

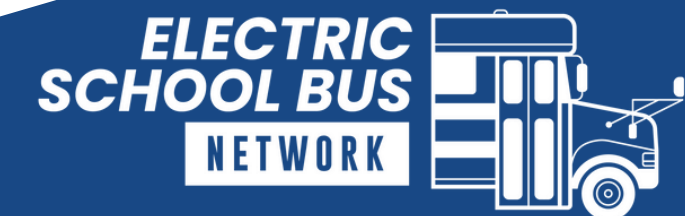
ELECTRIC
SCHOOL BUS
NETWORK



CHARGER SELECTION

Northeast/Mid-Atlantic Electric School Bus Working Group

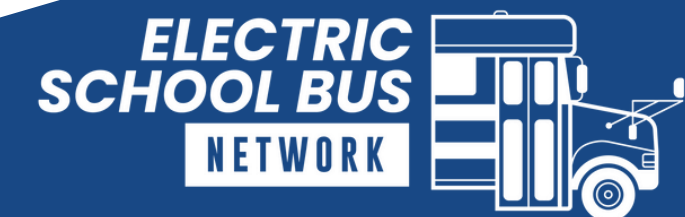
March 22, 2023 | 1:00 p.m. ET



MARCH 22, 2023

WORKING GROUP AGENDA

- 01.** Intro to the Electric School Bus Network
- 02.** Guest Speaker Introductions
- 03.** Selecting a Charger for Your ESB
- 04.** Q+A with Speakers
- 04.** Summary + Closing



MEET THE TEAM



Rachel Chard
National Program
Manager,
Electric School
Bus



Ian Fried
Lead Project
Manager



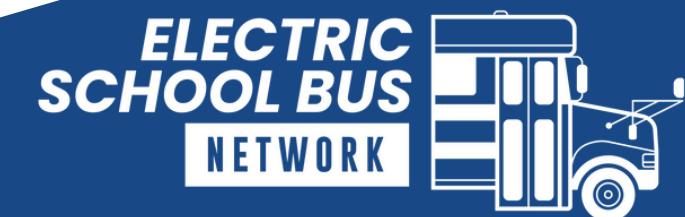
Tesi Bravo
Lead Project Manager,
Commercial ZEV
Infrastructure Incentive
Administration



Juan Espinoza
Project Manager,
Electric School Bus



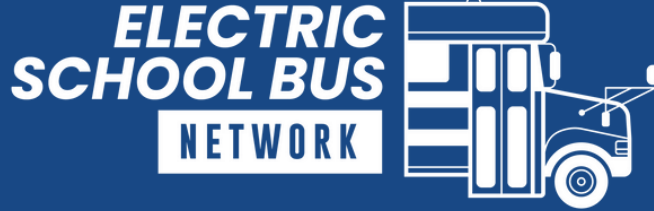
Liza Walsh
Associate Project
Manager



GLOBAL ORGANIZATION TRANSFORMING TRANSPORTATION FOR GOOD



 **Headquarters**  **Regional Office**

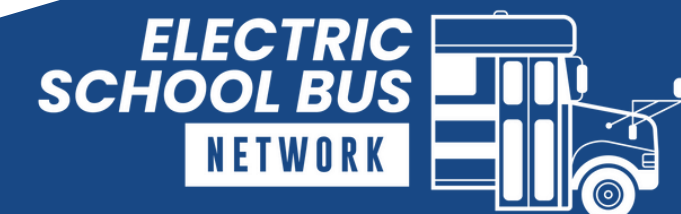




ELECTRIC SCHOOL BUS NETWORK

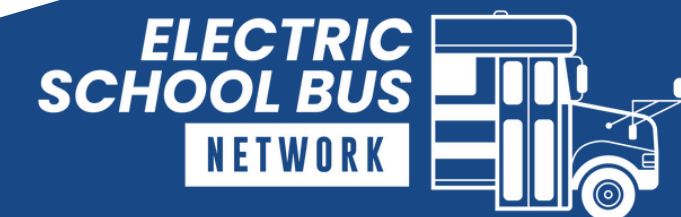
The Electric School Bus Network accelerates nationwide school bus fleet electrification through peer-to-peer networking and dialogue-driven working group meetings for school districts, advocacy and government organizations, and industry representatives. The ESB Network provides access to educational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

