and supplemental low-load cycle. Adapted from SwRI (Sharp, 2019).

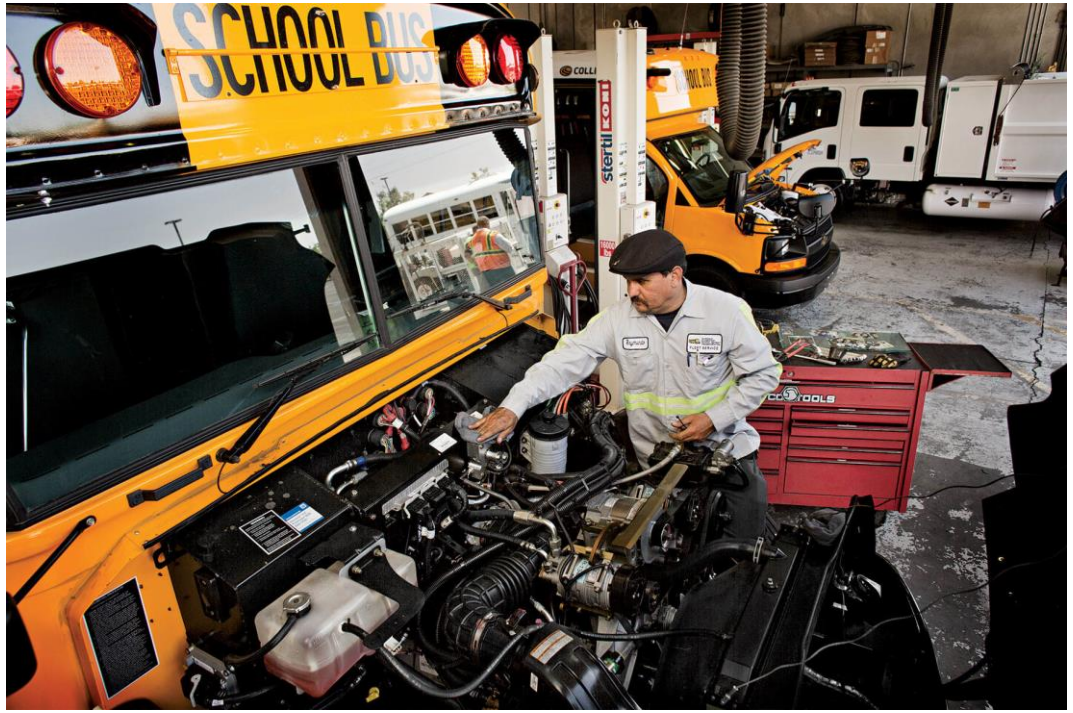
.02 NOx

Source: "ESTIMATED COST OF DIESEL EMISSIONS-CONTROL TECHNOLOGY TO MEET FUTURE CALIFORNIA LOW NOX STANDARDS IN 2024 AND 2027"
https://theicct.org/sites/default/files/publications/HDV-emissions-compliance-cost-may2020.pdf

1 LPG Meets This Today

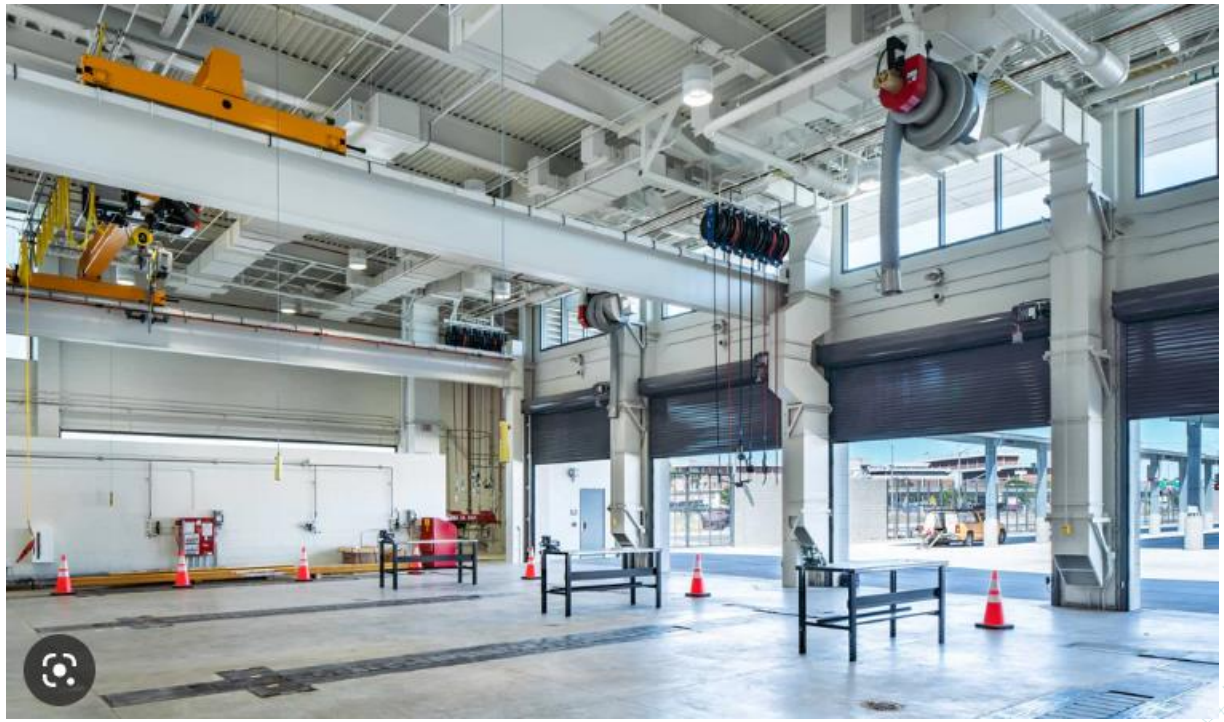
Maintenance Facility Upgrades

Propane



$0

CNG



$100,000/bay

What is Propane Autogas?

- Affordable, Clean, American-Made Fuel
  - C3H8
  - Byproduct of natural gas processing.
  - 100% Domestic
  - Commonly used for space and water heating, cooking, and as engine fuel.

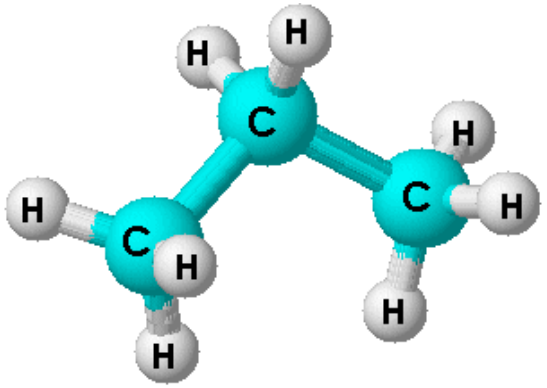
- Using Propane
  - 48 million Households
  - 900,000 Farms
  - 600,000 Forklifts
  - 25,000 Commercial Mowers

- Production
  - US produces more propane than any country in the world
  - 30 billion gallons/year
  - 20 billion exported/year

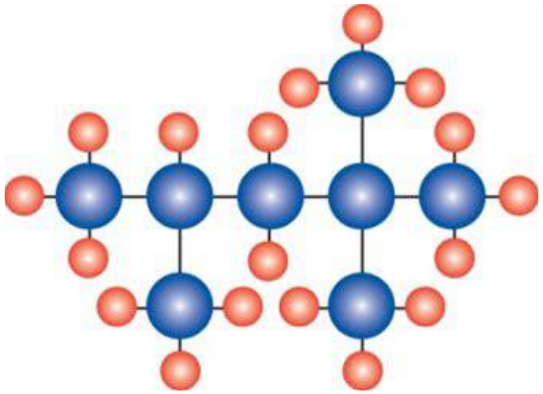
What is Propane?

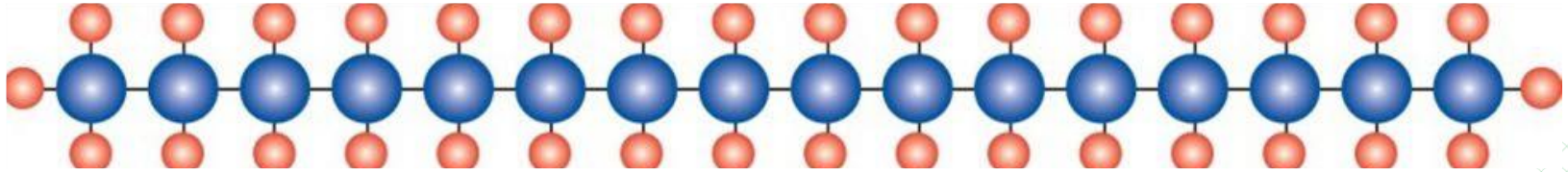
- Liquid state below minus 42 degrees Fahrenheit
- 100 PSI at 60-degree ambient temperature
- Heavier than air
  - No expensive ventilation systems needed for maintenance facilities

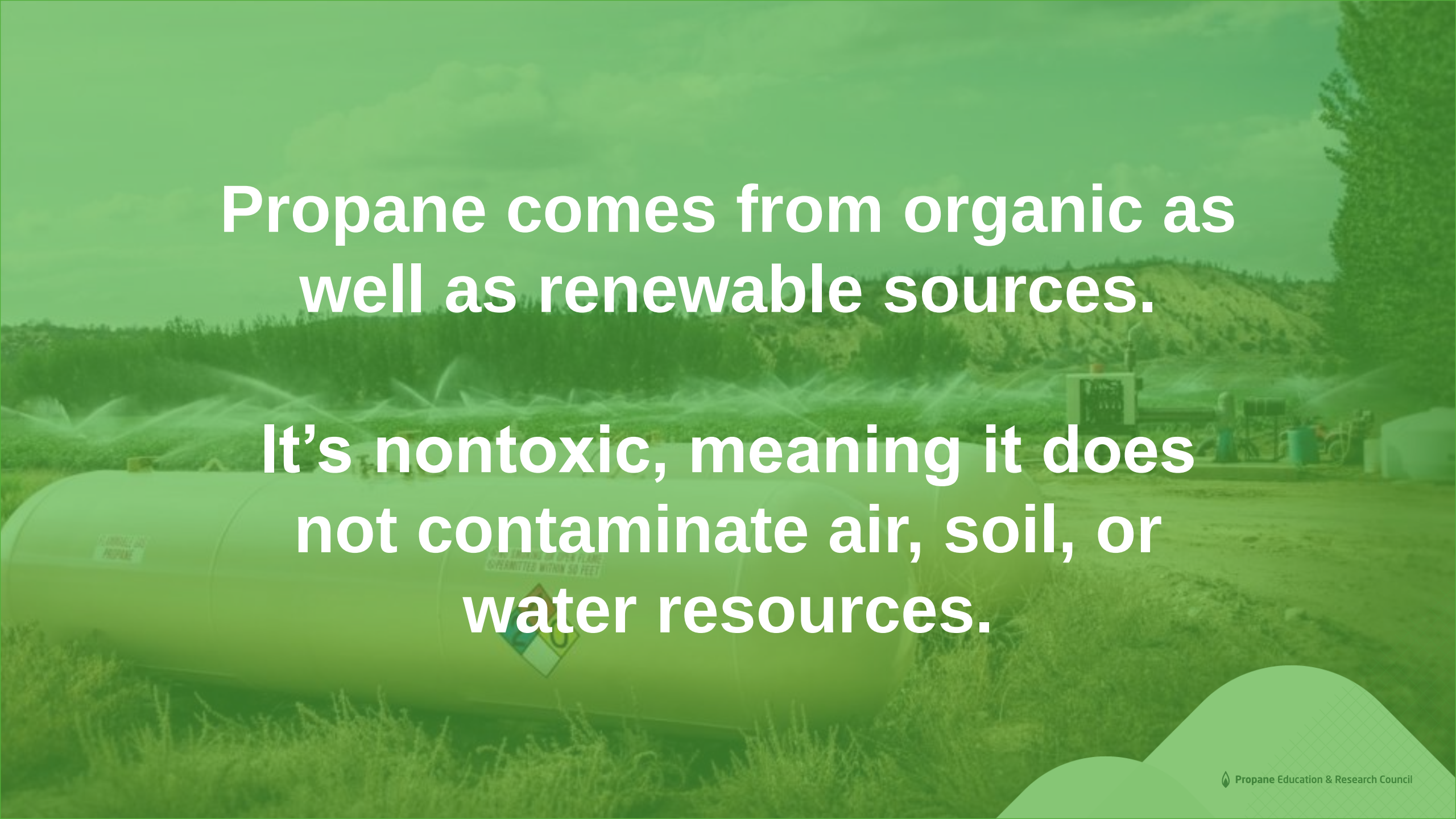
What is Propane?



Low Carbon – Hydrogen Rich Energy







Propane comes from organic as well as renewable sources.

It’s nontoxic, meaning it does not contaminate air, soil, or water resources.

Current Autogas Vehicle Offerings


SCHOOL BUS


Jean


SHIFT COMMANDER
SANDY SPRINGS
FIRE-RESCUE


0
PROPANE


ThyssenKrupp


EMERGE
911
POLICE


Powered by
Clean
Propane

OEM Propane Options

- Light & medium duty Ford trucks & vans, school bus.
- Factory Ford warranty maintained.
- No loss of HP / torque / towing capacity.
- Serviceable with existing diagnostic equipment.
- EPA & CARB Certified.

