EPA Clean School Bus Program

Fourth Report to Congress
Fiscal Year 2024

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Acronyms and Abbreviations

ADA	Americans with Disabilities Act
AFLEET	Alternative Fuel Life-Cycle Environmental and Economic Transportation
ARP	American Rescue Plan
BABA	Build America, Buy America Act
BEL	Beneficial Electrification League
BIA	Bureau of Indian Affairs
BIL	Bipartisan Infrastructure Law
BSD	Beaverton School District
CAA	Clean Air Act
CHDV	Clean Heavy-Duty Vehicles Program
CNG	compressed natural gas
CO	carbon monoxide
CO_2	carbon dioxide
CSB	Clean School Bus
CPS	Chicago Public Schools
DCFC	direct current fast charger
DERA	Diesel Emissions Reduction Act
EEI	Edison Electric Institute
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESB	electric school bus
EV	electric vehicle
EVSE	electric vehicle supply equipment
FY	Fiscal Year
GHG	greenhouse gas
IIJA	Infrastructure Investment and Jobs Act
IRA	Inflation Reduction Act
JOET	Joint Office of Energy and Transportation
MOVES	MOtor Vehicle Emissions Simulator
MY	model year
NCES	National Center for Education Statistics
NEVI	National Electric Vehicle Infrastructure
NOFO	Notice of Funding Opportunity
NO_x	nitrogen oxides
NREL	National Renewable Energy Laboratory
OEM	original equipment manufacturer
OIG	Office of Inspector General
PM	particulate matter
QA	quality assurance
QC	quality control
SAIPE	Small Area Income and Poverty Estimates
VOC	volatile organic compound
V2B	vehicle-to-building
V2G	vehicle-to-grid
WRI	World Resources Institute
ZE	zero-emission

Table of Contents

Executive Summary

Credit: EPA; DeKalb County, GA, January 2024.

School buses in the United States travel more than 4 billion miles each year, providing the safest transportation to and from school for more than 25 million American children every day.[1] However, many school buses on the road are powered by diesel-fueled engines that pre-date recent emission standards promulgated by the U.S. Environmental Protection Agency (EPA). These buses emit higher levels of pollutants in diesel exhaust, including nitrogen oxides (NOx) and particulate matter (PM), than newer models. These pollutants contribute to poor air quality and negatively impact human health, especially for children, who have faster breathing rates than adults and whose lungs are not yet fully developed.[2]

With funding from the Bipartisan Infrastructure Law (BIL), the EPA Clean School Bus (CSB) Program provides $5 billion over five years (FY 2022–2026) to replace existing school buses with zero-emission (ZE) and low-emission clean school buses. These replacement buses help ensure cleaner air for students, bus drivers, school staff working near bus loading areas, and the communities through which the buses drive each day. The reduction in greenhouse gas (GHG) emissions from these bus replacements will also help address the outsized role of the transportation sector in fueling the climate crisis.[3] ZE and clean school buses can also cost less to maintain or fuel than the older buses they are replacing, which can free up needed resources for schools.[4]

The EPA has offered four CSB funding opportunities: a 2022 Rebate Program, a 2023 Grant Program, a 2023 Rebate Program, and a 2024 Rebate Program. During fiscal year (FY) 2024, the EPA reached a number of CSB milestones, including receiving project Close-Out Forms from 2022 rebate selectees, announcing 2023 Grant Program and 2023 Rebate Program recipients, and opening the 2024 Rebate Program. The Agency also continued its outreach efforts, engaged stakeholders, and offered technical assistance to support clean school bus deployment.

At the end of FY 2024, the EPA had awarded almost $3 billion to fund more than 8,500 bus replacement projects at over 1,200 school districts. The EPA's CSB Program has resulted in funding for clean school buses in all 50 U.S. states, Washington, D.C., four U.S. territories, and roughly 60 federally-recognized Tribes.[a] Approximately 75 percent of school districts that have been awarded EPA funding are defined as high-need, rural, and/or Tribal based on CSB prioritization criteria.[b]

Based on requests from eligible applicants, CSB funding has been allocated to electric bus projects and related charging infrastructure, as well as to propane and other non-ZE clean school bus projects in accordance with the Clean School Bus statute.[5] The program has also spurred the growth of high-quality jobs across the clean school bus manufacturing sector nationwide, supporting workforce development training for bus drivers, mechanics, and transportation operators. This Fourth Annual Report to Congress focuses on CSB Program developments during FY 2024.

a Based on CSB Awards data as of September 30, 2024.
b Refer to §16091(b)(4) for more on prioritization of applicants.

Section I. Clean School Bus Background

Benefits of Clean School Buses

Credit: EPA; DeKalb County, GA, January 2024.

Buses are critical to learning by ensuring students can reliably get to school each day. While school buses provide the safest transportation to and from school from a vehicle safety and accident perspective, students riding on older school buses often experience high exposure to diesel exhaust during their bus rides.[6] Diesel exhaust can enter school buses indirectly via leaky cabins or directly through open windows or doors, which can result in exposures to pollutants that are as high as ten times those in ambient air. These exposures can have significant impacts since exposures to traffic-related pollutants are linked to inflammation, reduced lung function, and increased asthma attacks. Data suggest that school buses typically operate on the road for 16 years, which indicates that millions of students likely ride school buses that are model year (MY) 2010 or older and predate the EPA's latest emission standards.[7]

Children and pregnant women are considered vulnerable populations and especially sensitive to poor air quality, including particulate matter ($PM_{2.5}$) and ground-level ozone (O_3) created by diesel-powered engines. Children can be exposed to diesel emissions from standing at the bus stop and riding buses to and from school each day.[8] Pregnant women can be exposed to diesel emissions from standing at the bus stop with their children, driving school buses, and/or assisting with bus departure and pick up. Replacing older, high-emitting school buses with new, low- to zero-emission school buses may help to protect the health and well-being of these vulnerable populations as well as bus drivers and other members of communities in which these school buses operate. The transport of students with low-emission and ZE school buses has also been linked to improvements in student attendance and academic achievement.[9]

