

# DFW Clean Cities Clean Vehicle Vendor Expo

North Central Texas Council of Governments | 8.6.2024



# Thank You to Our Dallas-Fort Worth Clean Cities Sponsor



Interested in Sponsoring DFWCC? Visit  
<https://www.dfwcleancities.org/sponsorships!>

# Who We Are

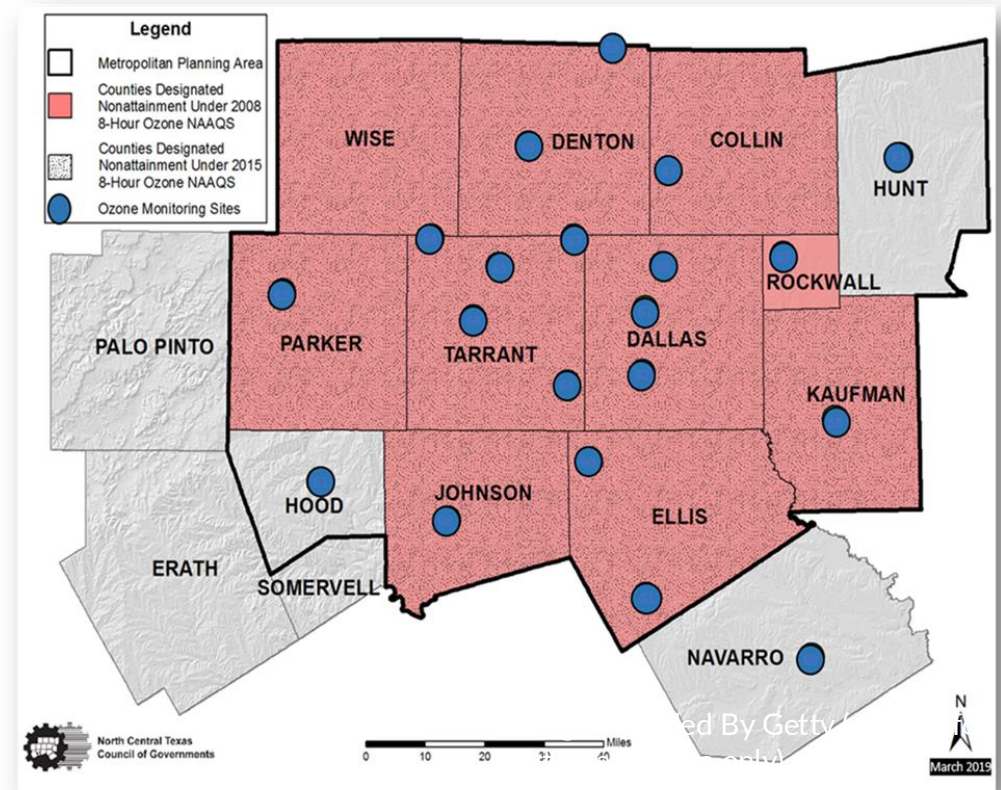
Regional Planning Agency



Metropolitan Planning Organization (MPO)



Department of Energy-Designated Clean Cities Coalition



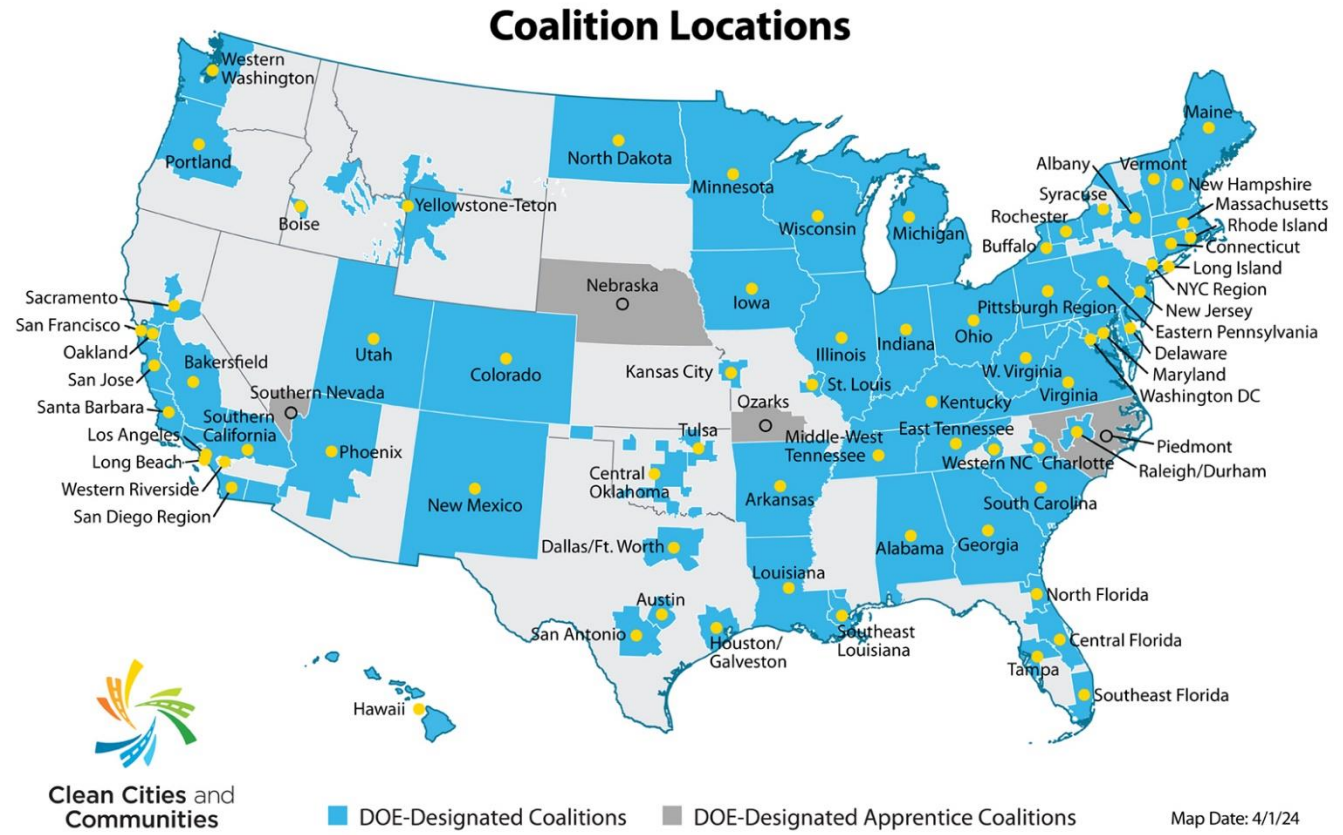


# National Network of Clean Cities Coalitions

More than 85 Clean Cities coalitions with thousands of stakeholders, representing ~90% of US population

Designated by the Department of Energy

Working locally to advance affordable, domestic transportation fuels, energy-efficient mobility systems, and other fuel-saving technologies and practices





# Clean Cities Technology Portfolio



Light-Medium-,  
and Heavy-Duty  
Vehicles



Alternative and  
Renewable  
Fuels and  
Infrastructure



Idle Reduction  
Measures and  
Fuel Economy  
Improvements



New Mobility  
Choices and  
Emerging  
Transportation  
Technologies

# What We Do

## Funding Support



Administer Funding

Assist with Navigating Programs and Developing Grant Applications

## Technical Assistance



Maintain and Analyze Data

Hold Webinars, Workshops, Peer Exchange

Develop Best Practices and Template Resources

## Planning the Future



Alternative Fuel Corridors

Texas EV Charging Plan

ZEV Infrastructure

Organic Waste to RNG Feasibility Study

## Raising Awareness



Facilitating Relationships

National Drive Electric Week

Fleet Recognition

Success Stories and Community Events

The image shows the interior of a bus, viewed from the back of the vehicle looking towards the front. The bus is empty. Yellow handrails are visible on both sides, and blue seats with a patterned fabric are arranged in rows. The lighting is bright, suggesting daylight. The text "First Up..." is overlaid in the center of the image.

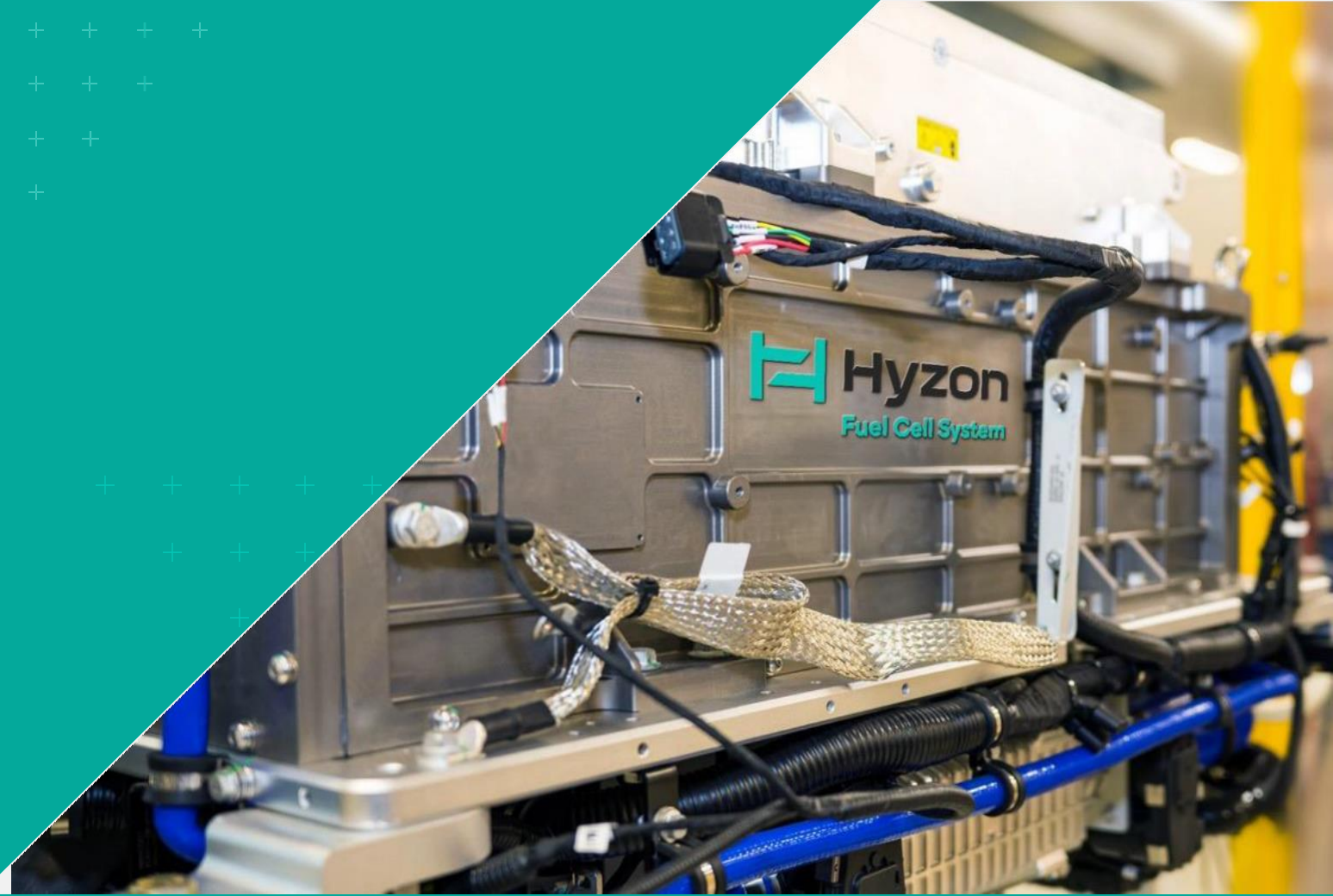
**First Up...**





# Growing the Fuel Cell Advantage: Hyzon Overview

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Hyzon

A close-up photograph of the Hyzon logo on a dark-colored handle or component of the fuel cell system.