ROUSH® CLEANTECH

Ford F-53 / F-59

Ford E-350/450

Ford F-450/550

Ford F-650/750

Blue Bird Vision

Micro Bird G5

Conversion Process- Existing Vehicles

- EPA Certified Plug and Play Conversion Systems for popular fleet vehicles
- Highest quality components / premium warranty on conversion system and host vehicle
- Easy – At your site vehicle conversion available
- Service and Support Training for servicing technician/shop
- Ongoing technical support and training
- Stable, well positioned company. We are in this for the same reasons you are

Over 398 EPA Approvals Covering 1765 Vehicle Platforms

Alliance AutoGas
POWERED BY PROPANE

F150 Pickup
- 3.3 PFDI
- 5.0 PFDI
- 2.7/3.5 PFDI

F250-F350 Pickup/Utility
- 6.2 PFI

F450-F750 Cab & Chassis
- 7.3 PFI

E350-E450 Cut-away
- 7.3 PFI

TRANSIT
- 3.7

EXPLORER
- 3.3 PFDI

SILVERADO 1500
- 5.3 DI

SILVERADO 2500/3500
- 6.6 DI

EXPRESS/SAVANA
- 6.0 PFI

DURANGO
- 5.7 PFI

CHARGER
- 3.6 PFI

RAM
- 5.7 PFI
- 3.6 PFI
- 6.4L PFI

ISUZU TRUCKS

NPR Chassis 6.0L Variety of Body Applications


SCHOOL BUS
SCHOOL BUS
R415
STOP

SNAPSHOT OF PROPANE AUTOGAS SCHOOL BUS MARKET

1,250,000

STUDENTS TRANSPORTED

DAILY

STATES WITH

14

500+ BUSES

1,000

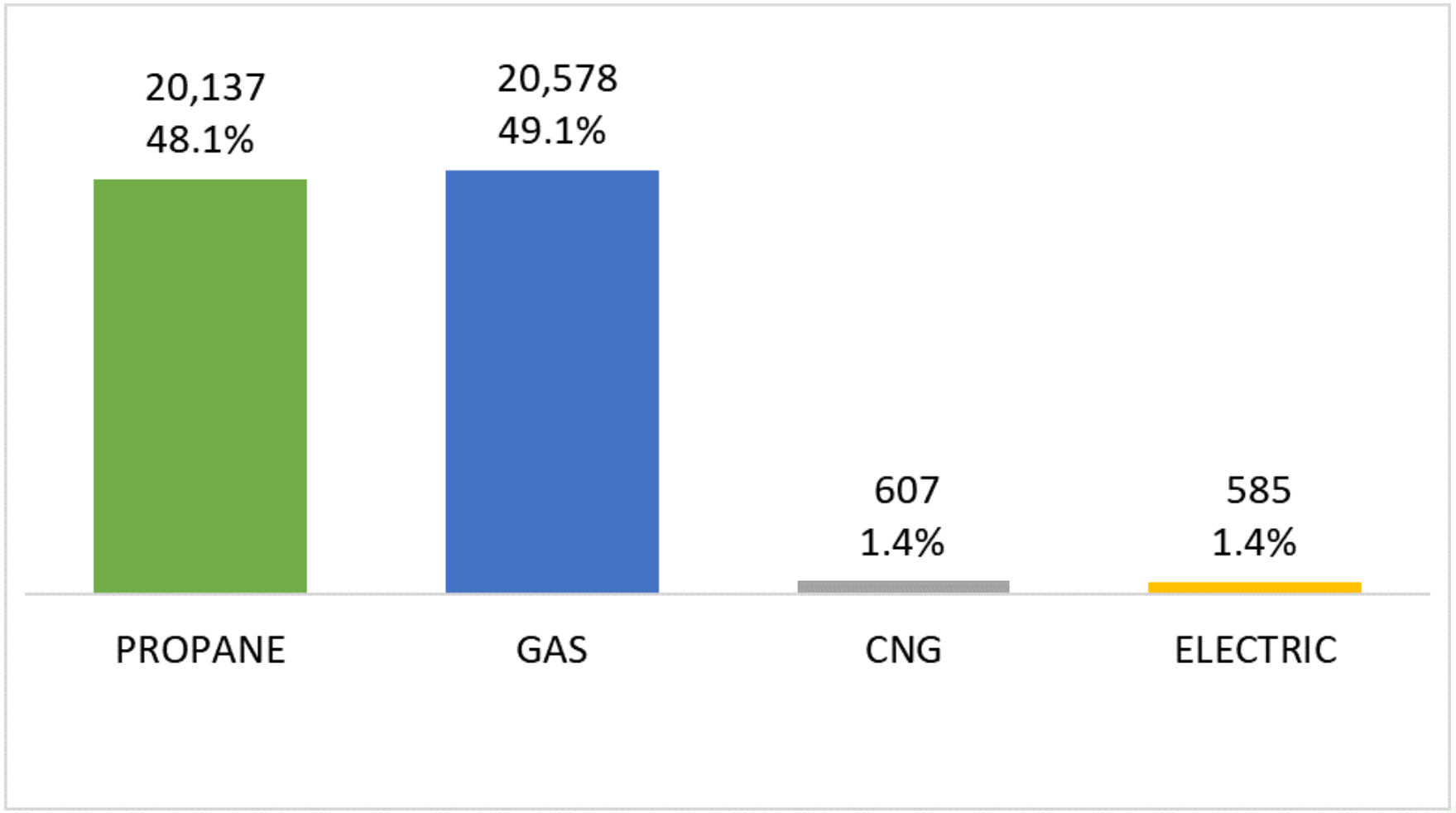
DISTRICTS & CONTRACTORS
OPERATE PROPANE AUTOGAS BUSES

22,000+

PROPANE AUTOGAS BUSES

ON THE ROAD

Non-diesel Type C School Buses (thru Q4 2022)



Source: IHS Polk data - vehicles in operation)

Similarly Equipped Type C Bus

Diesel	$120,000.00
Propane	$126,000.00
CNG	$154,000.00
Electric	$400,000.00

Similarly Equipped Type A Bus

Propane $100,000

EV $290,000

High Growth Vehicle Markets

EMERGING MARKETS

Parcel/Package

- USPS has 92,000 routes for moving mail.
  - **Over 70,000 routes are performed by independent contractors.**
- There are approximately 10,000 class 6-7 straight box trucks operated by USPS contractors.
- Contractors bidding on USPS routes score higher with alternative fuel vehicles.
- 1,000 gallons/month average fuel consumption.

ENERGY FOR EVERYONE
propane

USPS Contractors

USPS Contractors

“Win – Win! We need more of these financial and environmental success stories.”

Jennifer Biero-Reveille
Chief Sustainability Officer, US Postal Service

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EMERGING MARKETS

Food/Beverage

- Major companies have already validated propane autogas in this market.
  - ReadyRefresh by Nestlé Waters.
  - Schwan's Home Delivery.

ENERGY FOR EVERYONE
propane

Beverage – Shock Top & Ready Refresh

Beverage - Canada Dry (Pepsi Distributor)

Propane Education & Research Council

EMERGING MARKETS

Paratransit

- 51,000 paratransit vehicles nationwide.
- 600 gallons per month average fuel consumption.
- ADA requires every county in the U.S. to provide service.

ENERGY FOR EVERYONE propane

Shuttle Buses

San Diego Metropolitan Transit System

Industry: Paratransit

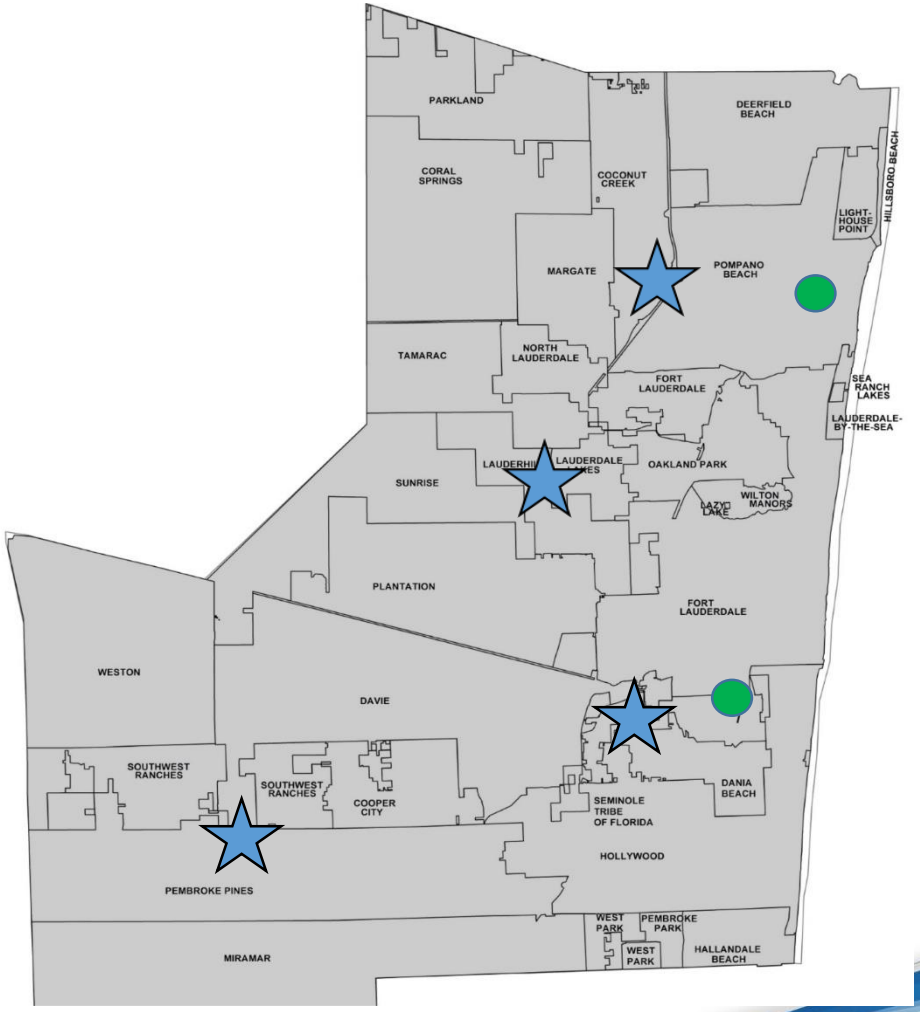
Location: San Diego, CA

Vehicles: 101 Ford F-550 / E-450 Buses

By The Numbers:

- Reduce emissions by **2 million pounds** per year.
- Will save **$5.8 million** over lifecycle of vehicles.
- Reported **$9,740 in savings annua**
- Reduce carbon intensity by **71%**.

Fueling Infrastructure



Broward County, FL
471 Sq. Miles

Benefits the environment

It’s Clean

- 24% reduction in Greenhouse Gas (GHG) emissions.
- 20% reduction in Nitrogen Oxide (NOx) emissions.
- 60% reduction in Carbon Monoxide (CO) emissions.

and

It’s getting cleaner!

Budget impact

	Propane Gallons	Gasoline Equilalent (85%)	Savings
2015	1,226,048	1,042,141	
2016	1,415,286	1,202,993	
2017	1,474,924	1,253,685	
2018	1,571,064	1,335,404	
2019	1,516,090	1,288,677	
2020	681,890	579,607	
2021	609,929	518,440	
2022	778,564	661,779	
Total Gallons	9,273,795	7,882,726	-1,391,069
Total Cost	$12,194,009.98	$21,835,150.66	$9,641,140.68
Cost per Gallon	$1.31	$2.77	$1.46
Alteranative Fuel Tax Credit	($3,743,467.00)	0	($3,743,467.00)
Total Net Cost	$8,450,542.98	$21,835,150.66	$13,384,607.68
Net Cost per Gallon	$0.91	$2.77	$1.86

Kitsap Transit - Bremerton, WA

- 3.5 million riders each year
- Started adopting propane autogas 2015

- 47 propane autogas buses
  - 11 remaining diesel buses to be replaced with current order of propane buses

- Fuel Costs per mile
  - Diesel $.48/mile
  - Gasoline $.50/mile
  - Propane $.20/mile

- GHG Emissions for 8-hour route period
  - Diesel bus – 2.4 metric tons
  - Propane bus - .014 metric tons

Same Equipped 14 Passenger Shuttle Bus

Gasoline (300 mi)	$165k
Propane (300 mi)	$195k
Electric 88kWh Battery (*150 mi)	$400k

*An existing NY EV fleet claims minimum 40% reduction in range during cold climate operation.

