Electric School Bus Measures in U.S. Climate Policy

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June 11, 2024

U.S. Climate Policy Resource Center

Electric School Buses

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School buses are among the most visible vehicles in the United States, transporting approximately 20 million students across every state in rural, urban, suburban and tribal settings. The vast majority of these buses are currently diesel powered, posing serious health risks to students, drivers and communities in addition to producing high levels of greenhouse gas emissions. With transportation accounting for 29% of U.S. emissions overall, electrifying the nation's fleet of 480,000 school buses is an opportunity to seize now.

Today, an electric school bus powered by the typical grid electricity mix in the U.S. produces half as many greenhouse gas emissions as other fuel options — and this will only improve as the power grid decarbonizes. Electric school buses can

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support grid decarbonization by storing energy in their batteries when the availability of renewable power is high and discharging that energy back to the grid when needed most. In addition, electric school buses produce no tailpipe emissions, keeping riders and drivers safe from the harmful impacts of diesel exhaust while improving air quality in the communities through which they travel.

U.S. Investment in Electric School Buses to Date

As of September 1, 2023, there were over 5,900 electric school buses ordered, delivered or in operation across the country. While this figure reflects significant growth, it is still less than 1% of the entire U.S. fleet.

To address this gap, state and federal policymakers, advocates and others are taking steps to mitigate the challenges that operators face in fleet electrification. Often the biggest barrier to electric school bus adoption is financial. The unsubsidized upfront cost of an electric school bus can be 3-4 times that of its diesel counterpart, and until cost parity is achieved, funding and financing initiatives will be necessary to increase adoption and help communities access their benefits as quickly as possible.

In addition, electric school buses and their associated charging infrastructure are new technologies for many school districts. Technical assistance on topics like funding and financing, charging infrastructure, operational planning and maintenance is key to demystifying the electrification process and supporting successful implementation by all districts and other bus operators.

Electric School Bus Initiatives Under New Climate Legislation

Financial incentives in recent federal laws will help spur adoption and expansion of zero-emission electric school buses. The Bipartisan Infrastructure Law makes a historic investment in clean school buses, while the 2022 Inflation Reduction Act provides further support for school districts through electric vehicle tax credits and other funding opportunities.

Electric school bus investments in the Bipartisan Infrastructure Law

The Environmental Protection Agency's Clean School Bus Program, created by the Bipartisan Infrastructure Law, makes $5 billion available to replace older school buses with electric and alternative fuel buses over the course of five years. This program focuses on

high-need school districts in rural, tribal and low-income communities, some of which are overburdened by air pollution.

The Clean School Bus Program gives states, tribes, municipalities and school districts an unprecedented opportunity to leverage federal funds in addition to their own resources as they invest in new electric school bus fleets. Indeed, in its first round of funding under the program, the EPA awarded funding for more than 2,300 electric school buses. These investments spanned 49 states, Washington, D.C., American Samoa, Guam, Puerto Rico and the U.S. Virgin Islands as well as four tribal nations (the Morongo Band of Mission Indians, Mississippi Band of Choctaw Indians, Lower Brule Sioux Tribe and the Soboba Band of Luiseño Indians).

Electric school bus investments in the Inflation Reduction Act

The Inflation Reduction Act (Section 71101) allocated $1 billion for a Clean Heavy Duty Vehicle Program to accelerate the electrification of class 6 and class 7 heavy-duty vehicles, which would include most types of school buses. This funding could be used for replacing eligible vehicles with zero-emission vehicles, maintaining charging infrastructure, and supporting workforce development efforts in the deployment of zero-emission vehicles. School districts may be eligible to access these funds for electric school bus procurement and maintenance, although the new program is still under development.

The Inflation Reduction Act also created the Qualified Commercial Clean Vehicle Credit (45W) which provides a tax credit of up to $40,000 or 30% of the cost for commercial clean vehicles over 14,000 lbs. (which includes school buses). Further, the Inflation Reduction Act amended the Alternative Fuel Refueling Property Credit (30C), which provides a tax credit of 30% of eligible costs, up to $100,00 per charger, including bidirectional charging equipment. Both of these tax credits include a direct payment option for certain qualified tax-exempt entities like school districts and tribal governments.