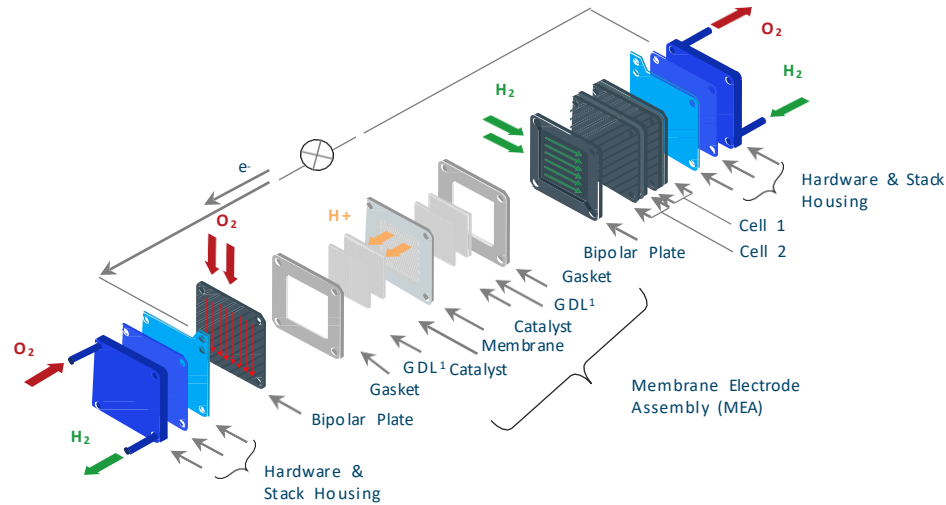
# Fuel Cell System's Key Elements: Stack And Balance Of Plant

Fuel cell components

Fuel cell stack



Fuel cell system module



## Fuel cell balance of plant (BoP)

### Hydrogen loop



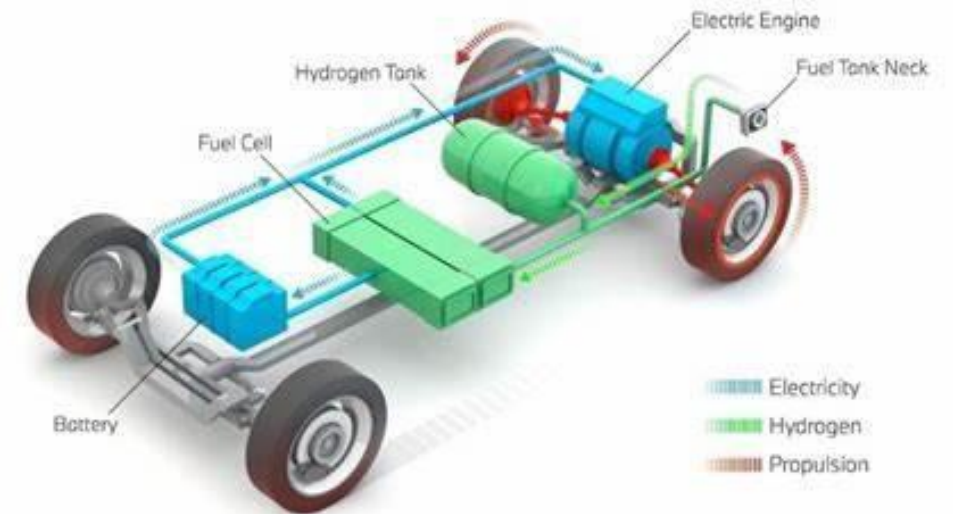
### Cathode loop



### Coolant loop



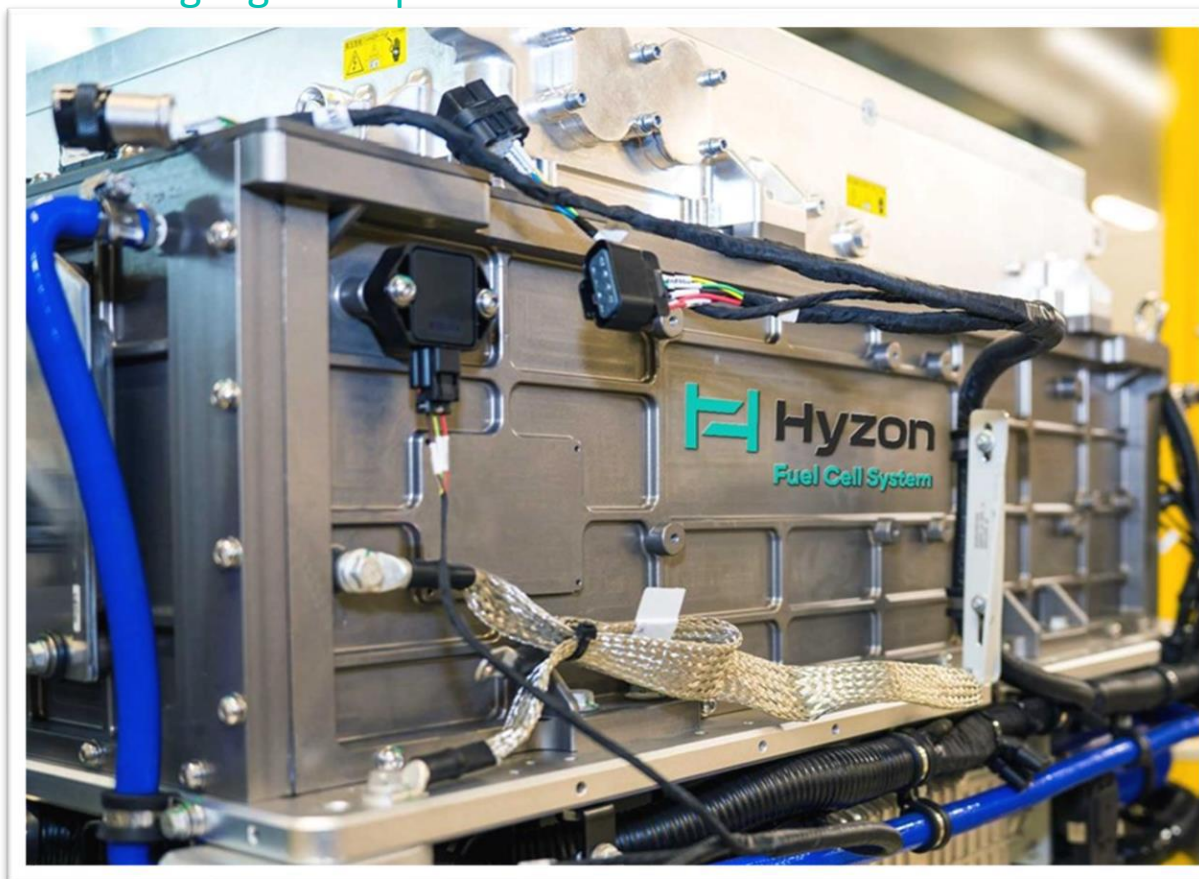
### Sensors, system controller & peripherals



1. Includes eDrive and power electronics  
Source: Hyzon management presentation, interviews

# Hyzon's Technology Advantages is Based on Proprietary Fuel Cell IP

Leveraging IP to produce and commercialize 200kW FC systems



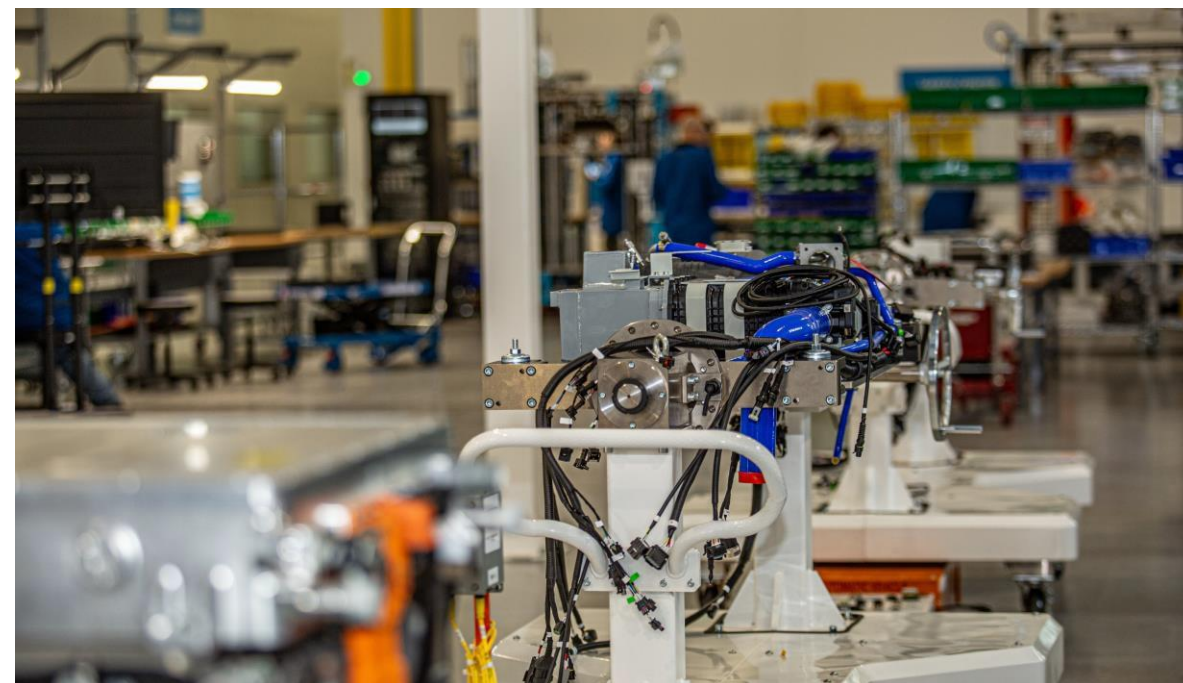
Category	# of patents	Significant areas
Membrane Electrode Assembly (MEA)	25	Covers, electrode design, membrane catalyst, gas diffusion layer
Bipolar Plate (BPP)	16	Flow field design, durability improvement
Unit Cell	15	Sealing, bonding
FC Stack	6	Stack design, assembly
Balance of Plant (BOP)	35	Humidifier, sensors, system controllers and peripherals
Fuel Cell System	23	Anode, cathode and coolant loops, Modular boost converter
Other	37	Hydrogen storage, vehicle and battery (incl. SOC management)
<b>Total</b>	<b>157</b>	

Note: These are exclusively utilized by Hyzon Motors in mobility in Hyzon's core markets of North America, Europe and Australia / New Zealand. Numbers include patents applied, including those awarded or pending.



