ELECTRIC SCHOOL BUSES AND THE ROAD TO DECARBONIZATION

EESI Briefing: Back to School: Catalyzing Climate Action in K-12 Schools, September 28, 2022
ABOUT WRI

WRI is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.
OUR AIM: ELECTRIFY THE ENTIRE 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
THE DECARBONIZATION OPPORTUNITY

School buses represent a unique opportunity to influence greenhouse gas emissions in both the transportation and energy sectors.

- Build out medium-and-heavy-duty EV manufacturing capabilities
- Advance medium-and-heavy-duty battery production and design
- Support renewable energy grid integration
- Normalize electric mobility for an entire generation
WHY ELECTRIFY THE U.S. SCHOOL BUS FLEET?

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

WORLD RESOURCES INSTITUTE
• Diesel exhaust pollutants can lead to asthma, cancer and other respiratory illnesses.

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

• Diesel exhaust pollution is a known carcinogen.

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

Sources: EPA; Beatty and Shimshack; Austin, Heutel and Kreisman; Liu and Grigg; WHO
THE BURDEN OF AIR POLLUTION IS INEQUITABLE

- 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.

Source: Bureau of Transportation Statistics, Union of Concerned Scientists, Public Health Report
THE STATUS OF SCHOOL BUS ELECTRIFICATION

480,000+ school buses in the U.S.

Less than 1% are electric

School districts in 38 states have deployed or committed to ESBs

Source: WRI analysis (2021), WRI analysis (2022)
ESB ADOPTION GROWTH SURGING

CUMULATIVE NUMBER OF ELECTRIC SCHOOL BUSES COMMITTED BY QUARTER IN THE UNITED STATES (2014-2022)

Notes: This graph depicts electric school bus (ESB) commitments at the earliest confirmed phase in the commitment process (awarded, ordered, delivered, or first operating). 266 ESBs were excluded due to unknown dates of their commitment stages. Abbreviation: Q = quarter.

Source: Based on Lazer and Frechette 2022.
Electric school buses are operating in every type of community and have been committed to in 38 states. 25% are in school districts in the top quartile for % of low-income households.

Leading state commitments:
- California: 1376 electric school buses
- Maryland: 336 electric school buses
- Florida: 218 electric school buses

Source: WRI analysis, June 2022
Supply: Manufacturers Scaling Up to Meet Demand

- Blue Bird: 6x expansion in 2020; more in 2022
- Lion Electric: new IL plant, 20,000 e-trucks/buses per year
- GreenPower: 2x production capacity in 2021; WV facility
SUPPLY: GROWING NUMBER OF MODELS

22 ESB models available

- 12 manufacturers across Type A, C and D buses
- Includes newly manufactured and repowered electric school buses

### AVAILABLE NEWLY MANUFACTURED ELECTRIC SCHOOL BUSES (TYPE C)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BLUE BIRD VISION</th>
<th>LIONC</th>
<th>SAF-T-LINER C2 JOULEY</th>
<th>IC CE SERIES ELECTRIC BUS/PBIDE</th>
<th>TYPE C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price range</td>
<td>$326,810-$365,000a</td>
<td>$338,253-$422,302b</td>
<td>$335,287-$437,000c</td>
<td>$347,870-$364,123d</td>
<td>Not available</td>
</tr>
<tr>
<td>Length (L)/width (W)/height (H)</td>
<td>L: Max 47&quot;&quot;</td>
<td>L: 47&quot;&quot;</td>
<td>L: 396&quot;</td>
<td>L: 303.9&quot;/474.9&quot;</td>
<td>L: 435.7/462&quot;</td>
</tr>
<tr>
<td></td>
<td>H: 123&quot;</td>
<td>H: 122&quot;</td>
<td>H: 144&quot;</td>
<td>H: 123&quot;</td>
<td>H: 132.9&quot;</td>
</tr>
<tr>
<td>Passenger capacity</td>
<td>77</td>
<td>77</td>
<td>81</td>
<td>29-72</td>
<td>78</td>
</tr>
</tbody>
</table>
GROWING MOMENTUM OF REPOWERS

Repower: A process that involves removing a vehicle’s original engine and replacing it with a new engine or power source (such as an electric drive system).