Electric school buses reduce GHG emissions, maintenance costs, and fuel costs. While the upfront costs of electric school buses are currently higher than diesel buses, data generally suggest that electric bus fleets experience lower operational costs due to reduced fuel and maintenance costs.[10] Additionally, when they are not being used to transport students, electric school buses can be used as sources of power by utilizing their battery storage.[11]

Experts are exploring advancements in bidirectional charging technologies, also known as vehicle-to-grid (V2G) technologies, that can store surplus energy and then return it to the grid during peak times of use.[12] This allows electric buses to play a role in bolstering grid resiliency during times of peak usage as well as power outages resulting from weather-related events, which may increase in frequency in coming years. Additionally, vehicle-to-building (V2B) technologies, which allow vehicles to transfer surplus energy to a building, can further support schools in areas with low power resilience.

Other types of clean school buses, including propane buses, can also reduce tailpipe emissions compared to their older diesel predecessors, and may reduce fuel costs. Propane buses can be an attractive option for school districts located in areas of the country with existing propane fueling infrastructure, especially rural areas. The environmental benefits of replacing existing diesel school buses with propane and other clean school buses depend on the sizes of the buses, the alternative fuel's emission performance compared to diesel, the driving activity of the vehicles, and the age of the vehicle being replaced.

History of the EPA School Bus Programs

Since 1970, the Clean Air Act, or CAA (42 U.S.C. §§7401 et seq.) has required the federal government to limit emissions from diesel engines and other mobile sources. The EPA has promulgated increasingly stringent emission standards for new highway and nonroad engines, including the introduction of new heavy-duty diesel standards in 2022 and 2024. However, due to the long operational lives of diesel engines, millions of older, high-emitting vehicles remain in use. The CAA does not provide the EPA the authority to set new emission standards on existing "legacy" diesel engines. To address emission concerns from legacy engines, the EPA began a Voluntary Diesel Retrofit Program in 2000 and a Clean School Bus Initiative in 2003.[13]

The Diesel Emissions Reduction Act (DERA) program, originally authorized under the Energy Policy Act of 2005, was reauthorized under the Diesel Emissions Reduction Act of 2010, and the Consolidated Appropriations Act of 2021. DERA enables the EPA to offer funding to accelerate the upgrade and turnover of legacy diesel fleets. Funding opportunities for diesel emissions reduction projects are provided through an annual DERA appropriation by Congress. The EPA awarded the first DERA grants in 2008 and continues to authorize grants each fiscal year. The EPA also offered rebates through the DERA program in the past.

In the *DERA Fifth Report to Congress*, highlighting program results for fiscal years 2008 to 2018, the EPA reported that the sector funded with the largest number of upgrades, at 43 percent, was school buses.[14] From 2012 to 2021, the DERA program provided around $65 million to fund over 3,000 school bus replacements or retrofits.[15] In addition, the 2021 American Rescue Plan (ARP) Electric School Bus Rebate Program offered $7 million to replace more than 20 old school buses with new electric school buses in low-income and disadvantaged school districts, as well as at Tribal schools.[16]

Administrator Regan Announces CSB Project in Orangeburg, SC

On February 12, 2024, students at Marshall Elementary School in Orangeburg, South Carolina were joined by EPA Administrator Michael Regan, Representative Jim Clyburn (SC), and school leaders to take a ride on a new electric school bus.[17] In the months that followed, students from Orangeburg County School District were able to ride in 20 of the first-ever electric school buses to hit the road in their state. South Carolina recently received over $9 million from EPA's 2023 CSB Rebate Program to deliver clean school buses to school districts across the state. More than 5,000 electric and low-emission buses are in the process of being delivered to communities nationwide. The new, electric-powered school buses will deliver safer, healthier, and more environmentally sustainable learning spaces for students, especially in the areas where children learn and play. And while they are parked during the day, the buses can also help rural electric cooperatives meet energy demands, strengthen grid reliability, and reduce customer costs.

Credit: EPA, Orangeburg, SC, February 2024.

Section II. Introduction of the EPA Clean School Bus Program

Credit: EPA, Orangeburg, SC, February 2024.

Infrastructure Investment and Jobs Act

On November 15, 2021, President Biden signed the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law.[18] Part of President Biden's larger Investing in America Agenda, the IIJA provides $5 billion over five years (FY 2022–2026) for the EPA to administer rebates, grants, and contracts to accelerate the transition of the nation's fleet of nearly 500,000 school buses to zero emission (ZE) and clean school buses. The replacement school buses will reduce harmful emissions from older, dirtier buses that predate the EPA's more stringent tailpipe emission standards.

Under the CSB Program statute,[19] half of the allocated funds must be awarded to ZE school bus replacement projects and the other half must be awarded to ZE and clean school bus replacement projects. A ZE school bus produces zero exhaust emissions of air pollutants and GHGs whereas a clean school bus reduces emissions by operating entirely or in part using an alternative fuel including liquified natural gas, hydrogen, propane or biofuels, or is a ZE school bus. The EPA may fund up to 100 percent of the replacement bus and charging or fueling infrastructure costs under its rebate and grant programs.

Eligibility and Prioritization

Credit: EPA; Jackson, MS, May 2024.

