

# Energy For Everyone:

## How Propane Autogas is Revolutionizing School Transportation

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# Agenda:



- Steve Whaley - Propane School Bus Market Update



- Amy Rosa – Wa-Nee Community Schools, Indiana



- Shay Coates – Newport News Public Schools, Virginia



- Kayne Smith – Cypress Fairbanks ISD, Texas

# 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





# Path to Zero Emissions

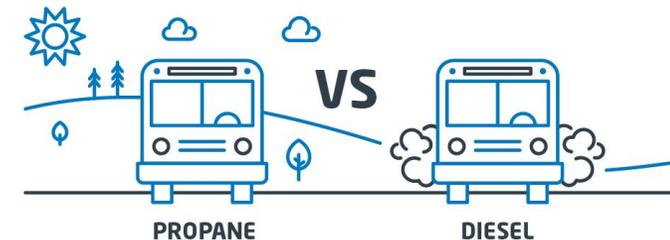
# Path to Zero Emissions

- 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

# 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](http://PROPANE.COM)

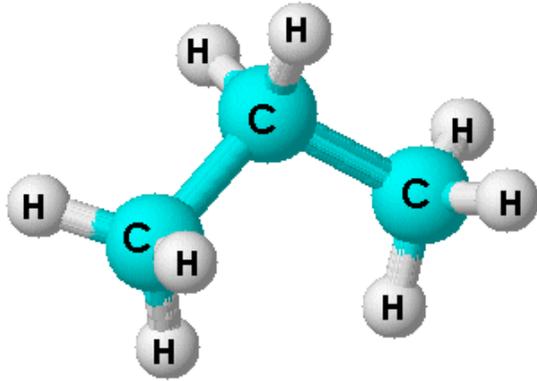
# WHAT IS PROPANE?

- Affordable, Clean, American-Made Fuel
  - C<sub>3</sub>H<sub>8</sub>
  - 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

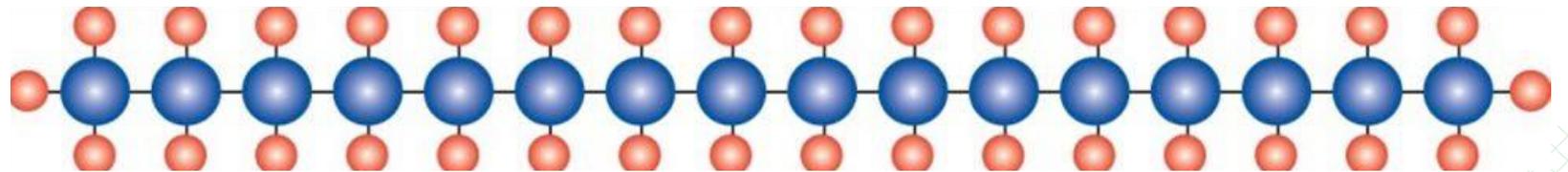
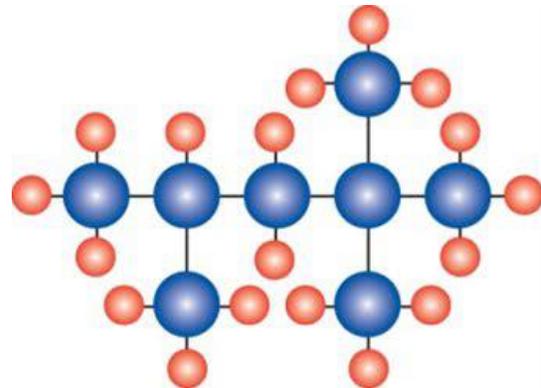
# What is Propane?

