

Training & Workforce Development w/ Joint Office of Energy and Transportation

March 27, 2024 @ 1 PM ET

Office of Transportation and Air Quality U.S. Environmental Protection Agency

## **Zoom Webinar Logistics**



- This presentation is being recorded. The slides and recording will be posted to <a href="mailto:epa.gov/cleanschoolbus">epa.gov/cleanschoolbus</a> as soon as they are processed for posting.
- All attendees are in listen-only mode. Audio is available through your computer speakers or by phone. The presenter will ask you to come off mute if applicable.
- Live transcription: Live captioning is available by clicking the "Live Transcript" icon.
- Live interpretation: Live Spanish interpretation is available by clicking the "Interpretation" icon and selecting Spanish. Click "Mute Original Audio" to mute English audio when listening in Spanish.
- Questions: Use the Q&A feature to ask questions during the presentation. We will address as many as possible after the presentation. If we are unable to answer your question at this time, we will list all questions and answers in the Q&A document available on our website. You can also submit written questions to the EPA Clean School Bus Program helpline at <a href="mailto:cleanschoolbus@epa.gov">cleanschoolbus@epa.gov</a>.
- Chat: Chat is disabled, but the presenters might share links through the chat feature.
- Reactions: Reactions are enabled for you to interact with the presenter.

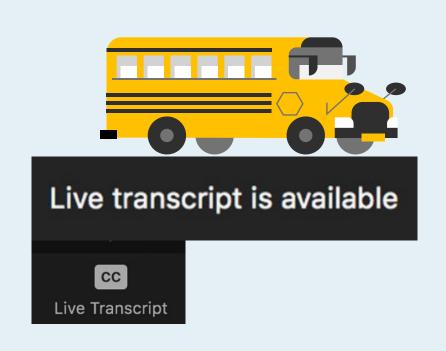
## Logística de seminarios web en Zoom



- **Esta presentación es grabada.** Las diapositivas y la grabación se publicarán en <u>epa.gov/cleanschoolbus</u> tan pronto sean procesadas para su publicación.
- Todos los asistentes se encuentran solo en modo escucha. Hay audio disponible a través de los altoparlantes de su computadora o por teléfono. El presentador le pedirá que quite el silencio si corresponde.
- Transcripción en vivo Hay subtítulos disponibles haciendo clic en el icono "Live Transcript" [Transcripción en vivo].
- Interpretación en vivo: Hay interpretación en español disponible haciendo clic en el icono "Interpreting" [Interpretación] y seleccionando el español. Haga clic en "Mute Original Audio" [Silenciar audio original] para silenciar el audio en inglés al escuchar en español.
- Preguntas: Use la función Q&A [preguntas y respuestas] para hacer preguntas durante la presentación. Abordaremos todas las que sea posible después de la presentación. Si no podemos contestar su pregunta en este momento, anotaremos todas las preguntas y respuestas en el documento Q&A correspondiente disponible en nuestro sitio web. Puede también enviar preguntas por escrito a la línea directa de ayuda del Programa de Autobuses Escolares Limpios de la EPA en cleanschoolbus@epa.gov.
- Chat Se encuentra inhabilitado el chat, pero los presentadores podrían compartir enlaces a través de la función de chat.
- Reacciones: Las reacciones están habilitadas para que usted interactúe con el presentador.

# Live Transcription / Transcripción simultánea

Live Spanish Interpretation / Interpretación simultánea







## **AGENDA**



# Overview of the Clean School Bus (CSB) Program

**CSB Technical Assistance Resources** 

Training & Workforce Development w/ JOET

Q&A

Next Steps and Resources

## Overview of the Clean School Bus Program

## **Bipartisan Infrastructure Law**

 Under Title XI: Clean School Buses and Ferries, the Bipartisan Infrastructure Law (BIL) provides \$5 billion over five years (FY22-26) for the replacement of existing school buses with zero-emission and clean school buses.

## **Future Funding Opportunities**

- EPA has offered rebates and grants in past funding opportunities.
- EPA anticipates opening a CHDV grant program in Spring 2024 and a CSB rebate program in Fall 2024.











## Why Clean School Buses?



CSBs emit zero or low tailpipe emissions.

#### **Cleaner Air**

CSBs result in cleaner air on the bus, in bus loading areas, and in the communities in which they operate.

#### **Cost Savings**

Replacing older diesel school buses with CSBs often reduces maintenance and fuel costs.