In Partnership with:



ELECTRIC SCHOOL BUS WORKING GROUPS

- **Working Groups are not webinars!**
- **They are ongoing, not static**
- Panels with industry subject matter experts
- **Goal: Ease the transition of the U.S. school bus fleet to electric**
 - Facilitate conversations
 - Provide up-to-date information
 - Independent/Third Party Partner



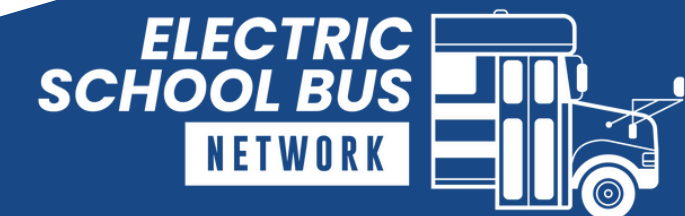
ELECTRIC
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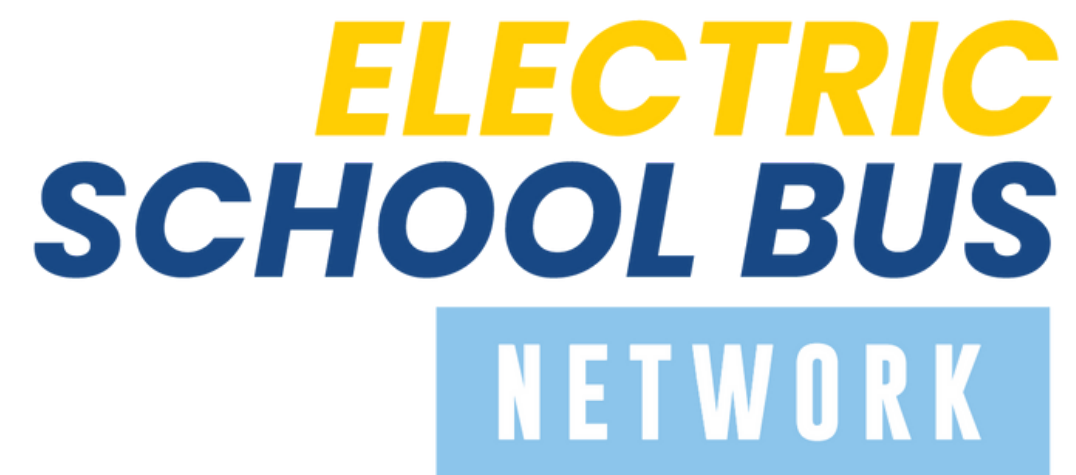