The IIJA, amended by the 2023 Omnibus Funding Bill,[c] defines eligible recipients for the EPA CSB Program funding as local or state governmental entities; eligible contractors; nonprofit school transportation associations; charter schools; and Indian tribes, Tribal organizations or Tribally-controlled schools. The IIJA allows the EPA to prioritize applicants that propose to replace buses that serve high-need local educational agencies, schools funded by the Bureau of Indian Affairs (BIA), or local educational agencies that receive basic support payments for children who reside on Indian land. It also allows the EPA to prioritize applicants that serve rural or low-income areas or propose to complement CSB assistance by securing additional funding for activities supported through the award such as public-private partnerships, grants from other entities, or issuance of school bonds. Applicants requesting funds to replace school buses that will serve districts meeting the CSB statutory prioritization criteria are eligible for higher amounts of funding per school bus and preference in the selection process under the CSB rebate programs or higher application scoring under the CSB competitive grant programs.

c The FY 2023 Consolidated Appropriations Act, also referred to as the 2023 Omnibus Funding Bill, included amendments to the CSB Program that affected the list of eligible applicants and bus usage requirements in future funding rounds. Specifically, the Act expanded eligibility for the program to include certain public charter schools and entities that lease, license, or contract for school bus services. It also allowed an exception to the requirement that a bus serve the school district in the application for five years in the event that a private bus fleet contract expires and the bus continues to serve another similarly prioritized district. The 2023 CSB Grant Program was the first EPA funding opportunity to reflect these two changes.

Justice40 Initiative

The EPA is committed to accelerating environmental justice (EJ) in communities overburdened by air pollution through the CSB Program. The Agency's CSB rebate and grant programs are covered programs under the Justice40 Initiative set forth in Executive Order 14008.[20] The goal of the Justice40 Initiative is to ensure that 40 percent of the overall benefits of certain federal investments flow to disadvantaged communities that are marginalized by underinvestment and overburdened by pollution. The EPA's actions in meeting the objectives of the Justice40 Initiative start with prioritizing CSB applicants, as described above, based on statutory prioritization criteria. For more information on prioritized school districts selected for funding, refer to Section VIII of this report.

Scrappage Requirements

The CSB Program is designed to reduce air pollution by taking existing high-emitting school buses off the road and replacing them with ZE and clean buses. To ensure emissions are not simply transferred to another community (e.g., through the sale of an older bus from one district to another), the EPA requires existing MY 2010 or older diesel school buses to be scrapped, typically by cutting a hole in the engine block and by cutting or crushing one chassis rail between the axles, after a school's new buses are delivered and in use.[d] The CSB Program's scrappage requirements help to ensure that the air and health benefits of the Program are fully realized, which aligns with the EPA's commitment to advancing clean air and improving public health.

For additional CSB Program considerations, please refer to pages 8-10 of the *Third Report to Congress*.

Credits: Scrappage

d Under the 2023 CSB Grant Program, the EPA allowed low-income applicants seeking to purchase ZE buses through the School District Sub-Program to request an exception to the scrappage requirement at the time of application if those applicants planned to own the new replacement buses and the current school bus contract provider was unwilling or unable to replace buses with zero-emission buses. This exception was designed to provide additional flexibility for applicants in these very specific circumstances. Given the low level of interest in the exception in the 2023 Grant Program, the EPA has not included this exception in subsequent funding opportunities to maintain alignment with program goals.

Workforce Development

Credit: EPA; Wabaunsee, SD, September 2024

The EPA recognizes that training and preparation for clean school bus drivers, mechanics, and transportation operators are essential to the success of the CSB Program. The Agency remains committed to collaborating with stakeholders to develop and promote workforce development resources so that all school transportation officials are equipped to drive, service, and manage their new clean school buses.

CSB Program applicants are encouraged to prepare workforce development plans for their projects to ensure that current bus drivers, mechanics, electricians, and other essential personnel are trained to safely operate and maintain new clean school buses and infrastructure. The EPA's guidance also encourages school districts to clarify how they will prevent the replacement or displacement of current workers. Selectees can use bus/infrastructure funding for workforce development activities, such as driver and mechanic training as well as certification of electricians working on CSB-funded projects. The EPA encourages CSB participants to partner with manufacturers, local community colleges, labor unions, technical schools, and other educational suppliers to provide necessary training and support.

In addition to supporting school bus workforce readiness, The EPA is also committed to supporting high-quality jobs in the growing clean school bus manufacturing sector. Original equipment manufacturers (OEMs) of clean school buses employ hundreds of workers across the nation that are building the next fleet of low-to-zero emission buses. Having a robust manufacturing workforce built on strong job quality principles and workforce development best practices is important to the overall success of the CSB Program.

More information on the EPA's workforce development initiatives, along with additional stakeholder resources the Agency has focused on, can be found in Section IX of this report.

The EPA's Clean Heavy-Duty Vehicles Grants Program

On April 24, 2024, the EPA announced a competitive grant program for eligible applicants to replace MY 2010 or older Class 6/7 heavy-duty vehicles with eligible battery-electric or hydrogen fuel cell vehicles. Under the Clean Heavy-Duty Vehicles (CHDV) Grant Program, made possible by the Inflation Reduction Act (IRA), $932 million was made available for awards, with approximately 70 percent of funding dedicated for projects under a School Bus Sub-Program and approximately 30 percent dedicated for projects under a Vocational Vehicles Sub-Program. The EPA earmarked funding for at least 15 projects under a Tribal and territory set-aside (dependent on the quantity and quality of applications), and, as required by Section 132 of the CAA, allocated at least $400 million to projects serving one or more communities in areas designated as being in nonattainment with the National Ambient Air Quality Standards.

The CHDV application period closed on July 25, 2024. The EPA reviewed all applications submitted and notified applicants of selection status in December 2024. The EPA is continuing to work with selectees to finalize awards in early 2025. For additional information on the Clean Heavy-Duty Vehicles Grant Program, please refer to the CHDV Grant Program website.

Section III. The CSB Program Offers Rebate and Grant Funding to Support Stakeholder Needs

The EPA's CSB Program provides school districts with flexibility to apply for rebates and/or grants to accommodate a diverse array of applicants, some of whom may be better positioned to apply for one funding type over the other depending on their fleet size, staff resources, and other factors. Offering two distinctive types of funding opportunities allows the EPA to deliver cleaner and quieter buses to a range of school districts across the country, and ultimately, as many children possible.

