Electric School Bus Webinar Series Webinar 1

Please mute your microphones and enter your name and organization in the chat box.

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Who and What is NCTCOG?

Regional Planning Agency

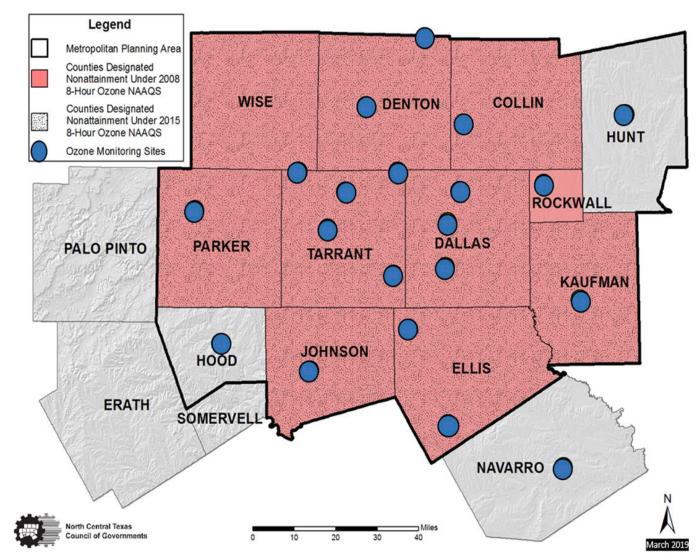


Metropolitan Planning Organization (MPO)



DFW Clean Cities Coalition





Clean Cities 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

Measuring Clean Cities Coalition Impact

Coalition projects have resulted in a cumulative impact in energy use equal to nearly 10 billion gasoline gallon equivalents resulting from reduced fuel use and increased fuel diversity.1

1 million alternative fuel
vehicles on the road.2

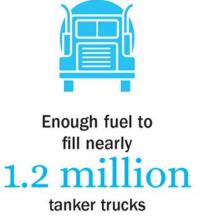






Enough to drive the distance to the sun and back

1,175



96 million gasoline gallon equivalents

of energy were saved through fuel economy improvement projects like telematics, driver training, and outfitting fleets with idle reduction equipment.²

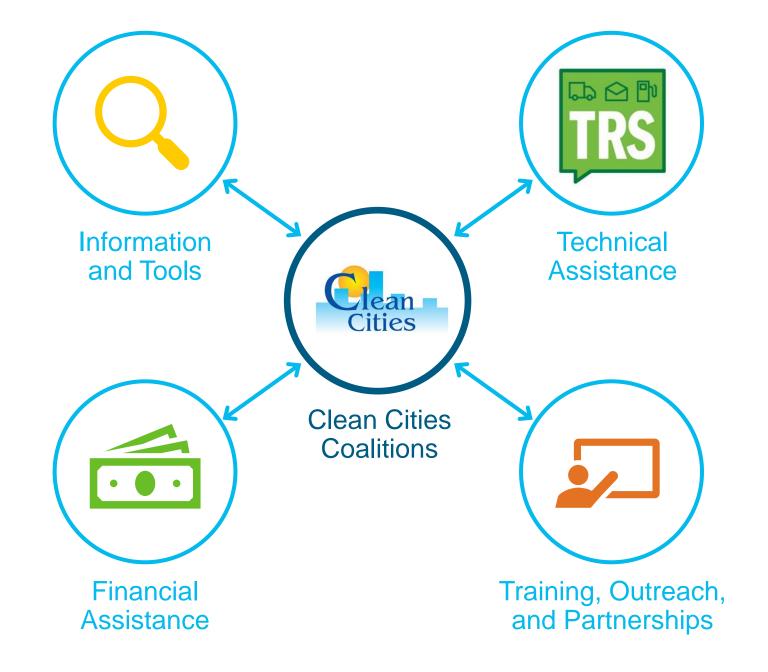






Technology Integration Program

Provide objective/unbiased data and real-world lessons learned that inform future research needs and support local decision-making



Your Regional Resources

Austin Area





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Dallas-Fort Worth Area





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Houston Area





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San Antonio Area





Lyle Hufstetler

Natural Resources Project Coordinator Ihufstetler@aacog.com 210-376-9901

Today's Agenda:

Lori Clark, DFWCC: Overview of Webinar Series

John Hall, EDF: Benefits of Electric School Buses

Randy Ray, IC Bus; Bill Maurer, In-Charge Energy: School Bus Electrification Fundamentals – Vehicle and Infrastructure

Albert Burleigh, Blue Bird; Marc Trahand, Nuvve; Jason Gillis, Everman ISD: Blue Bird Electric School Buses

Eric Daniels, Oncor: A How to Guide for Working with Oncor

General Q/A

Webinar Series Overview

Webinar 1- Thursday, December 3: EDF, IC Bus, Blue Bird, Oncor

Webinar 2- Wednesday, December 16: Collins, Thomas Built Buses, energy managers

Webinar 3- Wednesday, January 13: Lion Electric, grant funding, innovative financing

Need to register? <u>www.dfwcleancities.org/dfw-clean-cities-meetings</u>









LITERATURE REVIEW AND INDUSTRY SCAN OF ELECTRIC SCHOOL BUSES

Brittney N. Gick, John H. Overman, Todd B. Carlson Texas A&M Transportation Institute





Background



ride school buses each day in the U.S.