# U.S. Fuel Cell Manufacturing - Hyzon's Proprietary Fuel Cell

Bolingbrook, IL facility on track for 2024 Start of Production (SoP)



**Membrane Electrode Assembly (MEA) production line commissioned and in production**

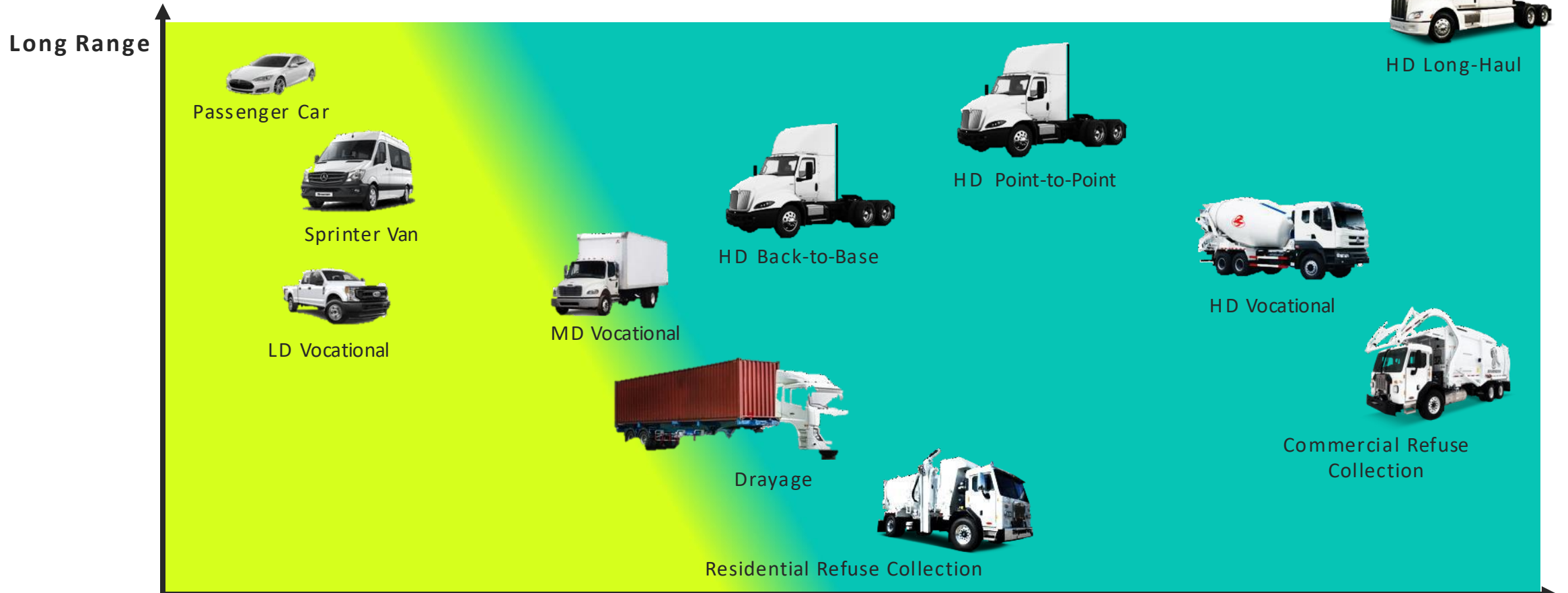


**200kW fuel cell system SoP and projected 700+ FCS initial annual capacity<sup>1</sup>**

1. Assumes three shifts.

# FCEVs Favored in more Applications than Expected

Projected Zero Emission Vehicle (ZEV) Conversion - 2024



 Battery Electric Vehicle (BEV) Advantaged

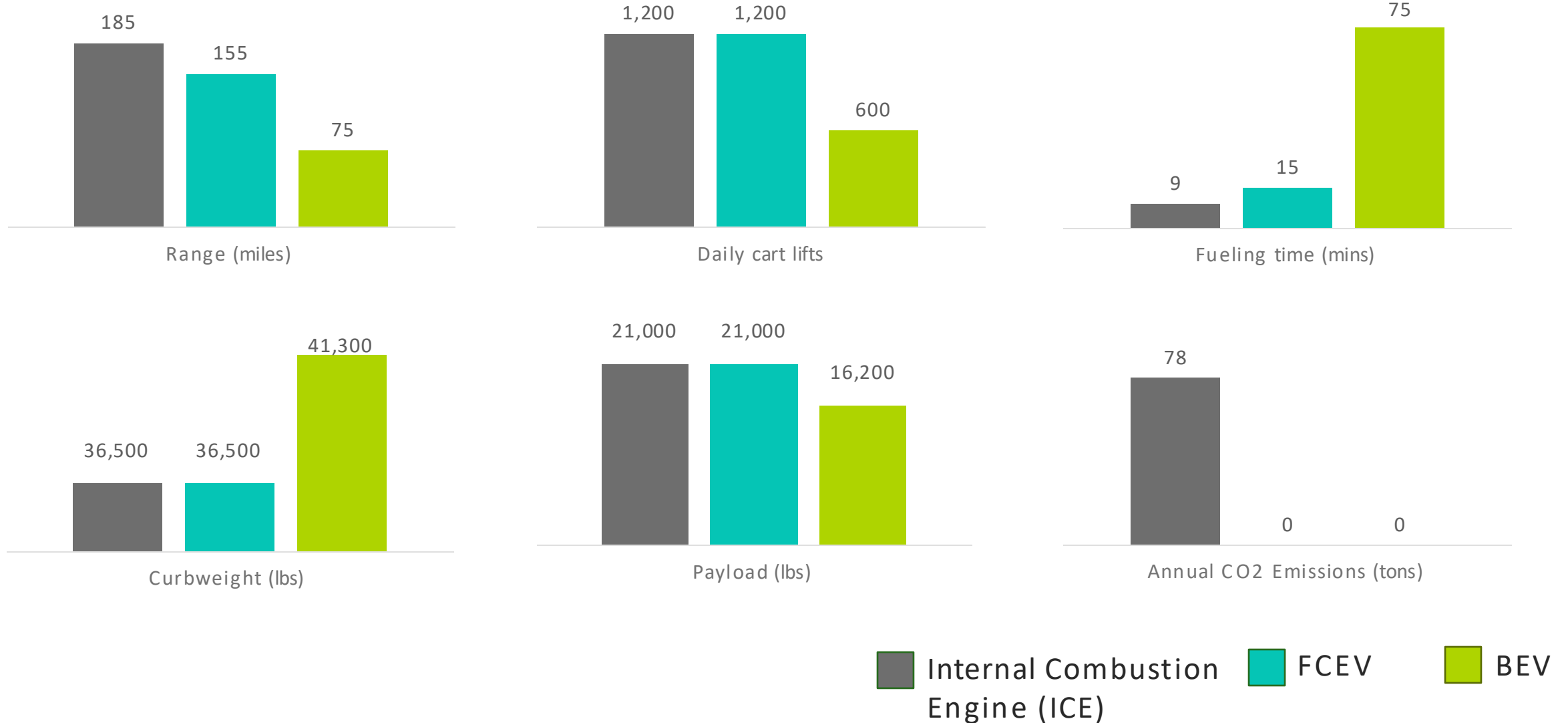
 Fuel Cell Electric Vehicle (FCEV) Advantaged







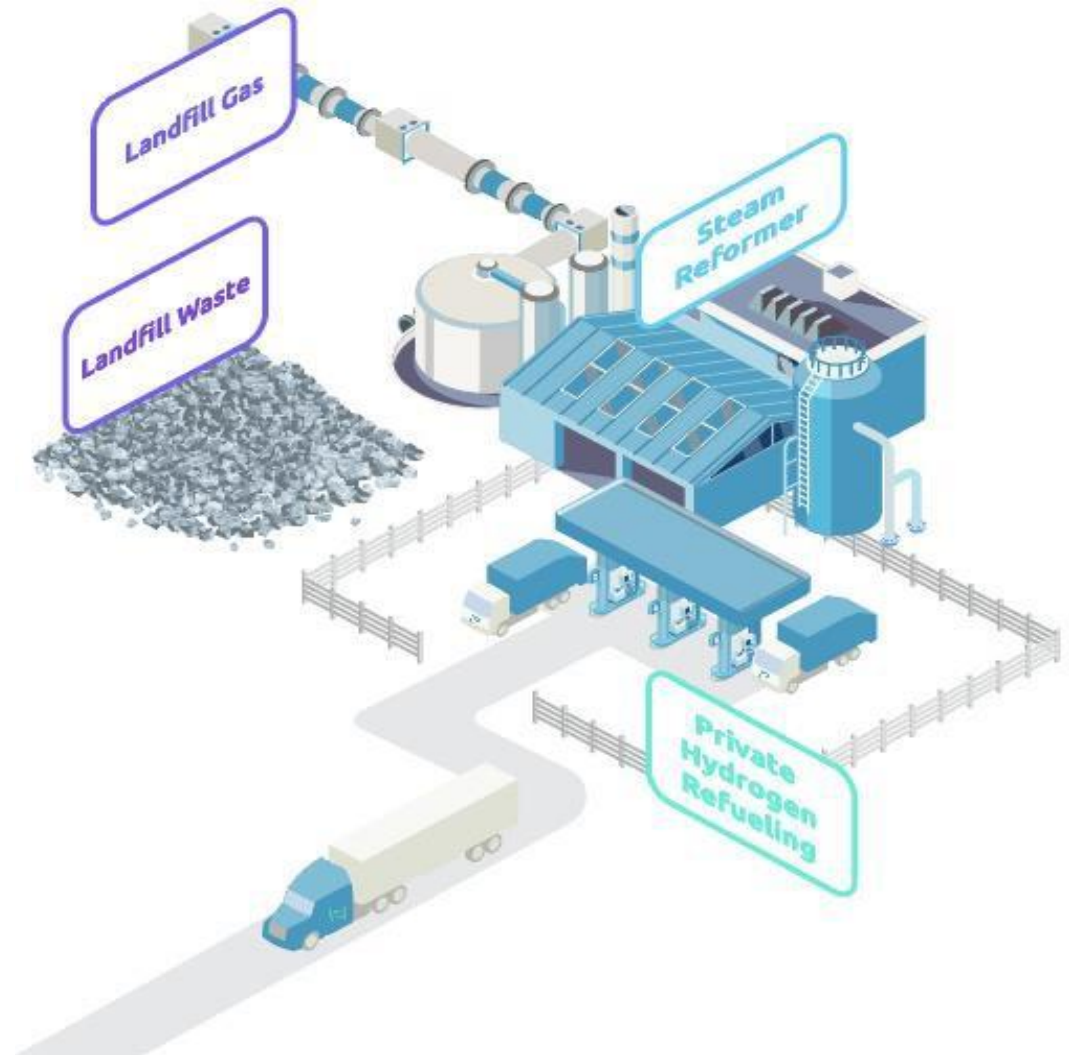
# Hyzon Refuse Trucks Operate on par with ICE, outperforming BEVs