- 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



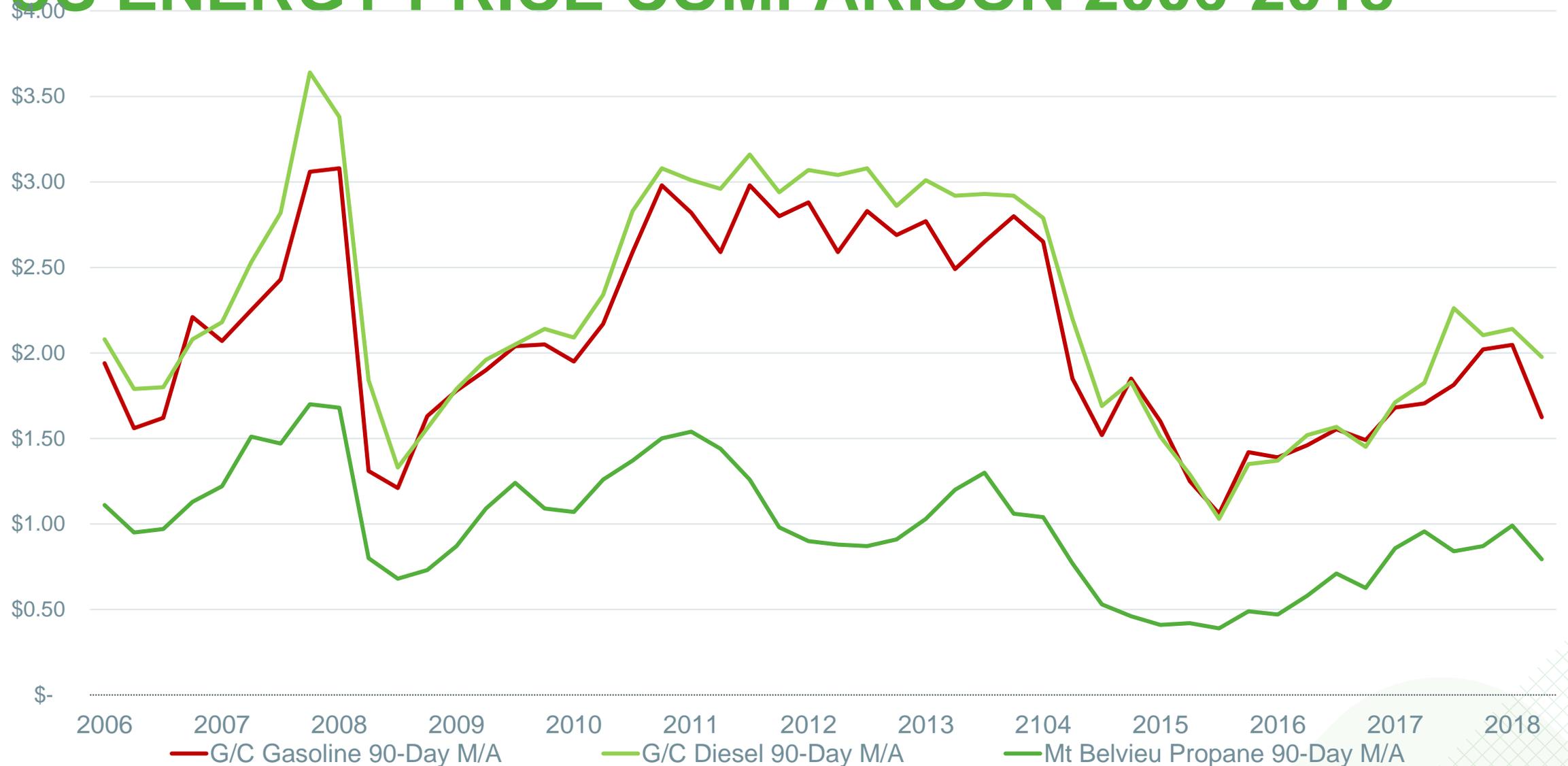
**Propane comes from organic as well as renewable sources.**

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



# Fuel & Maintenance Cost Reductions

# US ENERGY PRICE COMPARISON 2006-2018



Source: EIA.gov

# Today's Propane Autogas

## Average Price Per Gallon for the week of Thursday January 14, 2021

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.



# Reduced Maintenance – None of this with propane

- Propane eliminates the need for DEF and the possibility of putting the wrong fluid in a tank.



# Reduced Maintenance – None of this with propane



# The Future of Diesel:

## THE NEW PHASE II INTEGRATED SYSTEM CONCEPT

### HOW IT WORKS

- The integrated Rotary Turbine Control enables exhaust gases to bypass the turbine stage and enter the Close Coupled Unit after the gas has been injected with urea by the new Cummins UL4 injector.
- When combined with the Single Module™ chassis mounted aftertreatment, the concept integrated system has the potential to improve emissions, particularly for cold start and urban driving operations.



Combining Engineering Expertise to Help Customers Address Future Emissions Control Standards

2010



Figure 1. EPA 2010 aftertreatment system layout.

