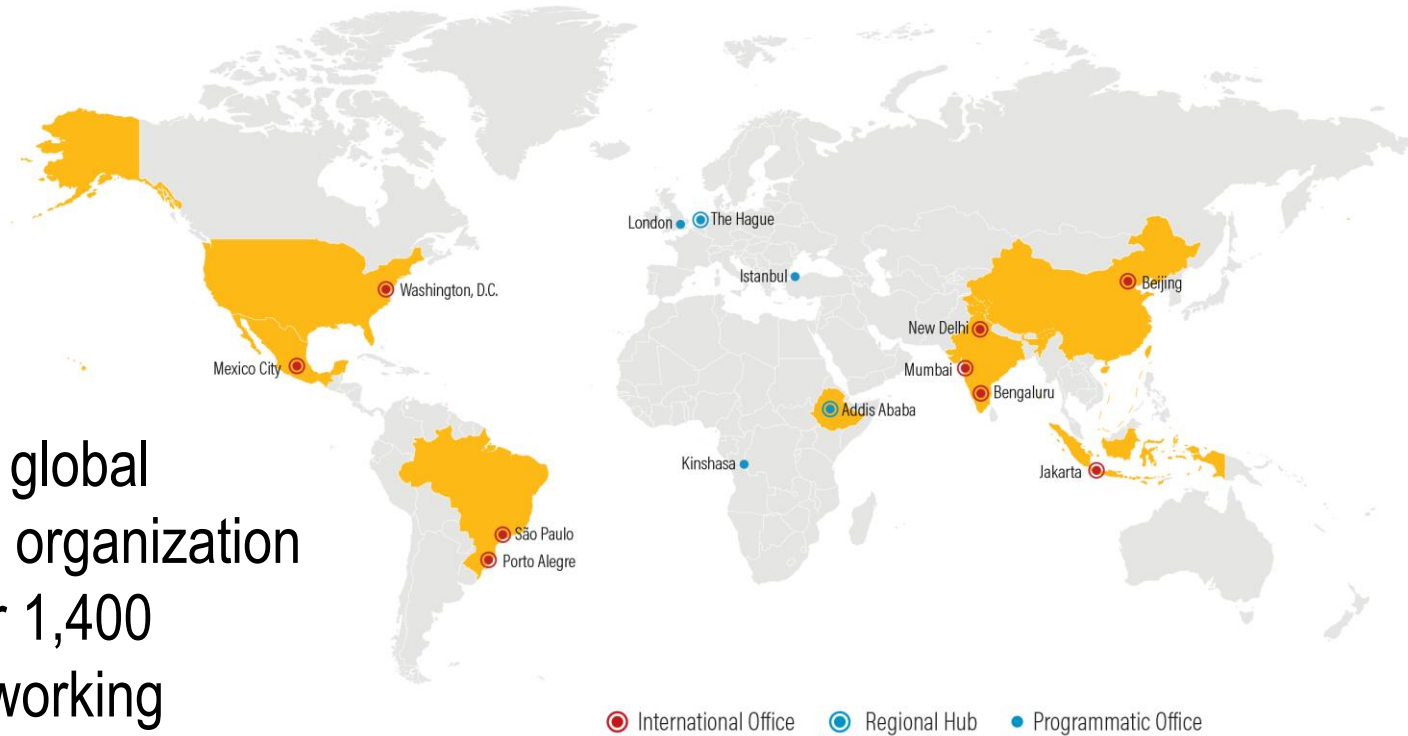


# WHY ELECTRIC SCHOOL BUSES?

February 1, 2024

# ABOUT WRI

WRI is a global research organization with over 1,400 experts working across 60+ countries





# OUR AIM: ELECTRIFY U.S. FLEET BY 2030

- Partner with communities, school districts, industry experts, manufacturers, utilities, and policy makers to **transform and electrify** the school bus market
- Together, build unstoppable momentum to **electrify** 480,000 school buses in the U.S. by 2030
- Ensure an **equitable transition** by focusing on underserved communities