#### Resiliency

Vehicle-to-Grid (V2G) capable CSBs can provide power to the grid or buildings during power shutdowns.

## Improved Student Attendance & Achievement

The transport of students with CSBs has been linked to student attendance and academic achievement improvements.

## **CSB Program Technical Assistance Resources**



#### Technical Assistance

- Clean School Bus Technical Assistance
- Charging and Fueling Infrastructure Resources
- Clean School Bus Case Studies
- NEW <u>Tax Credits</u>



#### Workforce Development

- Bus Manufacturer Job Quality and Workforce Development Practices
- Workforce Development and Training Resources



#### Educational Materials

- Clean School Bus Reports to Congress
- · Benefits of Clean School Buses
- Resources to Engage Your Community





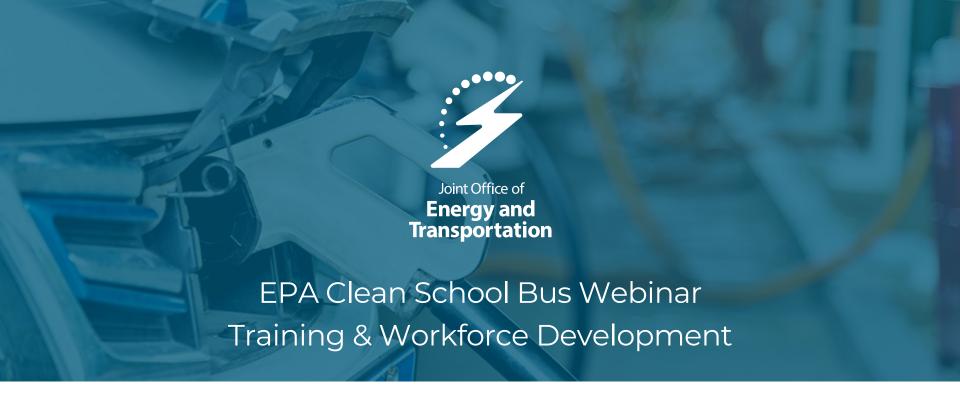
#### **Technical Assistance Webinar Playlist**



Technical Assistance via the Joint Office of Energy and Transportation







Ryan Frasier, NREL March 27, 2024

driveelectric.gov

#### 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.

#### **Key Resources**

<u>DriveElectric.gov</u> <u>AFDC.energy.gov</u>





#### **Examples of How We Can Help**

Coordinating with electric utilities

Identifying available funding and incentives

Analyzing charging infrastructure needs

Conducting route analysis and planning

Conducting training and workforce development

Opportunities for resiliency (V2X)

Analyzing energy needs and grid impact

Identifying solar and battery storage opportunities

## Clean Bus Planning Awards (CBPA) Program Overview

- Funded by the Joint Office and managed by the National Renewable Energy Laboratory (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.).



#### Learn more and apply



<u>driveelectric.gov/clean-bus-planning-awards</u>

#### **Electrification Transition Plans - \*What's Included?**

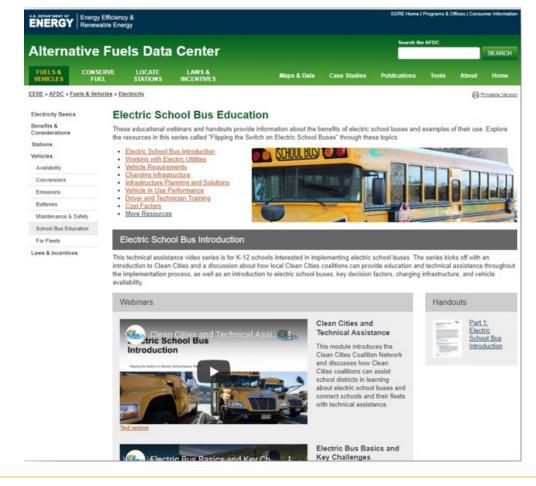
- Existing fleet baseline analysis
- Vehicle electrification feasibility analysis
- Infrastructure assessment and optimization
- Procurement and project staging
- Financial analysis/modeling
- Emissions analysis/modeling
- Stakeholder analysis
- Workforce considerations
- Recommended next steps



<sup>\*</sup>Plans tailored to the specific circumstances and needs of the fleet.