# Incentives Aligned throughout Hydrogen Ecosystem Players



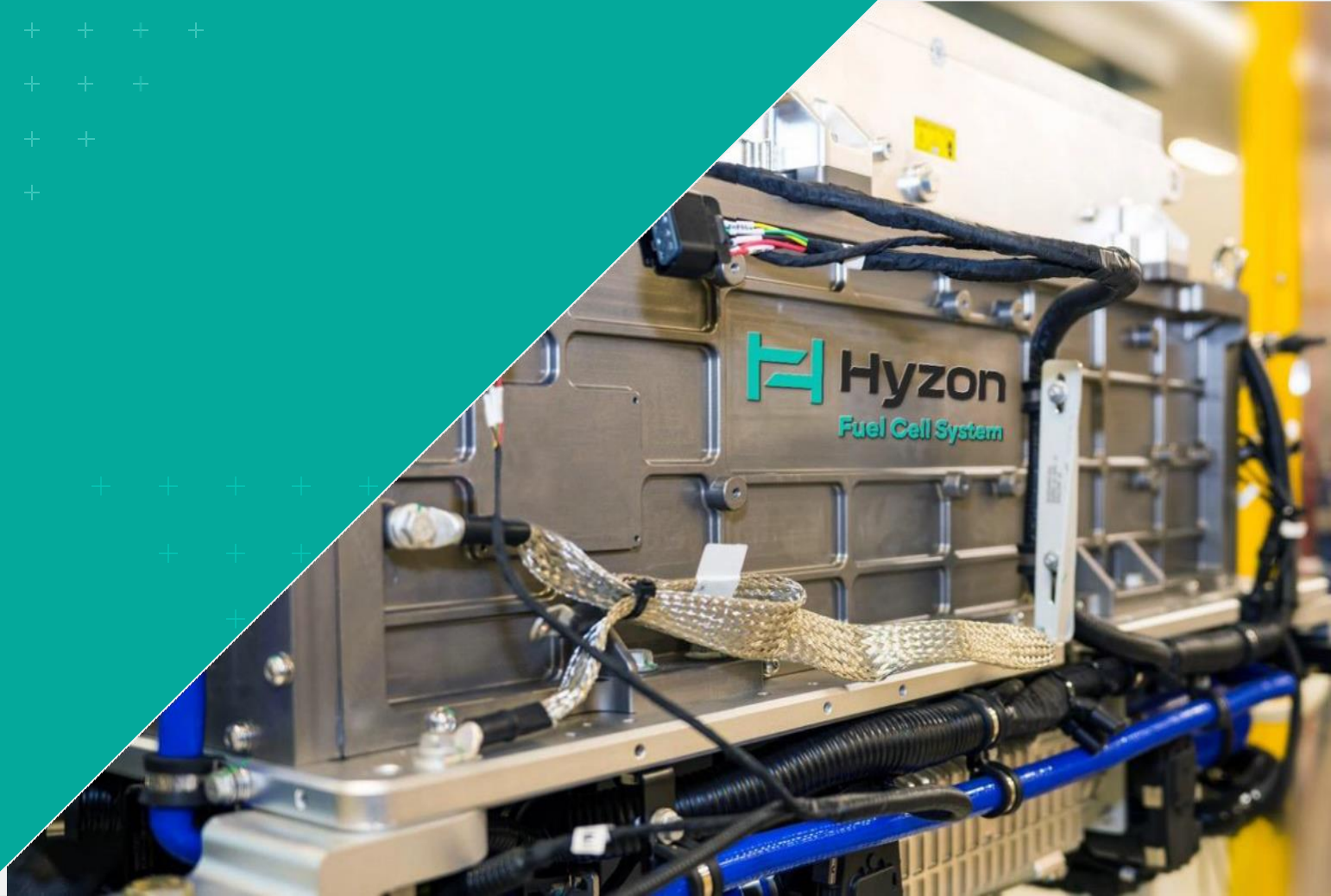
Refuse fleets already have experience producing onsite fuel, enabling a circular economy.





Thank You

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Cory Shumaker  
Head of Business Development – Americas  
[cory.shumaker@hyzonfuelcell.com](mailto:cory.shumaker@hyzonfuelcell.com)



The image shows the interior of a bus, viewed from the back of the vehicle looking forward. The bus is empty. There are rows of blue seats with a patterned fabric. Yellow handrails and vertical poles are visible throughout the cabin. The lighting is bright, suggesting daylight coming through the windows. The text "Next Up..." is centered in the middle of the image in a dark blue, bold font.

**Next Up...**



EVEEO

CUTTING-EDGE SOLUTIONS FOR THE EV INDUSTRY



**EVEEO SERVICES**



**INFRASTRUCTURE SUPPORT**



**CHARGING**



**EV MALFUNCTIONS**





EVEEO

CURRENT STATE OF THE INDUSTRY

## INFRASTRUCTURE SUPPORT



- ❗ Electricity Demand
- ❗ Too Much Too Fast
- ❗ Lack of Expertise



CURRENT STATE OF THE INDUSTRY

## CHARGING STATIONS



- ❗ Reliability
- ❗ Poor/Cheap Design & Materials
- ❗ Installation Not Done Properly



EV EEO

CURRENT STATE OF THE INDUSTRY

## EV MALFUNCTIONS



- ❗ Complex Software
- ❗ Inclement Weather
- ❗ Lack of Troubleshooting





## EVEEO WHY WORK WITH US?



**EXPERTISE &  
EXPERIENCE**



**COMPREHENSIVE  
SUPPORT**



**CUSTOMER-CENTRIC  
APPROACH**



EVEEO

SOLUTIONS TO INDUSTRY PROBLEMS

## INFRASTRUCTURE SUPPORT



- ✓ Overall system evaluation & implementation
- ✓ Integration of diesel/gas vehicles into the grid
- ✓ Comprehensive Support



EVEEO

SOLUTIONS TO INDUSTRY PROBLEMS

## CHARGING STATIONS



✓ Diagnostics

✓ Procurement

✓ Systematic Correction





EVEEO

SOLUTIONS TO INDUSTRY PROBLEMS

## EV MALFUNCTIONS



- ✓ Fleet Evaluation
- ✓ Procurement
- ✓ Tailored Solutions



# THANK YOU! OUR INFO...

EMAIL

[INFO@EVEEO.CO](mailto:INFO@EVEEO.CO)

PHONE

281-940-5024

WEBSITE

[EVEEO.CO](http://EVEEO.CO)

REGION

DFW

The image shows the interior of a bus, viewed from the back of the vehicle looking forward. The seats are blue with a colorful pattern. Yellow handrails are visible along the sides of the bus. The text "Next Up..." is centered in the middle of the image.

**Next Up...**



# **D&M** **LEASING**

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Government & Commercial  
**Fleet Services**

The image shows the interior of a bus, viewed from the back of the vehicle looking forward. The seats are blue with a colorful pattern. Yellow handrails are visible along the sides of the bus. The text "Next Up..." is centered in the middle of the image.

**Next Up...**

# ROMCO's Electric Equipment Overview

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Derrick Edmonds





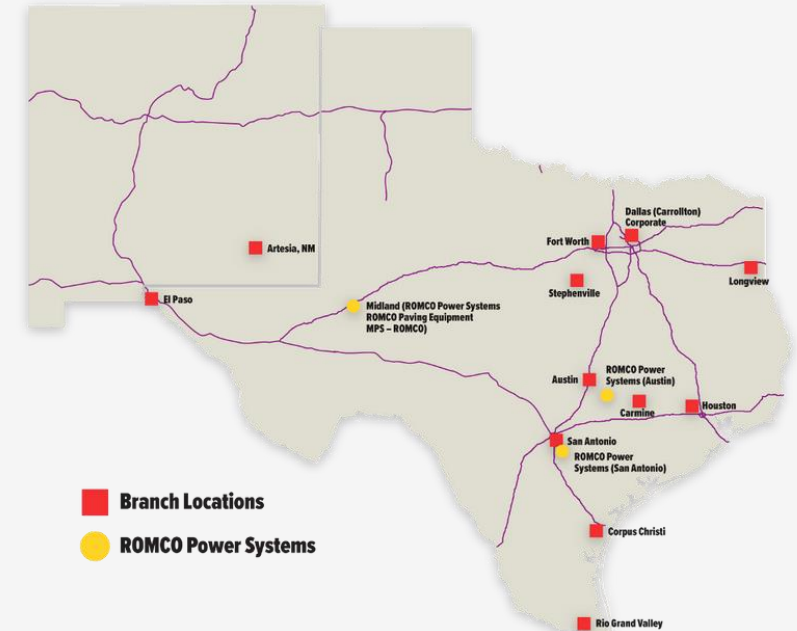
# ROMCO Equipment


a SMT Company

**-63 Years of excellence, stability,  
innovation and professionalism**

**-15 branches in Texas and New Mexico**

**-4 divisions (ROMCO Equipment Co,  
ROMCO Paving, ROMCO Power Systems,  
and Material Processing Systems)**



**Charge  
Forward  
with  
Electric** 

**LeeBoy**



**V O L V O**

# Electrification

## Benefits

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### Comfort

- Zero emissions
- Low noise levels
- Less vibrations

### Power

- These machines perform on par with, and in some cases exceed the diesel equivalent.

