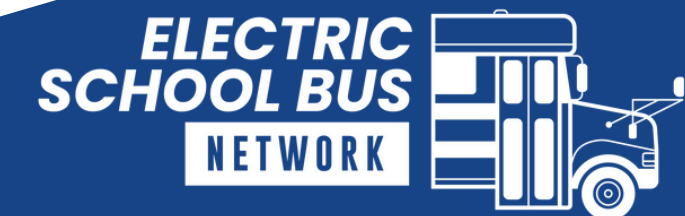


# ELECTRIC SCHOOL BUS NETWORK NATIONAL FORUM

## Fleet Transition Planning

March 13, 2024

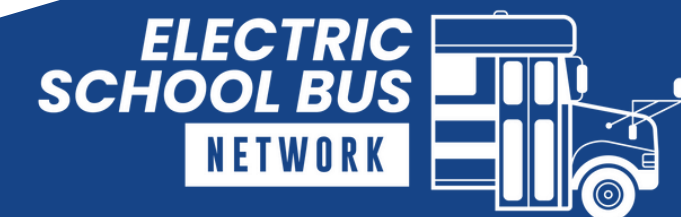
In collaboration with



**March 13, 2024**

# Forum Agenda

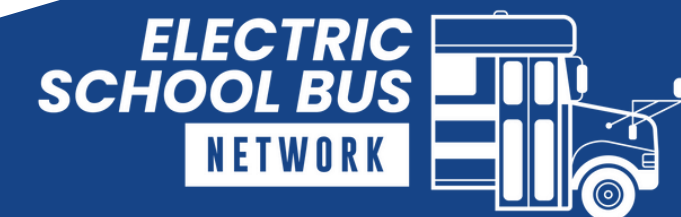
- 01.** Intro to the Electric School Bus Network
- 02.** Fleet Transition Planning
- 03.** Clean Bus Planning Awards with NREL
- 04.** Q&A
- 05.** Summary and Closing





# 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



**Juan Espinoza**  
Project Manager



**Chrystal Ales**  
Project Manager



**Emily Gasca**  
Project Manager



**Liza Walsh**  
Project Manager

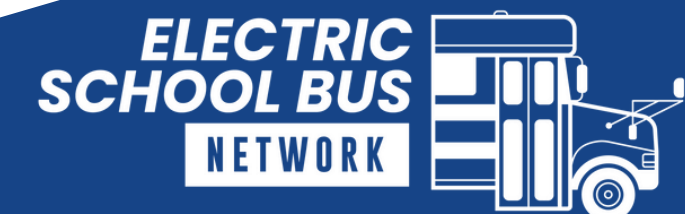


**Katelyn Tomaszewski**  
Project Manager

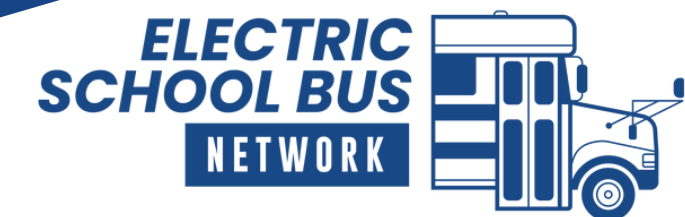


**Skyler Potocek**  
Project Manager

We're growing...

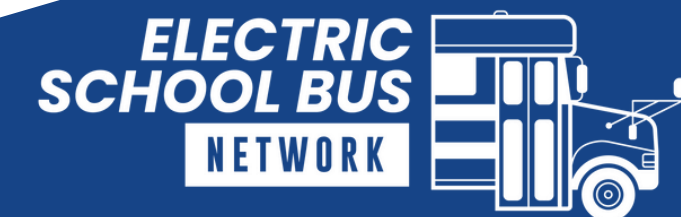


# FLEET TRANSITION PLANNING



# Fleet Transition Plan Benefits

- Can make the electrification project feel more **manageable**
- Helps to make sure your current electrification plan is **futureproof**
- Get to view the project from the perspective of consultants who have worked **across many fleet electrification projects**
- Is a document to **reassure skeptical stakeholders**



# Fleet Transition Planning Elements



## Phase 1: Analyze

- Begin an open dialogue with the fleet to collect all required data and information.