WORKING GROUP TOPIC: **Selecting a Charger for Your ESB**

Tesi Bravo

Lead Project Manager,
CALSTART





CHARGER SELECTION GUEST SPEAKERS

Tiffany Hammond

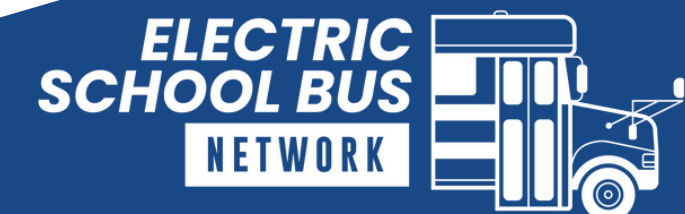
bp pulse fleet

thammond@bppulsefleet.com

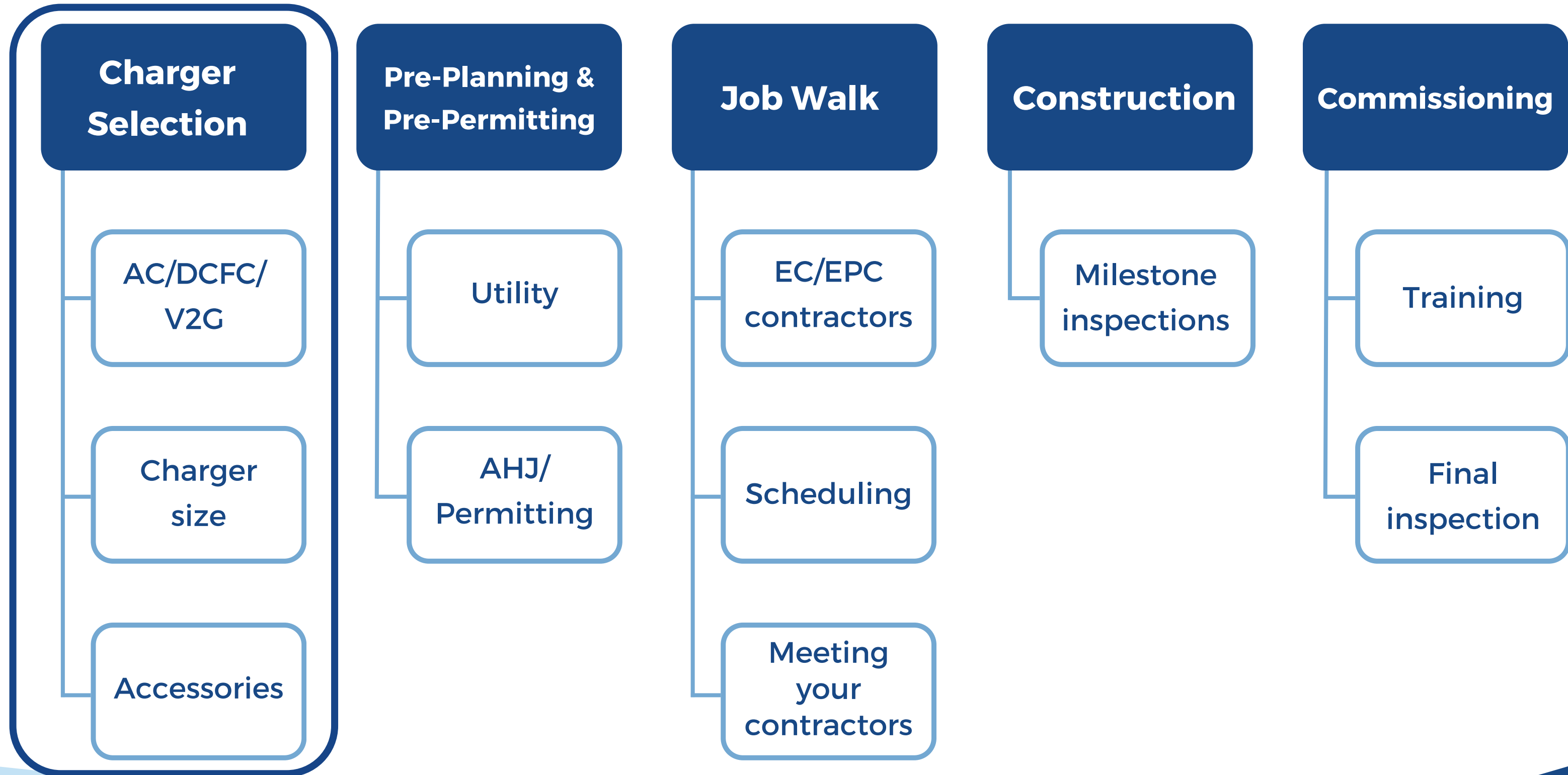
Jackie Hayes

Boston Public Schools

jhayes4@bostonpublicschools.org



PROJECT ROADMAP

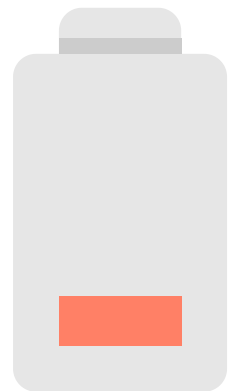


SETTING THE PROJECT UP FOR SUCCESS

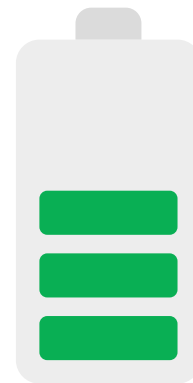
Charger Types, Size, and Connector Cables