Autogas Infrastructure

Fueling Infrastructure – Mobile Refueling

Temporary Refueling Set-up

CATS Propane Autogas Fueling Station

Standard Private Station

Standard Private Station

Advanced Private Station

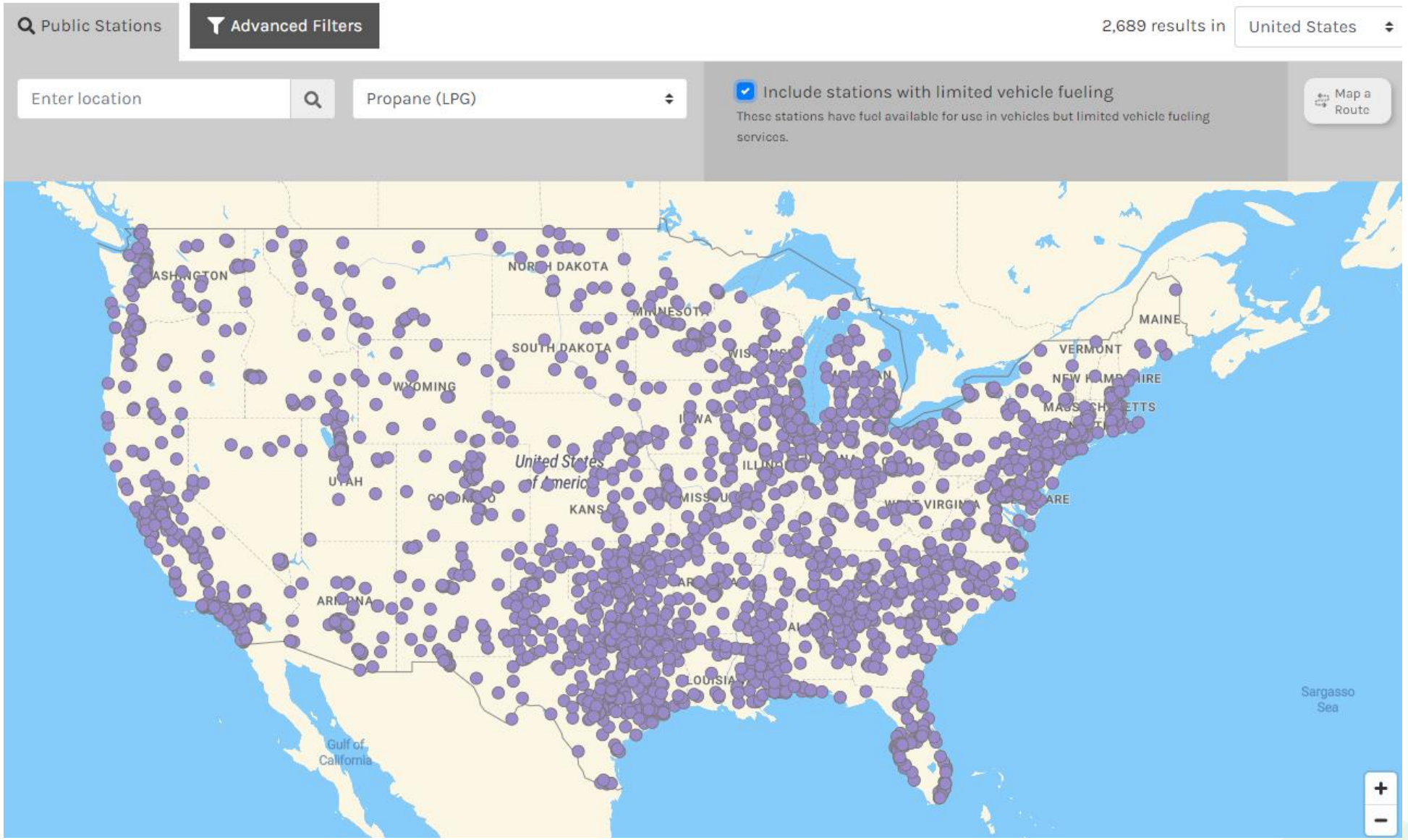
Off the Grid Stand-Alone Station

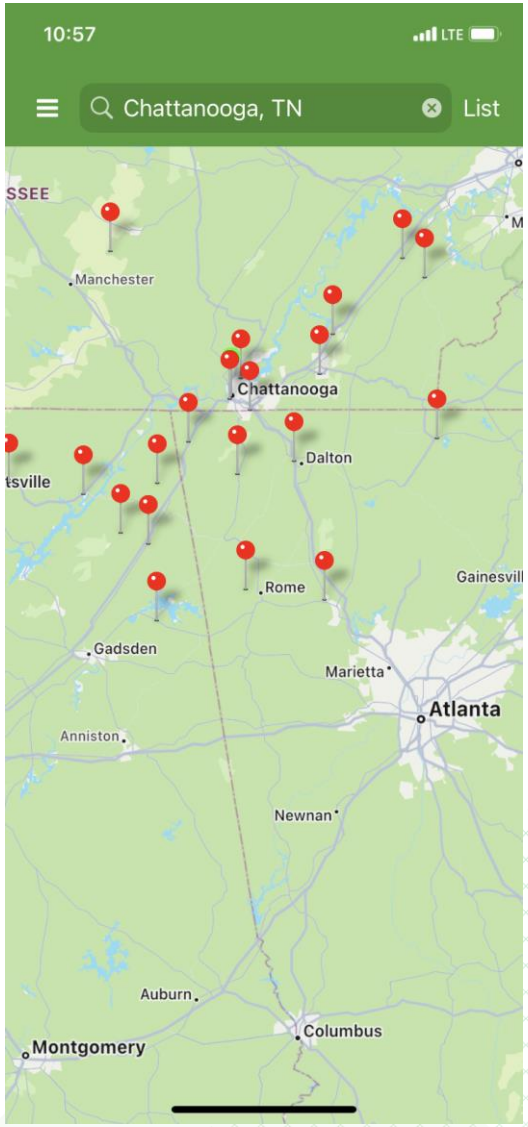

PROPANE EDUCATION & RESEARCH COUNCIL

Fueling Infrastructure Cost for 10 Vehicles

- Propane = $50k
- CNG = $200k (ten fixed time fill hoses)
- Electric = $360k (ten fixed plug in lines)

Dept of Energy Alt Fuel Station Locator





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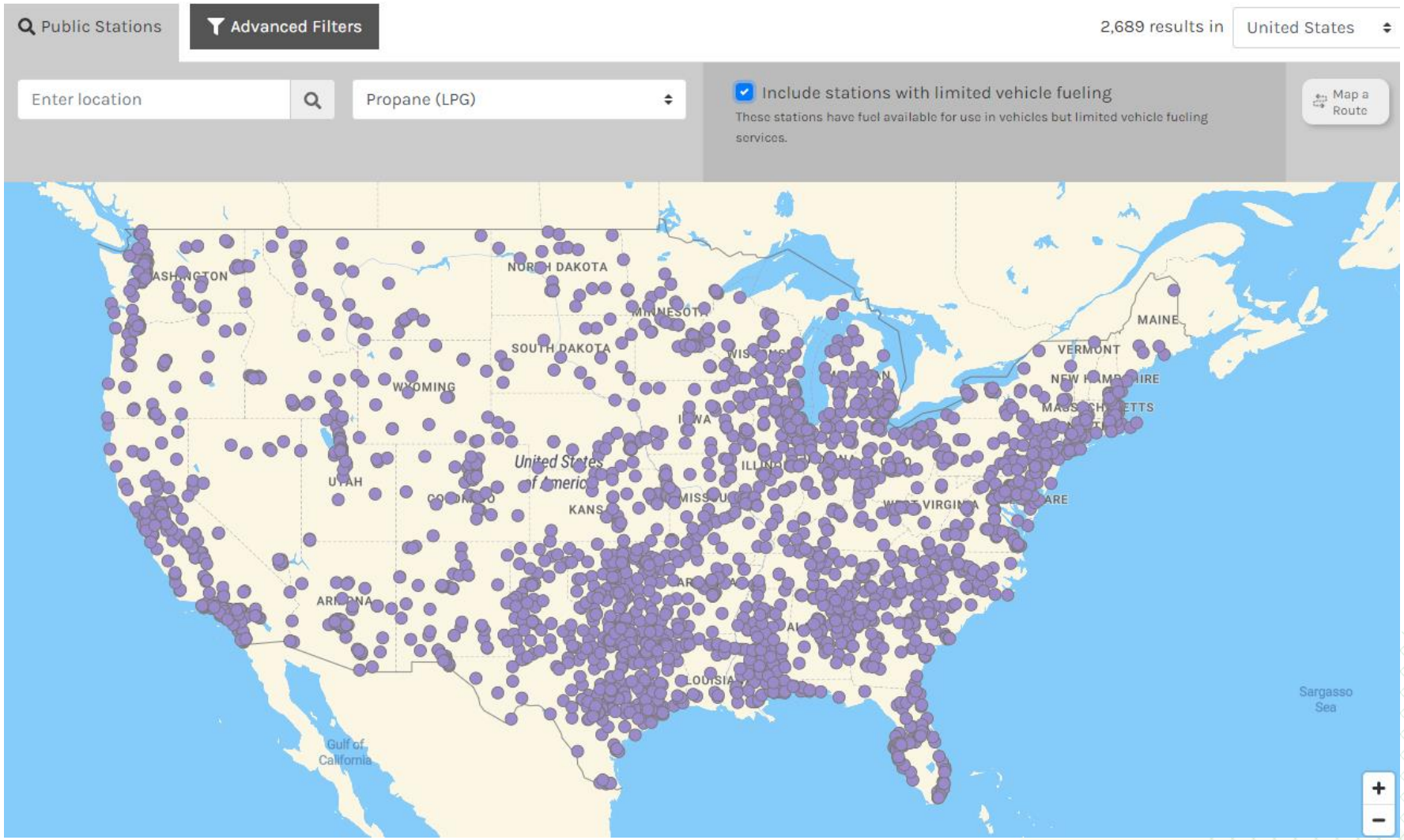
Dept of Energy Alt Fuel Station Locator



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Resiliency

Resiliency


CLEAN BURNING PROPANE
BROWARD COUNTY Transit
TOPS!


SCHOOL BUS
05/12/2016

Benefits of Propane/Renewable Propane

Average Price Per Gallon for the week of May 19, 2023

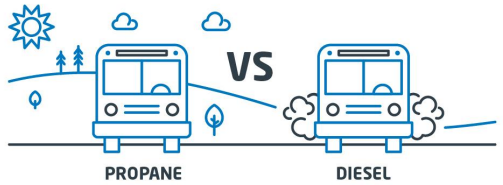
These prices are based on National averages. To receive a custom quote with your local autogas pricing, contact us today.
Learn more about the savings and stability of autogas.
*Autogas price estimates do not reflect the current federal tax credit.

New England	Central Atlantic	Lower Atlantic	Midwest	Gulf Coast	Rocky Mountain	West Coast
$1.46	$1.56	$1.46	$1.49	$1.35	$1.44	$1.40

96%

NOx REDUCTION VERSUS CLEAN DIESEL BUS

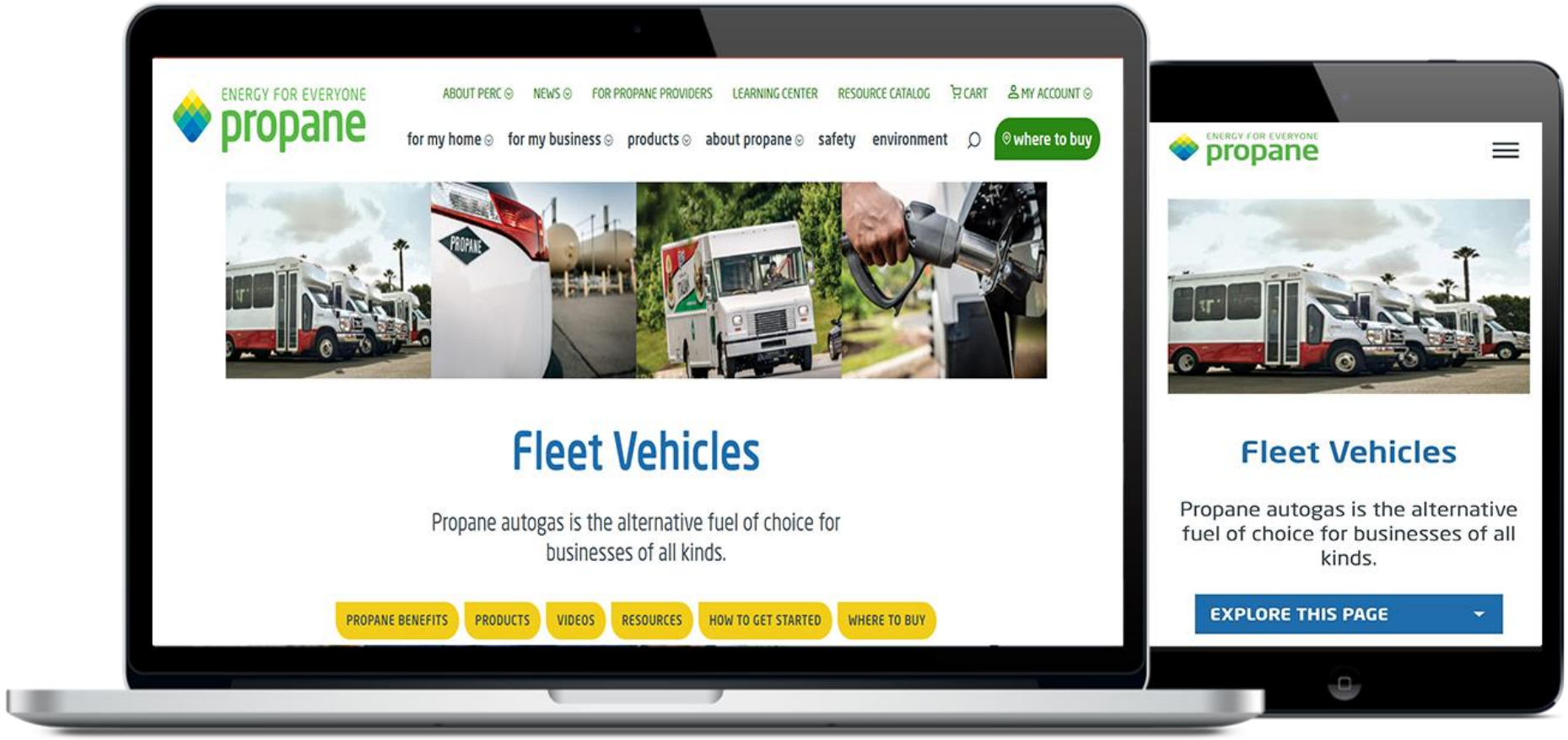
Duty cycle: Low speed, stop-and-go route