• Can help:
  o Reduce upfront price
  o Alleviate supply chain delays
  o Divert waste from diesel buses

• Fleets can have both newly manufactured and repowered buses

• Not every bus is a good candidate for repowering – speak with repower OEM
In November 2021, Congress passed the bipartisan Infrastructure Investment & Jobs Act, including a **record $5 billion** to replace older, polluting school buses with cleaner and electric school buses.

That includes **$2.5 billion in dedicated, standalone funding for electric school buses** and another $2.5 billion for electric and low-emissions school buses.

**EPA** has launched the **Clean School Bus Program** to disburse the funding through annual rebate and grant applications, providing multiple opportunities for schools to apply over 5 years.

**Source:** [STN](#)
CSBP'S 2022 REBATE FUNDING OPPORTUNITY (1ST ROUND)

• **Who is eligible?**
  – School districts, charter schools, Tribes, non-profit school bus associations, and school bus dealers/manufacturers
  – **Priority applicants**: High-need school districts & low-income areas; Rural school districts; Tribal school districts

• **How will it work?**
  – Online applications into a lottery – closed August 19
  – Funds transferred upfront, after order and before purchase/delivery
  – Two years to obtain buses, document disposal of old buses
  – Upgrades needed by utility will *not* be covered – districts starting conversation with their utilities

• **What's Next?**
  – Overwhelming response in this first RFA
  – Applications currently under eligibility review
  – Award announcements expected imminently
  – Next funding opportunity to open later this year – grant applications
# CSBP'S 2022 REBATE MAXIMUM AWARDS

## Maximum Bus Funding Amount per Replacement School Bus

<table>
<thead>
<tr>
<th>School District Prioritization Status</th>
<th>ZE – Class 7+</th>
<th>ZE – Class 3-6</th>
<th>CNG – Class 7+</th>
<th>CNG – Class 3-6</th>
<th>Propane – Class 7+</th>
<th>Propane – Class 3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buses serving school districts that meet one or more prioritization criteria</td>
<td>$375,000</td>
<td>$285,000</td>
<td>$45,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Buses serving other eligible school districts</td>
<td>$250,000</td>
<td>$190,000</td>
<td>$30,000</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$15,000</td>
</tr>
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Winners are responsible for any costs beyond maximum rebate amounts

## Maximum Infrastructure Funding Amount

<table>
<thead>
<tr>
<th>School District Prioritization Status</th>
<th>ZE – Class 3+ Infrastructure Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buses serving school districts that meet one or more prioritization criteria</td>
<td>$20,000</td>
</tr>
<tr>
<td>Buses serving other eligible school districts</td>
<td>$13,000</td>
</tr>
</tbody>
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Table source: EPA
ESB SUPPORT IN THE INFLATION REDUCTION ACT

Additional support for electric school buses via Inflation Reduction Act

- $1 billion to electrify medium & heavy-duty vehicles, including school buses
- Up to $40,000/vehicle over 14,000 lbs in a qualified Commercial Clean Vehicle Tax Credit
- Up to $100,000/property in the Alternative Fuel Refueling Property Credit (chargers)
- Rural Energy for America Program
- Greenhouse Gas Reduction Fund
- Funding to Address Air Pollution at Schools
- Environmental and Climate Justice Block Grants
- Advanced Manufacturing Production Credit
- Domestic Manufacturing Conversion Grants
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<tr>
<th>Transition targets (NY, CT, MD, ME)</th>
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<tbody>
<tr>
<td>New state (CO, NJ) and utility (IN, MD) funding programs</td>
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<tr>
<td>Modifications to education transportation funding, contract terms, ESB eligibility (WA, ID, MS)</td>
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<td>Manufacturing support and adders for in-state produced buses (WV)</td>
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ARE YOU READY TO GET ON BOARD?
THANK YOU

Find out more at wri.org/electric-school-buses