### Project Diversity

- Low Carbon
- Indoors
- Nighttime



# Flexible Charging Solutions

## Charging Solutions

### Compact Construction Equipment 48V



Volvo EV  
Portable Charger



Benning  
DC Fast Charger



VOLVO PU130  
Mobile Charger



Portable Electric  
Voltstack 30k



BEAM Global  
EV ARC 2020



DANNAR Mobile  
Power Station



AirBurners BioCharger

### Large Construction Equipment 600V



Heliox Mobile 50kW



Kempower  
Movable Charger 50kW



ABB Terra 184



InCharge ICE-180



Volvo PU750

## Chargers

- Wall Mounted
- Portable
- Long-term Stationary – Beam Solar Array

# Atlas Copco

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**E-Air H185 Portable Compressor**



**480V Energy Storage System**



# LeeBoy

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**8520C Electric Paver**



**RB50 Electric Broom**

**LeeBoy**



# Shuttlewago

Electric Rail Car movers – 9  
Track and modeler tire units  
Towing capabilities 110- 4,500 tons

n



SWXe-5



NVXe



# V O L V O

## Electromobility lineup

-  Fuel Cell Electric
-  ICE with e-fuel
-  Battery Electric

Large

Medium

Compact





# Compact Excavators

ECR18, EC18, & ECR25





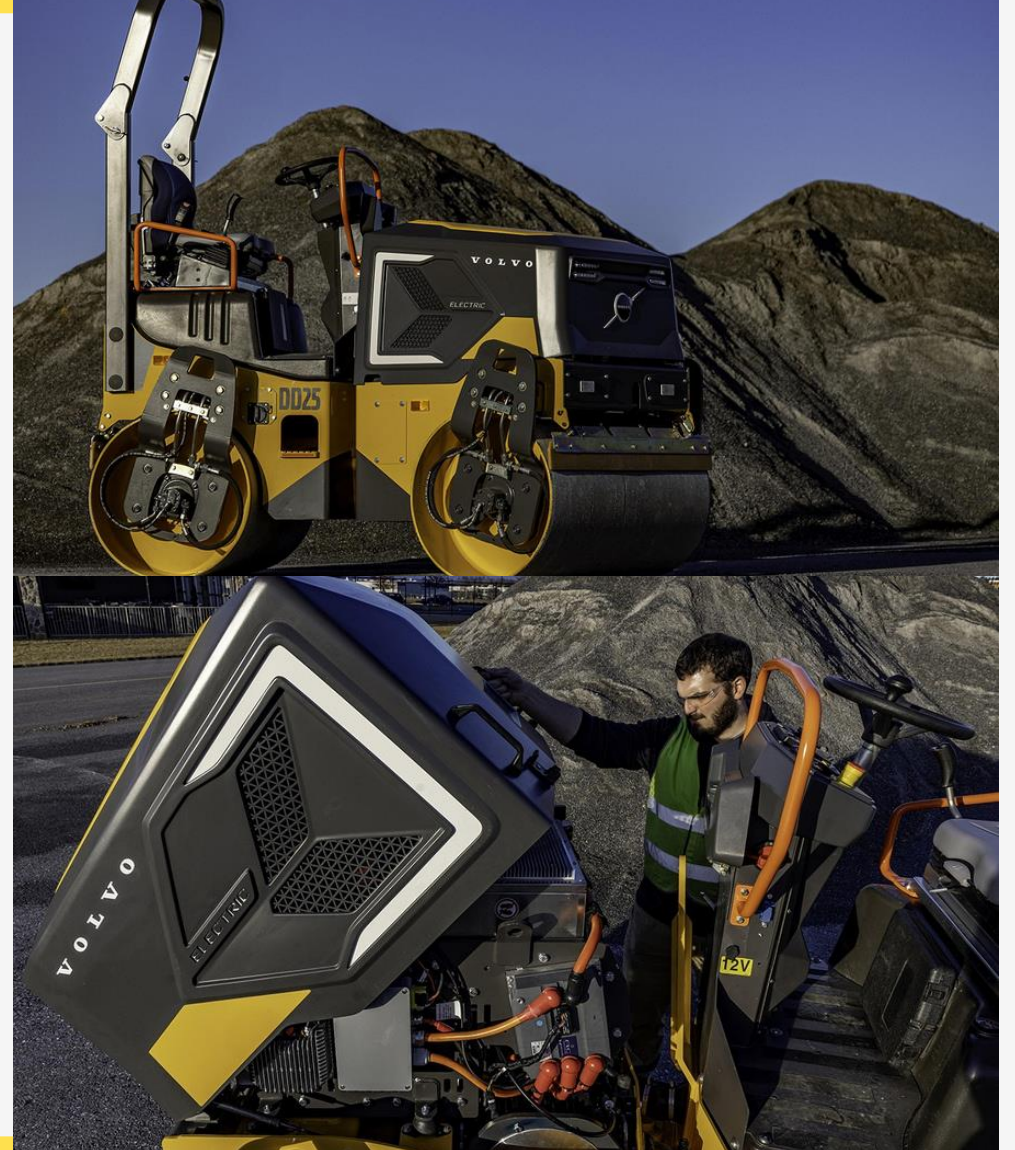
# Compact Wheel Loaders

L20 & L25



# Rollers

**Volvo DD25 Electric Roller**  
**33HP**  
**39"- 47" drum width**





# Midsize Excavator

**Volvo Electric EC230**  
**23-ton weight class**

**8-10 hours runtime in next generation**





**Coming in 2025**  
**Volvo Electric L120**



# For More Information



The image shows the interior of a bus, viewed from the back of the vehicle looking forward. The seats are blue with a patterned fabric. Yellow handrails are visible on both sides of the aisle. The bus is empty, and the lighting is bright, suggesting it is daytime. The text "Next Up..." is centered in the middle of the image.

**Next Up...**





CUSTOMERS DRIVE US





# Peterbilt Natural Gas



X15N 400 – 500HP

X12N 320 – 400HP

L9N 320 HP

B6.7N 220 – 240HP





## 579 EV

- Regional Haul / Drayage
- GCWR: 82,000 lbs.
- Range: 150 Miles
- Power: 670 hp Peak
- Charge Time: 3 Hours
- ePTO Provisions



## 520 EV

- Refuse
- GVWR: 66,000 lbs.
- Range: 100 Miles / 1,100 Bins
- Power: 670 hp Peak
- Charge Time: 3 Hours
- ePTO Provisions



## 220 EV

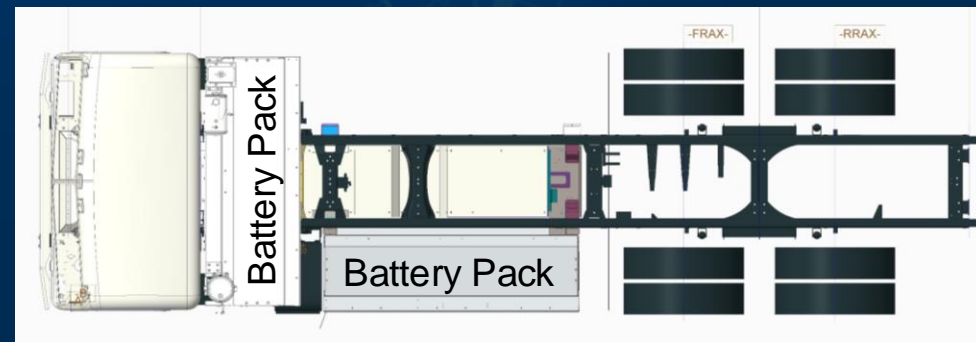
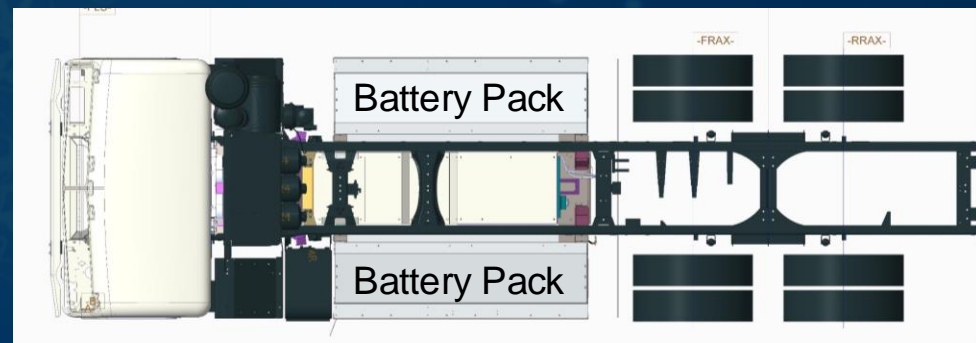
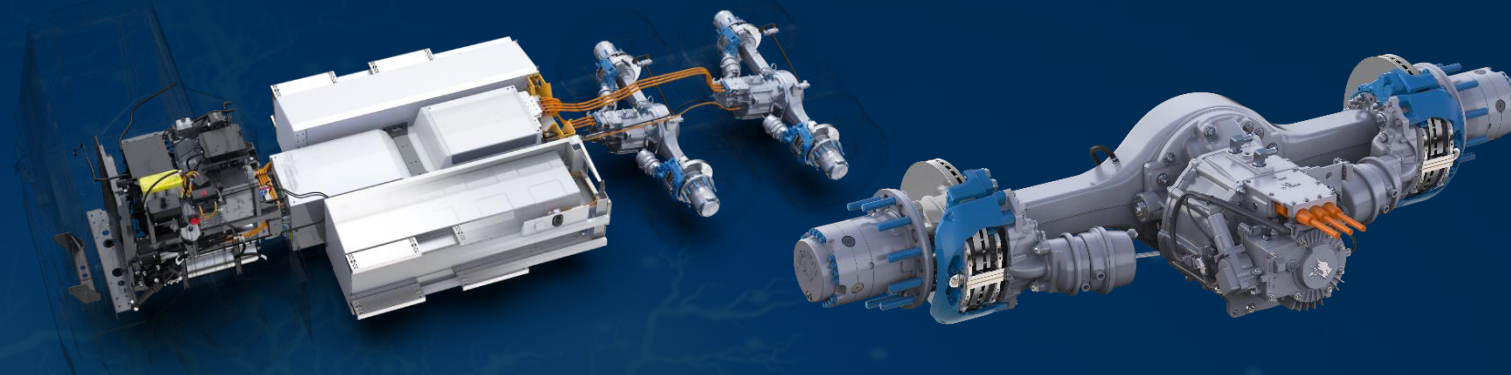
- Dry Van / Reefer
- GVWR: 26,000-33,000 lbs.
- Range: 100-200 Miles
- Power: 355-469 hp Peak
- Charge Time: 1-2.1 Hours



# S20EV Spec Overview



- Powertrain - Meritor eAxle
  - 6x4 - 80,000 # GVW
- Wheel Bases: 200" & 215"
  - ePTO Options Available
  - Front/Rear/Side Loader Configurations
- Power:
  - 400kW (536hp) continuous
  - 500kW (670hp) peak
- Range:
  - 80 – 120 Miles Range / 1,100 Bins / 400 kWh Battery Pack
- Thermally Managed Batteries
- 6,000 - 7,000 lb. Weight Increase
- Charge Time
  - AC Charging: ~18.5 Hours
  - Fast DC Charging: 3.1 Hours