.2 NOx

2024

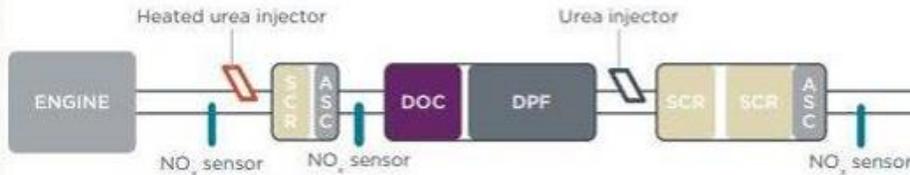


Figure 3. Potential aftertreatment configuration (No. 2) of a CARB 2024 compliant system.

.05 NOx

2027

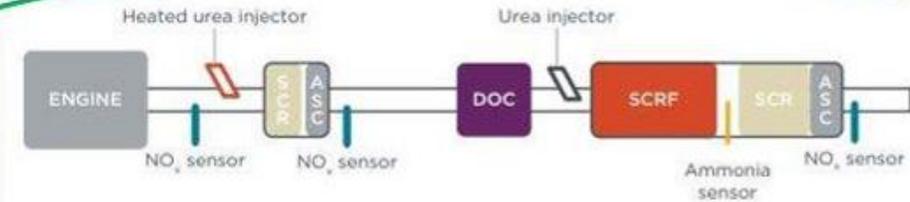


Figure 5. Aftertreatment configuration 2 to meet CARB 2027 standards under FTP and supplemental low-load cycle. Adapted from SwRI (Sharp, 2019).

.02 NOx

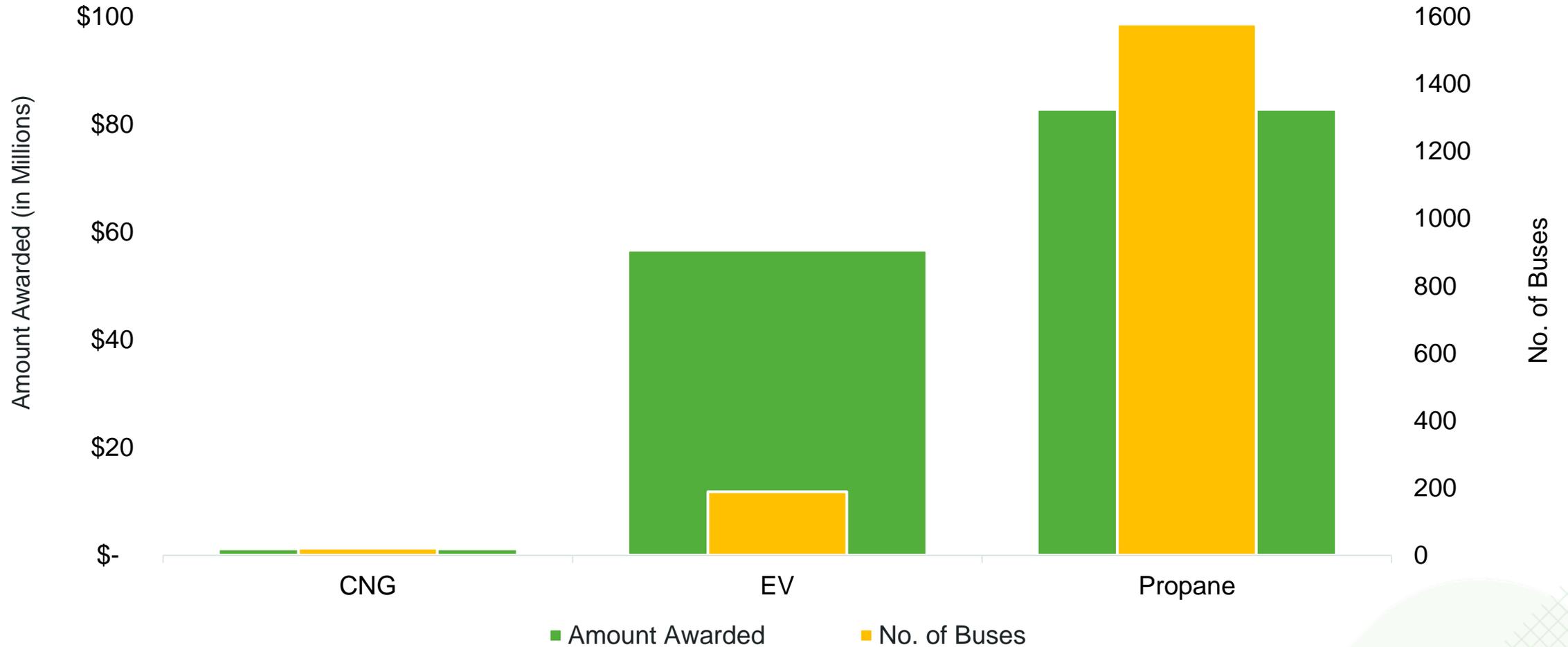
Source: "ESTIMATED COST OF DIESEL EMISSIONS-CONTROL TECHNOLOGY TO MEET FUTURE CALIFORNIA LOW NOX STANDARDS IN 2024 AND 2027"  
<https://theicct.org/sites/default/files/publications/HDV-emissions-compliance-cost-may2020.pdf>