While both rebate and grant programs help subsidize the purchase of new clean school buses and eligible infrastructure, and can provide selectees with funds prior to paying their vendors, there are a few key differences between the two types of CSB funding programs (Table 1). The EPA encourages potential applicants to consider which type of funding opportunity best suits their needs. Please note that grant recipients are subject to all applicable CSB Grant Program requirements as well as the EPA General Terms and Conditions. Similarly, rebate recipients are subject to the terms and conditions included in the CSB Rebate Program Guide.

Table 1. CSB Rebate and Grant Funding Programs Offer Different Opportunities for Stakeholders

	Rebate Programs	Grant Programs
Application Process	Quick and simple; applications submitted through the EPA portal	Longer, more detailed process; applications submitted through grants.gov
Selection Process	Random number generated lottery process	Evaluation of application materials and scoring criteria
Selectee Support and Flexibility	The EPA provides less support and flexibility in funding to selectees	The EPA may offer more support for selectees during the project, which can allow for more complex projects
Number of Replacement Buses	Funds the transition of smaller fleets (lower bus replacement minimum and maximum)	Funds the transition of larger fleets (higher bus replacement minimum and maximum)

Section IV. 2022 CSB Rebate Program

In May 2022, the EPA announced $500 million in available funding for its first ever CSB funding opportunity. The Agency received approximately 2,000 applications requesting an estimated $4 billion in funding to replace more than 12,000 buses. Given the tremendous response, the EPA decided to offer up to $965 million in awards for the 2022 CSB Rebate Program. Please refer to the *Second Report to Congress* and *Third Report to Congress* for more details on the funding opportunity; eligible applicants; prioritization; eligible expenses; applications; selection process; and selected projects by state, bus type, etc.

Selectee Summary

In October 2022, the CSB Program announced that nearly $1 billion from the Bipartisan Infrastructure Law was awarded to 389 school districts spanning 50 states, Washington D.C., and several Tribes and U.S. territories. School districts identified as priority areas serving low-income, rural, and/or Tribal students made up 99 percent of the selected projects. A summary of the number of buses funded under the 2022 CSB Rebate Program by fuel type and school district prioritization category is found in Table 2.

Starting in March 2023, selectees from the 2022 CSB Rebate Program began submitting their documentation to the EPA for the purchase of new, clean buses and eligible infrastructure with rebate funds. The EPA reviewed all documentation to ensure it met program requirements and disbursed funds for eligible project costs. Selectees could then use their rebate funds to purchase new buses and any infrastructure included in their approved purchasing documentation. Once their new buses arrived, and any infrastructure was installed, school districts could deploy their new buses and integrate them into their fleets. Selectees subsequently prepared and submitted their project close-out documentation to the EPA for review. Close-Out Forms for 2022 CSB Rebate selectees were due by October 31, 2024. The EPA will provide additional updates on the 2022 CSB Rebate Program in the FY 2025 Clean School Bus Report to Congress.

Table 2. Number of Buses Awarded Under the 2022 CSB Rebate Program (as of September 30, 2024).

School District Category	Number of Awarded School Districts	Number of Awarded Electric Buses	Number of Awarded Propane Buses	Number of Awarded CNG Buses	Total Number of Awarded Buses	Total Awarded CSB Funding
Prioritized	366	2,212	115	1	2,328	$866,255,000
Non-Prioritized	2	23	1	5	29	$5,799,000
Total	**368**	**2,235**	**116**	**6**	**2,357**	**$872,054,000**

Withdrawals

As of September 30, 2024, a total of 56 applicants (13 percent of selectees) had withdrawn their applications under the 2022 CSB Rebate Program. Of these withdrawals, 53 were prioritized applicants and three were non-prioritized, which aligns with the majority of selected school districts meeting prioritization criteria under the 2022 CSB Rebate Program (Table 2). Rural school districts (NCES Code 42/43) comprised 72 percent of all withdrawals, with 80 percent of those rural withdrawals being NCES Code 42 school districts. The majority of withdrawn applications (76 percent or 41 applicants) cited school boards had declined or schools had voted against CSB projects. Returned funds will be utilized in future CSB funding opportunities.

Starting with the 2023 CSB Grant Program, the EPA implemented a "School Board Awareness Certification" form that all applicants must complete prior to applying for CSB funding to ensure that school boards are aware of proposed clean school bus projects. This extra step should minimize the likelihood of future withdrawals due to a lack of school board approval.

Program Audits and Oversight

The EPA began conducting site visits in November 2024, as project recipients under the 2022 CSB Rebate Program received their new school buses, finalized replacement projects, and reached an appropriate stage for auditing. To ensure CSB funds support the goals of the program through adherence to program requirements, the EPA may pursue additional site visits to confirm record retention and verify that replacement buses are still actively servicing the school districts identified on applications for five years from when buses were delivered. CSB selectees are expected to comply with all the EPA site visit requests, recordkeeping requirements, and document requests for five years from the date of replacement bus delivery, or risk cancellation of an active rebate application or other enforcement action.

CSB Program funds are also subject to random reviews and audits by the EPA Office of Inspector General (OIG), or authorized representatives, to ensure the CSB Program follows requirements of the IIJA and protect against fraud, waste, and abuse. The CSB Program strongly believes in the spirit of continuous improvement in partnership with the OIG and is committed to oversight and accountability and to ensuring that all funds are delivering clean air and climate benefits to communities. Visit the Clean School Bus Oversight webpage for more information on CSB audits and evaluations.

Bus/Charger Costs

As discussed in the *Third Report to Congress*, the overwhelming majority of 2022 CSB Rebate Program selectees purchased Type C school buses, which have a maximum passenger load of approximately 75-80 passengers. The majority of awarded electric school buses funded under the 2022 CSB Rebate Program cost at or near $375,000, which corresponds with the maximum funding amount available for electric school buses under the program. In subsequent CSB funding opportunities, the per-bus funding levels for ZE buses included combined bus and electric vehicle (EV) charging infrastructure to provide selectees more flexibility when discussing bus pricing with their vendors. Propane school buses awarded under the 2022 CSB Rebate Program cost around $150,000. Please refer to Section IV of the *Third Report to Congress* for additional information on prices of buses funded under the 2022 CSB Rebate Program.