480,000 school buses in the country

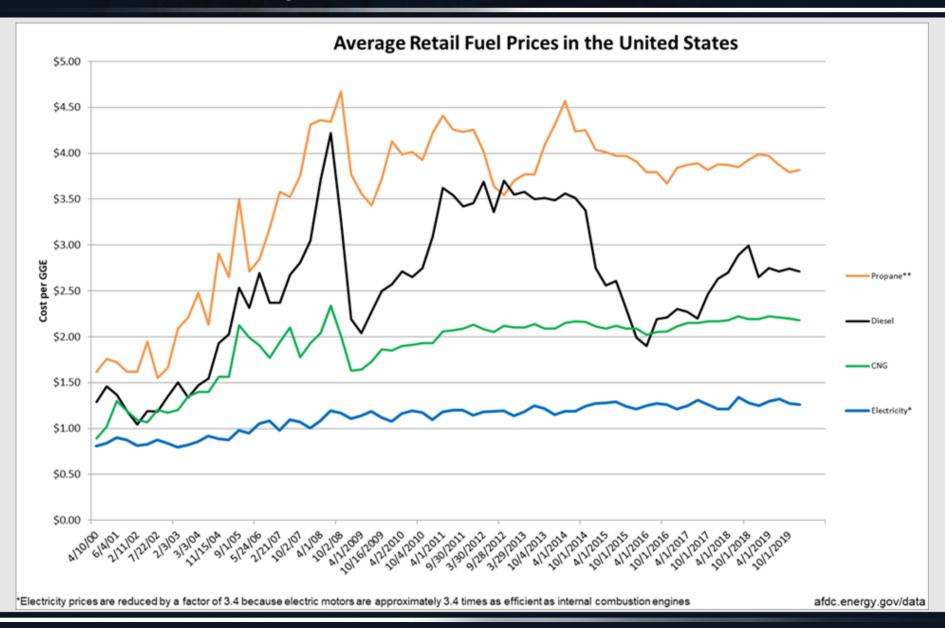


30,541 school buses in Texas



School-aged children's respiratory systems are still developing, making them more susceptible to the dangers of diesel emissions.

Fuel Price Volatility



V2G and V2B Technology Incentives

Utilize bi-directional chargers

- Vehicle-to-Grid (V2G) supply power back to grid
- Vehicle-to-Building (V2B)

 supply power to
 building

Costs not yet known

- Expensive
- Opportunities to collaborate with utility providers

Electric School Bus Opportunities

V2G

- School buses sit idle the majority of the day, so could be a unique source of power during peak periods of high demand.
 - Potential savings of up to \$230,000 over 14 years
 - Schools with V2G Plans
 - Nuuve California
 - Duke Energy North Carolina
 - Dominion Energy Virginia
 - DTE Energy Michigan



Presented by:

Bill Maurer Randall Ray December 3, 2020



Agenda

- Market Drivers
- Navistar and NEXT
- Bus Specifications
- In-Charge
 - Charging and Infrastructure
 - Financing
 - Fleet Management Software Solutions
- Summary and Turn-Key Solution
- Q & A



Why Now....CE Electric makes sense

- Early adaptors will succeed
- Benefits to client
 - Zero Emissions
 - Quiet Operations / Noise Pollution
 - Low Maintenance
 - No Oil / Filters / Smog Check Testing
 - No Transmission Maintenance
 - Coolant Maintenance
 - No Glow plug Maintenance
 - +75% Reduction in Energy Costs
 - +60% Reduction in Maintenance Costs
 - Positive Impact on Students and Community
 - Positive Impact on the Environment



Market Drivers - Industry Change and Stress

DEMOGRAPHIC SHIFTS, TECHNOLOGY GROWTH & ENVIRONMENT CONCERNS CREATE OPPORTUNITIES, BUT SCHOOL BUS INDUSTRY IS RIPE FOR DISRUPTION



Changing Demographics

Gen X and Millennials in purchase decision / influencer roles in school transportation

High % of parents are millennials

Tech Savvy



Environmental Concerns

"Green alternatives"

Electric

Propane

CNG

Continued
environmental
regulations leading to
decline in diesel &
growth of
Gasoline



Growth in Technology

Provides efficiency and safety

Technology leads to higher learning curve

New technologies need to work together

External tech disruptors (ride sharing, online sales)

Easier to operate (may aid driver shortage)

The school bus industry is influenced by trends impacting communities they serve

- Opportunities to differentiate in technology
- Delivery of technology may create efficiencies for customers
- Incentives for "green" school buses fueling the adoption of alternative powertrains - electric moving faster than expected – top down approach
- Gen X and millennials will expect technology in school buses for safety and connectivity
- Average transportation cost/student increased over 73% in 35 years*
- 2017 only 33% of children ages 5-17 rode a school bus*
- School funding pressures pushing out bus replacement & cost cutting for transportation
- Regulatory pressures could increase driver shortage issue
- External technology trends including ride sharing (Hop Skip Drive) bring alternatives to student transportation
- Online learning trends