To qualify for the Commercial Clean Vehicle Credit, electric school buses must be made by a qualified manufacturer, operated on public roads, and must be acquired for “use or lease,” not for resale. While the IRS has not finalized guidance on the direct pay provision, it can currently be stacked on top of any funding a school district may be awarded through the Clean School Bus Program or other federal funding programs. Additional guidance is needed on how school districts can receive this as a direct payment.

Next Steps for Advancing Electric School Buses

The federal government, state and local governments and individual school districts all have a role to play in accelerating the United States’ electric school bus transition.

States

State lawmakers can pursue several strategies to maximize the climate impacts of the Clean School Bus Program and ensure an equitable distribution of electric school buses.

- **Allocate dedicated funding.** State dollars can complement federal clean school bus investments by providing the resources necessary to increase project scale and ambition. Some states can utilize remaining funds from the Volkswagen Mitigation Settlement, while others may redirect revenues from environmental markets created by low carbon fuel standards and cap-and-trade programs. In other cases, states are authorizing new funding allocations, such as in Connecticut and Colorado.
- **Create new financing programs.** The electric school bus market is ripe to benefit from financing programs, such as through state green banks, that can help address the upfront costs of vehicle procurement by capitalizing future operating savings. State energy offices and state financing authorities can also enable electric school bus finance through partnerships with the primary recipient entities of EPA's new Greenhouse Gas Reduction Fund. State experience lending in the electric school bus market will pave the way for future financing mechanisms across the transportation sector. For all programs, states should ensure that electric repowers of diesel vehicles are eligible as well.
- **Provide technical assistance.** States can establish technical assistance offerings or avail themselves of partner resources. Funding to establish such an offering (or other state initiatives) can come from the State Energy Program; the Bipartisan Infrastructure Law explicitly authorized use of these funds for planning programs that help reduce carbon emissions in the transportation sector.
- **Create an enabling environment.** States can build a supportive policy environment through other transportation, buildings and land use planning authorities available. This may include adopting the Advanced Clean Cars, Advanced Clean Trucks, and Heavy-Duty Omnibus rules; moving towards EVSE supportive building codes; and reviewing permitting requirements for EV charging stations. States including Maryland, New York, Maine and Connecticut have already enacted specific transition requirements for the school bus sector, mandating new vehicle purchases be zero emission or fleet conversions be complete after a specified year.
- **Help develop strategic and equitable EV infrastructure.** States may also engage with utilities and at public utility commissions to support the development of integrated approaches to charging, renewable energy and storage, and to develop solutions for "vehicle-to-everything" (V2X) applications that enhance infrastructure resilience. This may include evaluation of new and existing programs for EV charging rate design, make ready investments and beneficial electrification plans.

Federal Government

In addition to the funding and tax credit opportunities currently available to support electric school bus and infrastructure investments, the federal government can take steps to help districts and other school bus operators understand charging infrastructure and other unfamiliar topics. Specifically, the federal government can:

- **Provide technical support.** The government can provide assistance to school districts and states looking to electrify their fleets, including by making resources, materials and expert staff from the National Renewable Energy Lab available. Additionally, the Department of Energy (DOE) could leverage its Clean Cities Coalitions, a network of over 75 coordinated groups providing resources and technical assistance to advance energy efficient mobility systems like electric school buses.
- **Increase financing options.** The DOE can maintain or increase loan guarantees and loan underwriting through the DOE Loan Program. New funds appropriated to DOE LPO do not need to be “innovative” if they are disbursed in partnership with a State Energy Financing Institution (SEFI).
- **Conduct and share R&D analysis**. This is especially important for the topic of electric school bus battery reuse and recycling.

School Districts

School districts have a variety of steps they can take regardless of where they are in the electrification process.