Rebate selectees purchasing electric school buses could choose to purchase either Level 2 chargers or direct current fast chargers (DCFCs) to power their electric school buses. Payment Request Form data indicated that total costs for less powerful Level 2 chargers were between $5,000 and $8,000, while DCFC costs were between $21,000 and $27,000. The majority of chargers purchased under the 2022 CSB Rebate Program were DCFCs. Please refer to Section IV of the *Third Report to Congress* for additional information. The EPA expects to provide additional information on buses and chargers funded under the 2022 CSB Rebate Program in the FY 2025 CSB Report to Congress.

Projected Emissions Reductions

The CSB Program funds the replacement of existing school buses with cleaner buses with the goal of achieving better air quality on the bus, in bus loading areas, and throughout the communities in which they operate. Presented below are projected emissions reductions from the 2022 CSB Rebate Program. These projected emissions reductions are based on emissions sources at the vehicle, including from the tailpipe, evaporative systems, and brake and tire wear that would occur over the operational life of the new, cleaner buses. The values presented below are initial estimates that the EPA currently expects to refine as additional information becomes available, including data from additional buses being added to the program. Please see Appendix A for information on the methods used to calculate these values.

Table 3. 2022 CSB Rebate Program Projected Emissions Reductions by Pollutant and Emissions Process[e]

Pollutants	Running Emissions[f] (Tons)	Idle Emissions[g] (Tons)	Total Emissions (Tons)
NO_x	444.87	183.50	628.37
CO	-158.30	56.55	-101.75
VOC	3.47	0.68	4.15
PM_{10}	-0.65	0.23	-0.43
$PM_{2.5}$	1.84	0.21	2.05
CO_2	318,137.12	33,983.86	352,120.98

e Running emissions of carbon monoxide (CO) increase due to higher rates of CO emissions from propane school buses compared to new diesel replacement buses. CO emission rates for propane school buses are higher than diesel school buses due to the difference in combustion processes of spark ignition and compression ignition engines. Running emissions of PM_{10} increase due to the emissions from existing buses that did not have to be scrapped by selectees and MOVES4.0.1 modeling PM_{10} brake and tire wear emissions for buses of different fuel types equally. See Appendix A for more details on the calculation methodology.

f Running emissions occur while the vehicle is operating on its routes and includes emissions from the tailpipe, evaporative systems, and brake and tire wear.

g Idle emissions occur while the vehicle is idling separate from its operation during normal driving routes and includes emissions from the tailpipe and evaporative systems.

The EPA's CSB Program Provides Opportunities for Students with Disabilities

According to a recent World Resources Institute (WRI) publication, roughly 15 percent of K-12 students - more than 7 million kids - have a disability.[21] For many of them, school buses are their only mean of getting to school. But despite laws guaranteeing accommodations for disabled children, research suggests that school buses are often inaccessible to those experiencing both mental and physical disabilities. Alongside difficulties with features such as ramps and wheelchair tie-downs, many students deal with stimulation sensitivities from the diesel engine's noise, vibrations, and smell.

Credit: EPA; Wabaunsee, SD, September 2024

To help improve the school commute for students with disabilities, applicants under EPA's CSB Program can request up to $20,000 per bus in additional funds for ADA-compliant replacement buses equipped with wheelchair lifts. In addition to prioritizing funding to high-need, Tribal, rural and low-income school districts, EPA's CSB Program strives to deliver safer and cleaner school buses to disadvantaged communities and students who can benefit the most, including those with disabilities.

Credit: EPA; Alexandria, VA, May 2022

According to an accompanying WRI working paper, the transition to electric school buses has the potential to either expand transportation equity for people with disabilities or replicate preexisting transportation barriers, which currently offer narrow accommodation options for diverse bodies and minds, pose safety challenges, and restrict mobility access.[22] To avoid replicating the same inaccessibility problems present on current diesel school bus fleets, research recommendations include:

- Prioritize the deployment of buses that serve students with disabilities along with other disadvantaged communities.
- Every bus procured should have accessibility features, such as a wheelchair ramp or lift, so all students can always have transportation access. Every bus should also include accessibility features that go beyond current accessibility standards.
- Identify and address the intersectional, environmental, and infrastructural challenges of under-resourced communities in the transition.
- Address current design and maintenance problems. Specifically, malfunctioning wheelchair lifts are unreliable and unsafe for students, drivers, and monitors. Design improvements can also include announcement or noise systems to address the hazards quieter ESBs pose to people with vision disabilities.
- Make universal design an industry standard;
- Reassess the current system of policy guidance and accountability to ensure that school districts and manufacturers comply with the ADA and Individuals with Disabilities Education Act.

Section V. 2023 CSB Grant Program

Credit: EPA; Alexandria, VA, May 2022

Credit: EPA; Cassville, MO, September 2024

In April 2023, the EPA announced the availability of at least $400 million for its 2023 CSB Grant Program through a Notice of Funding Opportunity (NOFO). Please refer to the *Third Report to Congress* for additional information on the 2023 CSB Grant Program NOFO. The grant application closed in August 2023 with over 120 eligible applications requesting over $1.9 billion in federal funds. Given the overwhelming demand and large number of high-scoring applications, including applicants in low-income communities, the EPA more than doubled the amount of funding awarded to approximately $965 million.