*Source: Bellwether Education Partners July 2019

IC Bus NEXT eMobility Group

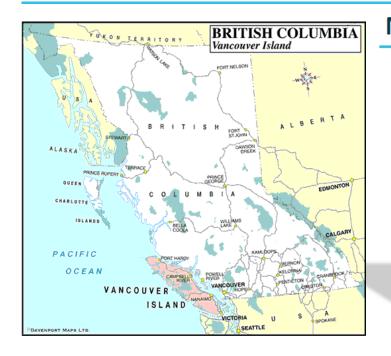
NEXT is an eMobility solutions group designed to help commercial truck and bus customers implement electric vehicles via its unique consultative approach that goes beyond the vehicle.



eMOBILITY SOLUTIONS



IC and Navistar Electric Rollout



NEXT Product Roadmap

		Vehicle	Engineering Units	Customer Units
	1	CE Electric School Bus	Validation ongoing	Q1 2021
	2	eMV Medium Duty pickup and delivery	Q4 2020	Q4 2021 (limited customers)
	3	Future Program eTractor BEV/FCEV regional haul tractor	Q2 2021	2022

- 1st Product to Market School Bus this Winter
- Truck will launch in 2021
- New Truck Plant in TX 1st Truck to be Electric





Technology has to help

Technology Advancements

Electronic Stability Control

Lane Departure Warning

Obstacle Detection

Adaptive Cruise Control

Active Braking

Exterior Camera System

Interior Camera Systems

WIFI (Students & Drivers)

USB Ports

GPS & Routing

Driver Tablets

Telematics



Must assist the Stakeholders

- Transportation Department
- Fleet Maintenance
- Parents
- Students
- Drivers
- District
- Community



CE Electric School Bus



Vehicle Performance

Peak power: 335hp (250kW)

Continuous power: 215hp (160kW) Peak torque: 11,579 ft-lbs. (15,700Nm)

Battery Capacity Options



Timing

2021 – Launching selectively

2022 – Additional markets added



IC Electric Bus

Industry Leading Standard Features:

- V2G ready Standard
- Level II and DCFC charging
- Charge Port Location
 - Frt charge port (rear option)
- Air Disk Brakes standard
- Maximum Range over 200 miles
 - Battery size: 105, 210, 315 kWh
- 3 Levels of Regen Braking
- Electronic Stability Control





- Air Conditioning available
- Fuel Fired Heater available

Power of Choice

- 217" wb lift bus
- 276" wb route bus
- Direct Drive



IC Bus Details

Safety:

- HV Disconnect Switch
- LV Disconnect Switch
- Manual Service Disconnects







HV Components:

- AC to DC converter
- VCU
- Power Steer
- Air Compressor





Maintenance Savings – Up To 75% Annual Savings

Diesel

- Oil Maintenance Oil and Filters every 6 months
- Fuel Systems filters / separators every 4-6 months
- Aftertreatment and Exhaust System Maintenance
- Transmission fluid replacements
- Air Filter Annual
- Engine Block Heaters ,etc.



Electric

- No Engine Oil Maintenance
- No Fuel Filters
- No Aftertreatment Maintenance
- No Transmission Maintenance
- No Engine Air Filters
- No Engine Block Heaters





IC and our In-Charge Partner

Consulting 1

Route Simulation to determine EV requirements and efficiencies



Charging

2

Providing charging solutions that will guarantee vehicle Uptime



Constructing

3

Configuring and building trucks and buses in Navistar facilities



Connecting

4

Monitor and communicate EV performance and data to customers



Conserving

5

Providing environmentally friendly options at vehicle end-of-life







Which Charging System Should I Use?

Utility Grid Voltage	Input Power	Max. current, continuous (amps)	Branch circuit breaker rating (amps)	Power	Charging Time (Range Per Hour)
120 V AC	1-phase	12 A	15 A (min.)	1.44 kW	2-5 Miles
		16 A	20 A	1.92 kW	
208 to 240 V AC	1-phase	≤ 80 A	Per NEC 625	Up to 19.20 kW	10-20 Miles
208 to 600 V AC (Typ. 480 V)	3-phase	<200 A (Typ. 60 A)	40 A – 80 A	<150 kW (Typ. 50 kW)	Up to 80% Charge in <hour* Full Charge Range is about 250 miles</hour*
	120 V AC 208 to 240 V AC 208 to 600 V AC (Typ. 480 V)	120 V AC 1-phase 208 to 240 V AC 1-phase 208 to 600 V AC (Typ. 480 V) 3-phase	Utility Grid VoltageInput Powercurrent, continuous (amps)120 V AC1-phase12 A208 to 240 V AC1-phase≤ 80 A208 to 600 V AC (Typ. 480 V)3-phase<200 A (Typ. 60 A)	Utility Grid VoltageInput Powercurrent, continuous (amps)Branch circuit breaker rating (amps)12 V AC1-phase12 A15 A (min.)208 to 240 V AC1-phase≤ 80 APer NEC 625208 to 600 V AC3-phase<200 A	Utility Grid Voltage Input Power current, continuous (amps) Branch circuit breaker rating (amps) Power 120 V AC 1-phase 12 A 15 A (min.) 1.44 kW 208 to 240 V AC 1-phase ≤ 80 A Per NEC 625 Up to 19.20 kW 208 to 600 V AC (Typ. 480 V) 3-phase <200 A (Typ. 60 A)

- **Level 1:** Provides charging through a 120 V AC plug and does not require installation of additional charging equipment.
- Level 2: Provides charging through a 240 V (for residential) or 208 V (for commercial) plug and requires installation of additional charging equipment.
- **DC Fast Charge:** Provides charging through 208 600 V AC input and requires specialized equipment to be installed at your vehicle location.