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

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



ROUSH CLEANTECH

CTAA 2023

PROPANE AUTOGAS

Enterprise Brand Portfolio

ROUSH Industries
OEM manufacturing, engineering, prototyping and design

Roush Fenway Keselowski Racing
Dominant NASCAR racing team

ROUSH Performance
Industry leading high-performance vehicles

ROUSH CleanTech
Advanced clean transportation solutions provider

MARKETS & CUSTOMERS WE SERVE

MOBILITY

GM
FCA
Ford
Argo.ai
GAC
Aptiv
Rivian
Toyota
Google/Waymo
Honda
Hyundai
Isuzu
Volkswagen
Nissan
Bluebird
BMW

DEFENSE

Navistar Defense
BAE Systems
AM General
SAIC
Textron
FAAC
US Army/TARDEC
Oskosh Defense
Hardwire
Astradyne

ENTERTAINMENT

Disney
Universal Studios
The Henry Ford

AEROSPACE

Bell
Textron Systems
Boeing
Collins Aerospace
Pratt & Whitney
Sikorsky
United Launch Alliance

ROUSH CLEANTECH

Alternative Fuels Experience

1998 — Ford Ranger EV Prototyping

1999 — First Hybrid Transmission Prototype Build & Test

2005 — Ford Escape HEV Prototyping

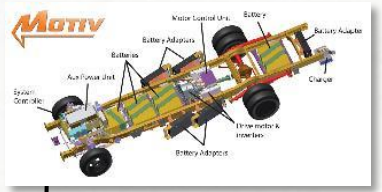
2007 — Propane F-150

2009 — Propane F-250 / F-350, E-150 / E-250 / E-350

2009 — Roush Electric Vehicle

2010 — Propane E-450

2011 — Motiv BEV Assembly



2011 — Blink Charger Assembly

2012 — Blue Bird Propane School Bus

2013 — Propane F-450 / F-550, F-650, F-53 / F-59

2017 — Cummins AEOS Class 7 EV Demo

2019 — Canoo

2019 — Nuro AI Delivery Bot

2020 — EV F-650 Demonstration Units

2021 — CARB UPS Hydrogen Fuel Cell Electric Vehicle

ROUSH CleanTech Scorecard / Experience

OVER

28,000

PROPANE VEHICLES ON THE ROAD

OVER

2 Billion

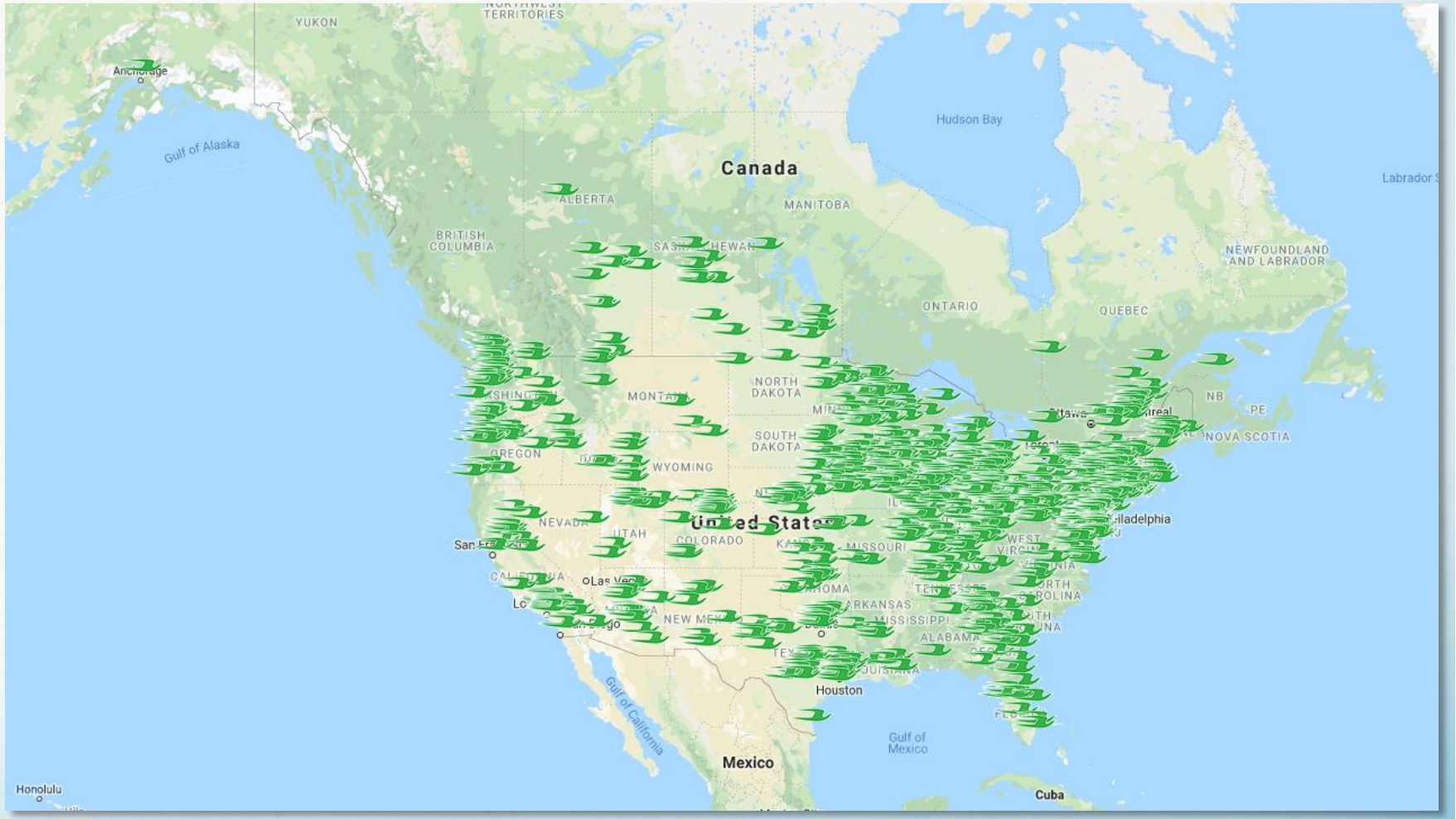
MILES ACCUMULATED

OVER

3,000

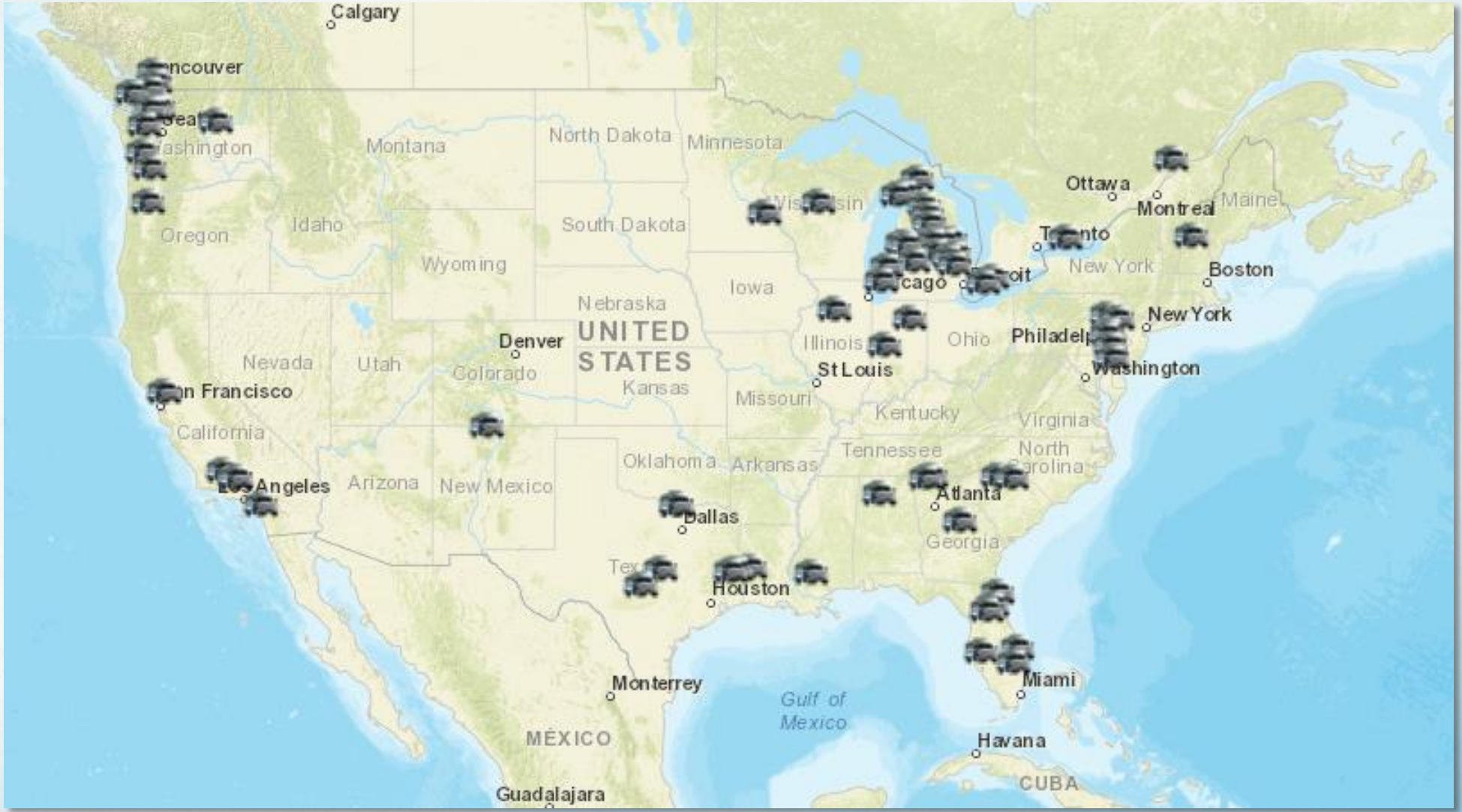
FLEETS

School Bus Deployments – over 20,000 on the road



ROUSH CLEANTECH

Transit Deployments



ROUSH CLEANTECH

Transit Customer Adoptions

ROUSH CLEANTECH

FLEET GOALS

PURSUIT OF A MOVING TARGET

Fleet Viewpoint

Diesel / Gasoline

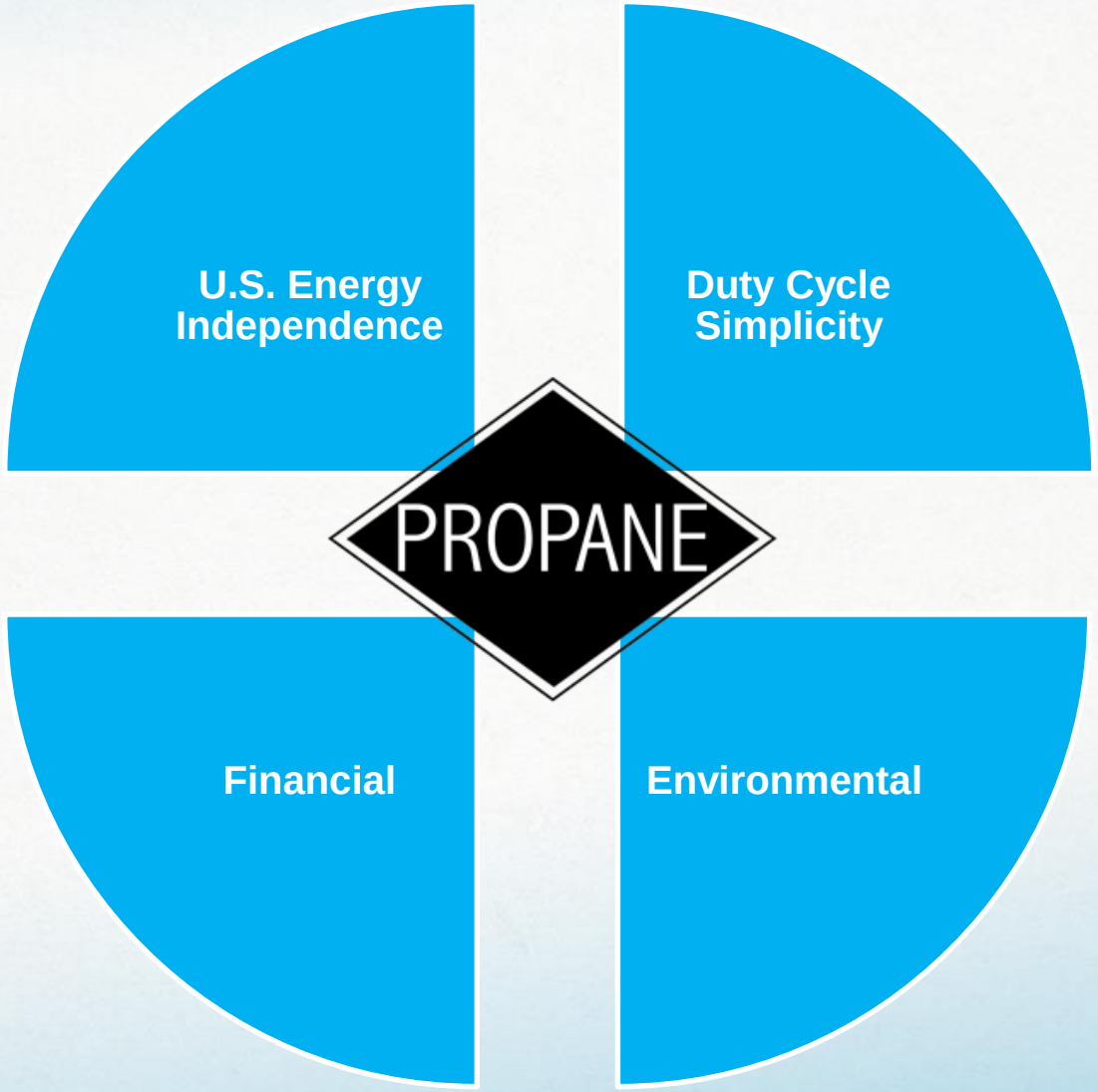
PROS	CONS
Familiar	Increasing complexity
Infrastructure in place	Volatile fuel price / scarcity
Low capital cost	No environmental aspect

