



Joint Office of
**Energy and
Transportation**

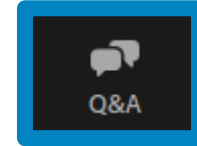
Zero-Emission Bus Resources

3/14/2024

driveelectric.gov

Zoom Tips and Housekeeping

- Controls are located at the bottom of your screen. If they aren't appearing, move your cursor to the bottom edge.
- Submit questions using the “Q&A” window



Disclaimer

Notice: This webinar is being recorded and may be posted on the Joint Office website or used internally.

If you speak during the webinar or use video, you are presumed to consent to recording and use of your voice or image.

Agenda

Introduction from Jeff Peel,
Deployment Manager

Brief Presentations from

- Ryan Frasier, NREL
- Mike Jones, NREL

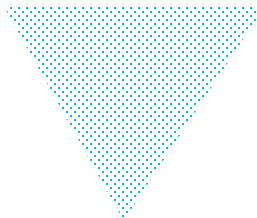
Audience Q&A





Intro from Deployment Manager Jeff Peel

Mission and Vision



Mission

To accelerate an electrified transportation system that is affordable, convenient, equitable, reliable, and safe.

Vision

A future where everyone can ride and drive electric.

BIL Programs Supported by the Joint Office

The Joint Office will provide unifying guidance, technical assistance, and analysis to support the following programs:



National Electric Vehicle Infrastructure (NEVI) Formula Program (U.S. DOT)

\$5 billion for states to build a national electric vehicle (EV) charging network along corridors



Charging & Fueling Infrastructure (CFI) Discretionary Grant Program (U.S. DOT)

\$2.5 billion in community and corridor grants for EV charging, as well as hydrogen, natural gas, and propane fueling infrastructure



Low-No Emissions Grants Program for Transit (U.S. DOT)

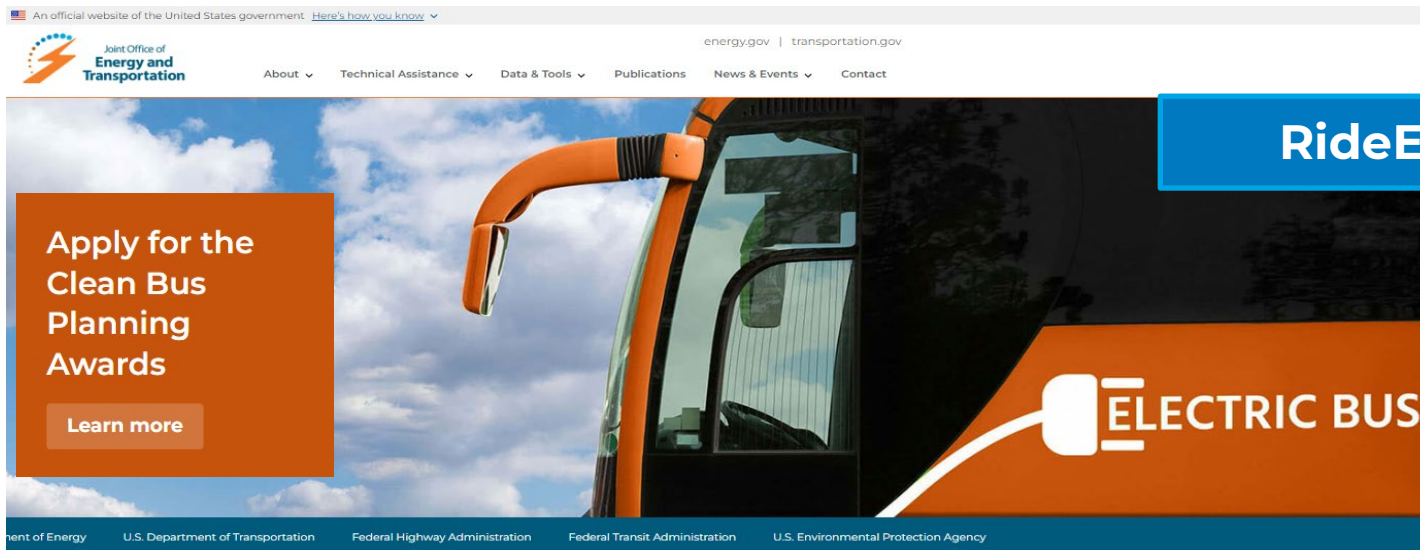
\$5.6 billion in support of low- and no-emission transit bus deployments



Clean School Bus Program (U.S. EPA)

\$5 billion in support of electric school bus deployments

Clean Transit & School Bus Technical Assistance



To support electric ridership across the nation's public transportation systems, this page contains information on technical assistance and resources for school districts, transit agencies, and riders of all zero-emission transportation modes.