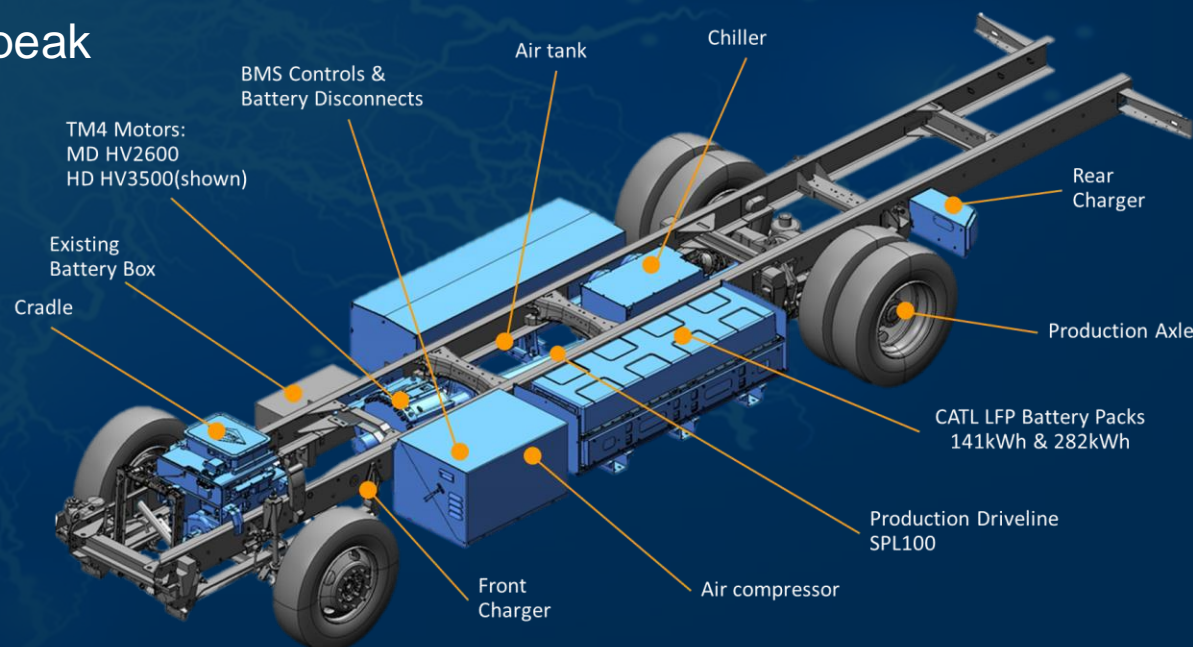
# 220EV Spec Overview



- Powertrain - Dana/TM4 Midship Motor Electric
  - 4X2 - 26,000 Lbs (Class 6)
  - 4X2 - 33,000 Lbs (Class 7)
- Wheel Bases: 206" / 218" / 274"
  - Body Lengths: 24' / 26' / 30'
- Power:
  - Class 6: 154kW (207hp) continuous; 265kW (355hp) peak
  - Class 7: 259kW (347hp) continuous; 372kW (499hp) peak

- Range
  - 100 / 150 / 200 Miles
  - 141 / 209 / 282 kWh Battery Pack
- Thermally Managed Batteries
- 2,000 lb - 4,000 lb Weight Increase

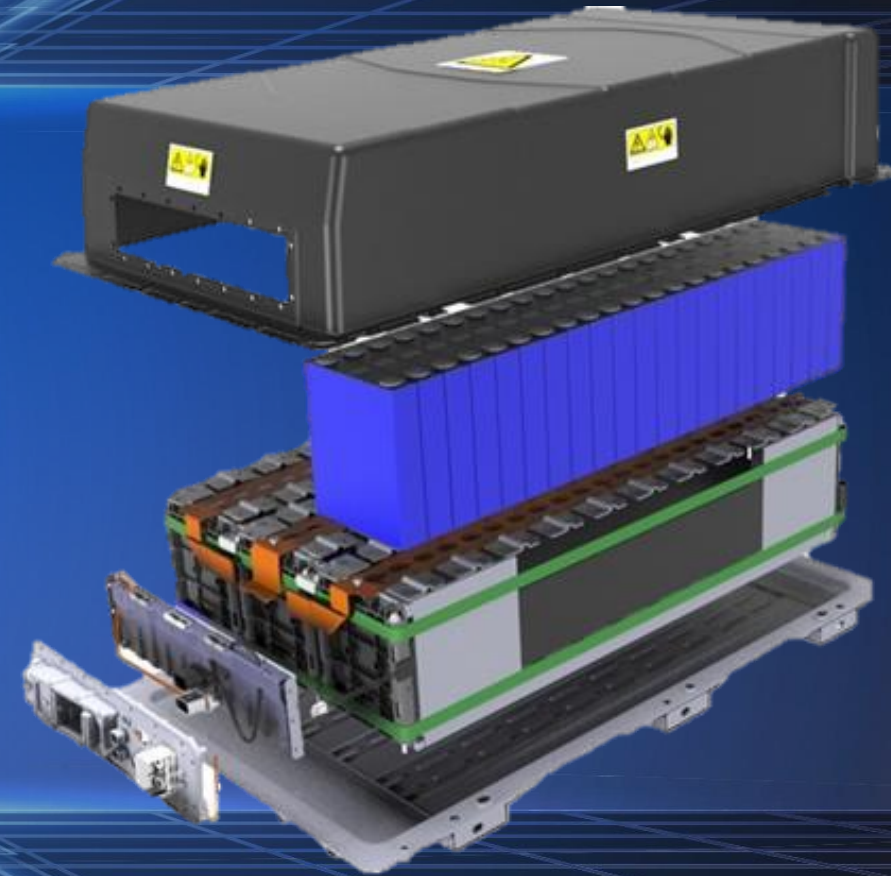
- Charge Time
  - AC Charging: 6.5 - 13 Hours
  - Fast DC Charging: 2 Hours





# Battery Chemistry

Description	Chemical Makeup	Energy / Power	Cycle Life	Temp Sensitivity
LFP	Lithium Iron Phosphate	M Energy H Power	Better (4,000+)	270 C
NMC	Nickel Manganese Cobalt	H Energy H Power	Good (1 – 2k)	210 C
NCA	Nickel Cobalt Aluminum	H Energy M Power	Worse (500 – 1k)	150 C



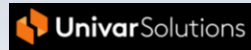


LEADING THE CHARGE

# Leader in EV



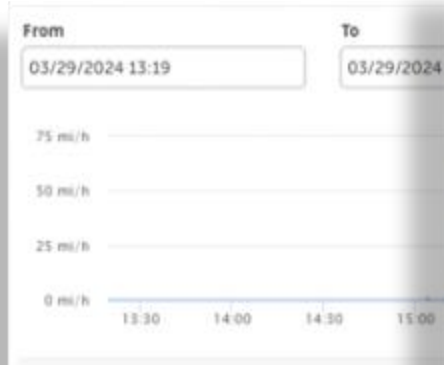
BAE SYSTEMS



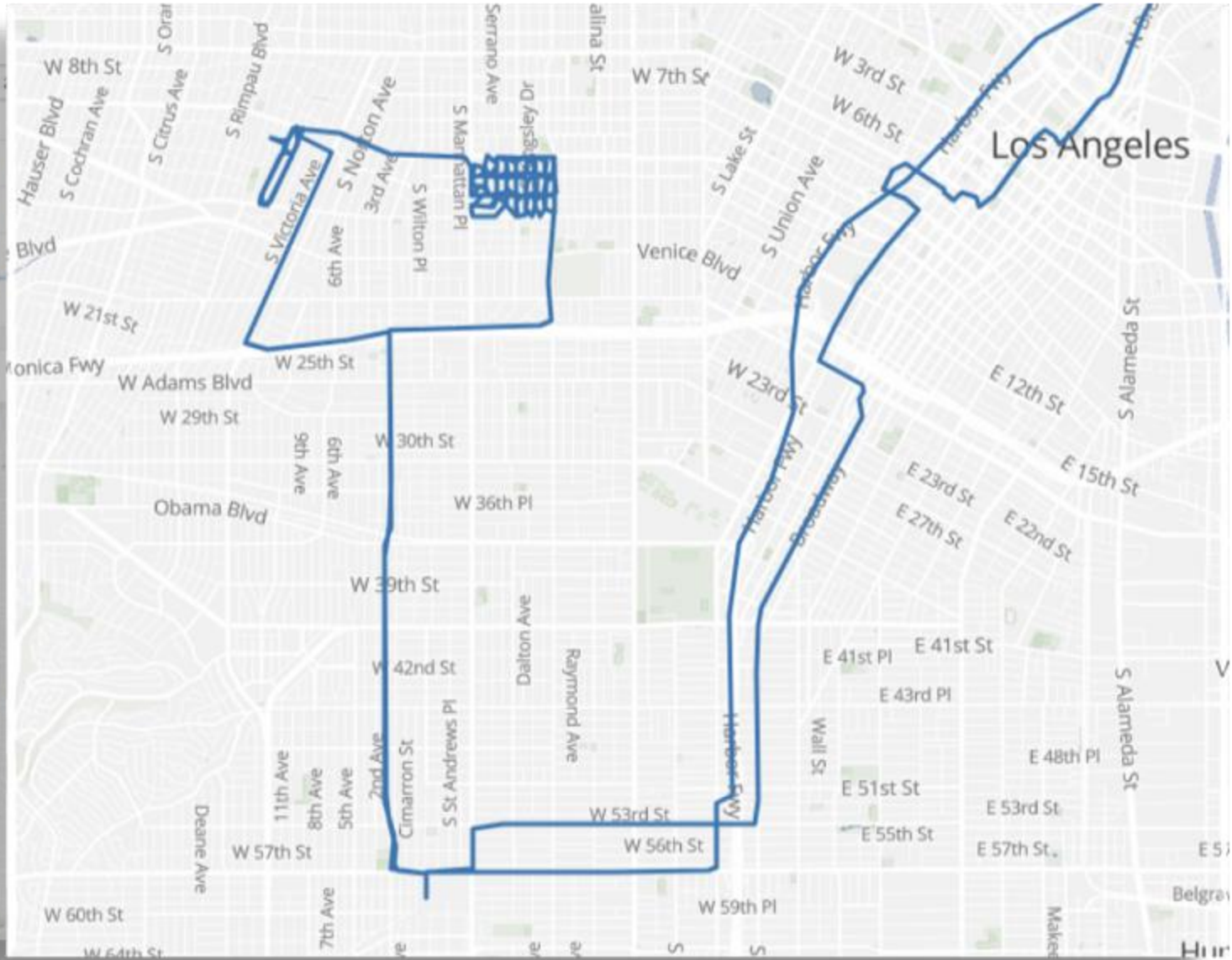
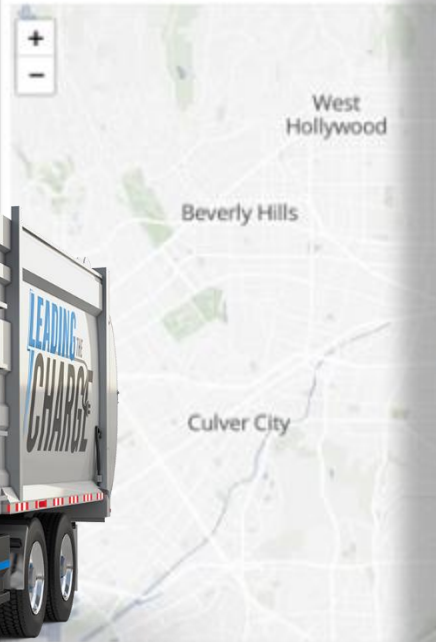
FERGUSON