## 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.

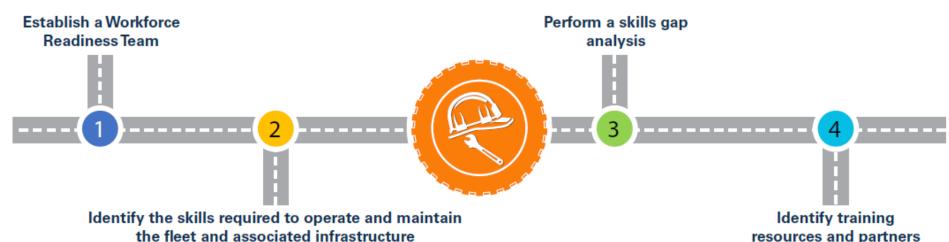


https://afdc.energy.gov/vehicles/electric\_school\_buses.html

#### **Develop A Plan**



# WORKFORCE PLANNING RECOMMENDATIONS AND RESOURCES



https://www.epa.gov/cleanschoolbus/workforce-development-and-training-resources

#### **Electrification Partners**



Bus Manufacturer/ Dealer

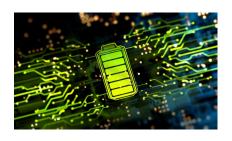


Software Integrator or EV Service Provider

Your partners in electrification should be the main source for training.

#### **Best Practices**:

- Include training in contracts.
  - TWC: Training RFP Language
- Ask to see materials.
- Talk with ESB fleets/ references.



Turnkey or As-a-Service provider



Charger Manufacturer

#### **Basic Safety and Electric School Bus Familiarization**

#### Who

Drivers

- Dispatch
   First responders
- Technicians
   Managers
- Support staff



#### What

- High level overview of electric school buses (ESBs)
- Identifying labels and stickers
- High voltage (HV) hazards and protection





#### Where

- Original equipment manufacturer (OEM)/Dealer
  - OEM websites and YouTube sites
- ESB Familiarization Webinar Series (beginning April 2024)
  - Register at <u>driveelectric.gov/webinars</u>

## Why is ESB Training Important?

Teach safe practices

Driver comfort and range anxiety

Maximize vehicle range

Ensure a smooth transition

Ensure staff is educated on new technology



#### Identify for each type of training:

Who

Who should attend the training and/or learn the material.

What

What topics should the training include.

Where

Where can you find the different types of training.

# New Electric School Bus Familiarization Webinar Series

#### Brought to you by:

- Joint Office
- 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 technology.
- Live Q&A during each session.
- Recordings with testing materials for internal training programs.



# Register for ESB Familiarization Webinars

Register at:
<a href="mailto:driveelectric.gov">driveelectric.gov</a>
/webinars

#### Webinar topics:

- Operator Overview (April 10, 2024)
- Electric School Bus Technology Overview
- High Voltage Safety Considerations
- Charging Considerations



## **Driver/Operator Training**

## What

- Pre-trip routine
- Start up procedures
- Efficient driving
- Regenerative braking



- Instrument cluster and icons
- Range and state-of-charge (SOC)
- Heating, cooling, and pre-conditioning
- How to charge
  - Green: Charger is free
  - White (blinking): Vehicle is connected and charging
  - O White (solid): Vehicle is connected and in line to charge
  - ⊗ Red, Blue or Off: Report to the shop

## **Driver/Operator Training**

#### Where

- 1. OEM/Dealer typically given on delivery
  - Consider train the trainer or mentor program
- 2. Online Resources
  - ESB Training Connections: Best Driving Practices (VA Clean Cities)
  - ESB Training (A-Z Bus Sales)
- 3. Operator Overview ESB Familiarization Webinar (April 10, 2024)
  - Register at: <u>driveelectric.gov/webinars</u>
  - Operators will have live Q&A will OEMs

## **Technician Training – Manufacturer Specific**

#### What

- Component overview HV battery, battery thermal management system (BTMS), air compressor, etc.
- Personal protective equipment (PPE)
- Lockout/Tagout procedures
- HV disconnect and measurement
- Preventive maintenance task and schedule
- Troubleshooting and diagnostic codes

**Technician Training – Supplemental Skills** 

#### What

- Safety is first
- Principles of Electricity/Electrical Schematics
- Personal Protective Equipment (PPE) and Lock Out/Tag Out
- Electrical Measurement Devices
- Diagnostics/Computer Skills



 Existing ICE Skills – Suspension, Steering, Brakes, Pneumatics, CAN, Multiplexing, Low-Voltage Systems