As shown in Table 4, a total of 67 projects were selected in January 2024, with at least 85 percent of grant funds supporting communities meeting the statutory definition for prioritization under the CSB statute. EPA expects that these projects will support the replacement of more than 2,700 buses (Table 5) across 281 school districts (Table 4). As shown in Figure 1, an estimated 67 percent of the new, clean school buses under the 2023 CSB Grant Program will operate in school districts that meet EPA's prioritization criteria. An estimated 61 percent of clean school buses funded plan to operate in high-need school districts, 4 percent in Tribal school districts, and 2 percent in school districts in rural areas.[h] It's worth noting that school districts may meet more than one CSB prioritization category, i.e., a prioritized school may qualify as high-need and Tribal, or high-need and rural.[i]

White House Recognizes Ann Arbor Public Schools as the EPA CSB Rebate Recipient

On June 10, 2024, the White House and EPA recognized Ann Arbor Public Schools in Michigan, as recipient of rebates from the EPA's CSB Program.[23] The school district will receive up to $800,000 from President Biden's Bipartisan Infrastructure Law to help purchase electric school buses. Heather Boushey of the White House's Council of Economic Advisers, Ali Zaidi the Assistant to the President and National Climate Advisor, EPA Region 5 Administrator Debra Shore, and Representative Debbie Dingell (MI) joined state and local officials on a tour of an electric school bus and highlighted how these vehicles will reduce GHG emissions, save schools money, and better protect children's health.

h Rural school districts are those districts that meet the criteria for NCES locale classification 43.

i To prevent double counting, schools that met only the high-need criteria were included in the high-need count. Schools that were both high-need and rural or high-need and tribal were included in either the rural count or the tribal count.

Table 4. Summary of 2023 CSB Grant Program Recipients (as of September 30, 2024)[j]

EPA Region	Number of Eligible Applications Received	Number of Selected Projects	Projects Under School Bus Sub-Program	Projects Under Third Party Sub-Program	Total Awarded CSB Funding (Million $)	Total Number of Beneficiary School Districts	% of Awards to Prioritized School Districts
1	6	2	1	1	$53.4M	6	100
2	13	4	1	3	$87.9M	42	97.6
3	17	6	4	2	$87.8M	17	82.4
4	26	15	13	2	$172.1M	35	94.3
5	17	9	5	4	$140.8M	41	92.7
6	11	10	6	4	$138.8M	36	91.7
7	6	5	3	2	$55.6M	12	91.7
8	2	2	0	2	$25.8M	20	65.0
9	15	10	5	5	$151.6M	45	80
10	12	4	2	2	$51.2M	27	51.9
Total	**125**	**67**	**40**	**27**	**$965.0M**	**281**	**85.4**

j The 2023 CSB Grant Program was split into two sub-programs: (1) school districts and Tribal applicants targeting single fleet turnovers and (2) third-party applicants partnering with at least four beneficiary school districts. For additional program details, please refer to the 2023 CSB Grant Program NOFO.

Table 5. Buses Requested Under the 2023 CSB Grant Program by Fuel Type[k]

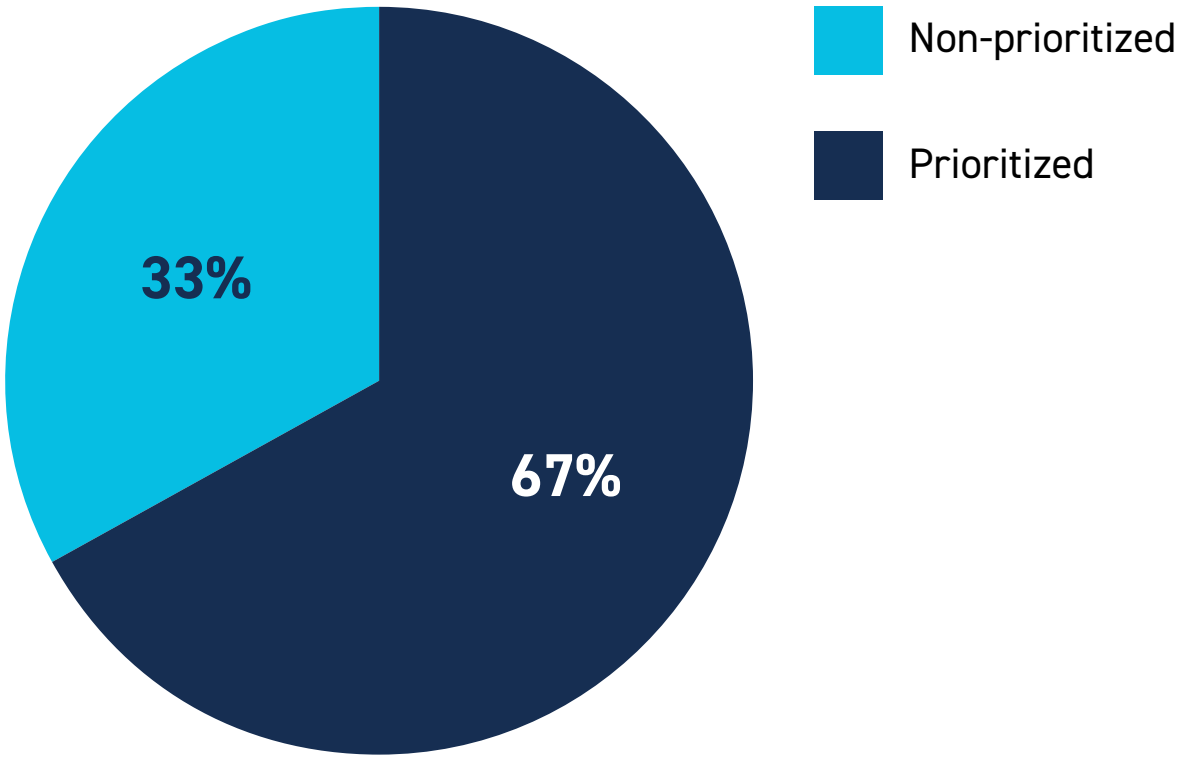
EPA Region	Number of Electric Buses Requested	Number of Propane Buses Requested	Total Number of Clean Buses Requested
1	135	0	135
2	242	0	242
3	259	15	274
4	464	40	504
5	380	0	380
6	376	0	376
7	160	0	160
8	97	0	97
9	418	7	425
10	144	0	144
Total	**2,675**	**62**	**2,737**

k Compressed natural gas (CNG) buses were an eligible replacement, however, none were requested in this funding opportunity.