## Phase 2: Plan

- Identify the opportunities, needs, and benefits for vehicle electrification (vehicles, infrastructure, charging) and the total cost of ownership (TCO).

## Phase 3: Develop

- Develop the full electrification plan for the fleet.

## Phase 4: Deliver

- Deliver the full electrification plan for the fleet.

# Fleet Transition Planning Elements



- Fleet Overview
- Ownership Structure
- Stakeholder Analysis
- Route Analysis



# Fleet Transition Planning Elements

Phase 1  
Analyze

Phase 2  
Plan

Phase 3  
Develop

Phase 4  
Deliver

Begin an open dialogue with the fleet to collect all required data and information

- **Fleet Overview:** Understand the current and future fleet by vehicle class, use cases, and domicile.
  - Current and Future Plan for improved efficiencies – right-sizing the fleet
- **Ownership Structure:** Understand the fleet's business model



Image Source: Highland Electric Fleets

# Fleet Transition Planning Elements

Phase 1  
Analyze

Phase 2  
Plan

Phase 3  
Develop

Phase 4  
Deliver

- **Stakeholder Analysis:** Identify key project partners and partner responsibilities
- **Route Analysis:** Understand the fleet's operating plans, conditions, and requirements.
  - Gain a full understanding of daily vehicle operations, routes, and requirements