The Joint Office of Energy and Transportation's (Joint Office's) mission is to accelerate an electrified transportation system that is convenient, affordable, accessible, reliable, equitable, and safe. To fulfill this mission, it is critical that communities across the nation have access to a variety of electrified transportation options, whether it be cars, buses, bicycles, scooters, or shared fleets.

[Contact us](#)[Technical assistance](#)

**Direct technical assistance
for eligible transit agencies
and school bus fleets to
plan for and deploy clean
buses**

Examples of How We Can Help

Electric utility
coordination

Identifying
available
funding and
incentives

Analyzing
charging
infrastructure
needs

Conducting
route analysis
and planning

Conducting
training and
workforce
development

Bus evaluation

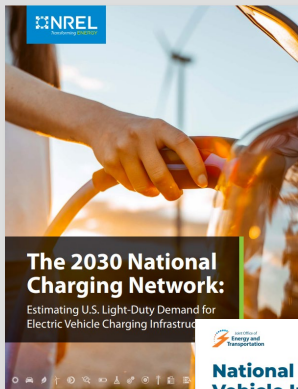
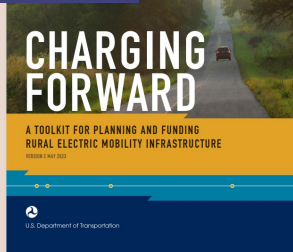
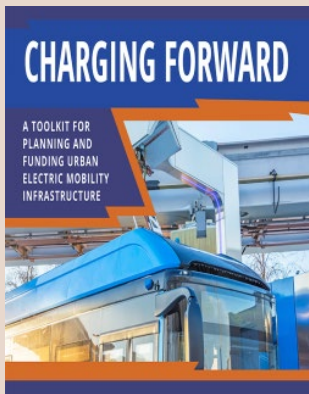
Analyzing
energy needs
and grid
impact

Identifying
solar and
battery storage
opportunities

Rural and Urban EV Toolkits

Forecasts and Reports

Help Sheets and Checklists



driveelectric.gov/resources

- Request assistance via online form

- Initial response within 48 hours

- General questions and feedback welcome!

The screenshot shows the 'Contact Us' page of the Joint Office of Energy and Transportation. The header includes the logo and navigation links: About, Technical Assistance, Data & Tools, Publications, News & Events, and Contact. The main heading is 'Contact Us'. Below it, a paragraph explains the form's purpose: 'Use this contact form to submit a media inquiry, ask a general question about Joint Office of Energy and Transportation resources and activities, or request technical assistance for states, tribal nations, or clean school buses or transit buses.' To the right, there is a 'Find Us on Social' section with links to LinkedIn and YouTube. The form itself is a light gray box with the following fields: 'Inquiry type *' (a dropdown menu), 'Name *' (a text input), 'Email *' (a text input), 'Subject *' (a text input), and 'Message *' (a large text area). A 'Send' button is at the bottom left of the form. A note at the top of the form states: 'Required fields are marked with an asterisk (*).'

driveelectric.gov/contact

The screenshot shows the 'Subscribe to News and Updates' page of the Joint Office of Energy and Transportation. The header is identical to the contact page. The main heading is 'Subscribe to News and Updates'. Below it, a paragraph says: 'Subscribe to news and updates from the Joint Office of Energy and Transportation.' To the left, there is a sidebar with links for 'News', 'Webinars', and 'Subscribe' (which is highlighted). The main content area contains a 'Sign up for news alerts *' section with a text input field containing 'name@example.com'. Below this is a checkbox with the text: 'By checking this box, you consent to our [data privacy policy](#) *'. A 'Next' button is at the bottom of the form.

driveelectric.gov/subscribe



Polling Questions

Panelists



Ryan Frasier

*National Renewable Energy
Laboratory (NREL)*



Mike Jones

*National Renewable Energy
Laboratory (NREL)*



Overview of Zero-Emission Bus Resources

Ryan Frasier, NREL

Clean School Bus Technical Assistance



The Joint Office of Energy and Transportation (Joint Office) is providing **FREE** technical assistance for the EPA's Clean School Bus program

Technical Assistance Offerings:

- **Fleets receiving funds or planning to apply are eligible**
- Proactive and reactive, hands-on assistance tailored to each fleet
- New and updated tools and resources.

Clean School Bus Technical Assistance

CleanSchoolBusTA@nrel.gov
driveelectric.gov/contact



Flipping the Switch on Electric School Buses

- This technical assistance video series is for K-12 schools interested in implementing electric school buses.
- Watch the videos in order or pick and choose the topics most interesting or relevant to you.