# Data Analysis Capabilities



## GPS Route log





[Home](#) / [Trucks](#) / [Electric](#) / [520EV](#)

[All](#) [Exterior](#)



## MODEL 520EV

### Specs

<b>Class:</b>	8
<b>GCWR:</b>	66,000 lbs.
<b>Used for:</b>	Right-Hand Side Loader and Rear Loader Refuse Collection
<b>Max Horsepower:</b>	670 hp (500kw)
<b>Front Axle &amp; Suspension:</b>	20,000 - 23,000 lbs.
<b>Rear Axle &amp; Suspension:</b>	46,000 lbs.
<b>Est Daily Range:</b>	80 - 120 Miles Per Charge (1,100 Bin Pickups)
<b>Minimum Charge Time:</b>	3 Hours

[FIND A DEALER](#)[COSTS CALCULATOR](#)[MORE SPECS](#)



# EV Incentives



- Voucher / Rebate Programs
  - California, New Jersey, Texas, Canada
- Scrap Programs
  - Widely Available
- Low Carbon Fuel Source (LCFS)
  - California, Oregon, Washington
- Federal Tax Incentives
  - \$40,000 / truck
  - Up to \$100,000 for charging/infrastructure



# The Whole EV Package

Truck



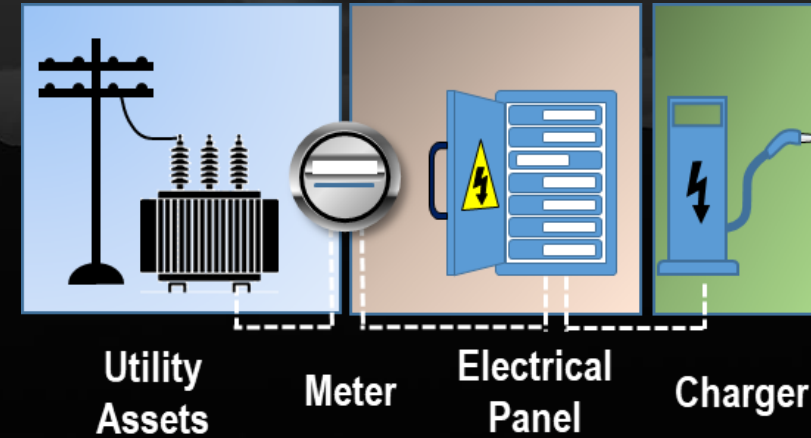
Funding



Charger



Infrastructure



520EV

The background is a vibrant blue digital space. It features a perspective grid of thin white lines that recede towards a bright, glowing horizon line in the center. Overlaid on this grid are numerous semi-transparent, rectangular planes and lines that create a sense of depth and movement, resembling a data stream or a complex network. The overall effect is one of a high-tech, futuristic environment.

QUESTIONS?



The image shows the interior of a bus, looking down the aisle. The seats are blue with a patterned fabric. Yellow handrails and poles are visible. The text "Next Up..." is centered in the middle of the image.

**Next Up...**

# OVER 10 MILLION MILES OF PROOF YOU CAN DECARBONIZE TODAY

Johanna Seminario



**OPTIMUS**  
TECHNOLOGIES

# Why Biogenic Fuel?

- 100% Biogenic Carbon
- Utilizes Existing Infrastructure
- Renewable, Sustainable, & Scalable
- Low Cost
- Safer & More Efficient than ULSD

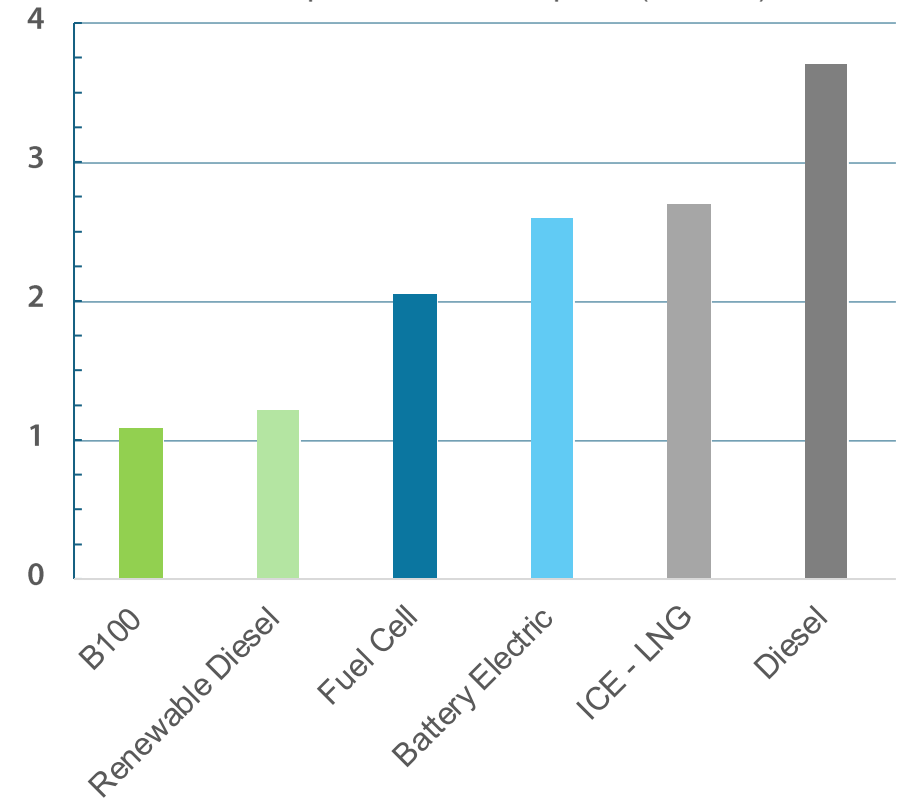




If a class 8 truck powered by 100% biodiesel is replaced with a BEV, the net carbon emissions output would increase by 2.5x.



Total Lifecycle CO2 Emissions:  
Production, Operations and Disposal (MM lbs.)



Source: American Transportation Research Institute (ATRI), May 2022 - [Understanding the CO<sub>2</sub> Impacts of Zero-Emission Trucks](#)

# Fleets can Decarbonize When...



**Cost  
Effective to  
Scale**



**Can't affect  
Fleet  
Uptime**



**Fuel  
Readily  
Available**

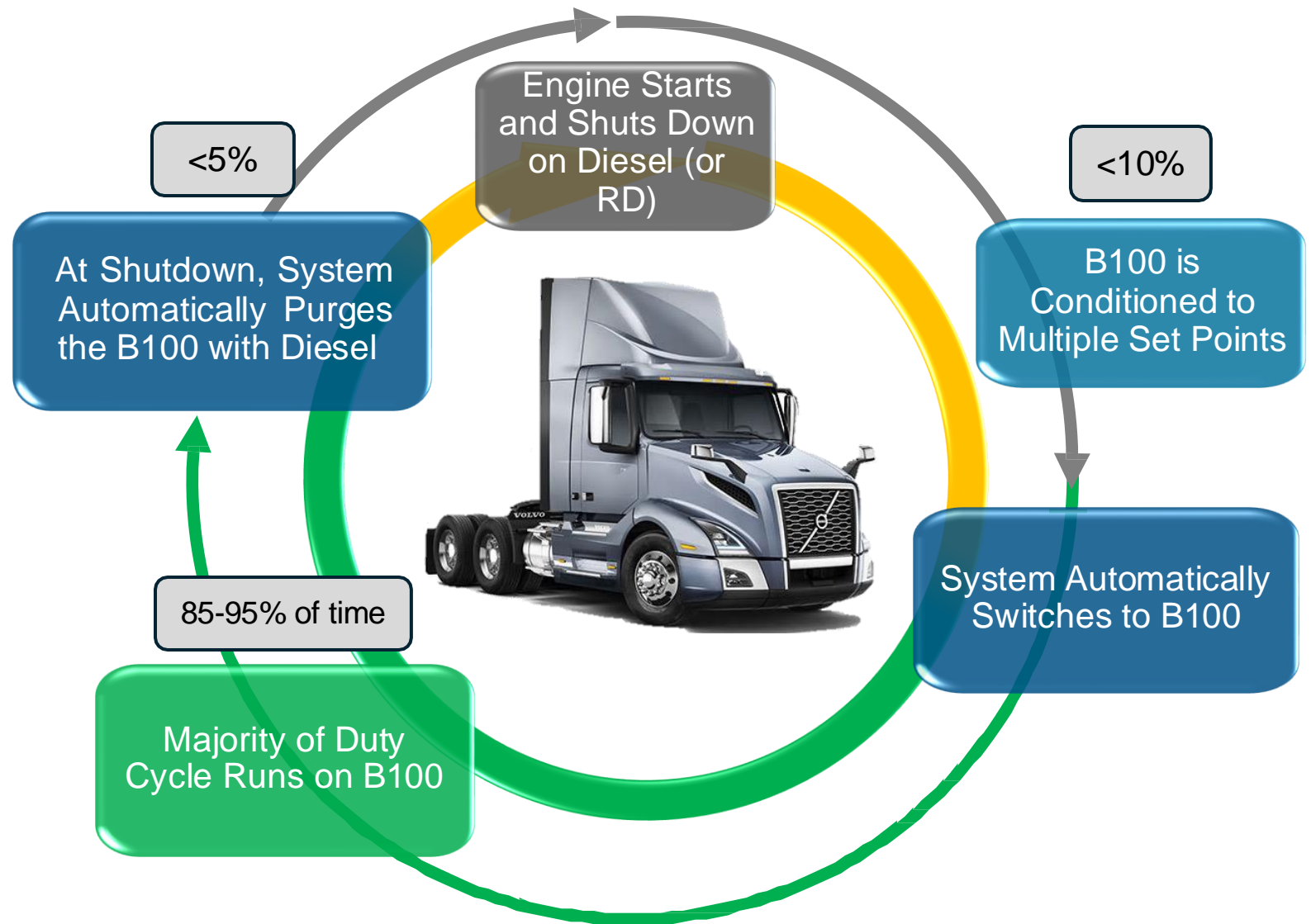


**Data  
Validated**



**Seamless  
Use for  
Operators**

# How Optimus Makes Biogenic Fuel Immediately Viable





# OPTIMUS ECOSYSTEM

RFID Tag



SMARTFuel System



B100 Fuel Dispenser



Vector Manifold & ECU

Fuel Selector Valve

Biodiesel Fuel Tank



Customer Dashboard



# OPTIMUS

T E C H N O L O G I E S

Johanna Seminario  
[j.seminario@optimustec.com](mailto:j.seminario@optimustec.com)  
412.956.3263



Request a copy of our 1.3 mil  
mile study with ADM here



The image shows the interior of a bus, viewed from the back of the vehicle looking forward. The seats are blue with a colorful pattern. Yellow handrails are visible along the top of the bus. The text "Next Up..." is centered in the middle of the image.