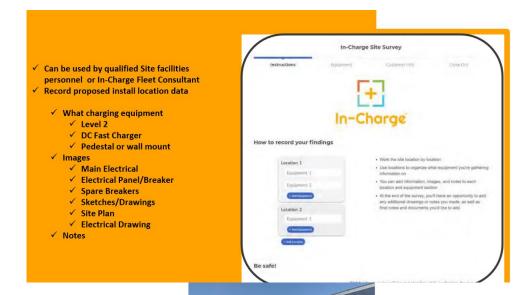


SAE J1772 Combo CCS1



When Should I Start the Process – (6 to 12 Months)

- 1. Contact In-Charge to begin process
- Gather Site Information
 - Utility Bills
 - Site Plan
 - · One-Line Electrical Drawings
- 3. In-Charge Performs Site Walk
 - Understand existing site parking / layout
 - Verify property limits / utility right of ways
 - Begin prelim layout
 - Web Based Remote Survey Tool
- 4. Overall Evaluation
 - Bus Routes / Distance, etc.
 - Current Parking / fueling
 - Determine Current power usage
 - Determine Current capacity for EV fueling
 - Calculate costs based on existing rate tariffs
 - Develop future capacity needs analysis short term / long term
 - Develop Energy Management control plan
 - Determine any / all utility rebate / incentive / grants
- 5. In-Charge develops Preliminary Plan
- 6. Review of Prelim Plan with Client
- 7. Development and Presentation of Final Plan / Estimates
- 8. Identify Financial Solutions to meet clients needs



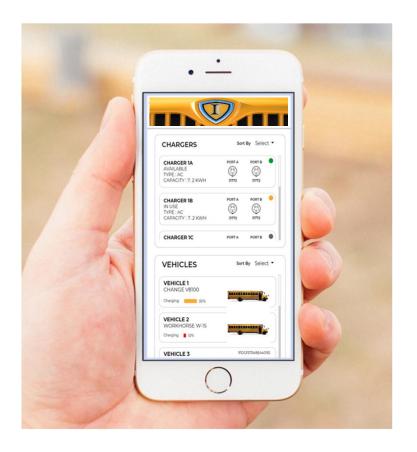


Fleet Management of Electric Fleet



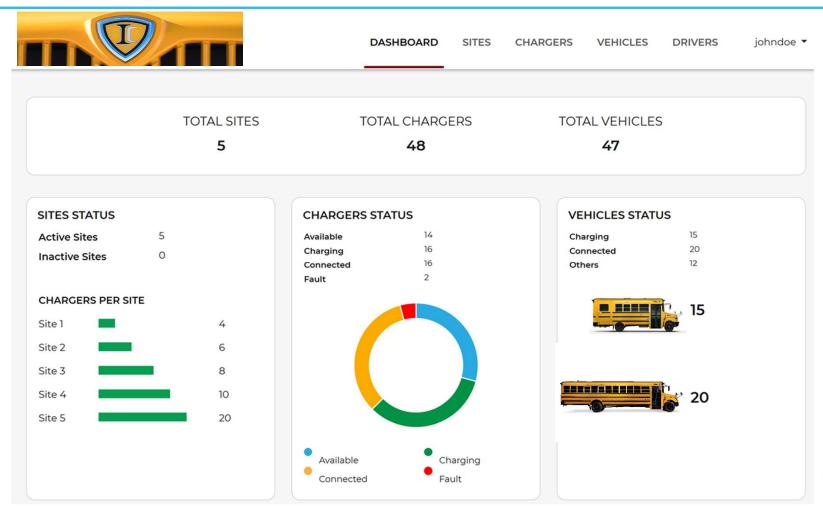
Software Solutions - Charging

- Custom Designed Solutions
- Feature Selection based on Client Needs
- Open Source Platform
 - Easy to make Changes
 - Minimal Annual Costs
- Web Based / Smart Phone Accessible
 - Simple to view and use
- Real Time Data