EV / Fuel Cell

PROS	CONS
Environmental aspect	High capital cost
Funding availability	Duty cycle limitations
Low operational cost	Infrastructure / charging / personnel

ROUSH CLEANTECH

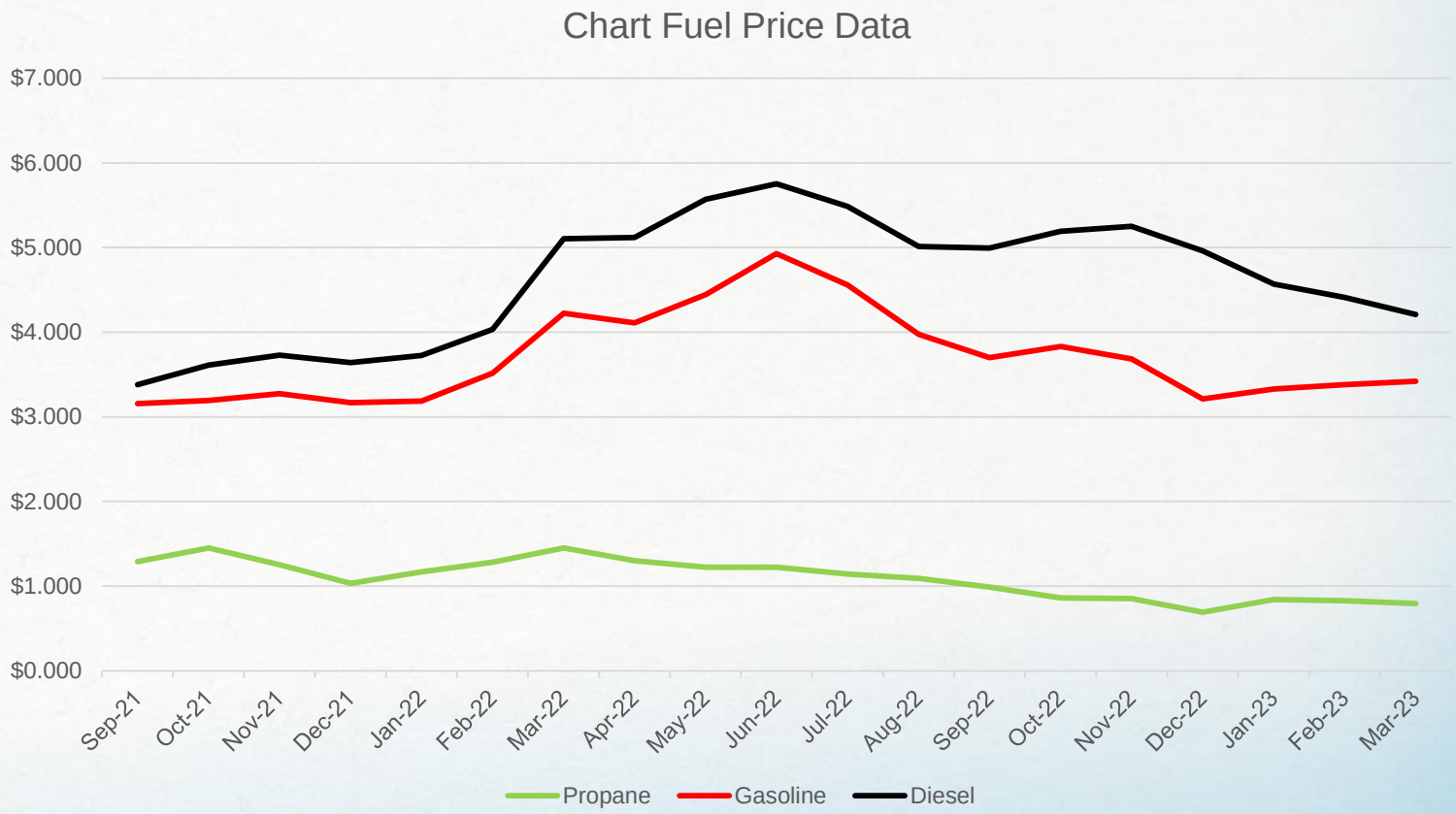
Propane Autogas - Consideration



Fuel Landscape & Trends

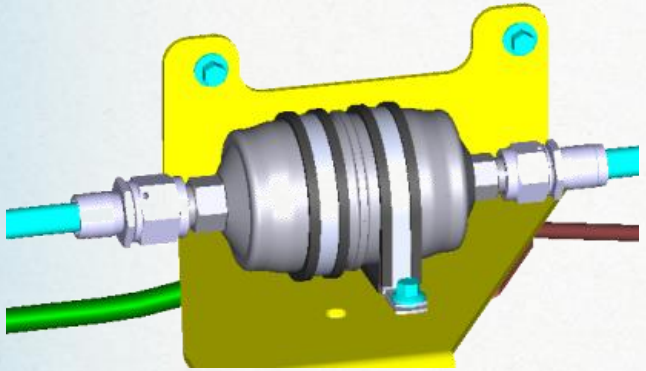
Propane Facts:

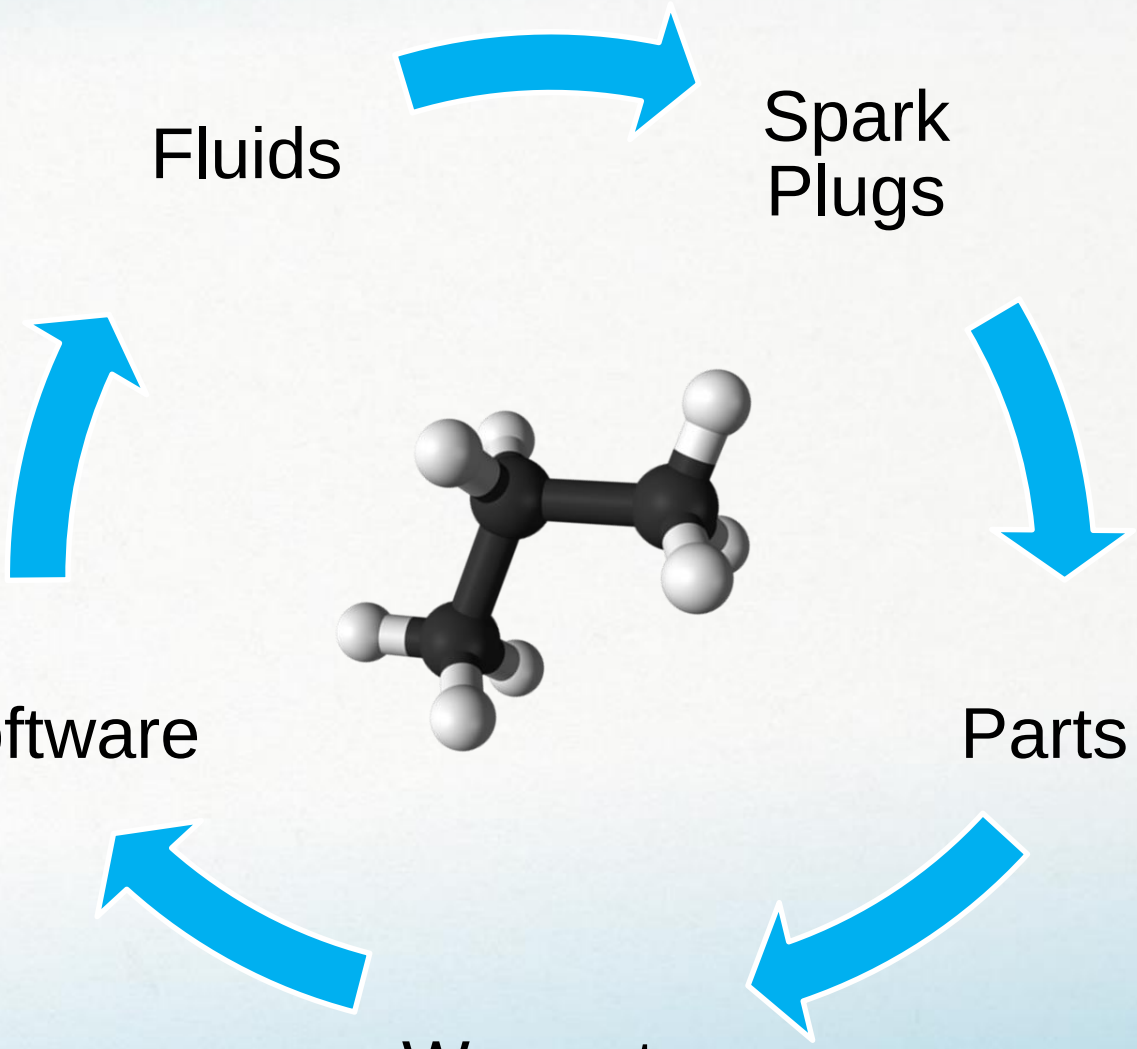
- 30B gallons produced annually in U.S.
- 20B exported
- Biproduct of many activities



Propane Maintenance

Fuel filtration is the only unique maintenance item





Cherokee County Area Transit – GA

- **Received 85% funding** from Federal Transit Administration for a propane bus.
  - **Propane meets FTA's green initiatives**
- **Obtained 90% funding** from the Federal Transit Administration for a propane fueling station.
  - **Propane meets FTA's green initiatives**
- **Saved $10,000 per propane vehicle** compared to same model gasoline vehicle.
  - **Higher FTA funding and propane supplier funding.**
- Locked in 3-year fuel price agreement with propane provider at a **50% saving per gallon** over gasoline

ROUSH 7.3L Propane - Emissions

Emission Constituent	ROUSH 2023e 7.3 LPG
NOx (Nitrogen Oxides)	0.02
HCHO (Formaldehyde)	0.001
PM (Particulate Matter)	0.002
NMHC (Non-Methane Hydrocarbons)	.04
CO (Carbon Monoxide)	5.0
Greenhouse Gas Emissions	
GHG Carbon Dioxide (CO_2)	544
GHG Methane (CH_4)	0.03
GHG Nitrous Oxide (N_20)	0.02

- Approximate average: 70% cleaner than federal emission standards
- Meaningful impact now, without the need for grant funding

ROUSH CLEANTECH

PLATFORMS

Transit Bus – Vehicle Profile

Model Years

2024

Engine Size

7.3L V8

Applications

158” / 176” / 186” / 190” / 208” wheelbases.

6-speed automatic transmission.

Fuel Tank Capacity

Aft-axle: 41 gallons (usable)

Extended range: 64 gallons (usable)

Technical Specifications

EPA and CARB approved.

GVWR: < 14,500 lbs.

Requires “91G” gaseous fuels prep. package.

Order Availability

Ford Ship Through.

Ford E-450 Cutaway
& Strip Chassis

ALTOONA TESTED

Transit Bus – Vehicle Profile

Model Years

2019 – 2021 – Retrofit

Engine Size

6.8L V10 (2V) superseded by 7.3L V8

Applications

Various wheelbases

5-speed automatic transmission.

Fuel Tank Capacity

Aft-axle: 65 gallons (usable)

Technical Specifications

EPA and CARB approved.

GVWR: < 14,500 lbs.

Requires “91G” gaseous fuels prep. package.

Order Availability

Available retrofit only

Ford F-550 Cutaway
& Strip Chassis

ALTOONA TESTED

Ford F-53 / F-59 – Class 5 / 6

Model Years

2023

Engine Size

7.3L V8

Applications

Various wheelbases

6-speed automatic transmission.

Fuel Tank Capacity

Aft-axle: 65 or 93 gallons (usable)

Technical Specifications

EPA and CARB approved.

GVWR: 16K – 26K lbs.

Requires “91G” gaseous fuels prep. package.