# THANKS TO OUR NEW JERSEY PARTNERS



**Doug O'Malley**, Director



**SIERRA CLUB**  
NEW JERSEY CHAPTER

**Anjuli Ramos-Busot**, Chapter Director  
**Bill Beren**, Transportation Chair



**Ben Haygood**, Director of Policy & Partnerships

# WHY ELECTRIFY SCHOOL BUSES?

Electrification can accelerate decarbonization while bringing direct, tangible benefits to every community



**Improved health** and cognitive outcomes for children



**Cleaner air** than with diesel buses, especially in communities of color



**Reduced operating expenses** for school districts



**New jobs** in green manufacturing



**A tipping point** for MHD + electrification





Enhanced **resiliency** and **renewables integration** with V2G

# HARMS OF DIESEL EXHAUST

 Diesel exhaust pollutants can lead to **asthma, cancer and other respiratory illnesses**.

 Diesel exhaust pollution is a **known carcinogen**


 There are **documented negative impacts** on both student health and academic performance – and there is increasing evidence that **children are particularly susceptible**.


 Reducing students' exposure to air pollution from school buses has **positive and significant effects on some test scores**.



# INEQUITABLE HARMS

 **60% of low-income students** take the bus compared to 45% of non-low-income students

 Fine PM exposure from on-road sources can be **75% higher for Latinos, 73% higher for Asian Americans, and 61% higher for African Americans**

 Native American children are **1.5 times more likely to have asthma** as non-Hispanic white children.



# ELECTRIC SCHOOL BUS ADOPTION

**More than 6,000 electric school buses committed, procured, delivered or in operation as of September 2023:**

- 929 districts and private fleet operators
- 56% are in school districts with the highest shares of low-income households
- Commitments in 49 states, D.C., several territories and Tribal nations

**Electric school bus commitments are in:**

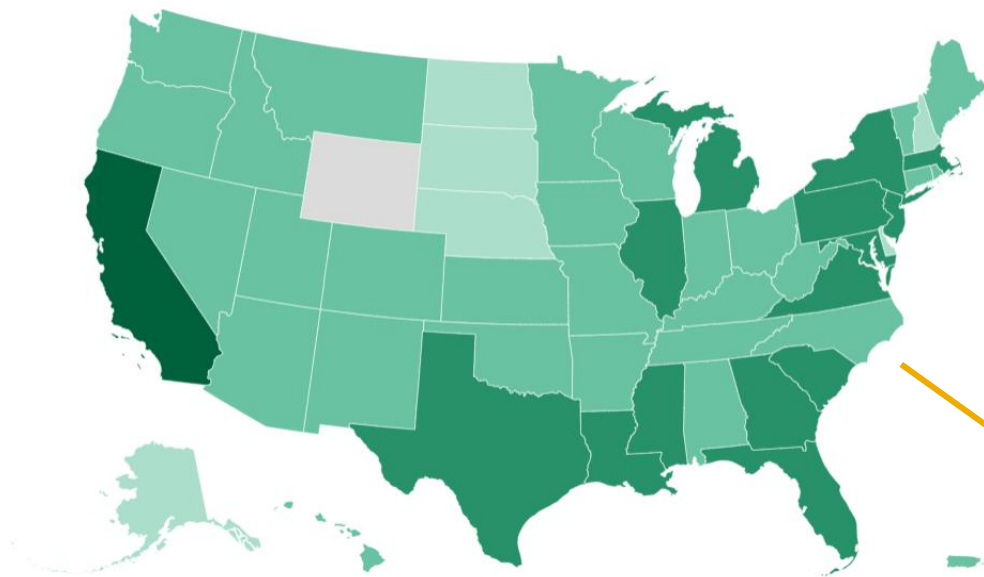
- suburban areas (35%)
- cities (31%)
- towns (10%)
- rural areas (19%)



# ELECTRIC SCHOOL BUS ADOPTION

Committed\* electric school buses by state

0 1-10 11-100 101-500 501+



Source: [Lazer and Freese, 2023](#) - Data as of June 2023.

\*awarded, ordered, delivered, or in operation.