## **Technician Training - Supplemental**

## Where

NFPA 70E – Standard for Electrical Safety in the Workplace

Automotive Service Excellence (ASE) xEV, <u>Level 1 & 2 xEV</u>

Standards and Certifications

SAE, <u>Course Catalog</u>

 Axle Mobility free online EV training for safety, electrical awareness

Local technical colleges

## **Technician Training - Supplemental**

## Where

• ESBI ESB Technician Training Database

- State workforce dept or even DOT/DOE
  - Michigan Ex: <u>EV Jobs Academy</u> and <u>employer vetted curriculum</u>

 Clean Cities and Communities <u>https://cleancities.energy.gov/</u>





## **Charging Station Training**

#### Who

Drivers

- Technicians
  - Managers
- Dispatch First responders
  - Support staff



#### What

- How to charge
- Safety and hazard overview
- Cable management

- Preventive maintenance
  - Repairs
- Monitoring and alerts

Software

## **Charging Station Training**

#### Where

- Charger manufacturer/Bus OEM/Dealer/EV Service Provider (EVSP)
- Electric School Bus Initiative's <u>All About Charging Infrastructure Video Guides</u>
- EVITP, <a href="https://evitp.org/">https://evitp.org/</a> for licensed electricians
  - NOTE: this is required for any electricians working on a ESB project under 2023 CSB grants and rebates.



- ESB Familiarization Webinar Module 4
  - August/September 2024 registration coming soon!
- Clean Cities & Communities coalitions and state departments of transportation/state energy offices
  - https://www.fhwa.dot.gov/environment/nevi/ev\_deployment\_plans/

## First Responder Training

## What

- Invite first responders to all electric school bus trainings.
- How to identify electric school buses.
- Emergency shut down procedure.





- HV component layout
  - Emergency Response Guides: <u>NFPA</u> or <u>ESA</u>
- How to move the bus
- Submerged vehicles, <u>NFPA Fact</u>
   Sheet

#### **First Responder Training**

## Where

- Alternative Fuels Data Center. **EV Safety Training Resources** for First and Second Responders
- National Fire Protection Association EV Safety Online Training
- Clean Cities & Communities coalitions cleancities.energy.gov/



#### Alternative Fuel Vehicle Emergency Response Guides and General EV Safety/Fire Resources

The following include links to emergency response guides and general safety and fire resources for alternative fuel vehicles.

provider and content. This list includes both free and for-fee resources.

the accuracy, reliability, completeness, or usefulness of this information.

Conversions

Maintenance & Safety

 Emergency Response School Bus Education

Emissions

For Fleets

For Consumers Laws & Incentives Vehicle-Specific Emergency Response Guides – National Fire Protection Association (NFPA) website with links to U.S. vehicle emergency

This list is provided for informational or educational purposes only. The Alternative Fuels Data Center makes no warranties or claims as to

- . Vehicle-Specific Emergency Response Guides Energy Security Agency (ESA) website with links to U.S. vehicle emergency response
- . Submerged Hybrid/Electric Vehicles One-page bulletin published by the NFPA providing guidance to emergency responders on submerged and previously-submerged hybrid vehicles/EVs.
- . Electric and Hybrid Vehicle Quick Reference: Fire Service Edition Electric quick reference card for fire services published by NFPA.
- Interim Guidance for Electric and Hybrid-Electric Vehicles Equipped With High-Voltage Batteries (A. (Law Enforcement/Emergency Medical Services/Fire Department) - One-page document published by the National Highway Traffic Safety Administration (NHTSA) providing guidance to first responders specific to crash damage and high-voltage battery fires in EVs.
- Interim Guidance for Electric and Hybrid-Electric Vehicles Equipped With High-Voltage Batteries (A) (Towing and Recovery Operators and Vehicle Storage Facilities) - One-page document published by NHTSA providing guidance to towing/recovery/storage personnel specific to recovering, transporting, and storing EVs.
- Safety Risks to Emergency Responders from Lithium-Ion Battery Fires in EVs (Report Pland Video Summary) Eighty-page safety report and video summary published by the National Transportation Safety Board describing the safety risks to emergency responders from
- IAFC Bulletin: Fire Department Response to Electrical Vehicle Fires B One-page bulletin published by the International Association of Fire Chiefs (IAFC) outlining fire department response information specific to EV and hybrid vehicle fires

very life and the large season as a second second

#### **Tow Staff**

#### What

- How to identify electric school buses.
- Emergency shut down procedure.