LPG Meets This Today

# Similarly Equipped Type C Bus

Diesel, Cummins, ISB, 6.7L	\$100,000.00
LPG, Ford/Roush, 6.8L	\$106,000.00
CNG, Ford/Roush, 6.8L	\$134,000.00
Electric, Cummins	\$350,000.00

# VW: School Bus Funding & No. of Buses Through July 31, 2021



Source: Propane Education & Research Council



# Autogas Infrastructure

# Fueling Infrastructure – Mobile Refueling



# Temporary Refueling Set-up



# Standard Private Station



# Standard Private Station



# Standard Private Station



# Advanced Private Station



# Advanced Private Station

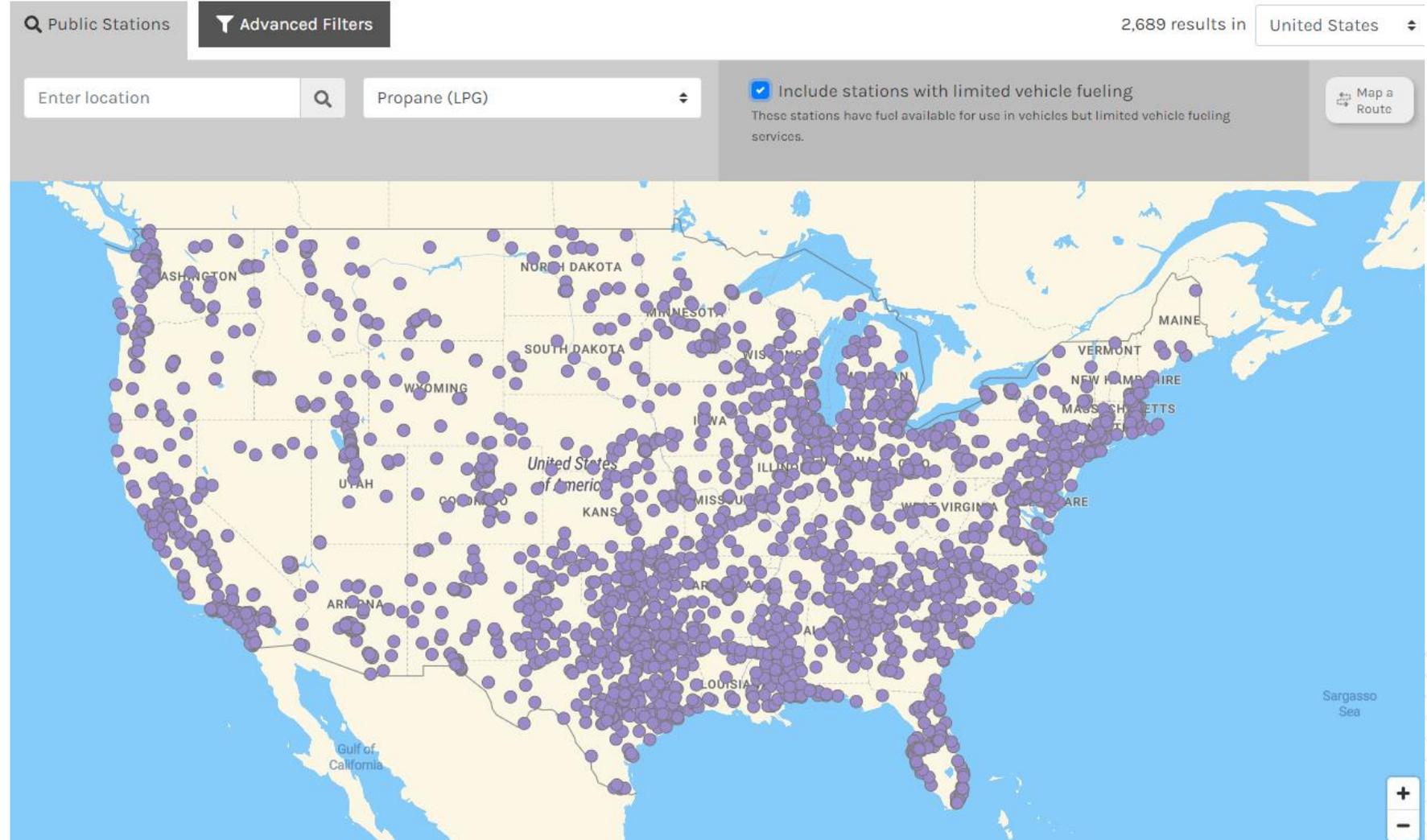
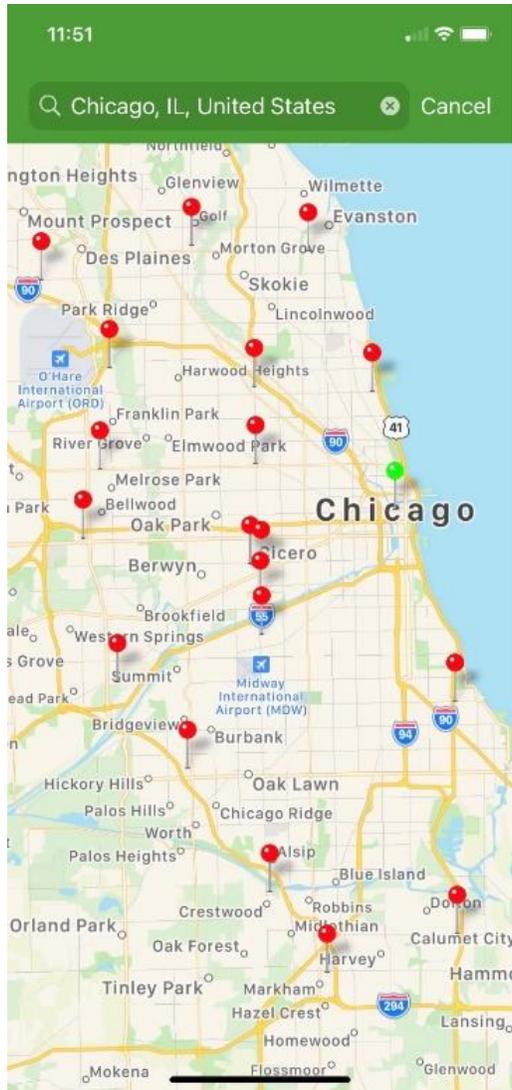




# Fueling Infrastructure Cost for 10 Shuttles

- Propane = \$40k
- CNG = \$200k (ten fixed time fill hoses)
- Electric = \$360k (ten fixed plug in lines)

# Dept of Energy Alt Fuel Station Locator



# Resiliency



# Infrastructure Investment and Jobs Act

*H.R. 3684*

## **New EPA Clean School Bus Program: \$5 Billion**

\$500 million a year for “Clean School Buses” -- powered by: electric, propane, natural gas, hydrogen, and biofuels.

\$500 million a year from 2022-2026 for “Zero Emission School Buses.”

Competitive grants, rebates, and contracts.

EPA may prioritize buses that serve lower income school districts, *rural* areas, and Tribes.

Eligible recipients:

- Local or state government entities responsible for providing school bus service or purchasing buses;
- For-profit or Non-profit Contractors that sell Clean School Buses or fueling infrastructure to owners of school buses;
- Non-profit school transportation associations
- Indian Tribes

EPA developing a grant outreach plan by March.

RFP likely in spring/early summer.