**Next Up...**



# Tax Credits and Elective Pay

## Electric Vehicle (EV) and Fuel Cell Electric Vehicle (FCEV) Tax Credit

 Purchase or lease light-duty EVs, Plug-In Hybrids, or Fuel Cell Electric Vehicles

 Up to \$2,500

 No Deadline

## Commercial Electric Vehicle (EV) and Fuel Cell Electric Vehicle (FCEV) Tax Credit

 Purchase or lease light-duty EVs, Plug-In Hybrids, or Fuel Cell Electric Vehicles

 \$7,500 for <14,000 lbs GVWR and \$40,000 for >14,000 lbs GVWR

 No Deadline

Tax exempt entities can still claim these tax credits through elective pay, also known as direct pay, through the IRS. For more information on Elective Pay and Eligibility, see <https://www.irs.gov/credits-deductions/elective-pay-and-transferability>

# Texas Emissions Reduction Plan (TERP)

[Light-Duty Motor Vehicle Purchase or Lease Incentive Program](#) - Expected to open Spring 2026

[New Technology Implementation Grant \(NTIG\)](#) - Expected to open October 2024

[Alternative Fueling Facilities Program \(AFFP\)](#) - Expected to open Spring 2026

[Texas Clean Fleet Program \(TCFP\)](#) - Expected to open January 2025

[Seaport and Rail Yard Areas Emissions Reduction Program \(SPRY\)](#) - Open through March 4, 2025

[Texas Clean School Bus Program \(TCSB\)](#) - Open through October 14, 2024

[Texas Natural Gas Vehicle Grant Program \(TNGVGP\)](#) - Expected to open September 2024

[Emissions Reduction Incentive Grants \(ERIG\)](#) - Open Now; Accepting Applications through October 29

[Governmental Alternative Fuel Fleet Grant Program \(GAFF\)](#) - Expected to open December 2024

[Rebate Grants](#) - Recently Closed



# Emissions Reduction Incentive Grant (ERIG) Program

**Eligible Applicants:** Individuals, state and local governments, corporations, or any other legal entity

**Eligible Activities:** Scrap/replace high-emitting heavy-duty vehicles or equipment

- ❖ Select non-road equipment
- ❖ Stationary equipment
- ❖ Marine vessels
- ❖ Locomotives

**Funding Amount:** Up to 80%, capped based on cost per ton (CPT)

**Open Now:** Accepting applications through October 29, 2024

<https://www.tceq.texas.gov/airquality/terp/erig.html>





# Governmental Alternative Fuel Fleet (GAFF) Grant Program

**Eligible Applicants:** State agencies, counties, municipalities, school districts, junior college districts, river authorities, water or other special districts, or other political subdivisions that operate a fleet of more than 15 motor vehicles.

**Eligible Activities:** Purchase or lease new on-road vehicles that operate using

- ❖ Compressed Natural Gas
- ❖ Liquefied Natural Gas
- ❖ Liquefied Petroleum Gas
- ❖ Hydrogen Fuel Cells
- ❖ Electricity

**Funding Amount:** Up to \$80,000 depending on vehicle class

Expected to open December 2024



# TxVEMP – All-Electric Grant Program

Purchase New Battery or Fuel Cell Electric Vehicle/Equipment to Replace or Repower Existing Diesel	Funding Available to DFW Area as of May 2024 (First-Come, First-Served)	Funding Threshold
Class 4-8 Local Freight or Port Drayage Trucks GVWR 14,001 Pounds and Up Used to Transport Freight, Cargo, or Refuse Model Year 1992-2009	-\$3,770,345.75	For Government Entities: <u>Up to 100% of Incremental Cost</u>  For Non-Government Entities: <u>Up to 75% of Incremental Cost</u>
Class 4-8 School, Shuttle, or Transit Buses GVWR 14,001 Pounds and Up Used to Transport Passengers within a City or Defined Region Model Year 2009 or Older		
Airport Ground Support Equipment Tier 0, Tier 1, or Tier 2 Diesel Equipment 25 HP and Up Used to Service Aircraft Between Flights	-\$1,460,659	“Incremental Cost” = the eligible cost of the project less default scrap value* and any other financial incentives, tax credits, etc.
Forklifts and Port Cargo Handling Equipment Tier 0, Tier 1, or Tier 2 Diesel Engines Must have Greater than 9,000 Pounds Lift Capacity	\$500,639	

\*All old vehicles/engines/equipment must be scrapped; default scrap value = \$1000 for replaced vehicles/equipment and \$250 for replaced engines



# Texas Volkswagen Environmental Mitigation Program (TxVEMP) – Ferry, Tug, and Switcher Grant Program

**Eligible Applicants:** Individuals, state and local governments, corporations, or any other legal entity

## Eligible Activities include:

- Replace or repower freight switchers.
- Repower ferries and tugs.
- Applicants purchasing a qualifying ferry, tug, or freight switcher powered by electricity may request additional funding for on-site electric charging infrastructure

## Funding Amount:

- Government-Owned Equipment: **up to 100%** for eligible equipment and electric charging infrastructure
- Non-Government-Owned Equipment: **up to 75%** for eligible equipment with electric engine(s) and electric charging infrastructure



# Future Pending Funding Applications

## Clean Heavy-Duty Vehicle (CHDV) Grant Program

Administered by the Environmental Protection Agency (EPA), the Clean Heavy-Duty Vehicle (CHDV) Grant Program will award **\$932 million** to replace non-zero emission Class 6/7 vehicles with zero-emission vehicles (ZEV)

NCTCOG has applied for \$60M on behalf of the region for vehicle replacement, infrastructure, and workforce development

Awards expected to be announced February 2025

## Diesel Emissions Reduction Act (DERA) Program

NCTCOG applied on behalf of the region for \$2.9M

Fund replacement or repower heavy-duty diesel vehicles or equipment with newer, lower emitting versions

Awards expected to be announced Summer 2024



# Upcoming Events

Date: Tuesday, August 27, 2024

Time: 12:00 p.m. – 1:00 p.m.

Location: Virtual Zoom Meeting

**Lunch and Learn  
Webinar:  
School Districts' Guide  
to Clean School Bus  
Funding**

Date: Sunday, October 6, 2024

Time: 10:00 a.m. – 2:00 p.m.

Location: Tanger Outlets

**2024 DFW  
National Drive  
Electric Week  
Event**



**For More Information Visit:**  
[dfwcleancities.org/events](https://dfwcleancities.org/events)



DFW Clean Cities Clean Vehicle Vendor Expo

# Tools and Resources

## DFWCC Events

[dfwcleancities.org/events](http://dfwcleancities.org/events)



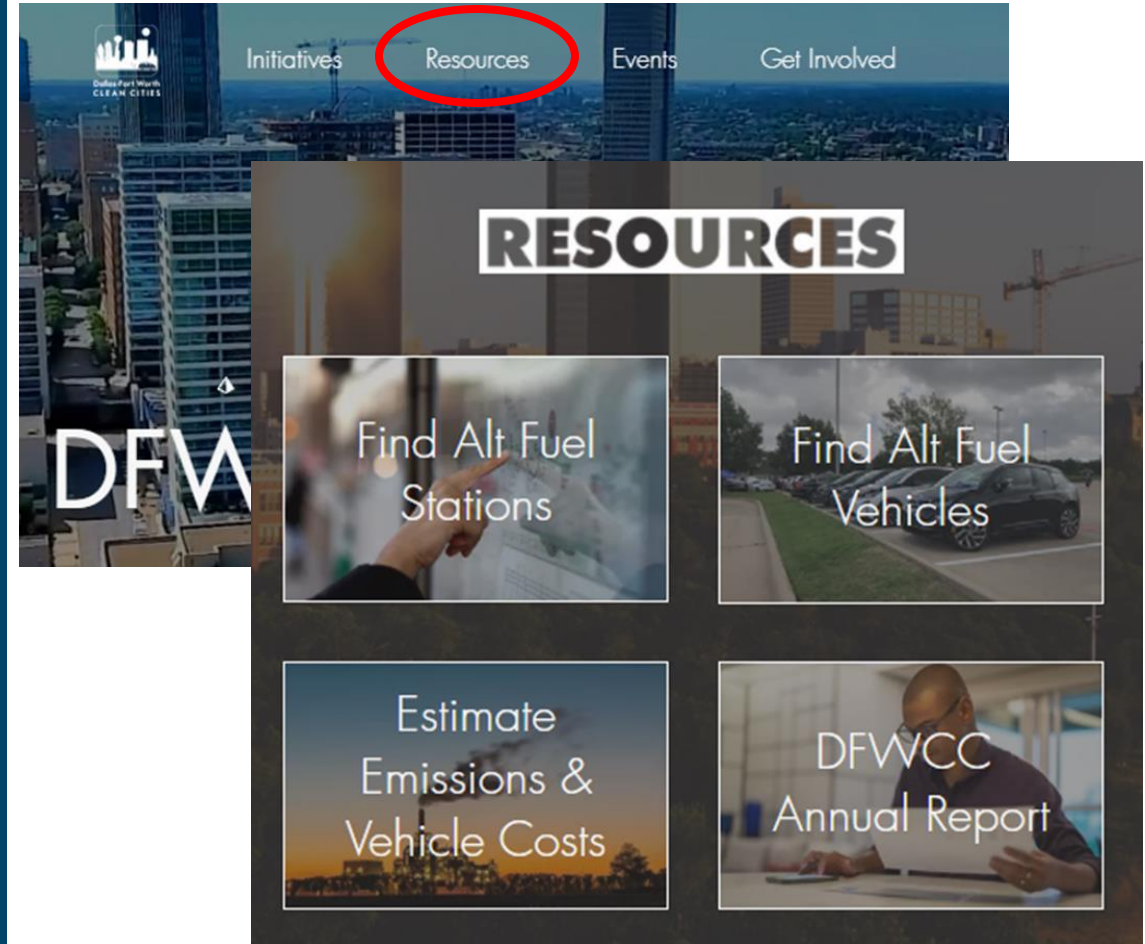
## EV Registration Data

[dfwcleancities.org/evnt](http://dfwcleancities.org/evnt)



## Funding Opportunities

[nctcog.org/aqfunding](http://nctcog.org/aqfunding)





# Get Involved with DFWCC

Contact us at [cleancities@nctcog.org](mailto:cleancities@nctcog.org) for any questions on fleet electrification, funding opportunities, or other inquiries

Upcoming and past webinars and events posted at [dfwcleancities.org/events](http://dfwcleancities.org/events)

To stay up to date on procurement opportunities, register under “air quality/energy planning” and/or “alternative fuels” on the NCTCOG Transportation Department Vendor Database  
[www.dfwcleancities.org/get-involved](http://www.dfwcleancities.org/get-involved)

Sign up for our weekly email list  
[dfwcleancities.org/getinvolved](http://dfwcleancities.org/getinvolved)