Not shown: American Samoa (1 ESB), Guam (25 ESBs), and U.S. Virgin Islands (10 ESBs).

Electric school buses are operating in **urban, rural and suburban communities**, and have been committed to in 49 states, Washington, DC, multiple territories and Tribal nations

Leading states for commitments:

- California: 2,078 electric school buses
- Maryland: 391 electric school buses
- New York: 304 electric school buses

# ELECTRIC SCHOOL BUSES IN NEW JERSEY



- 203 total committed ESBs
  - 182 with awarded funding
  - 10 on order
  - 11 delivered or operating
- 446 students riding ESBs
- 44 ESBs funded by EPA's Clean School Bus Program

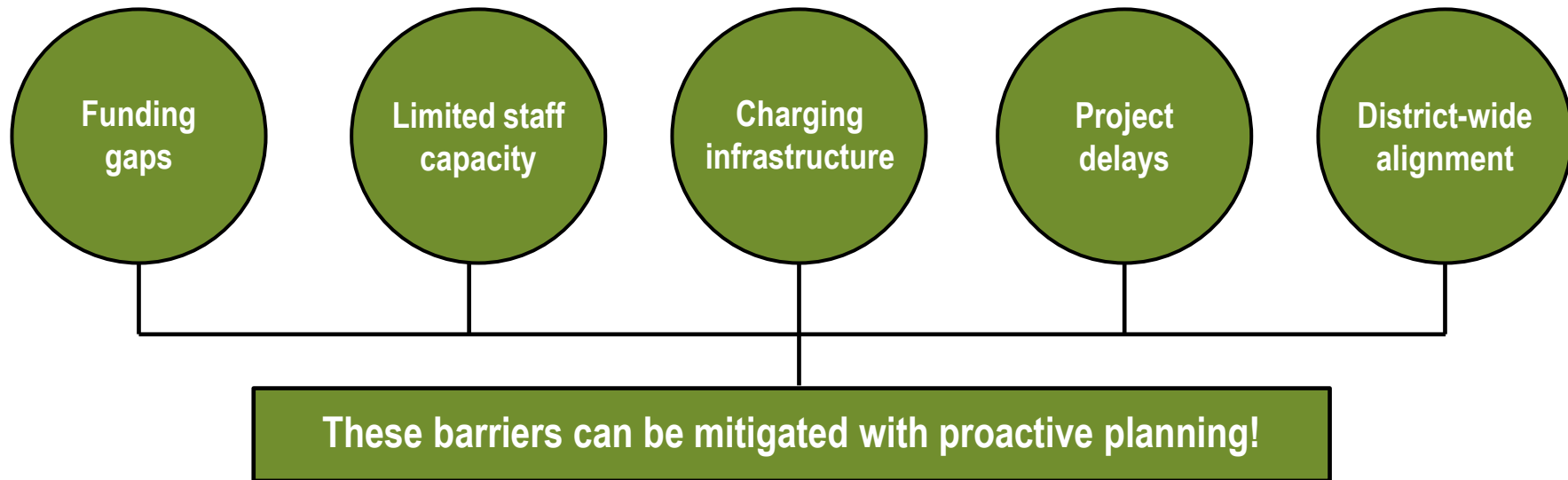
# CSBP AWARDEES IN NEW JERSEY



- Lakewood Township: 14 ESBs
- Union City: 12 ESBs
- Elizabeth: 7 ESBs
- Newark: 6 ESBs
- Bloomfield Township: 3 ESBs
- Bridgeton City: 2 ESBs

**Nearly \$20 million in total awards**

# CHALLENGES FACING ELECTRIFICATION





# LESSONS LEARNED FROM SUCCESSFUL ESB DEPLOYMENTS

- Designate a project manager
- Coordinate with district leadership and across district departments
- Engage your electric utility and other local partners
- Center equity in community engagement and ESB deployment
- Prioritize planning for charging infrastructure
- Make a plan for staff training and workforce development
- Negotiate training and maintenance requirements during procurement
- Build relationships with other school districts
- Aggressively pursue funding opportunities

