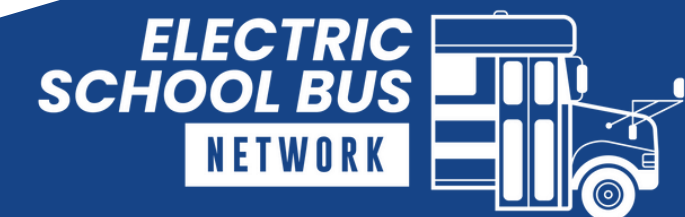


ELECTRIC SCHOOL BUS NETWORK NATIONAL FORUM

Infrastructure Planning

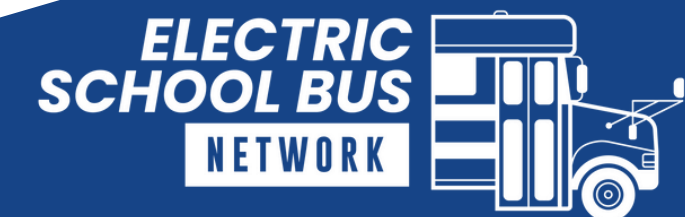
October 9, 2024



October 9, 2024

Forum Agenda

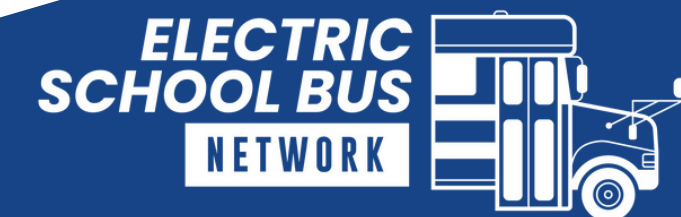
- 01.** Intro to the Electric School Bus Network
- 02.** Infrastructure Planning with Borg Warner
- 03.** Q&A
- 04.** Summary and Closing





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



Chrystal Ales
Lead Project Manager



Emily Gasca
Lead Project Manager



Sarah Stalcup-Jones
Project Manager



Alberto Santos-Davidson
Project Manager



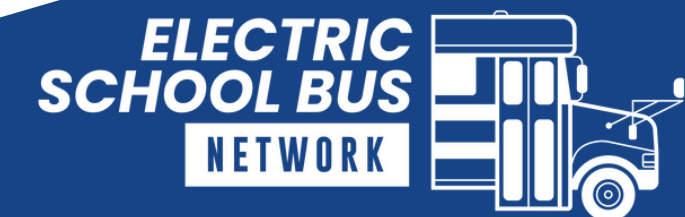
Liza Walsh
Project Manager



Katelyn Tomaszewski
Project Manager



Skyler Potocek
Project Manager



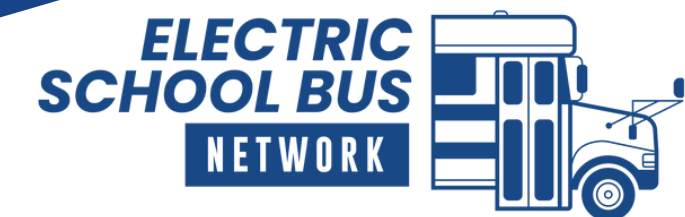
National Forum Visions for 2024-2025

Creating a space where stakeholders can come together to discuss advancing the ESB industry by:

- **Bringing together** stakeholders in ESB adoption from
 - Industry, agencies, operators, school districts, advocates, and more
- Presenting topics that **encourage discussion** on advancing the ESB industry