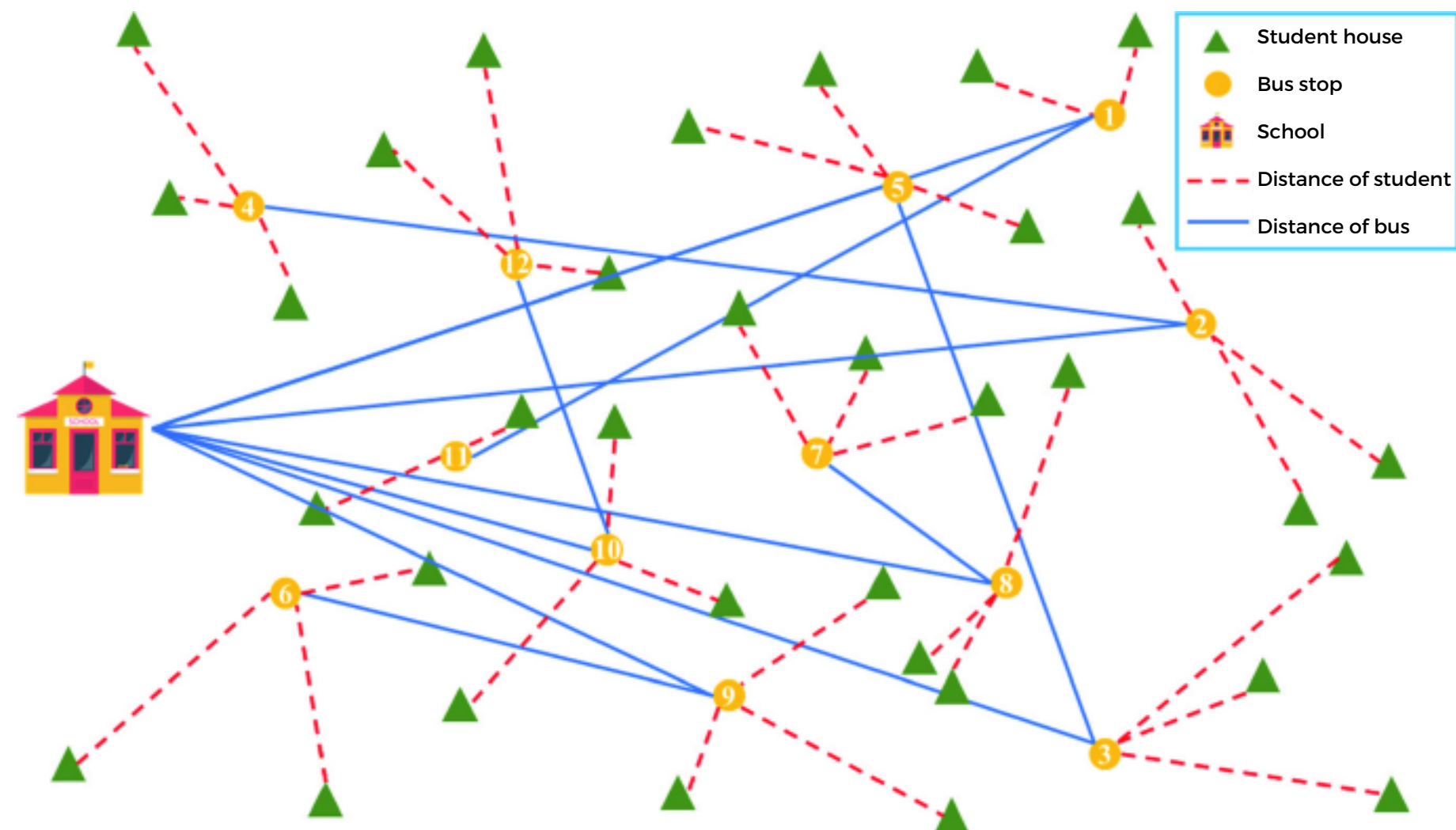


Image Source: Springer Link

# Fleet Transition Planning Elements



- Vehicle Replacement Plan
- Infrastructure Planning
- Vehicle Charging Plan
- Rate Structure Analysis
- V2G and Utility Program Participation
- Electricity Demand Analysis
- Site Assessment
- Total Cost of Ownership
- Greenhouse Gas Emissions Calculations
- Funding Opportunities
- Policy Considerations



# Fleet Transition Planning Elements



Identify the opportunities, needs, and benefits for vehicle electrification (vehicles, infrastructure, charging) and total cost of ownership (TCO)

- **Vehicle Replacement Plan:** Determine ESB options using the specifications required to operate within the specifications of the fleets.
  - Providing potential fuel reduction, air quality, and emissions reductions can be included
- **Infrastructure Assessment:** Understand the fleet's facility, electricity consumption, and cost patterns to determine the best Electric Vehicle Supply Equipment (EVSE) (charger types and power requirements).
  - Develop load profile assumptions based on fleet assessment with a focus on future-proofing



# Fleet Transition Planning Elements

Phase 1  
Analyze

Phase 2  
Plan

Phase 3  
Develop

Phase 4  
Deliver

- **Infrastructure Planning:** Propose site layout with respect to vehicle charging demands and minimize charging infrastructure costs.
  - Consider the fleet's participation in vehicle-to-grid (V2G) and utility programs
- **Charging Strategy:** Develop an optimum vehicle charging plan and logistics strategy to meet fleet requirements while minimizing charging infrastructure and electricity costs.