Order Availability

Order Bank Open

OEM Offering

Model Year

2021 - 2023

Engine Size

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 automatic transmission

Fuel Tank Capacity

Short: 47 gallons (usable)

Standard: 67 gallons (usable)

Extended: 93 gallons (usable)

Technical Specifications

EPA and CARB approved.

GVWR: 33,000 lbs.

Up to 81 passengers

Blue Bird Vision

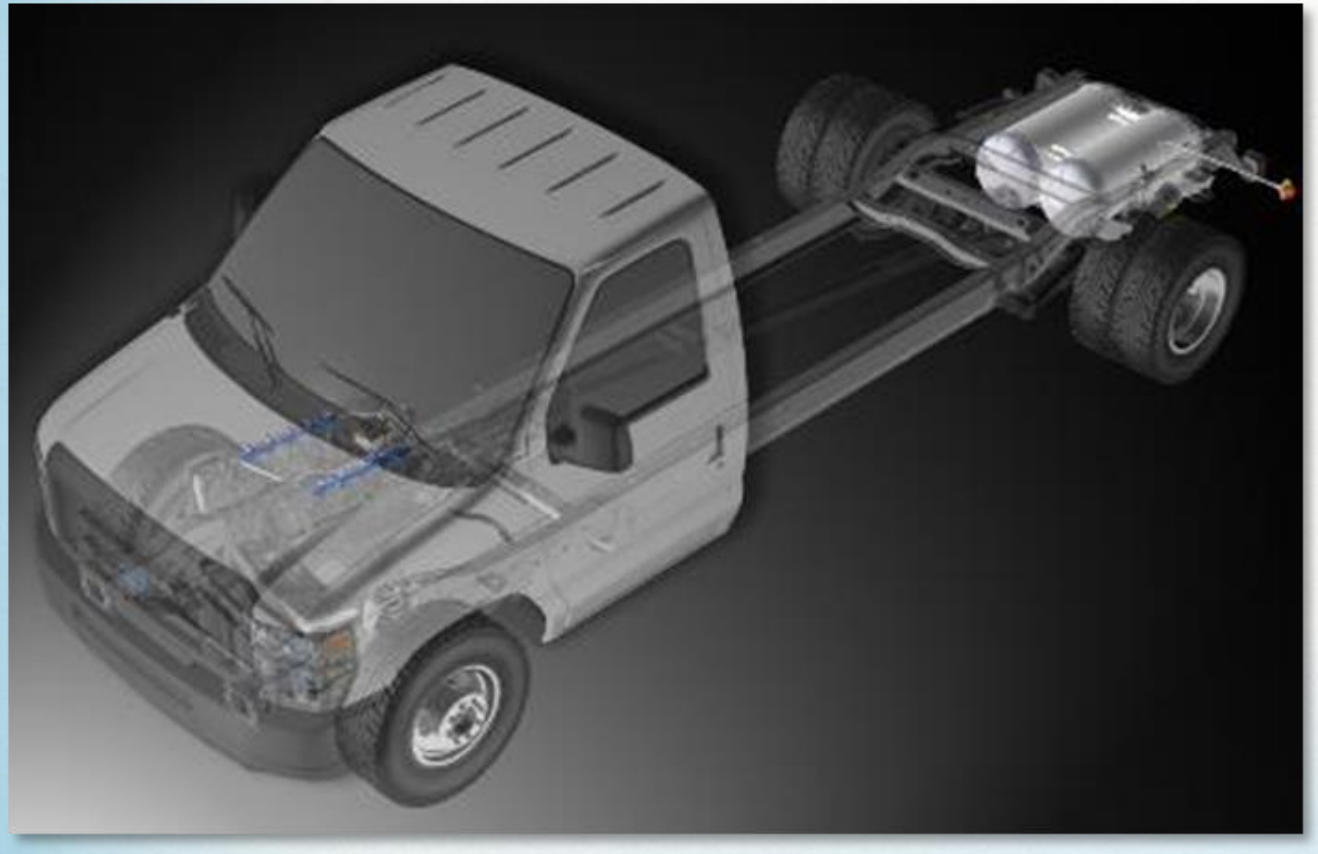
(Type C)

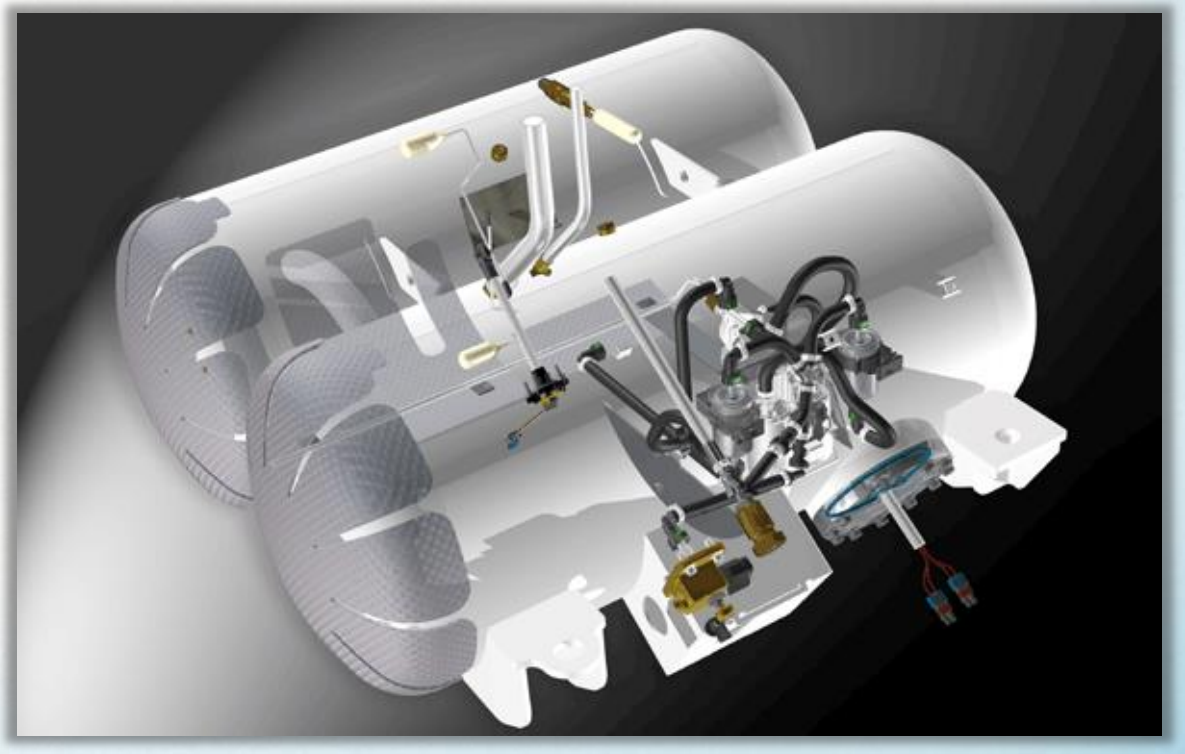
ROUSH CLEANTECH

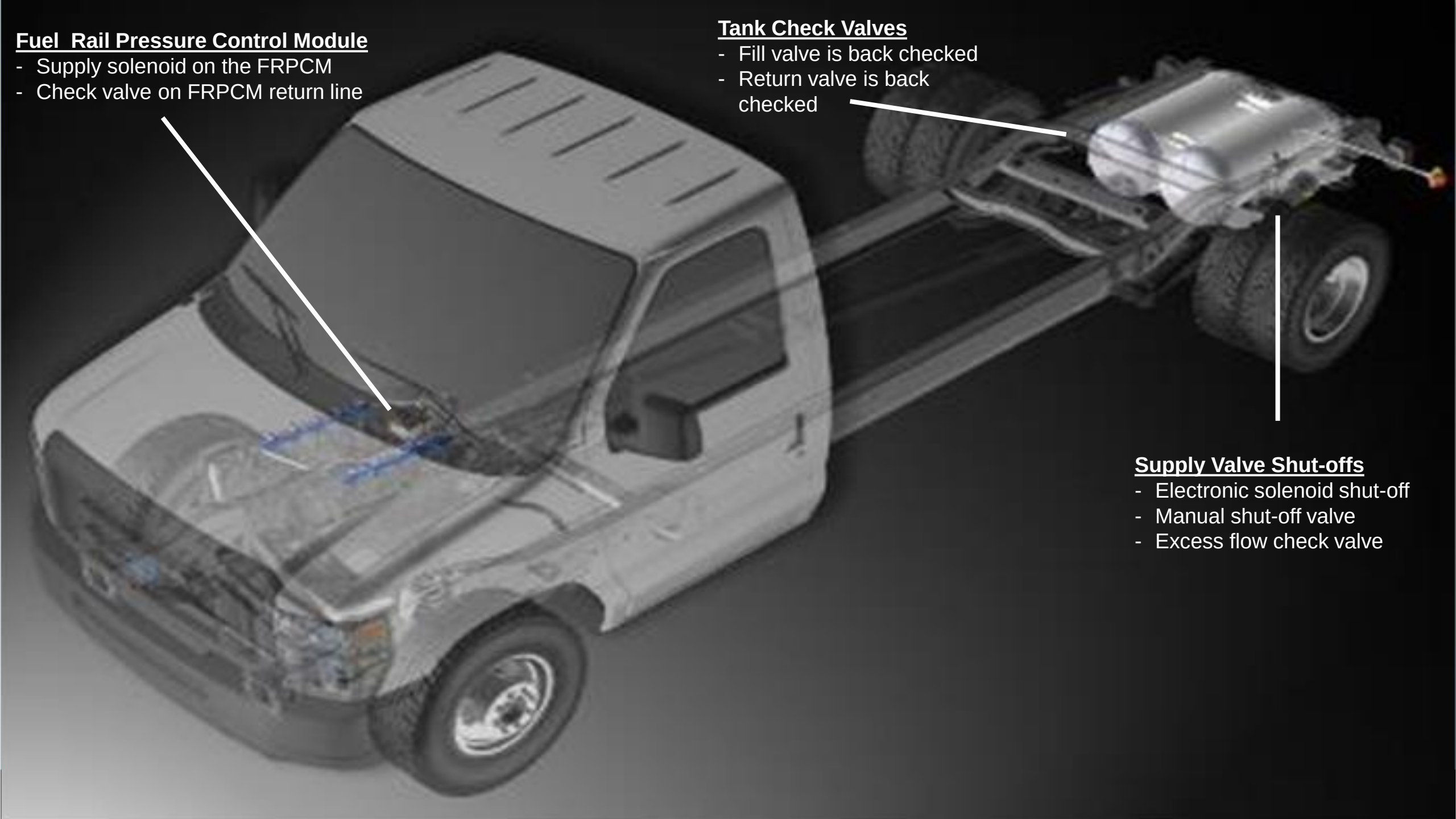
SAFETY

ROUSH CLEANTECH

System Layout and Function





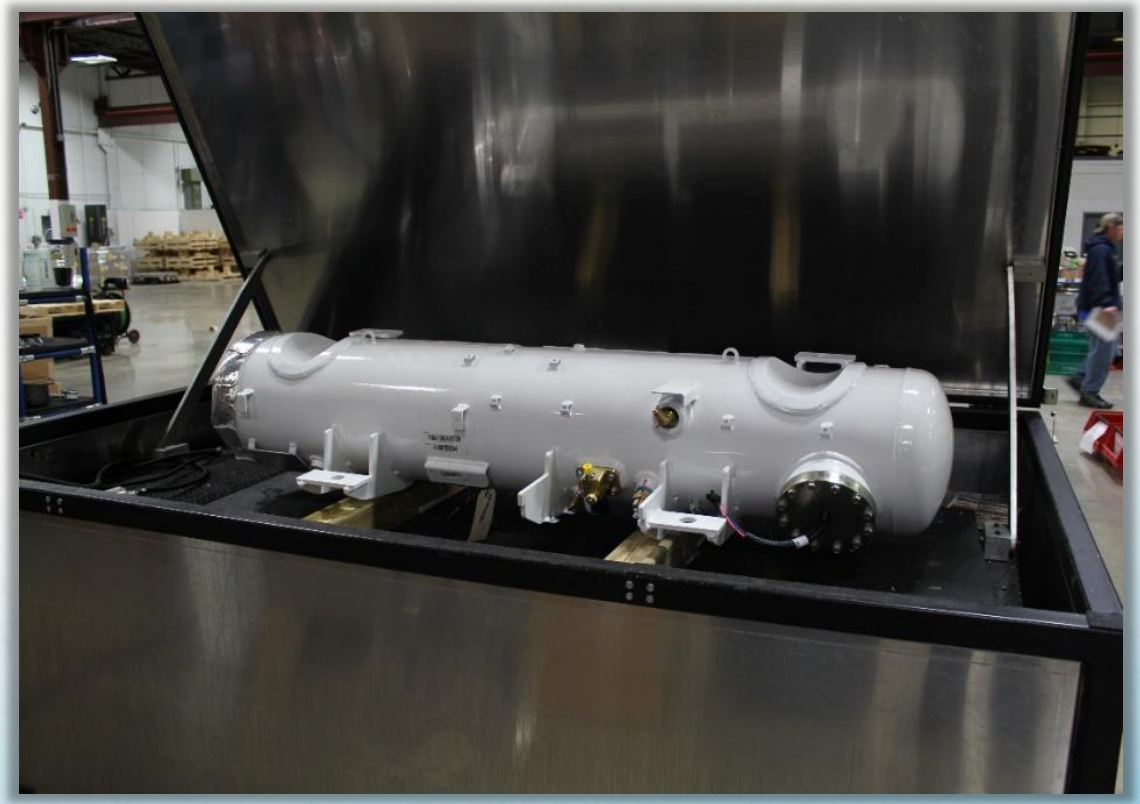

Fuel Rail Pressure Control Module
- Supply solenoid on the FRPCM
- Check valve on FRPCM return line
Tank Check Valves
- Fill valve is back checked
- Return valve is back checked
Supply Valve Shut-offs
- Electronic solenoid shut-off
- Manual shut-off valve
- Excess flow check valve

Propane Safety

- LPG is as safe as any conventional engine fuel.
  - Propane is a nontoxic, non carcinogenic, and noncorrosive fuel.
  - It poses no harm to groundwater, surface water, or soil.