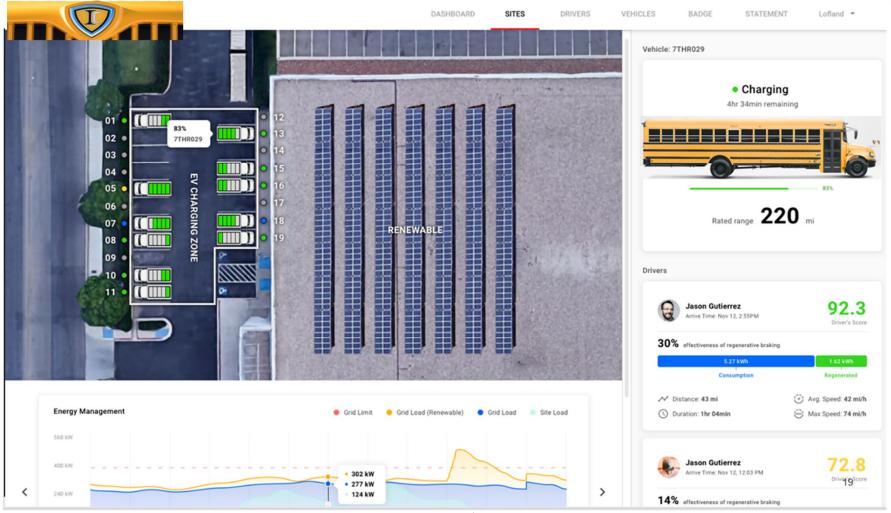


Navistar Software Solutions - Charging





Monitoring Your Fleet





CONFIDENTIAL and Proprietary to NAVISTAR

Financing and Funding Solutions



Financial Solutions

Financed Direct

- **Capital Purchase**
- Annual / Quarterly Payments
- Owner owns the equipment
- Owner gets the depreciation, etc.
- Typically a 5-7 Year Term

Third Party Ownership

- In-Charge owns the bus and the infrastructure
- Client pays on per mile basis
- No Capital Outlay
- Paid from Operational and Fuel Savings
- **Typically Monthly Payments**
- In-Charge owns all the equipment
- In-Charge gets the depreciation, etc.
- Typically a minimum of 10 Year Term

Operating Lease

- Similar to a Car Lease / Printer Lease
- Annual / Quarterly Payments
- Paid from Operational and Fuel Savings
- In-Charge owns the equipment / etc.
 - Owner buys out the equipment at end of lease for depreciated amount (typically)
- In-Charge gets the depreciation, etc.
- Typically longer Term 7-10 Years







CONFIDENTIAL and Proprietary to NAVISTAR*

Turn-Key Solution

Product Offerings

On-Site Maintenance In-Charge Certified Guaranteed Infrastructure **Environmental Operating Software Equipment Kit** Certification & Validation **Performance Financing EV Charge Equipment** DC Fast Charger Charger uptime By the Month Renewable power Access control guarantee (>98%) AC-L2 review Remote start/stop Quarterly preventative By the Mile EV Charge Equipment DC Quarterly emissions maintenance Lifetime equipment Throughput Residual value warranty report reporting Software updates guarantee Real-time fault Agency and NGO Circuit Breakers Output validation Scheduling Operating cost certification monitoring smoothing Panel Boards Load management Fault-Current Test LCFS collection & Parts inventory and **Transformers** Potential to lead into Enhanced vehicle **GFI Test** repair reporting vehicle and/or battery **Disconnect Switches** connectivity Filter Replacement financing **Distribution Centers**

Typical Installation for First Phase

- Six Buses
- Six Level 2
- One DCFC (50kW)

























Training Provided

- Driver Training
 - Work with drivers to train on new bus
 - Increased power
 - Braking Methods (increase battery life) regeneration
- Technician Training
 - High Voltage and Lockout Training
 - Battery Charging / Charging Station Connection
- Battery and drivetrain maintenance will be handled by the manufacturer









I E X

eMOBILITY SOLUTIONS

Thank You!

Blue Bird Electric School Buses

NCTCOG/DFW Clean Cities - December 3, 2020



Albert Burleigh

Regional Executive Director



Blue Bird – The Alternative Power Experts



20,000
ALT POWER
SCHOOL
BUSES



900 SCHOOL DISTRICTS



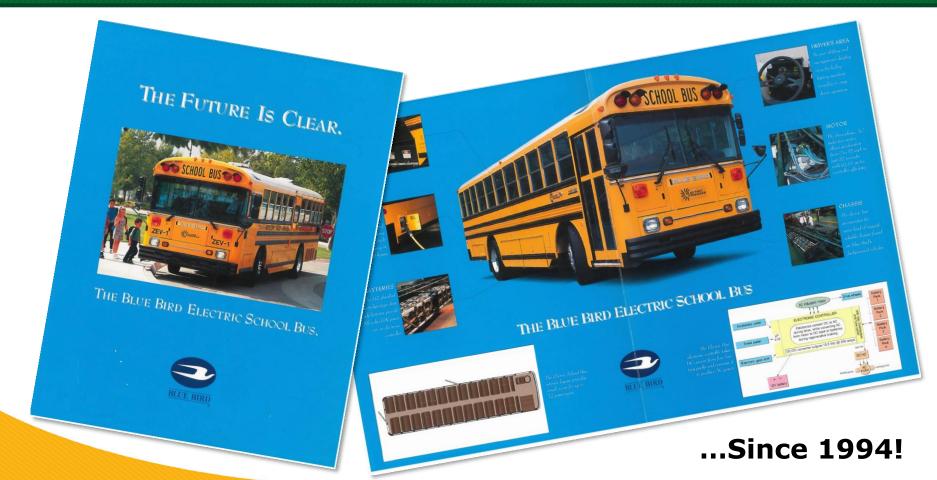






Blue Bird - First to Market with EV





Where are we today?