INFRASTRUCTURE PLANNING



BORGWARNER

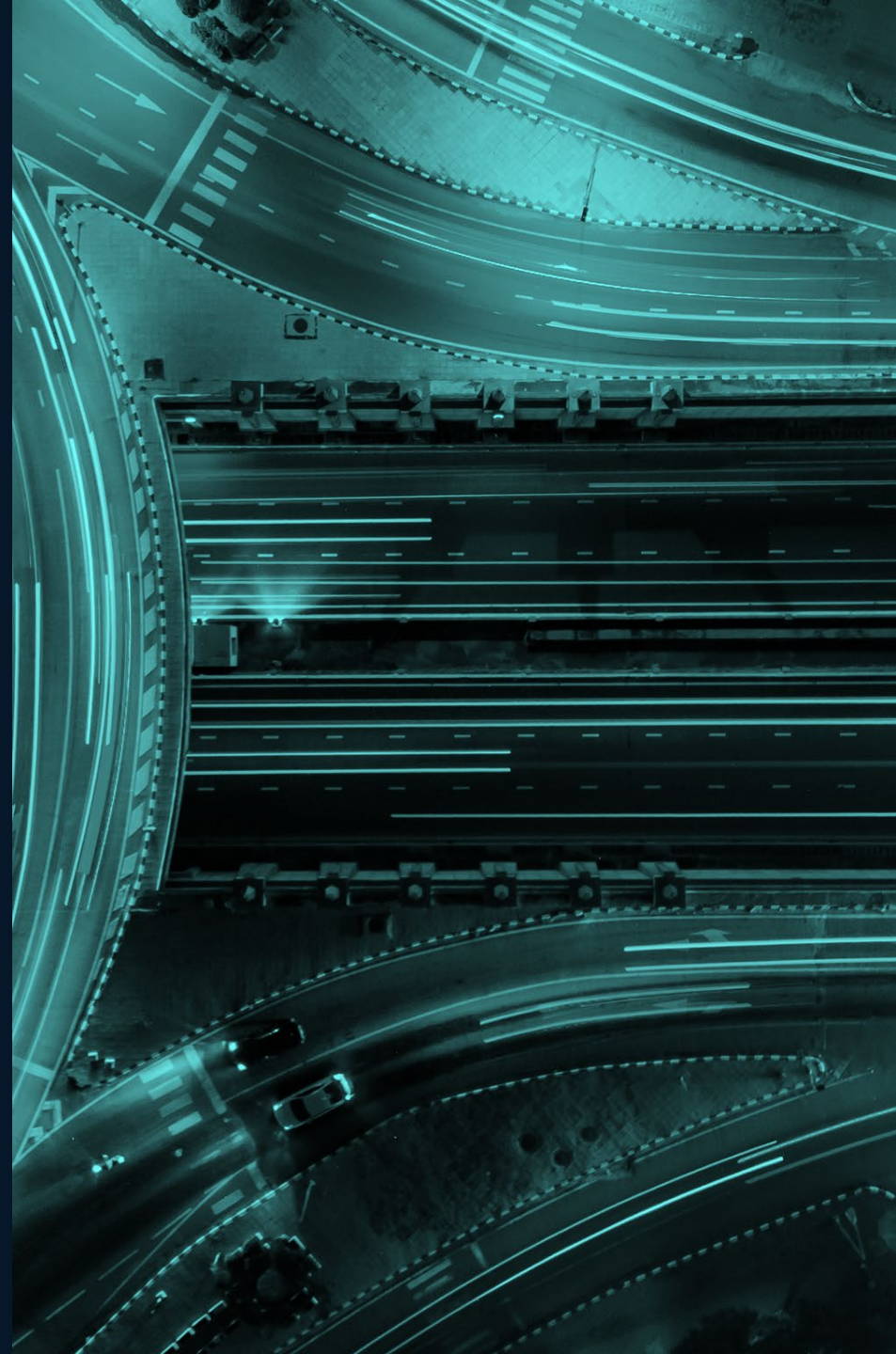
The art vs science of Infrastructure planning for School EV Bus Adoption

Vicki Hover, EV Grants Manager

BorgWarner

vhover@BorgWarner.com

October 9, 2024



How does BorgWarner recommend that School Districts approach infrastructure planning?

Day to Day POC for California Energy Commission
22-612 Electric School Bus Bi-Directional Infrastructure
grant

High percentage of BorgWarner's DCFC Chargers are
installed for ESBs.