- Fuel tanks are 20 times more puncture resistant than gasoline.
  - Ductile steel tanks about 1/8" thick (varies slightly by tank diameter).
  - All fuel tanks are leak checked before installation.

- Colorless and odorless.
  - Ethyl mercaptan added for leak detection.



ROUSH CLEANTECH

CUSTOMER SUCCESS

Delivering on the ROUSH CleanTech Promise

How We Deliver Our Promise

Order Management

Bridge between sales and operations

Timely processing of orders

Communication of status to key stakeholders

Service Network

The right partners in the right locations

Trained technicians

Smooth on-boarding process

Technical Publications

How to use and service the product

Guidelines for maintenance and repair

Training

Interactive web-based courses

Factory workshops

On-site, hands-on

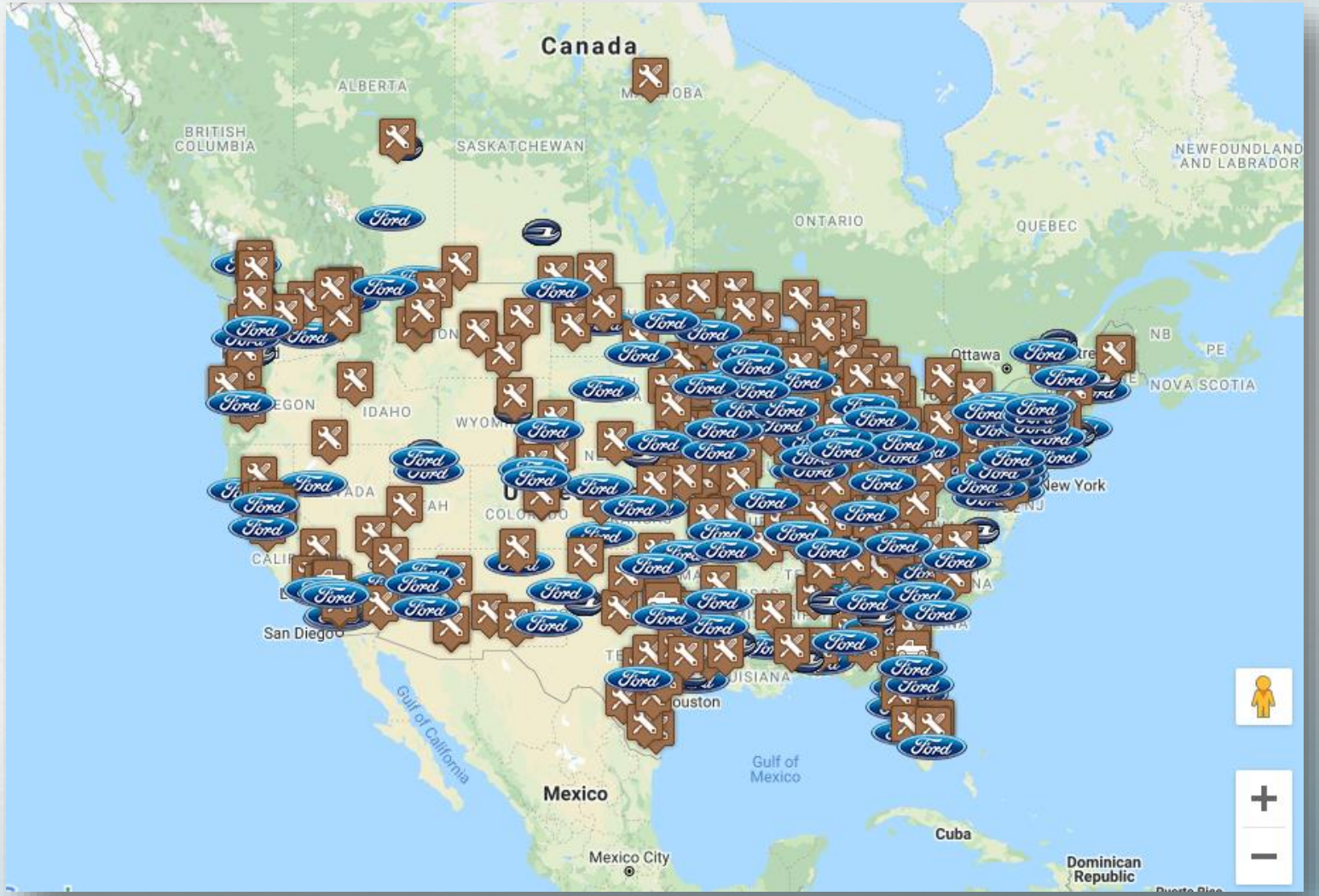
Warranty & Tech Support

Guided diagnostics and troubleshooting

Quick replacement part identification and delivery

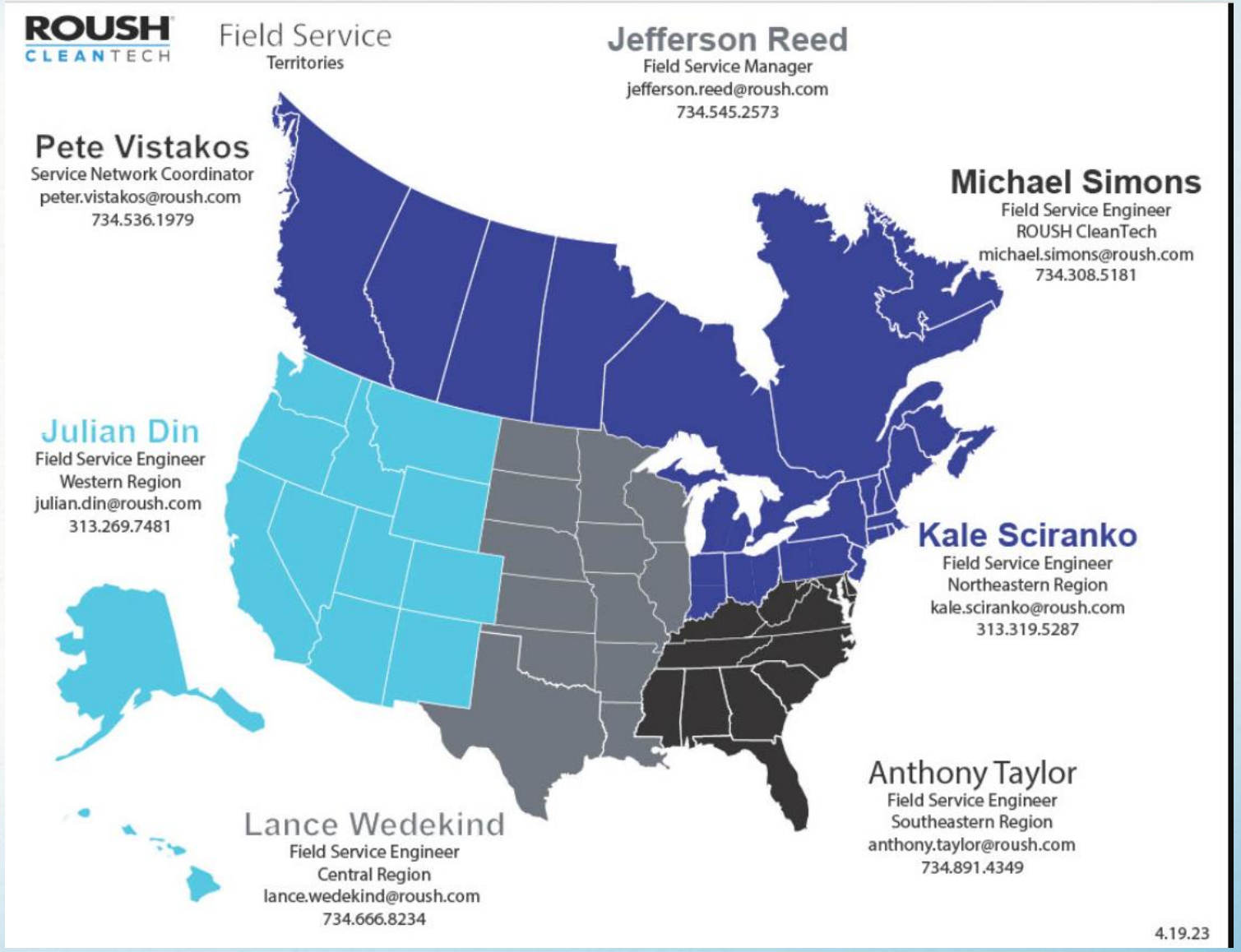
Service Network Coverage

Independents:	446
Ford Dealers:	236
Blue Bird Dealers:	76
Mobile Service:	5
Total:	**763**

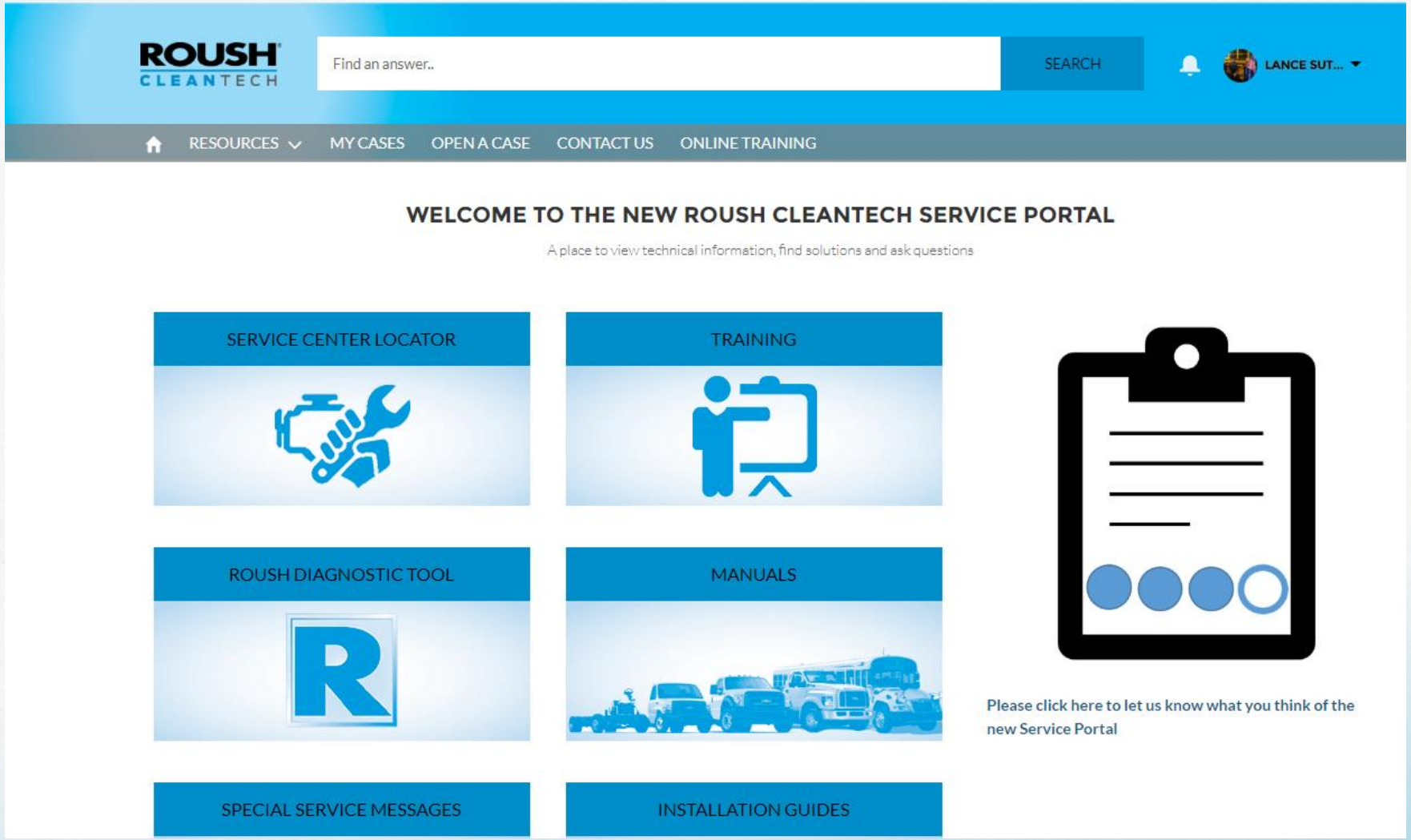


Field Service Engineers Coverage

- **6 Field Service Engineers**
- **~100 years Ford/Bus experience**
- **1 dedicated service network coordinator**