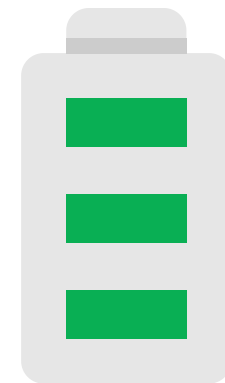
AC



DCFC



V2G



AC



TYPE 1

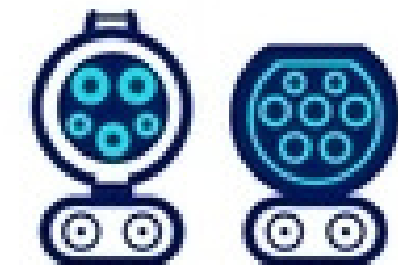


TYPE 2

DC



CHAdeMo



CCS COMBO

GENERAL CHARGER TYPES

AC Chargers		DC Fast Chargers		Vehicle to Grid (V2G)	
Pros	Cons	Pros	Cons	Pros	Cons
Easy install	Slow charge time	Fast charge time	Complex install	Future planning	New technology
Low project demand	Plug connectors	Networking options	High project demand	Networking Options	Complex installation
Accessories	Networking options	3Ph options	Long lead times	3Ph options	
Low maintenance	On board charger (OBC)		Large footprints	Power flexibility	
Small lead time					
Small footprint					



CHARGER ACCESSORIES

- Cable management
- Mounting Systems
- Software
- Signage
- Security
- Communications Hardware
- Maintenance
- Networking
- Demand and management software
- Fleet management software

PROJECT ROADMAP

Charger Selection

AC/DCFC/
V2G

Charger
size

Accessories

Pre-Planning & Pre-Permitting

Utility

AHJ/
Permitting

Job Walk

EC/EPC
contractors

Scheduling

Meeting
your
contractors

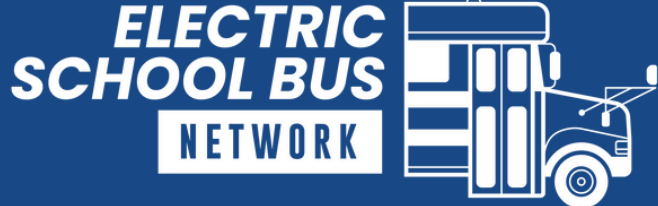
Construction

Milestone
inspections

Commissioning

Training

Final
inspection

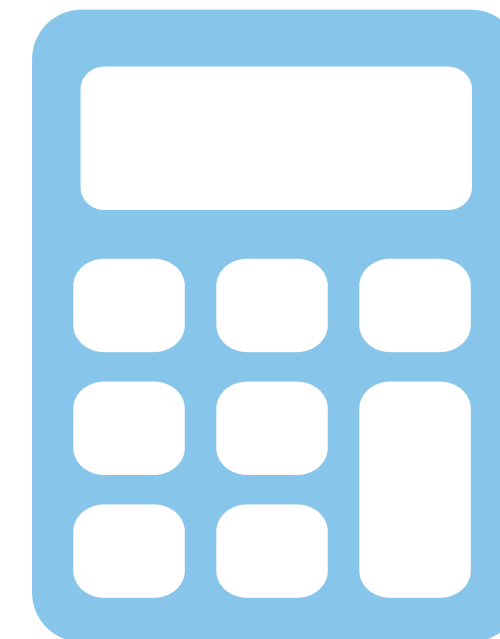


WHAT IS NEEDED FOR PRE-PLANNING?