Sequential Charging

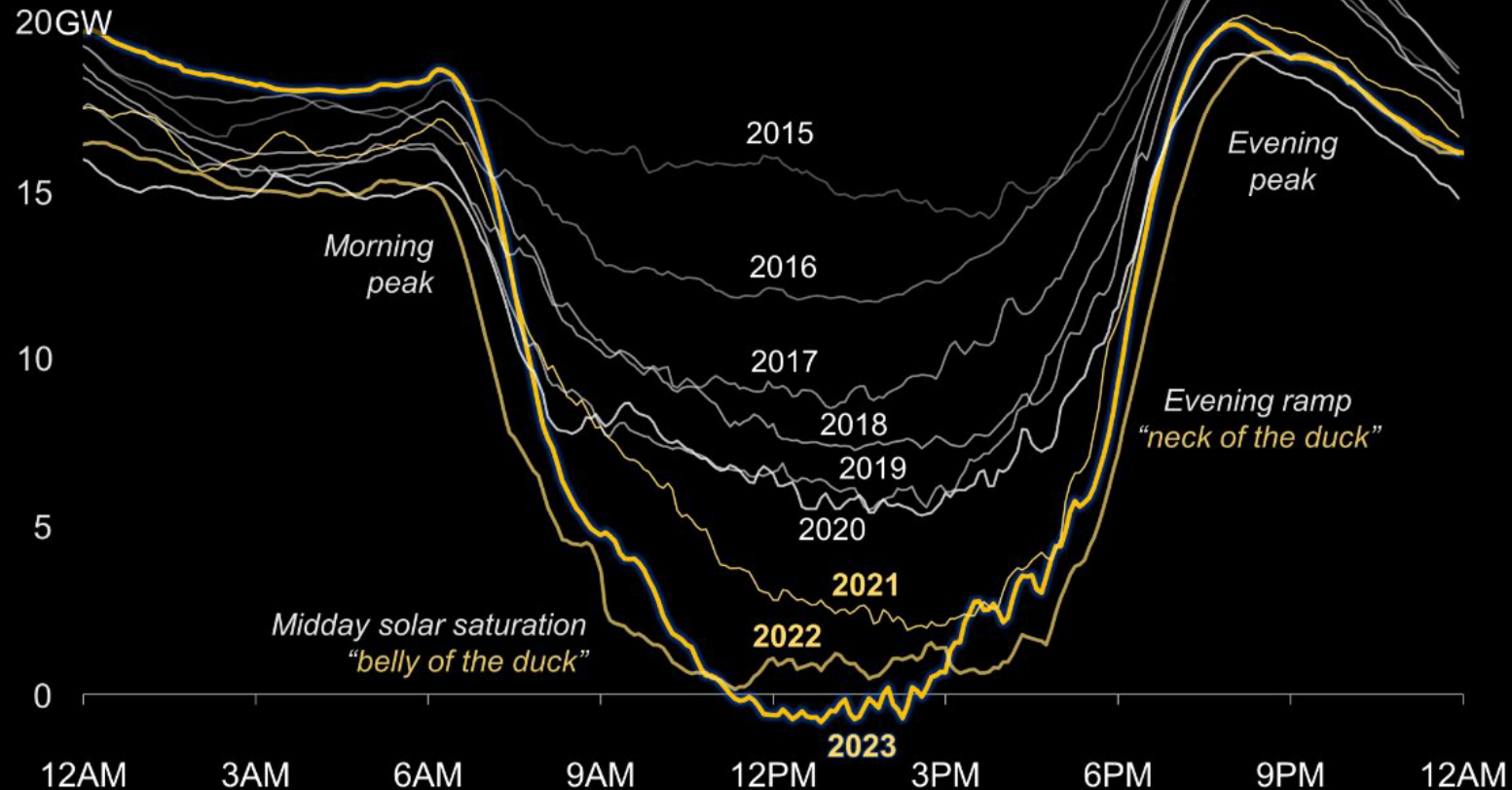
- Enables charging vehicles one at a time
- Target application: fleets such as school bus, vocational trucks for those with defined duty cycles and depot times
- Charges EV battery to max state of charge then sequentially charges next EV in line



California's duck curve hits record lows

California's duck curve hits record lows

Lowest minimum net load day each year in CAISO, 2015-2023



Source: CAISO | @BPBartholomew

Note: Net load shown is demand minus utility-scale wind and solar

The
Merit Order

- Over the course of a day duck curve shows the timing imbalance between peak demand and solar power generation.
- The duck curve emphasized the challenges associated with a growing solar resource imbalance.
- The net demand being reduced during the day and sharply increasing at sunset.