**Proactive, comprehensive ESB planning can lead to more successful deployments**

# CHARGING INFRASTRUCTURE CONSIDERATIONS

- Engage your **electric utility**
  - Make-ready programs, fleet advisory services, other incentives
- Center **equity** in deployment
  - Depot locations, route selection, air quality
- Consider **operational constraints**
  - Depot space, dwell time, route length, terrain and weather conditions
- Be mindful of **utility rates**
  - Overnight charging, mid-day charging, demand charges
- Right-size bus **batteries and chargers**
  - Larger battery capacity can mitigate range concerns
  - Level 2/AC chargers are cheaper and simpler, but take more time
  - Level 3/DC fast chargers are more expensive and complex, but can charge quickly
- Think **long-term**
  - “Dig once” to limit underground construction
  - Maintain flexibility with above-ground infrastructure
  - Leased or owned depot?

# BATTERY, CHARGER AND DWELL TIME RELATIONSHIPS

Manufacturer	Battery Size (kWh)	19.2kW AC charger	25kW DC charger	60kW DC fast charger
	(usable)	(18.2kW)	(23.8kW)	(57.0kW)
Blue Bird Type C & D	155 (124)	6.8 hours	5.2 hours	2.2 hours
GreenPower Type D	194 (155)	8.5 hours	6.5 hours	2.7 hours
IC Bus Type C	210 (168)	9.2 hours	7.1 hours	2.9 hours
Thomas Type C	226 (181)	N/A	7.6 hours	3.2 hours

- 80% of battery nameplate considered usable to maintain battery state of health
- 95% of charger nameplate considered useable based on efficiency losses
- Dwell time hours based on usable battery and usable charge

# ADDITIONAL RESOURCES FOR SCHOOL DISTRICTS

- Planning and Deployment
  - [Electric School Bus Campaign](#) (Sierra Club-NJ)
  - [Electrification of New Jersey's School Buses: Benefits, Barriers and Opportunities](#) (ChargEVC-NJ)
  - [Step-by-Step Guide for School Bus Electrification](#)
  - All About [Charging Infrastructure](#) and [Working with Your Electric Utility](#)
  - [ESB Technician Training Database](#)
  - [ESB Battery Resources](#)
- Funding
  - [Clearinghouse of ESB Funding and Financing Opportunities](#)
  - [How to Apply for CSBP Funding](#)
  - [EV Make-Ready Programs](#)
- Procurement
  - [New Jersey ESB Buyer's Guide](#) (Sierra Club-NJ)
  - [ESB Market Study and U.S. Buyer's Guide](#)
  - [RFP Template for ESBs](#)
  - [All About Service Level Agreements for ESBs and Chargers](#)
- Equity
  - [Electric School Buses Can Fight — or Further — Inequity in the US](#)
  - [How School Districts Can Include Equity When Choosing Where to Deploy ESBs](#)



# HOW TO ENGAGE WITH ESBI

- Join our [weekly “office hours”](#)
  - Free, one-on-one support for school districts and bus operators offering hands-on help from ESBI staff
- Sign up for our [email updates](#)
  - Monthly emails from our team with details on funding programs, webinars and new resources

# 2023 CSB REBATES



## How does it work?

- \$500 million in rebates available through a lottery



## What are the key dates?

- Opened September 28, 2023
- Closes **February 14, 2024**

Visit [EPA.gov](https://www.epa.gov) for  
more information  
on how to apply



## Who can apply?

- Public school districts
- Public charter schools
- Indian tribes
- Non-profit school bus associations
- Dealers/manufacturers/service providers
- Eligible contractors



## Who is prioritized?

- Low-income districts
- Rural districts
- Tribal districts
- Public districts in US territories



# THANK YOU

**[electricschoolbusinitiative.org](http://electricschoolbusinitiative.org)**  
**[Twitter.com/ESBInitiative](https://twitter.com/ESBInitiative)**  
**[Facebook.com/ESBInitiative](https://facebook.com/ESBInitiative)**  
**[Phillip.Burgoyne-Allen@wri.org](mailto:Phillip.Burgoyne-Allen@wri.org)**