Electric School Bus Network California Forum

March 5, 2025



Forum Agenda

	01.	ZESBI Part C
March 5, 2025	02.	Infrastructur
	03.	Q&A
	04.	Summary ar





C Updates

re 101

nd Closing





Electric School Bus Network

The Electric School Bus Network accelerates nationwide school bus fleet electrification through peer-to-peer networking and dialogue-driven forum **meetings** for school districts, advocacy organizations, government organizations, and industry representatives. The ESB Network provides access to educational tools, resources, and subject matter experts to help **support the electric school bus fleet** transition.



Meet the ESB Team



Rachel Chard Deputy Director



Michelle Hanson Program Manager



Ian Fried Lead Project Manager



Alise Crippen Lead Project Manager



Project Manager



Skyler Potocek Project Manager



Sarah Stalcup-Jones Project Manager



Ibraheem Ameer Project Manager



Emily Gasca Project Manager





Katelyn Tomaszewski



Paige Seles Project Manager



Alberto Santos-Davidson Project Manager





Chrystal Ales Project Manager





Liza Walsh Project Manager



Electric School Bus Network Forum Meetings

- Forum meetings are not webinars they are ongoing discussions where participation is encouraged
- **Goal: Ease the transition to electrify school bus fleets nationwide**
 - Facilitate conversations
 - Provide up-to-date information
 - Independent/Third Party Partner







Ice Breaker: What has been your greatest challenge with infrastructure?





ZESBI Part C Overview







Zero-Emission School Bus and Infrastructure (ZESBI) Project

ZESBI Application Part C - Step 1

Once Applicants have completed Application Part B and receive a notice on eligibility and funding status, the Applicant will move onto Application Part C -Step 1. At this stage, Applicants will select their new zero-emission school bus type and final charger quantity and type(s).



Zero-Emission School Bus and Infrastructure (ZESBI) Project

Applicant must submit the following **vehicle** requirements during Application Part C -Step 1:

• New ZE school bus type

Applicant must submit the following **infrastructure** requirements during Application Part C - Step 1:

- Final quantity and type of charger(s)
- Installation partner contact information
- Site verification form
- Utility confirmation
- Preliminary site plans
- Proof of license, insurance, and EVITP certification of contractor



Infrastructure Selection 101 with The Mobility House







Charger Selection for Electric School Bus Fleets



Power Level & Charging Speed: All About Vehicle Duty Cycles

Hypothetical:

Morning Route: 50 miles from 6:00-9:00am

Afternoon Route: 50 miles from 3:00-6:00pm



200 kWh Battery Efficiency = 2 kWh/mile



Units

Chargers: Power = Rate measured in kilowatts (kW)

Bus Batteries: Energy = Amount measured in kilowatt hours (kWh)

6:00pm

60-gallon tank

10 mpg



<u>?</u> kW Charger

Takeaway Dwell Time Charger Rec Charge Needed (kW) (hr) (kWh) *this is a starting place... be conservative!

Charger Type: AC vs. DC

AC Chargers:

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- Also known as Level 2 chargers
- AC \rightarrow DC conversion happens on vehicle
- Electrically simpler & cheaper equipment
- Lower power = slower charging

DC Chargers:

- Also known as Level 3 or "DC Fast Chargers"
- AC \rightarrow DC conversion happen at charging station
- Equipment is more sophisticated & expensive
- Higher power = faster charging



Electrical Terms

AC (Alternating Current) = Electric Grid DC (Direct Current) = Bus Battery



w	100 kW	120 kW
DC Chargers	5	
B		
15-120+ kW		



Charger Compatibility: Know Your Site & Your Fleet

Site Compatibility:

- In the US, common electrical services deliver power at 208V, 240V, or 480V
- See charger spec sheet to confirm **input** voltage = site voltage
- AC chargers input at 208/240V
- DC chargers (generally) input at 480V

Vehicle Compatibility:

- Interoperability testing is key
- Every make/model of electric school bus has a different maximum accepted charge rate
- Not every make/model can accept AC chargers

Charge Management System Compatibility:

- Open Charge Point Protocol (OCPP) is the **industry standard** for charger \rightarrow charge management communications
- Connection between charger \rightarrow software system can be made via wifi, cellular, or ethernet cable

Electrical Term

Electricity is delivered at different **voltages.** All equipment has input &

output voltages, and they must be compatible

Takeaway

Check specifications & ask partners/vendors to confirm

compatibility across ecosystem

Bidirectional Charging

- V2X-capable school buses & chargers are increasingly common in the market
- Currently only viable using DC chargers
- Common configurations ≈ 20-60kW range
- Equipment is typically more expensive, but may also reduce total cost of operations

Additional steps for deployment:

- Utility interconnection
- Enrollment in applicable utility program

Utility Programs

Example of <u>one</u> program in California:

- Emergency Load Reduction Program (ELRP)
- Offered by PG&E, SCE and SDG&E
- Compensation = \$2/kWh of load reduction and/or export during ELRP events
- (10) 3-hour events guaranteed May-Oct
- Day-ahead notice, no penalty for not participating
- Approved & funded through 2027



Takeaway

V2X uses cases are viable in many parts of

California

A Resource for Schools & Partners



THE MOBILITY HOUSE

ESB Charger Selection Guide

Key considerations when choosing chargers for your **Electric School Bus Fleet**

Download Whitepaper



Thank You!

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Questions?





Thank You for Participating

- A follow-up email will be sent **Friday, March 7** with the following:
 - Recording of the meeting
 - Copy of the slide deck
- The next ESB Network Newsletter will be sent on Tuesday, March 11
- The next National Forum will be April 9, 2025, from 1:002:00 p.m. ET
- Please email <u>schoolbusteam@calstart.org</u> with questions for our team





www.electricschoolbusnetwork.org