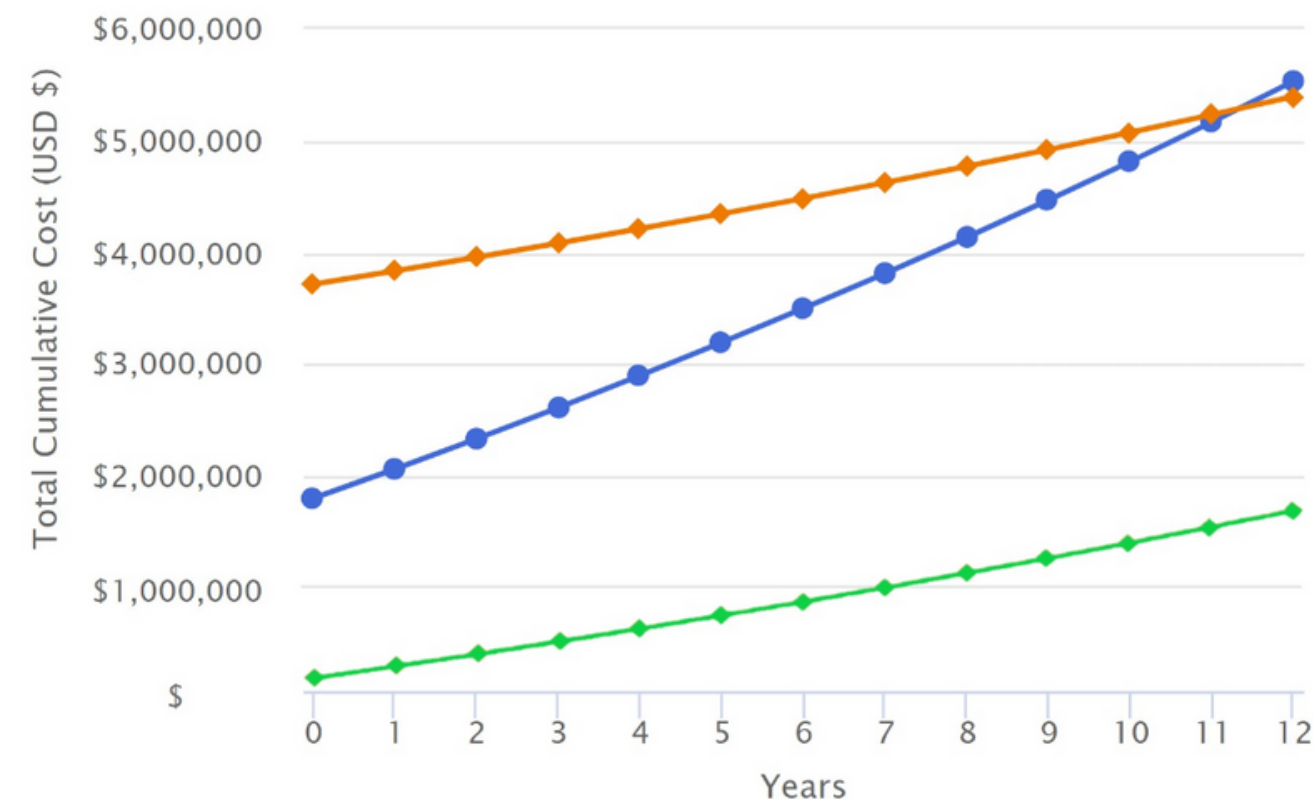


# Fleet Transition Planning Elements



- **Total Cost of Ownership (TCO):** Develop a TCO calculation for ICE school bus vs. ESB.
- **Funding and Policy Review:** Develop a list of available funding programs for incentives and rebates to help offset the costs and any state requirements or mandates for school bus electrification.

Payback Period Clean vs Baseline (Real Cash Flows)



- Diesel
- ◆ Battery (without rebates)
- ◆ Battery (with rebates)

# Fleet Transition Planning Elements



- Phasing Plan
- Resiliency Analysis
- Workforce Development

# Fleet Transition Planning Elements

Phase 1  
Analyze

Phase 2  
Plan

Phase 3  
Develop

Phase 4  
Deliver

Develop the full electrification plan for the fleet

- **Fleet Electrification Roadmap:** Propose a fleet electrification conversion plan based on data collected in Phases 1 and 2 to at-scale/full deployments.
- **Resiliency Analysis:** Understand potential resiliency needs and goals to identify possible solutions, such as microgrid implementation and battery storage.
- **Workforce Development:** Develop and implement a workforce development program for operations and maintenance staff.