Station Electrical Output	
Max Output Power	62.5 kW
Output Voltage, Charging	200-1000V DC
Max Output Current	156A
Max Modules per Station	2

- **Project Demand**
 - Charger Size (Output Rating kW)
 - Quantity of Chargers
- **Service Size & Voltage (if possible)**

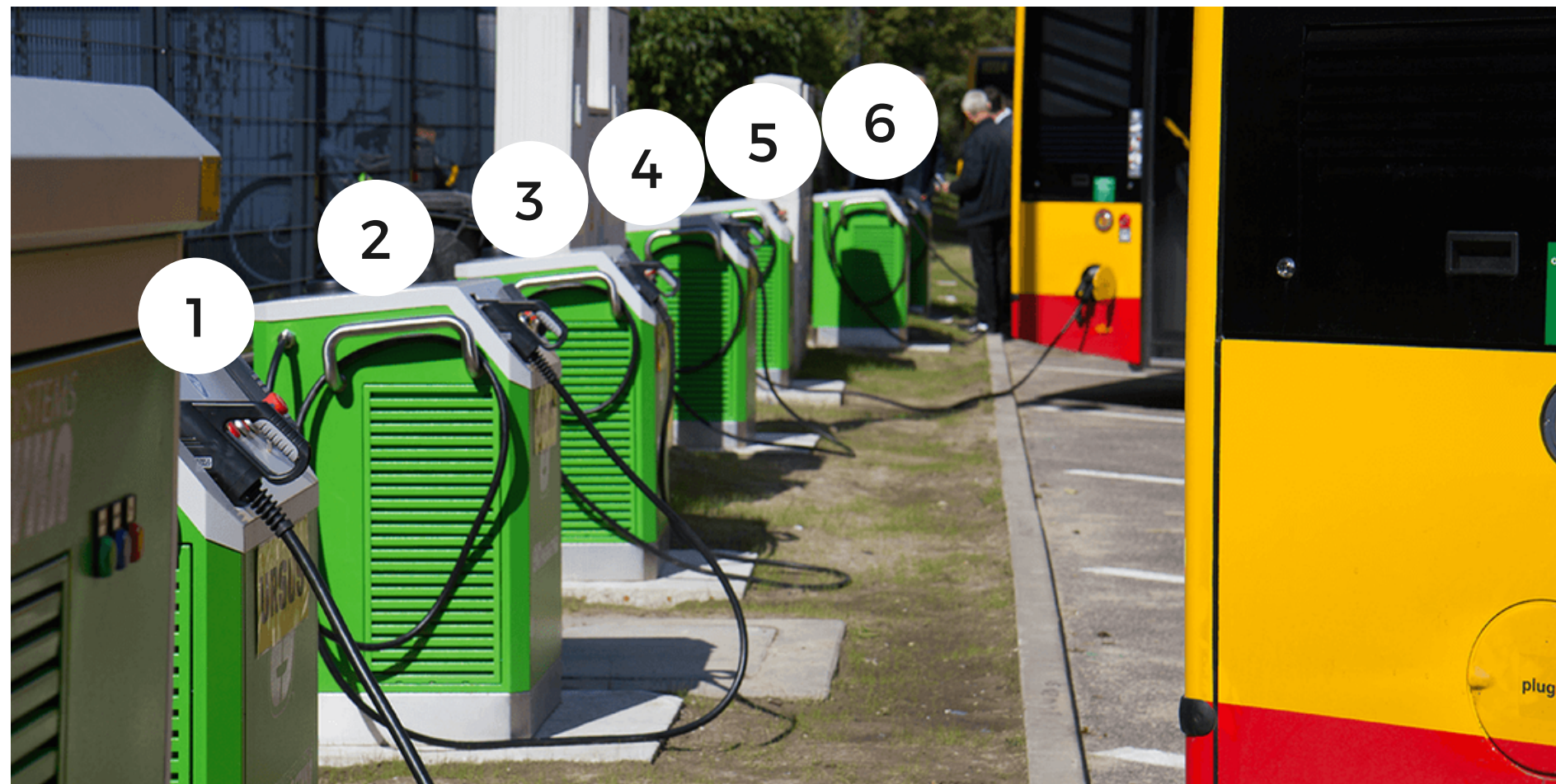
Specifications	Terra 54	Terra 54 HV
Electrical		
Max output power	50 kW continuous	



WHAT IS PROJECT DEMAND?