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Alternative Fuels Data Center

Search the AFDC

FUELS & VEHICLES | CONSERVE FUEL | LOCATE STATIONS | LAWS & INCENTIVES | Maps & Data | Case Studies | Publications | Tools | About | Home

EERE > AFDC > Fuels & Vehicles > Electricity

Electricity Basics

Benefits & Considerations

Stations

Vehicles

Availability

Conversions

Emissions

Batteries

Maintenance & Safety

School Bus Education

For Fleets

Law & Incentives

Electric School Bus Education

These educational webinars and handouts provide information about the benefits of electric school buses and examples of their use. Explore the resources in this series called "Flipping the Switch on Electric School Buses" through these topics:

- [Electric School Bus Introduction](#)
- [Working with Electric Utilities](#)
- [Vehicle Requirements](#)
- [Charging Infrastructure](#)
- [Infrastructure Planning and Solutions](#)
- [Vehicle In Use Performance](#)
- [Driver and Technician Training](#)
- [Cost Factors](#)
- [More Resources](#)



Electric School Bus Introduction

This technical assistance video series is for K-12 schools interested in implementing electric school buses. The series kicks off with an introduction to Clean Cities and a discussion about how local Clean Cities coalitions can provide education and technical assistance throughout the implementation process, as well as an introduction to electric school buses, key decision factors, charging infrastructure, and vehicle availability.

Webinars

Clean Cities and Technical Assistance
Electric School Bus Introduction

Part 1: Electric School Bus Introduction

Electric Bus Basics and Key Challenges

https://afdc.energy.gov/vehicles/electric_school_buses.html

NREL/Joint Office ESB Route Analysis Tool

The Electric School Bus (ESB) Route Analysis Tool is a spreadsheet tool designed to assist school bus fleets in determining the bus energy usage and charger power needs for their unique routes.

Lowest Expected
Temperature (°F):

30°+

*See NCEI Climate at a Glance for local
temperatures:

<https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series>

Bus Info		Route Info							User Selections		Energy/Power Results	
Bus Type	ESB Make/Model	Route #	Morning Route Distance (miles)	Morning Depart Time	Morning Return Time	Afternoon Route Distance (miles)	Afternoon Depart Time	Afternoon Return Time	Cabin Heater	Mid-Day Charging	Max Energy Used (kWh)	Estimated Minimum Charger Power Level (kW)
TypeC	IC Bus Electric CE (315 kWh)	1	50	6:30 AM	8:30 AM	60	12:30 PM	4:30 PM	Electric	Yes	157.5	20.3
TypeC	LionC (210 kWh)	2	30	6:30 AM	8:30 AM	40	12:30 PM	4:30 PM	Electric	Yes	90.3	13.3
TypeC	Bluebird Vision Electric	3	35	6:30 AM	8:30 AM	40	12:30 PM	4:30 PM	Electric	Yes	86.1	15.2
TypeC	BYD Type C	4	20	6:30 AM	8:30 AM	40	12:30 PM	4:30 PM	Electric	Yes	109.9	13.8

Charger Selection	
Charger Size (kW)	Expected Minimum SOC (%)
20.0	11%
19.2	48%
19.2	20%
19.2	58%

Tool and short instructional video available at:
<https://driveelectric.gov/school-districts>

Cold Weather Impacts on Electric School Buses Fact Sheet

A handout that explains how cold weather impacts electric school buses.

<https://driveelectric.gov/school-districts>



TECHNICAL ASSISTANCE HELP SHEET

Cold Weather Impacts on Electric School Buses



New Electric School Bus Familiarization Webinar Series

Brought to you by:

- Joint Office of Energy and Transportation
- National Renewable Energy Laboratory (NREL)
- International Transportation Learning Center (ITLC)
- School bus manufacturers

- Four-part module-based series for operators, technicians, and other school bus fleet members.
- Learn fundamentals of electric school bus (ESB) technology.
- Live Q&A during each session.
- Recordings with testing materials for internal training programs.