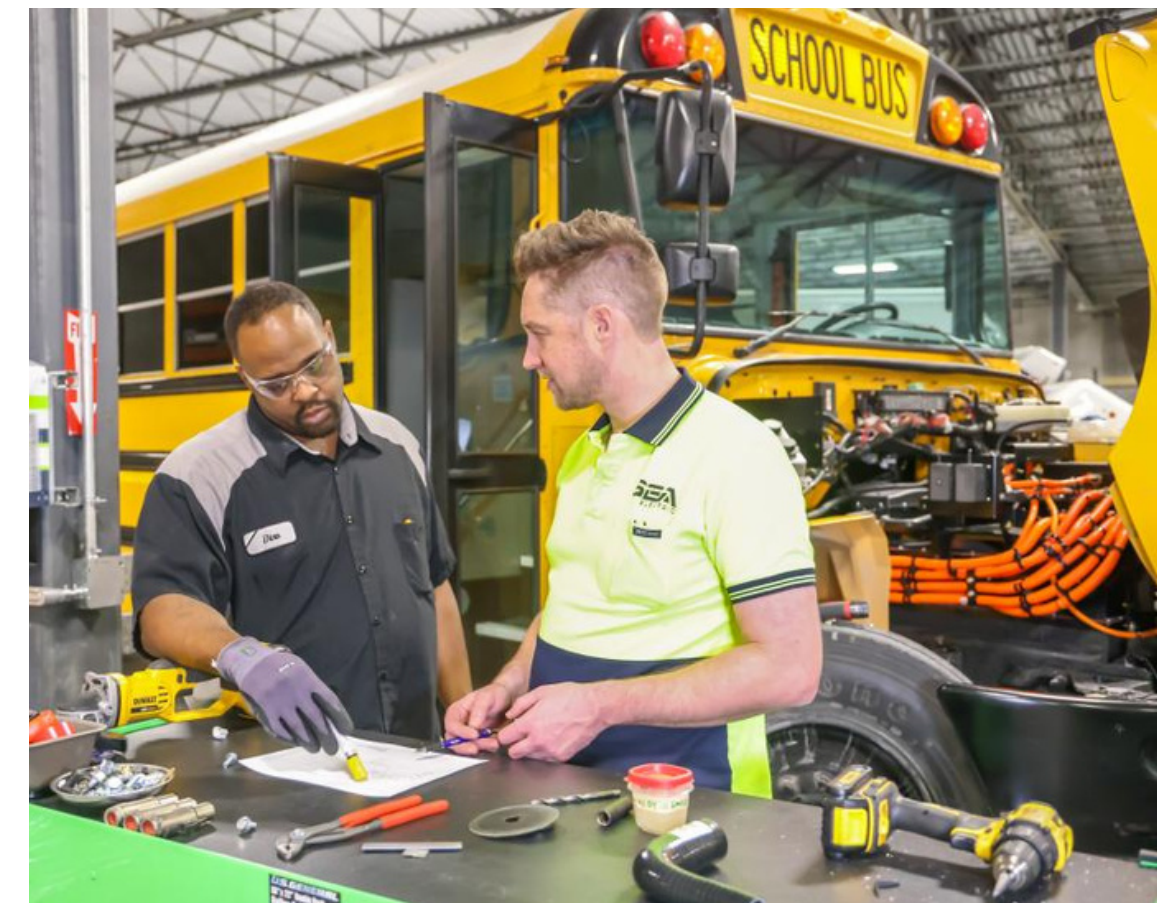


Image Source: SEA Electric



# Fleet Transition Planning Elements



- Deliver final Fleet Electrification Report

# Fleet Transition Planning Elements

Phase 1  
Analyze

Phase 2  
Plan

Phase 3  
Develop

Phase 4  
Deliver

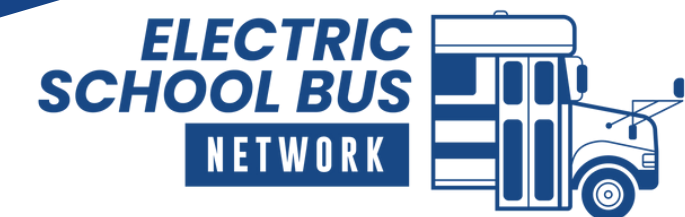
## Deliver the full electrification plan for the fleet

- **Fleet Report:** Present findings, benefits, and considerations for vehicle electrification in a report delivered to the fleet customer.
- **One-page handout:** Present high-level findings in an easily, digestible, one-page infographic



Image Source: Sourcewell

# NREL CLEAN BUS PLANNING AWARDS





# Clean Bus Planning Awards (CBPA)

CALSTART ESB Network National Forum

March 13<sup>th</sup>, 2024

Mike Jones, Project Lead- NREL



# CBPA Program Overview

- Free technical assistance for comprehensive and customized fleet electrification transition plans.
- Funded by the Joint Office of Energy and Transportation (Joint Office) and managed by the National Renewable Energy Laboratory (NREL).
- Eligible fleets generally includes fleets eligible for EPA Clean School Bus 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.)
- Applications open on a rolling basis.

[Learn more and apply](#)



# 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.



Joint Office of  
**Energy and  
Transportation**

Questions?

[cbpa@nrel.gov](mailto:cbpa@nrel.gov)

[driveelectric.gov](http://driveelectric.gov)



# Save the Date!

- A follow-up email will be sent **Friday, March 15** with the following:
  - Recording of the meeting
  - Copy of the slide deck
  - NREL Clean Bus Planning Awards one-pager
- The next ESB Network Newsletter will be sent on **Tuesday, April 9**
- Mark your calendars for the next ESB Network National Forum:
  - **Wednesday, May 8, 2024, from 2:00–3:00 p.m. ET**
- Please email [schoolbusteam@calstart.org](mailto:schoolbusteam@calstart.org) with questions