Impacts of the DERA School Bus Rebate Program on Student Attendance

Researchers at the University of Michigan and the University of Washington have assessed the impact of the EPA's DERA school bus rebate funding on student attendance.[24] In examining school district attendance rates of districts that received rebate funding through DERA between 2012 and 2017 compared to those that did not, the study found that the districts awarded EPA rebate funds had greater attendance improvements – resulting in over 350,000 estimated additional student days of attendance annually. These improvements were most significant when the oldest school buses were replaced and when bus ridership was highest.

Figure 1. Percentage of Buses Funded by 2023 CSB Grant Program That Will Operate in Prioritized vs. Non-Prioritized School Districts.



Most grantees submitted initial reporting data in late summer 2024. In fall 2024, EPA conducted QA/QC on the data received and anticipates providing additional information on grant projects in the FY 2025 CSB *Report to Congress*. In the interim, the CSB Awards webpage provides up-to-date information on bus projects funded under the 2023 CSB Grant Program.

Section VI. 2023 CSB Rebate Program

In September 2023, the EPA announced the availability of at least $500 million in funding under the 2023 CSB Rebate Program. The application period closed in February 2024 with an overwhelming response from school districts across the country seeking rebates to purchase electric and clean school buses. Given the level of demand, including from low-income communities, Tribal nations and U.S. territories, the EPA, once again, doubled the initial amount of available funding to a total of nearly $965 million.

As described in the *2023 Clean School Bus Rebates Program Guide*, applicants could request up to $20,000 per bus in additional funds for replacement buses equipped with wheelchair lifts and compliant with the Americans with Disabilities Act (ADA). Additionally, school districts in Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands, or third-party entities applying on their behalf, could request up to an additional $20,000 per bus for increased shipping costs if selected for funding.

Selectee Summary

The 2023 CSB Rebate Program selections were announced in May 2024. The EPA selected more than 550 school districts spanning nearly every state, Washington, D.C., and several Tribes and U.S. territories. These rebates will help school districts purchase over 3,600 clean school buses. As shown in Table 6, more than 60 percent of the total funds were allocated to prioritized school districts and more than half of the new, clean buses will operate in prioritized districts. As shown in Figure 2, roughly 5 percent of the buses will serve Tribal and/or rural schools.

In comparison to the 2022 CSB Rebate program, a greater number of non-prioritized applications were selected. Non-prioritized school districts received less funding per bus than in prior CSB funding rounds, which is why more non-prioritized applications were able to be selected for funding in comparison to prioritized school districts (Table 6). Additionally, the statute indicates that a state can receive no more than 10 percent of funding per fiscal year. Under the 2023 CSB Rebate Program, two states (New York and California) reached that cap of receiving no more than $96.5 million in funding.

Applicants that were not selected during the initial lottery and selection process remained in random number order on a waitlist. The *2023 Clean School Bus Rebates Program Guide* indicated that applicants may be pulled from the waitlist up to 90 days post after the initial selection notifications. The 2023 CSB Rebate Program waitlist pulls were finalized in mid-August 2024. A total of 61 school districts were selected from the waitlist to receive 284 buses under the 2023 CSB Rebate Program.

As shown in Figure 2, an estimated 52 percent of new, clean buses under the 2023 CSB Rebate Program will operate in high-need, rural and/or Tribal communities that meet the statutory prioritization criteria.[l] Within the prioritized category, 47 percent of clean school buses will operate in high-need school districts, 3 percent will operate in rural school districts and 2 percent will operate in Tribal school districts. Note, a selected school district may fall into more than one prioritization category.[m]

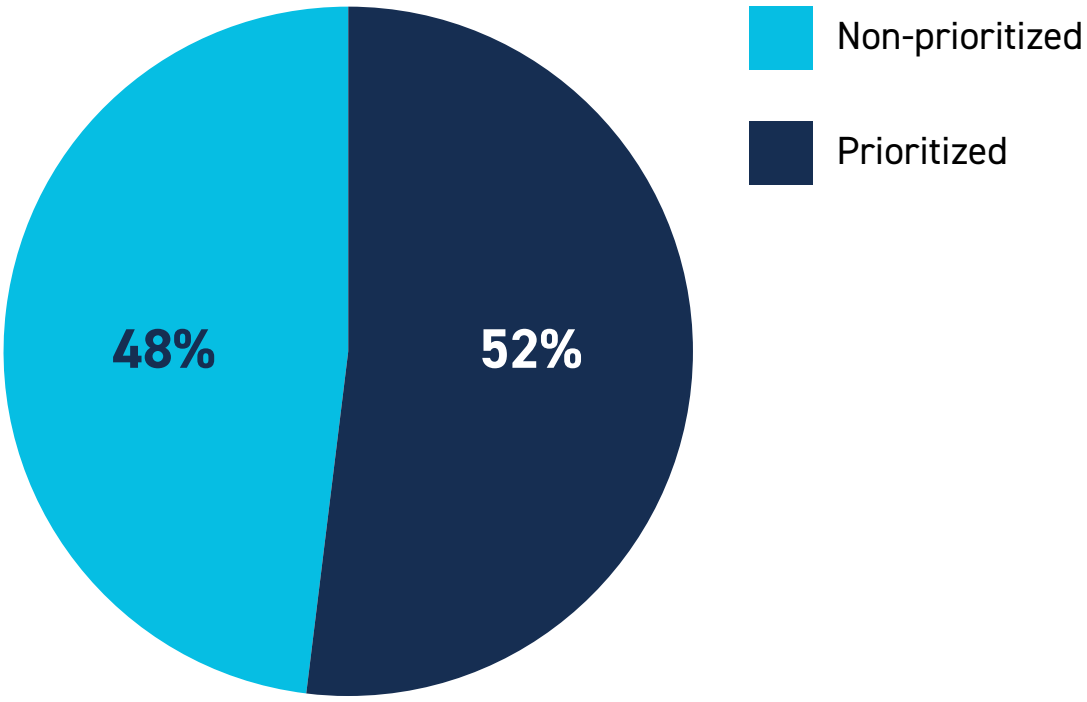
l Rural school districts are those districts that meet the criteria for NCES locale classification 43.

m To prevent double counting, schools that met only the high-need criteria were included in the high-need count. Schools that were both high-need and rural or high-need and tribal were included in either the rural count or the tribal count.