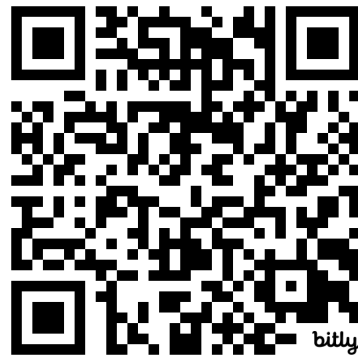
Register for ESB Familiarization Webinars

Webinar topics:

- Operator Overview (April 10)
- Electric School Bus Technology Overview
- High Voltage Safety Considerations
- Charging Considerations

Register at:

driveelectric.gov/webinars



Register for the April 10 Webinar:

Overview for Electric School Bus Operators

driveelectric.gov/webinars/electric-school-bus-operators

EPA Clean School Bus Webinars

Upcoming EPA/JO Technical Assistance Webinar Series
Register at: <https://www.epa.gov/cleanschoolbus/events-related-clean-school-bus-program>

Event Date	Event Name
3/27/2024	How to Develop a Training Plan And Where to get Certified Training
4/24/2024	Charging Best Practices, Incorporating Charge Management, Solar, Battery Storage, and Vehicle-to-Grid (V2G)
5/22/2024	Equipment Overview, Future Proofing, EVSE RFPs, and Best Practices
6/26/2024	Differences Between ESBs and ICE Buses, ESB Maintenance, and Bus RFP Best Practices

Event Date	Event Name
7/24/2024	Battery Overview, Recycling/End-of-Life Options, and Warranties
8/28/2024	Building a Case For ESBs in your Fleet including Benefits, Total Cost Of Ownership (TCO), and Emissions Calculators
9/25/2024	Electrification Process including a Step-by-Step Guide for New Adopters



Clean Bus Planning Awards (CBPA)

Mike Jones, NREL

CBPA Program Overview

- Funded by the Joint Office and managed by NREL.
- Free technical assistance for comprehensive and customized fleet electrification transition plans.
- Applications open on a rolling basis.
- Eligible fleets generally includes fleets eligible for EPA Clean School Bus and FTA Low-No Grant funding.
- Deployment assistance also available at the completion of the plan, for a period not to exceed 3 years (monthly check in calls, annual plan updates, RFP development, training support etc.)



The Clean Bus Planning Awards Program

Offering **free technical assistance** for developing comprehensive and customized **electrification plans** for transit and school **bus fleets** serving all types of communities.



Who Qualifies?

School bus and transit bus fleets that are eligible under the EPA Clean School Bus Program and FTA Low or No Emission Grant Program. Visit driveelectric.gov/clean-bus-planning-awards for eligibility and priority criteria.



Why Apply?

- Get a step-by-step plan tailored for your fleet electrification.
- Increase the likelihood of success in getting your electrification project funded and off the ground.
- Opportunity to receive free deployment assistance, closing the gap between planning and implementation.



How to Apply?

Visit driveelectric.gov/clean-bus-planning-awards and fill out an application today. The program accepts new applicants on a rolling basis.

driveelectric.gov/clean-bus-planning-awards



Electrification Transition Plans - What's Included*?

- Existing fleet baseline analysis
- Vehicle electrification feasibility analysis
- Infrastructure assessment and optimization
- Procurement and project staging
- Financial analysis/modeling
- Emissions analysis/modeling
- Stakeholder analysis
- Workforce considerations
- Recommended next steps



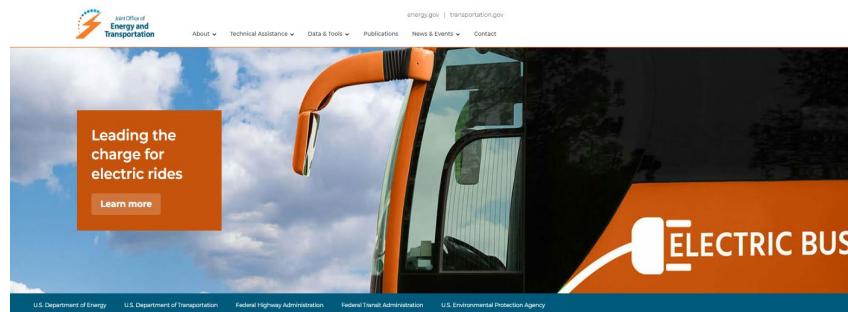
**Plans tailored to the specific circumstances and needs of the fleet.*



Questions and Answers

Resources

- Clean Bus Planning Awards - <https://driveelectric.gov/clean-bus-planning-awards>
- RideElectric.gov - <https://driveelectric.gov/ride>
- DriveElectric.gov Technical Assistance - <https://driveelectric.gov/technical-assistance>
- FTA Low or No Emission Vehicle Program - <https://www.transit.dot.gov/lowno>
- EPA Clean School Bus Program - <https://www.epa.gov/cleanschoolbus>



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[Contact us](#) [Technical assistance](#)



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Thank you!

Today's Presentation:
Zero-Emission Bus Resources

Didn't get your question answered?
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The webinar recording and slides will
be posted within a few weeks here:
driveelectric.gov/webinars