2016

 Blue Bird received a \$4.9MM grant from US Department of Energy (US DOE) for development and commercialization of high power V2G school buses.

2017

 Blue Bird Launched our current iteration of the Blue Bird electric bus at the STN Expo in Reno, Nevada

2018

Blue Bird delivered its first electric-powered school buses to customers in California

2020

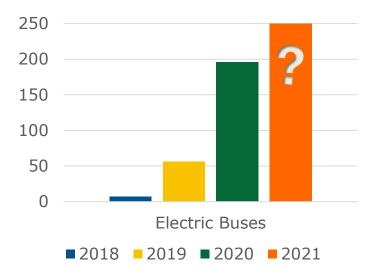
- Only manufacturer to have produced and deployed electric school buses in Type A,
 Type C, and Type D
- Only manufacturer to offer standard CCS1 connector to allow for either AC Level 2 or DC Fast Charging
- V2G capability is now standard on all of our buses
- 300 EV sales since introduction!

Deployments and Growth





Number of Buses Sold Since 2018



Why Electric School Buses?



We are seeing more and more districts interested in purchasing EV school buses. Why?











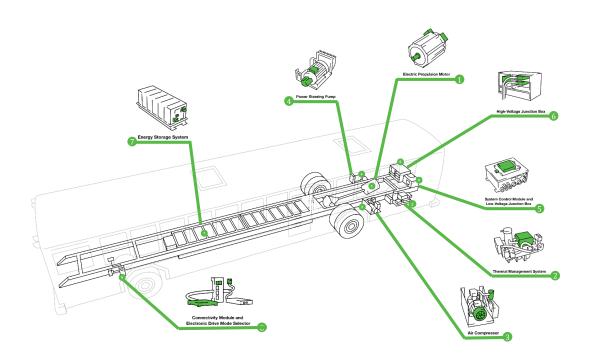




Zero-Emissions, Viable Total Cost of Ownership Solution

Major System Components





EV Maintenance Savings



Diesel Powertrain

- Cummins ISB 15 Quarts of Oil and Filter every 6 months. Disposal
- Allison Transmission Replace Filter every 50K miles. Fluid every 48 months.
- Fuel System Primary Filter/Water Separator – 6 months
- Exhaust System DEF Filter, DEF Tank Head Unit Filter
- Air Intake Filter 12k miles/12 months

Electric Drivetrain

- Sumo Electric Motor No lubricating oil
- No Transmission
- No Fuel Filters
- No Exhaust
- Does not require air filter

Approximately 80% Reduction in Maintenance Costs

Maintenance/Service Support Texas Locations

Type A,	Type C, a	nd Type D:
---------	-----------	------------

Rush Bus Centers – Dallas 4000 Irving Blvd. Dallas, TX (214) 884-1700

Rush Bus Centers – San Antonio 8922 IH 10 East San Antonio, TX 78219 (210) 901-7100

Rush Bus Centers – Houston 8401 East Freeway Houston, TX 77029 (281) 260-0161

Blue Star Bus Sales 5907 63rd St. Lubbock, TX 79424 (806) 794-1959

Type C and Type D:

Cummins Sales and Service Cummins Sales and Service 5224 I-40 Expressway East 7045 North Loop East Houston, Texas 77028 806 373-3793 713 679-2220

Cummins Sales and Service
4855 Mountain Creek Parkway
Dallas, Texas 75236
972 708-0000

Cummins Sales and Service
1210 South Grandview
Odessa, Texas 79761
432 332-9121

Cummins Sales and Service
Cummins Sales and Service
14333 Gateway West
1700 Smith Road
El Paso, Texas 79928
Austin, Texas 78721-3543
915 852-4200
512 389-2276

3250 North Freeway Fort Worth, Texas 76111 817 624-2107

Cummins Sales and Service

Training





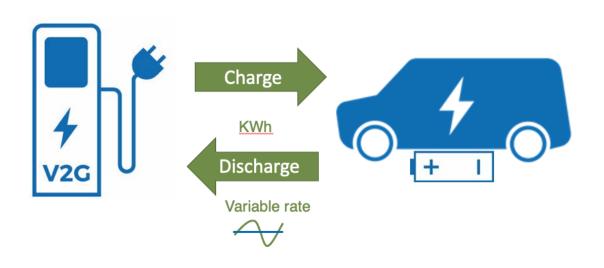
https://vantage.blue-bird.com/Portal/Vantage-Home.aspx

Online, On Location, and at the Blue Bird Plant

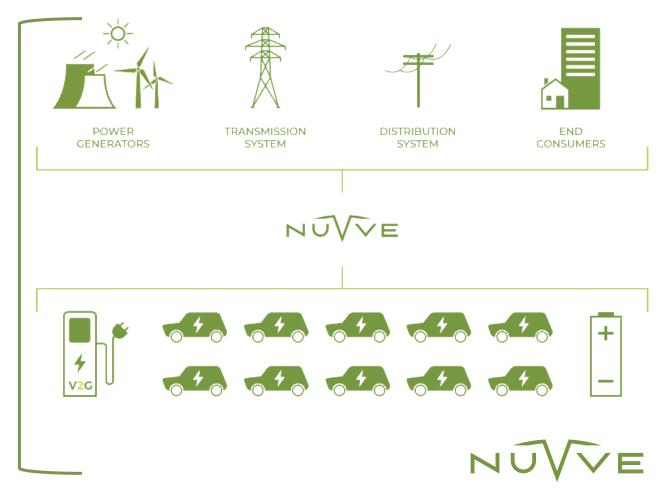
- **❖ EV Driver Training**
- Technician Training
- First Responder Training