- How to load and transport electric school buses (remove drive shaft/flatbed).
- Considerations for damaged batteries and submerged vehicles (how/where to store).

#### Where

- OEM/dealer
- NFPA video, <u>EV Safety Tow and Salvage Edition Online Training</u> (NFPA)

## **Other Training Considerations**

Refresher training

Staff turnover

Train the trainer

Dispatch/routing

Weather extremes



Thank You

CleanSchoolBusTA@nrel.gov

driveelectric.gov



## **Question & Answer Session**





Upvote and comment on questions similar to your own. Type your full thought so we can follow-up with an answer. Speak slowly and clearly for the captioner/interpreter.

cleanschoolbus@epa.gov epa.gov/cleanschoolbus

Upcoming JOET TA Webinars	
April 24, 2024	Charging Best Practices, Incorporating Charge Management, Solar, Battery Storage, and Vehicle-to-Grid (V2G)
May 22, 2024	Equipment Overview, Future Proofing, EVSE RFPs, and Best Practices
June 26, 2024	Differences Between ESBs and ICE Buses, ESB Maintenance, and Bus RFP Best Practices
July 24, 2024	Battery Overview, Recycling/End-of-Life Options, and Warranties
August 28, 2024	Building a Case For ESBs in your Fleet including Benefits, Total Cost Of Ownership (TCO), and Emissions Calculators
September 25, 2024	Electrification Process including a Step-by-Step Guide for New Adopters





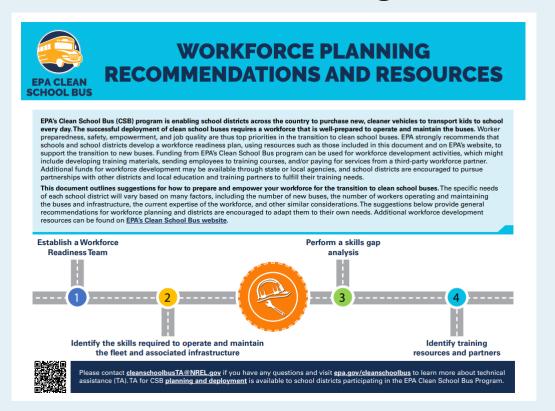
## Clean Bus Planning Awards (CBPA) Program

- In addition to the free technical assistance provided by NREL for CSB applicants and selectees, the \$5M Clean Bus Planning Awards Program provides FREE technical assistance to create comprehensive and customized bus electrification plans for fleets across the United States.
- Applications for assistance are open on a rolling basis through Sept. 30, 2024, giving fleets an opportunity to fully understand their needs before applying for support. This new program will reduce the burden of electrification by helping fleet managers create a step-by-step plan to transition their bus fleet.
- Learn more at <a href="https://driveelectric.gov/clean-bus-planning-awards">https://driveelectric.gov/clean-bus-planning-awards</a> and <a href="https://www.nrel.gov/news/program/2024/clean-bus-planning-awards-support-fleet-electrification-with-custom-transition-plans.html">https://www.nrel.gov/news/program/2024/clean-bus-planning-awards-support-fleet-electrification-with-custom-transition-plans.html</a>





## **NEW Workforce Planning Resource**









## Summary



#### 2023 CSB Rebates

- EPA anticipates announcing 2023 Rebate selections in late April or early May 2024.
- Dates and topics for future webinars are on our website under the 'Webinars' section.

#### **Future Funding Opportunities**

- EPA encourages school districts to consider which competition structure (grants or rebates) best suits their needs.
- EPA anticipates opening a CHDV grant program in Spring 2024 and a CSB rebate program in Fall 2024.

#### Resources

- The Joint Office of Energy and Transportation (cleanschoolbusTA@nrel.gov)
- The CSB helpline (cleanschoolbus@epa.gov)

#### **Stay in Touch**

- Learn more about the EPA Clean School Bus Program at epa.gov/cleanschoolbus
- Learn more about the JOET Clean Bus Planning Awards Program at <a href="mailto:driveelectric.gov/clean-bus-planning-awards">driveelectric.gov/clean-bus-planning-awards</a>
- Sign up for the CSB listserv at <a href="https://lp.constantcontactpages.com/su/dgrhRed/cleanschoolbus">https://lp.constantcontactpages.com/su/dgrhRed/cleanschoolbus</a>



cleanschoolbus@epa.gov epa.gov/cleanschoolbus