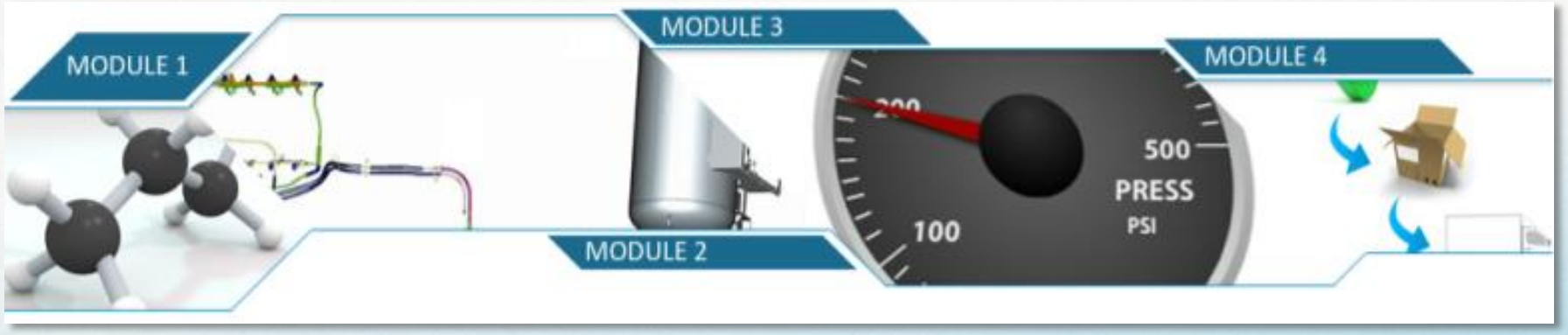


Service Portal



Web-Based Training

- Propane Properties and Safety
- Fuel System Components
- System Diagnostics
- Basic Warranty Information
- Technician Tip Videos



Instructor-Led Training

Onsite Training

Performed at customer location or service center

For fleets or service centers beginning with our system

Instructed by Service Team during visits or trainers during routes

Done as needed

Factory Workshop

Located at ROUSH CleanTech

For advanced repair facilities

Hands-on training

Small groups

Propane Consideration Summary

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

THANK YOU

800.59.ROUSH

ROUSHcleantech.com

Ryan Zic

Vice President - Sales

Ryan.Zic@roush.com

Our Propane Journey

Mike Whitten, Executive Director of MTA

Brief MTA Background

- Directly operate MB, DR, Para, IEB, DFR
- FY23 Annual Budget of just under $10M
- Also directly operate school, charter, wedding, & livery
- Small urban system

manchester transit

The Planning Process

We wanted to reduce our Carbon footprint but how?

- MTA had switched to B-20 biodiesel in 2010 but by 2015 we were looking to take the next step.
- Electric vehicles weren't operationally where we needed them to be in terms of range, charge time, and cold weather operations
- CNG required huge investments in rolling stock and facility upgrades that we didn't have $$ for.
- Propane was cleaner, cheaper, and seemed like a perfect fit.
- We chose to start on our school fleet to avoid FTA procurement requirements that may have limited our ability to find the best vehicle type for our community.

manchester transit

Rolling Stock & Infrustructure

Vehicle Selection

- Visited all three major school bus manufacturers in person to see entire process
- Visited Roush during the CTAA Expo in Detroit in 2018
- Released an RFP that ultimately was awarded to Bluebird

Fueling Infrastructure

- Partnered with a local provider called Dead River
- Dead River installed two 1,000 gallon above ground tanks and a fuel pump at no cost to MTA
- MTA entered 3 year contract for propane with Dead River

Facility Impacts

- Minimal costs, we are installing vapor detectors in the storage bay and maintenance
- Fans at ground level since Propane is heavier than air
- We don’t store overnight in maintenance

manchester transit


FREE DOWNTOWN AREA SHUTTLE
PROPANE POWERED
THE GREEN DASH
MTABUS.ORG
ROUSH

Propane Autogas Fuel Pumps

How's it worked out?

Great! We ordered 14 school buses initially and have since added 5 more last year and 4 more in 2023 so we're up to 23 out of a fleet of 45. Funded initially via VW settlement funds.

In 2023 we added our first two transit cutaways.

No winter issues or maintenance problems so far.

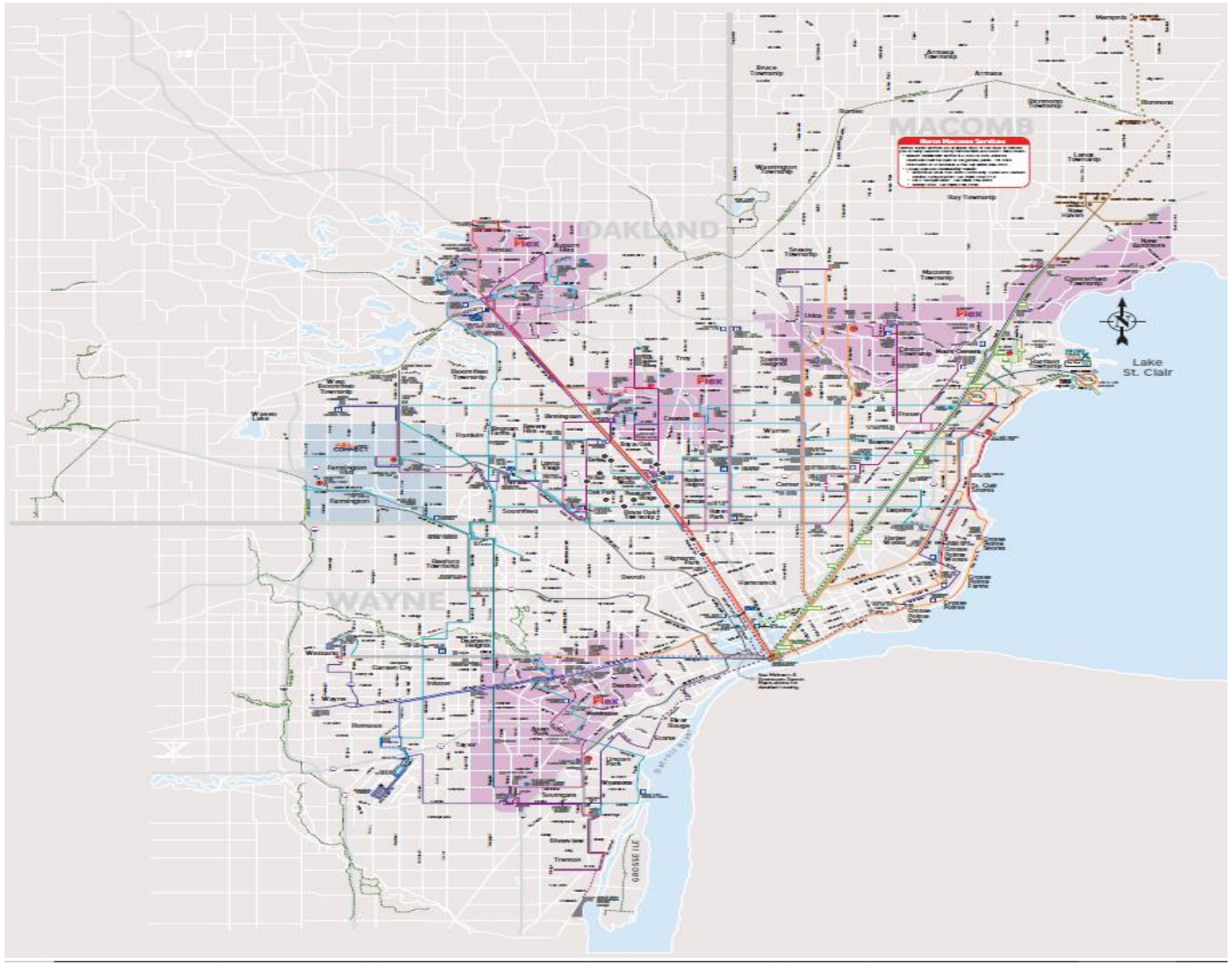
manchester transit

SMART

PROPANE PROGRAM
2023

Daniel Whitehouse
Vice President of Paratransit and On-Demand Services

SMART Service Area



SMART Service Area Today

- SMART provides service in Wayne, Oakland, and Macomb Counties.
- The SMART service area covers 2,100 square miles.

SMART Propane Fleet History

- 2015 SMART placed 61 propane vehicles in service
- 2016 SMART placed 13 propane vehicles in service
- 2018 SMART placed 22 propane vehicles in service
- 2019 SMART placed 25 propane vehicles in service
- 2023 SMART is replacing 40 propane vehicles which were placed into service in 2015.
- 2023 SMART is replacing 20 propane vehicles with transit vans.
- SMART operates 121 propane vehicles directly. Currently all directly operated para-transit vehicles are fueled by propane.
- SMART partners operate 4 additional propane vehicles.

SMART Propane Change

- Maintenance savings. With an engine similar to a gas engine, replacement parts are cheaper and, in many cases, easier to repair than diesel.
- Regen issues are gone after switching from diesel to propane which allows vehicles to be on the road more.

SMART Costs

- Fuel cost savings. SMART spends roughly $0.87 per gallon for propane compared to $2.67 per gallon for diesel.
- FY2021 Miles 2,603,687 miles driven at $0.87 = $2,265,207 using propane vs $6,951,844 using diesel. The savings in FY21 is $4,686,637 by using propane.
- FY2022 Miles 2,996,516 miles driven at $0.87 = $2,606.968 using propane vs $8,000,697 using diesel. The savings in FY22 was $5,393,729 by using propane

SMART Propane Lessons Learned

- 2015 series of vehicles had a 40-gallon propane tank. This allowed the vehicle to be on the road for half a day before refueling. This has major impacts to our operations.
- Subsequent fleets in 2016, 2018, 2019, and 2023 have a 60-gallon tank which in nearly all cases allows the vehicle to stay on the road for an entire 8 or even 10 hour shift.

Propane Station

Vehicles in Action

Vehicles in Action

Vehicles in Action

Contact Info

Daniel Whitehouse
Vice President of Paratransit and On-Demand Services
Email: dwhitehouse@smartbus.org
Phone: 248-419-7952

SMART's Website
www.smartbus.org

Authorized Funding: Buses and Bus Facilities Formula, Competitive, and Low-No Program (Section 5339)

Program Component	FY 2022 (in millions)	FY 2023 (in millions)	FY 2024 (in millions)	FY 2025 (in millions)	FY 2026 (in millions)
Formula	$603.99	$616.61	$632.71	$645.78	$662.20
Buses and Bus Facilities Competitive	$375.70	$383.54	$393.56	$401.69	$411.90
Low or No Emissions Competitive	$1,121.56	$1,123.06	$1,124.96	$1,126.51	$1,128.46
5339 Program TOTAL	$2,101.25	$2,123.21	$2,151.23	$2173.98	$2,202.56

***Please Note**: Funding amounts before subtracting administrative and oversight takedown.*

2023 Low-No & Buses and Bus Facilities Competition

Available Funding: Approximately **$1.7 billion**

- Buses and Bus Facilities Competitive: Approximately $469 million
- Low or No Emissions: $1.22 billion ($**357 million for low emission projects***)

Important Dates	
Notice of Funding Opportunity	January 27, 2023
Applications Due	11:59pm EST April 13, 2023
Project Evaluations	April – May 2023
Award Announcement	No Later than June 28, 2023
Pre-Award Authority	Starts on date of project announcement
Available for Obligation	The year of award plus 3 years – September 30, 2026

***Please note:** Due to less funding being requested than was available for low-emission projects in 2022, this amount includes approximately $69 million in FY22 funds reserved for low-emission projects as required by statute.*

Low Emission Set Aside – 25 Percent

- As required by Federal public transportation law (49 U.S.C. 5339(c)(5)), a minimum of 25 percent of the amount awarded under the Low-No Program will be awarded to **low-emission projects** other than zero-emission vehicles and related facilities.
- $69,192,987 of FY 2022 funding for low-emission projects remains available, in addition to the $287,920,295 available for FY 2023 – totaling **$357,113,282** total in available funds for low emission projects in 2023.
- Eligible projects include (but not limited to):
  - Hybrid Electric / Gas or Hybrid Electric /Diesel Buses
  - Compressed Natural Gas or Liquified Natural Gas Buses
  - Ethanol, Propane, and Other Alternative Fuel Buses
  - Constructing or Leasing Facilities Specifically for Low Emission Buses
  - Rehabilitating / Improving Existing Public Facilities to Accommodate Low Emission Buses

Additional Savings

Alternative Fuel Excise Tax Credit

A tax incentive is available for alternative fuel that is sold for use or used as a fuel to operate a motor vehicle. A tax credit in the amount of $0.36 per gallon* is available for propane. For more information about claiming the credit, see IRS Form 4136, which is available on the IRS Forms and Publications website.

NOTE: This incentive was originally set to expire on December 31, 2021, but has been extended through December 31, 2024, by Public Law 117-169.

Rebates & Incentives

Many State Propane Associations and Fuel Vendors provide incentives and rebates when purchases or retrofitting vehicles.

https://afdc.energy.gov/laws/319

***Gas Per Gallon Equivalent is used for calculating credit.**

STEVE WHALEY

DIRECTOR OF AUTOGAS

BUSINESS DEVELOPMENT

PROPANE EDUCATION &

RESEARCH COUNCIL

STEPHEN.WHALEY@PROPANE.COM

864-606-2290