Nuvve's Vehicle-to-Grid V2G

Nuvve controls power flow in and out of EV chargers, and creates a Virtual Power Plant out of many small EV batteries to deliver energy services

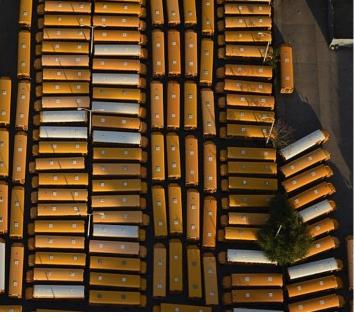


- Generates revenues from energy markets
- Saves energy on your meter and buildings
- Lowers the cost of electrification of your fleet



V2G is Active when EVs are Parked











Guaranteed energy to drive







HIGH LEVEL OF CONTROL

- Integrates variable sized resources (KWh)
- Independent control of each asset (EV)
- · Second-by-second control



MOBILE MANAGEMENT

- Set charge levels and enable last-minute charging remotely
- Available as a mobile app and web interface



Drivers can adjust charge needs on the go



VERSATILE INTEGRATION

- Third party integrations with existing systems including EVSEs, OEMs, and utilities
- · Secure REST API available
- Support for multiple communication protocols



PERFORMANCE INSIGHTS

- 24/7 dashboard view of EV usage and charging
- Live energy delivery performance reporting
- Custom reports



Monitor your entire fleet with the Nuvve dashboard

Nuvve Charging Station Options (North America)

Nuvve PowerPort - AC Charging

Overview

- Level 2 EVSE
- 80amps for 19.2kW max power
- UL Certified
- Energy Star certified
- 3 phase SAE J3068 version available (99kW max)
- Dual-mount pedestal available
- AC-V2G capability with specially configured vehicles*
- Input voltage: 240V / 1ø



Nuvve V2G 60kW – DC Charging

Overview

- V2G capable with specific EV models
- CCS1 connector
- 60kW charge and discharge power level
- UL1741-SA certified for California (Rule 21) interconnection
- Input voltage: 480V / 3ø



Diesel Maint & Fuel					EV Bus		
Item	Quant.	How often	Unit Price	\$/Year	X 14 yrs.	\$/Year	X 14 yr
Fuel	60 gal	1/wk x 40 wks	\$1.50/gal	\$3600	\$50,400	\$350	\$4900
Oil	20 qts.	2/year	\$7/qt	\$280	\$3,920		
Oil Filter	2	2/year	\$80/filter	\$320	\$4,480		
Trans Fluid	12 qts.	every 3 years	\$9/qt	\$36	\$504		
Trans Filter	1	every 3 years	\$140/filter	\$46.67	\$653		
Air Filter	1	1/year	\$120/filter	\$120	\$1,680		
Fuel Filter	1	every 2 years	\$70/filter	\$35	\$490		
DEF FLUID	15 gal	every 2 months	\$15/gal	\$1125	\$15,750		
DPF/DOC cleaning	1 clean	every 2 years	\$300	\$150	\$2100		
DPF/DOC Replace	1	Inevitable	\$3200		\$3200		
Turbo	1	Inevitable	\$1720		\$1720		
Fuel Inj Replace (8)	1	Inevitable	\$3487+Labor		\$3487		
Glow Plug Replace	1	Inevitable	\$549 +Labor		\$549		
Inj. Press. Regulator	2	Inevitable	\$327		\$654		
Charge Air Cooler	1	Inevitable	\$1193 +Labor		\$1193		
Mech. Serv. Hrs	350	Life of Bus	\$30/hr		\$10,500	\$90	\$1260
				\$5,713/yr Routine Maint.	\$101,280 Lifetime Diesel Maint.		\$6160 Lifetime EV Bus

EV Bus "Fuel" figured at \$0.035/kWH x 50 kWH/day = \$1.75/day x 5 days/week x 40 weeks = \$350/yr

Does not include Engine Replacement, Transmission Replacement, Towing, Fuel cost fluctuations, etc.

A how to guide for working with Oncor

Electric Vehicle Project Manager

Eric Daniels
Engineer | New Construction Management
12/3/20



Agenda

- Your Project Manager
- Project Submission Process
- Q & A
- Appendix



Your Project Manager

- Eric Daniels
- Graduate of Lamar University
 - B.S in Industrial Engineering
- Engineer in NCM group
 - Special Projects Engineer



Project Submission Process

Who

Customer Contacts for the Project:

- 1. Company Rep
- 2. Engineering Firms
- 3. All Contactors



Project Submission Process Cont.