Highland Electric Fleets & BorgWarner

- Summers periods (one bus): 2021 & 2022
- Participation days: 70
- Participation hours: 158 (utility access to EV battery)
- MWh to Grid: 10.78
- V2G revenue: \$23,000

Key Stakeholders



Initial planning :

- consider policy landscape;
- analyze costs, benefits, stakeholders, and challenges;
- set actionable and trackable targets;
- repeat

Advanced considerations:

- implement a long-term infrastructure plan;
- formalize e-bus procurement plans based on resources available to reduce costs and risks;
- provide training to bus operators based on best practices and local experiences;
- plan for the end-of-use of the buses, including batteries.

Financial considerations:

- the school's budget for transportation, as well as the school's credit rating and credit history.
- the need for additional school buses and identify ways to offset the cost of ESB ownership
 - buses as a service
 - debt financing for electric school buses through alternative financing options

Considerations for infrastructure

- state of existing charging infrastructure,
- charging time available
 - top off midday for longer routes or colder weather,
- interconnection availability,
- renewables already on the grid
- need for storage capacity,
- age of the grid and state of modernization,
- V2G or V2X option/priority

Utility considerations –

Reach out to the local utility to find out how long will it take to get the required service upgrade for the potential EV infrastructure.

- If possible, provide the utility with your future proofing plan, which may influence how they meet the site's needs on day one. Utilities do future planning for distribution lines years in advance.

Additional Utility considerations:

- Where is the existing power for the facility coming from? Identify the utility pole (if accessible)
- What is the kVA of the current utility transformer feeding power to the site?

Municipality considerations

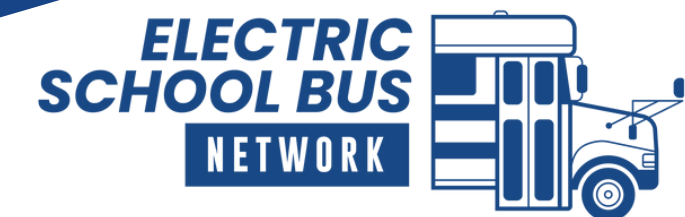
- Will the parking lot changes trigger a site plan amendment?
- Easements, both current and future, need to be executed for the infrastructure to be installed for the EV Chargers.
- Is the site in a Flood Zone? This could affect what model charger you install.
- Identify how adding the EV chargers will effect the existing parking, not only of the bus parking, but also the employees.

Additional Municipality considerations

- Existing drainage at the site. Does the parking lot have standing water in it?
- Where is the charging port on the bus?
- Front in, rear out parking?
- Where is the existing fuel station for the current buses on the site.

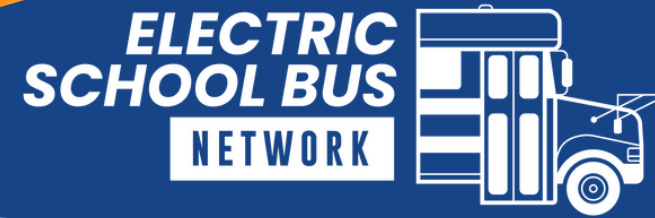
BORGWARNER

Q&A AND CLOSING



Any Questions?

Please raise your hand or type your questions for our speakers in the chat!



2024 EPA Clean School Bus Rebate Program

Funding levels include combined bus and EV charging infrastructure!