# Infrastructure Investment and Jobs Act

*H.R. 3684*

## **New EPA Clean School Bus Program: Key Criteria**

Lowest overall cost of bus replacement

Local conditions – e.g., length of bus routes, weather conditions

Technologies that most reduce emissions

Whether funds will bring new technologies to scale or promote cost parity between old technology and new technology

<https://propane.com/for-my-business/school-transportation/>





# STEVE WHALEY

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# Wa-Nee Community Schools Propane School Buses



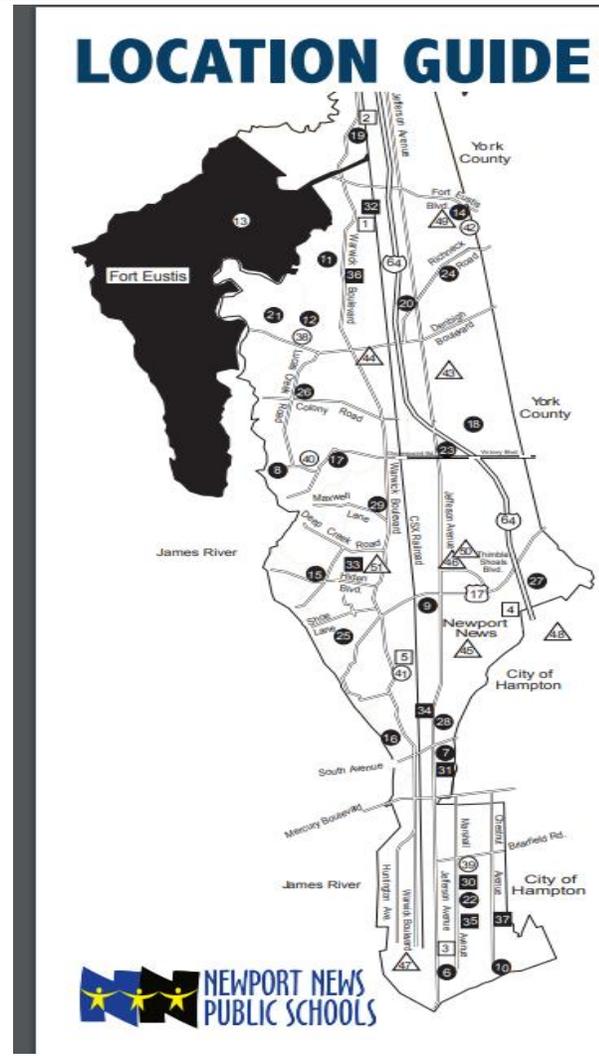
Fleet size: 55 vehicles

- 11 Blue Bird propane powered buses
- 4 new propane buses purchased annually



# NNPS Profile

- ❖ NNPS educates approximately 28,680 students
  - ❖ 5 early childhood centers
  - ❖ 24 elementary schools
  - ❖ 7 middle schools
  - ❖ 5 high schools
  - ❖ 1 middle/high combination school
  - ❖ 9 program sites
  
- ❖ District is 69.2 square miles / two major roads
  
- ❖ NNPS Transportation Department
  - ❖ Transports about 24,000 students
  - ❖ 340 Bus Drivers/95 Bus Assistants
  - ❖ 340 buses
    - ❖ 240 diesel
    - ❖ 100 propane (25 more to be delivered over the next month)





# Fueling at NNPS



**Skid Mounted 2K Tanker**

- ❖ Over \$790K in federal and state grants for propane buses
- ❖ Over \$200K in fuel usage credit



**18K Tanker**



# Fueling at NNPS





— CYPRESS-FAIRBANKS ISD —  
**TRANSPORTATION**

**2021-2022 Update**



# Student Ridership

- Largest student transporter in Texas
- 3<sup>rd</sup> largest school bus fleet in Texas
- 13<sup>th</sup> largest student transporter in nation
- 26<sup>th</sup> largest fleet in nation
- 85,000 students transported daily
- Over 150 CFISD employee children shuttled daily
- Over 150,000 student identification badges printed annually.





# Fleet and Facility Facts



- 5 transportation centers (#6 under construction)
- Over 725 buses used daily for routes
- 1,210 school buses
- 81 MPV's (multi-passenger vehicles)
- 12 high school band trailers
- Over 600 white fleet and police vehicles
- 336 propane-powered school buses
- Oldest route bus is a 2016 model
- Two body shops and paint booths (Falcon and Westgreen)



# Routing and Operations Facts

- Nearly 70,000 school bus stops made daily
- Over 17,000 field trips annually
- Over 9,700,000 miles driven annually
- Over 40,000 miles driven daily





Thank you!



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