What and Where

The Type of Project

- 1. Buildings
- 2. Electric Vehicle types
- 3. Charger Type



Project Submission Process Cont.

When

Project Milestone Dates

- 1. Breaking ground
- 2. EV and Charger arrival dates
 - 1. EV Fleet Growth timeline



Q & A



Appendix

Click here to access the **New Construction Customer Portal**, or:

- 1. From Oncor.com, select the Construction and Development Icon, scroll down and then select the button labeled Check Project Status
- 2. If you do not have an account, click the Registration button, and fill in the necessary information
- 3. Fill in your Email Address (that you provided on your new service request or that was added to the project by another portal user), Create Password, First Name, and Last Name
- 4. Click Register

Features of the New Construction Customer Portal include:

- 1. A summary of all your active, completed, and cancelled projects
- 2. A display of detailed information about each project
- 3. A display of the status of all tasks associated with each project phase
- 4. A list of all your upcoming, completed, and overdue action items
- 5. Access to contact information for and messages from your assigned Project Manager

Once you submit a new service request via the <u>Construction and Development page</u> on <u>Oncor.com</u>, an email will be sent to you with information on how to register an account with the New Construction Customer Portal.



Commercial & Industrial - Load Requirements

Please Complete in Full and return to Project Manager Include a copy of plat and water and sewer prints.



Company Use ONLY – WR #: _____ a Delaware limited liability company Your electric service request will be processed upon form completion in its entirety, signed and returned to the appropriate Oncor Electric Delivery Company Project Manager. Allow 10 working days for an estimated cost for providing electric service, including all applicable charges and approximate timeline for construction completion after all required documents have been provided. Please visit the Oncor Electric Delivery web site for information concerning electric service guidelines, approved meter-bases and other service installation requirements. All meters must be located outside the building, cannot be located within an enclosed area, and must meet proper clearance requirements. http://oncor.com/electricity/construct/guidelines/const_guide.aspx Project / Customer Name: Project Location / Cross Streets: Physical Address: Office Phone: Cell Phone: Fax # E-mail Address: General Contractor: Electrical Contractor: Requested Dates for Electric Service: Temporary Service Permanent Service If available – Please Provide: Additional Design Charge Temporary Premise Number: This charge is made for preparing iterative designs to provide new service to a specific location where such iterations are at the request of the Retail Customer/CR for the Retail Customer's sole benefit. The initial two designs on a project will be included in the system charges; any additional Permanent Premise Number: designs will be done at Retail Customer's expense pursuant to this charge. Designated responsible party for payment of any costs associated with providing electrical service. Contribution in Aid of Construction ("CIAC") shall be payable to Oncor Electric Delivery Company prior to any construction scheduling. Please check only one: General Contractor Architect Electrical Contractor Customer Federal Tax ID #: or Valid Driver's License #:



ELECTRIC REQUIREMENTS

A site plan will be required identifying the proposed transformer, meter and other Oncor equipment locations. A survey or plat may be required by the Oncor project manager. An easement for the onsite Oncor facilities will be required either by a final plat or by a separate instrument. A copy of the warranty deed will be required if a separate instrument is secured for the Oncor easement.					
Hours of Operation:A.M. toP.M. or Other:	Days of Operation:	thru			
Number of Electrical Meters Request: and Service in AM	rs:				
Number of Conductors per Phase:Wire Size:Reque	sted Service Type: Overhead	Underground			
Transocket Delivery Information:	Required Date:	:			
Ship to Attn:Address:	City:	, TX Zip:			
Allow up to 10 business days for preliminary cost estimate and an additional 3 weeks (minimum) for scheduling an Oncor Electric Delivery Crew. Required permits, utility easements and surveying will necessitate additional design time. All three-phase transformers will require a 14 to 18 week lead time — occeptions. Oncor Electric Delivery will provide the least cost design. This design will be considered Iterative Design #1. Excess facilities at the request of the customer shall result in additional charges of the customer. It is the customer's responsibility to clear right-of-way for the installation of electric distribution facilities to company specifications.					
Requested Voltage (select only one) Single Phase 120/240: 3 Phase 120/208Y: 3Phase 120/240: 3 Phase 277/480Y: 3 Phase 480: Other: Indicate only one: New Load Adding Load to an Electrically Energized Service					



Project / Cu	istomer Name:		-		Oncor Electric Delivery Company LLC a Delaware limited liability company
				ECTRIC LOAD RE use an additional	QUIREMENTS page if necessary)
Charger l	Load Information:				
Quantity	Phase	Volts	kW demand	Vehicles per charger	Equipment Description (Make/Model)
Vehicle Ir	nformation:				
Quantity		Vehicle	e Class Batt	ery Capacity kWh	Equipment Description (Make/Model)



Future C	harger Plans:				
Quantity	Phase Volts	kW Demand	Vehicles per chargers	Equipment Description (Make/Mo	del) Month/Year of Deployment
Future V	/ehicle Plans:				
Quantity	Vehicle Class	Battery Capacity	kWh Equipment	Description (Make/Model)	Month/Year of Deployment
	_	_			
	_	_			
	_				
	_				
Signature	e		Printed Name	Title	
Office Ph	none	Cell Phone	E-Mail Address	Date	