- Flexibility to determine the split between funding for the bus and supporting infrastructure
- Electric chargers and supporting equipment are subject to Build America, Buy America Requirements

For more info visit: epa.gov/cleanschoolbus

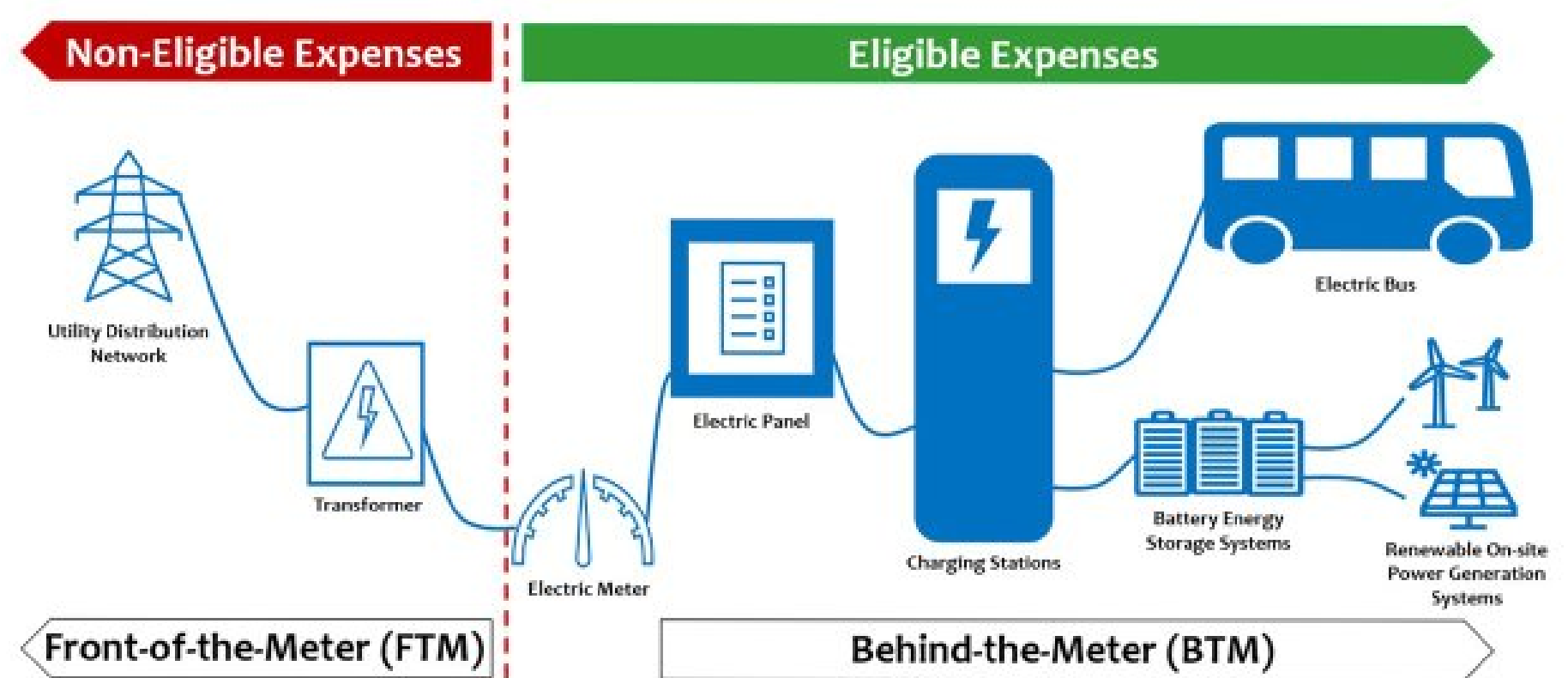


Image Source: EPA Clean School Bus Program

Applications due January 9th ,
2025 at 4:00pm ET

Save the Date!

- A follow-up email will be sent on Friday, October 11 with the following:
 - Recording of the meeting
 - Copy of the slide deck
- The next ESB Network Newsletter will be sent on **October 15**
- Mark your calendars for the next ESB Network National Forum:
 - **December 11, from 1:00–2:00 p.m. ET**
- Please email schoolbusteam@calstart.org with questions