- **Establish local-level commitments to electrification.** A district’s Clean School Bus Program application could be one component of a broader commitment, via school board resolution or local law, to full fleet electrification on a specified timeline. New York City offers one example of a district-level commitment of this type.
- **Leverage Inflation Reduction Act investments.** School districts can benefit directly from provisions in the Inflation Reduction Act. For example, many entities are eligible for the 45W tax credit, and the direct payment option enables school districts and tribal governments to benefit as well.
- **Engage stakeholders.** Districts can also begin engaging key partners in their electrification journey, starting with community and advocacy organizations and electric utilities. Together, districts and their utilities should discuss charger options, any necessary infrastructure updates, and funding or other programs available to support electric school buses. School districts can also reach out to their local governments and nearby school districts to discuss the potential for aggregated procurements of electric buses and charging infrastructure, such as those offered through the Climate Mayors Electric Vehicle Purchasing Collaborative.

Overcoming Implementation Challenges

School districts and bus operators face a number of obstacles, both financial and technical, in electrifying their fleets. Policymakers can help overcome some of these issues and create an enabling environment for electric school bus adoption.

- **States can provide technical support to overextended school districts.** School districts face a daunting set of challenges brought on and exacerbated by the pandemic. As they address issues like learning loss, low attendance and bus driver shortages, district staff may feel too stretched to take on the electrification process. In this context, state support in the form of technical assistance is especially critical. Electric school buses can be a core component of a broader strategy to improve student health and well-being, boost attendance rates, and improve comfort and job quality for bus drivers and maintenance technicians.
- **Policymakers can maximize support for the most underserved districts while encouraging market-wide price reductions.** Decision-makers must recognize that the most underserved districts face additional barriers to securing finance and funds to purchase electric school buses and will require supplemental support to address the upfront cost differential. This must be balanced with the need to drive downward price pressure in the market, which policymakers can support by reducing per-bus award amounts for the majority of well-resourced districts.
- **Policymakers can encourage consistency of bus specifications.** The school bus market is fragmented, with a multiplicity of specifications that vary from state to state and district to district. Policies to encourage convergence on specifications would likely foment greater competition among manufacturers and result in price reductions. Alignment on specifications would also facilitate collaborative aggregated purchasing across multiple districts and encourage a healthy market for second-hand vehicles that can be used for electric school bus repowers.
- **Policymakers and others can encourage a responsible approach to battery reuse and recycling.** Electric school buses, like all EVs, have large batteries that need to be safely repurposed or recycled at the end of their useful life in the vehicle. Batteries have high recyclability rates if they are properly disposed of and recycled, which would mitigate waste. Policymakers can set standards for the industry to ensure best practices in manufacturing, recycling and disposal are the norm.

At the same time, manufacturing and supply chain challenges are affecting the entire auto sector, including electric school buses. The global supply chain has been lagging behind current demand, and there is a shortage of major sub-components like semiconductors as well as raw materials like critical minerals, which are especially essential to electric vehicles. Inflation, combined with these supply chain issues, has diminished anticipated year-over-year electric school bus price reductions. Policymakers must understand that their supportive policies are only one set of factors that shape market prices.

Equity Considerations

The transition to electric school buses has the potential to deliver real and lasting value – however, the impacts are not felt equally by all communities or students because of long-standing inequities in our transportation, housing and education systems.

Historically marginalized groups, particularly Black students, children with disabilities and low-income students, rely on diesel school buses more than others. And, while diesel exhaust pollution is dangerous for everyone, its impacts are unevenly distributed. Today, communities of color face particulate matter pollution from on-road vehicles that is 61% to 75% higher than for white residents. In addition, not all communities have access to the same financial resources to pursue electrification, and underinvestment in some parts of the grid means those areas may require additional investments for electric school buses.

If carried out equitably, school bus electrification offers an opportunity to address some of these long-standing harms from discrimination and exclusion across the transportation and education landscapes. You can learn more about the Electric School Bus Initiative's approach to centering equity here.

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