Project Demand = Charger Size x # of Chargers

50kW Charger

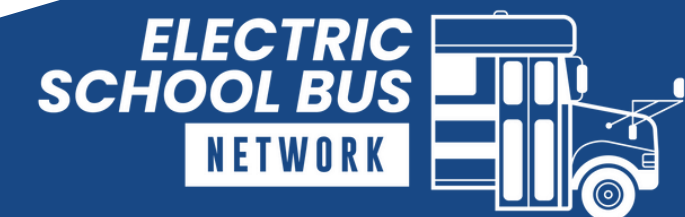


Project Demand:
50kW Charger x 6 chargers =
300kW



RESOURCE

- [SCE Approved Product List | Utility](#)
Approved Chargers



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WORKING GROUP TOPIC:
Selecting a Charger for Your ESB



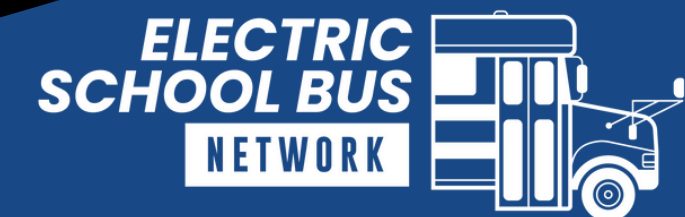
Tesi Bravo

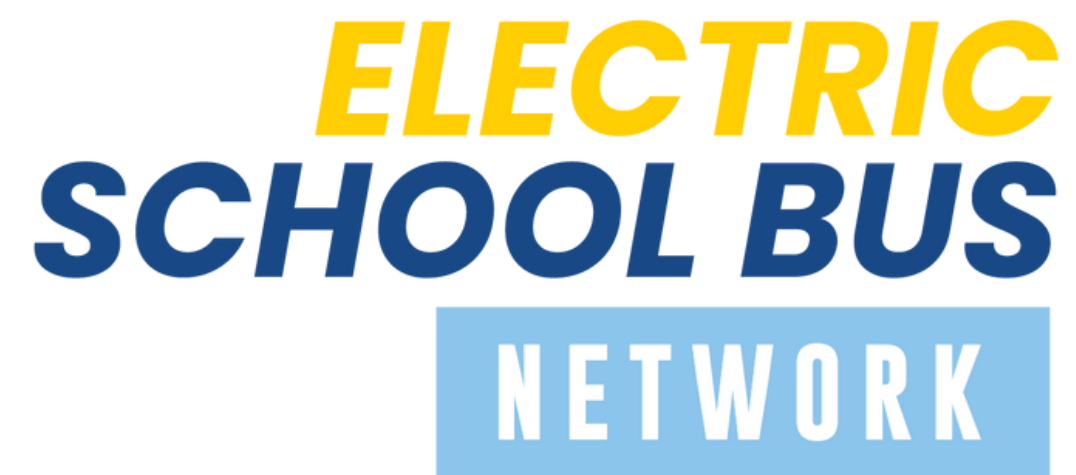
infrastructure@calstart.org

tbravo@calstart.org

GUEST SPEAKER Q+A

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





CHARGER SELECTION GUEST SPEAKERS

Tiffany Hammond

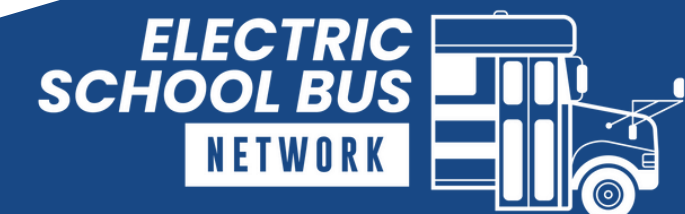
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thammond@bppulsefleet.com

Jackie Hayes

Boston Public Schools

jhayes4@bostonpublicschools.org



CLOSING

FOLLOW UP

Follow-Up Email on 3/24

Recording of meeting

Copy of slides

Links to resources shared

NEXT MEETING

Wednesday, May 24 - 1:00 p.m. ET

QUESTIONS

Email SchoolBusTeam@calstart.org