Table 6. 2023 CSB Rebate Program Recipients by Bus Type and School District Prioritization (as of September 30, 2024)[n,o]

School District Category	Number of School Districts	Number of Electric Buses Funded	Number of Propane Buses Funded	Total Number of Buses Funded	Total Awarded CSB Funding
Prioritized	246	1,840	58	1,898	$622,635,000
Non-Prioritized	309	1,523	209	1,733	$305,680,000
Total	**555**	**3,362**	**267**	**3,631**	**$928,315,000**

Figure 2. Percentage of Buses Funded by the 2023 CSB Rebate Program That Will Operate in Prioritized vs. Non-Prioritized School Districts



n CNG school buses were listed as an eligible replacement in the *2023 Rebate Program Guide* but they are no longer available in the school bus market.

o An additional 68 schools were tentatively selected from the waitlist and are currently undergoing eligibility checks. These potential recipients are not included in Table 6.

Withdrawals

As of September 30, 2024, a total of six applicants (1 percent of selectees) had withdrawn their applications under the 2023 CSB Rebate Program. Of these withdrawals, an equal number were prioritized vs. non-prioritized applicants. The majority of withdrawn applications (66 percent or four applicants) indicated budget shortfalls/concerns. These initial data, showing a relatively small number of withdrawals, lends early support to the positive impact of the Agency's "School Board Awareness Certification" and Utility Partnership Forms in ensuring critical conversations occur between school districts, school boards, and utilities prior to applying for CSB Program funding.

Next Steps for Selectees

2023 CSB Rebate selectees prepared for purchasing new, clean school buses and any supporting infrastructure leading into fall 2024. The EPA partnered with the Joint Office of Energy and Transportation (JOET) to provide prompt and free technical assistance for any selectee questions about clean school bus deployment including charging equipment, utility connections, bus performance, and operational considerations like routing and maintenance as selectees prepared for their new bus purchases. Selectees had until November 29, 2024, to submit Payment Request Forms with purchase orders demonstrating that new buses and eligible infrastructure had been ordered.[p] After reviewing purchase order documentation to ensure all program requirements were met, The EPA disbursed funds to selectees, which they then use to purchase and deploy their new buses. The EPA expects 2023 CSB Rebate Program selectees to receive new buses, install eligible infrastructure, replace existing buses, and submit project Close-Out Forms by May 29, 2026. EPA anticipates that some new buses funded under the 2023 CSB Rebate Program may be on the road as early as spring 2025, while other school districts may deploy their new buses in the 2025–2026 school year.

Credits: EPA; DeKalb County, GA, January 2024.

p If necessary to ensure successful planning and deployment of 2023 CSB Rebate Program projects, selectees could request a Payment Request Form deadline extension. EPA reviewed and approved extension requests on a case-by-case basis.

Replacing School Buses in Environmental Justice Communities with Higher Levels of Air Pollution

According to a recent report by the WRI, school districts with higher shares of low-income households are more likely to have a higher percentage of MY 2010 and older buses in their fleets. The disparity in school bus age is even more pronounced in communities of color, and school districts in rural areas also rely on older buses for a large share of their fleet. WRI recommends that school districts with the oldest school buses should be early targets for replacement to produce the greatest air quality and health benefits for their students.[25]

Credit: EPA; Jackson, MS, May 2024.

As part of the federal government's Justice40 Initiative[26] and consistent with the CSB statute, the EPA's CSB Program has developed prioritization criteria designed to increase available funding and opportunities for disadvantaged communities. To be considered a prioritized school district, a district must meet defined criteria for high-need and/or low-income areas or be classified as a remote rural or BIA-funded school district. Through the prioritized classification, school districts are eligible for a greater amount of funding per bus than non-prioritized school districts. This increased funding amount is beneficial for low-income school districts because older buses and fleets have larger replacement and maintenance costs.[27]

Electric school bus adoption is occurring most rapidly in school districts that experience the highest levels of air pollution and have higher shares of low-income households and residents of color.[28] The majority of electric school buses deployed using CSB Program funding have been awarded to communities with high rates of pediatric asthma and relatively higher levels of air pollution.[29,30] Among children living in families with incomes below the poverty level, 9.3 percent were reported to have asthma[31]. Additionally, it is more common for children of low-income families to ride the bus to and from school than children of higher income families; approximately 70 percent of low-income students ride the bus compared to the national average of 51 percent.[32]

Communities of color are often located closer to highways than predominately white communities; because of this, children of color are often exposed to increased air pollution both at home and at school along with having higher rates of asthma.[33] Asthma is a leading chronic illness among children and the leading cause of chronic school absenteeism in the United States.[34,35] Students with uncontrolled asthma often miss more school and have poorer academic performance than students without asthma.[36] Low-income populations, minorities, and children living in inner cities experience more emergency department visits, hospitalizations, and deaths due to asthma than the general population.[37] These factors and experiences of these children highlight the importance of focusing on prioritized communities, which include high-poverty, rural, and Tribal, school districts helping to address their disproportionate exposures to vehicle emissions. Without targeted prioritization criteria, benefits of funding programs would likely be more realized by higher-income areas.[38]

Section VII. 2024 CSB Rebate Program

In September 2024, the EPA announced its fourth CSB funding opportunity and third CSB Rebate Program. Given the significant number of applications under the first two rebate competitions, the EPA announced another $965 million in funding for school districts under the 2024 CSB Rebate Program. The deadline for submitting applications was January 9, 2025. The EPA is in the process of reviewing and selecting applications through the lottery process described in the *2024 CSB Rebate Program Guide*.

Credit: EPA; DeKalb County, GA, January 2024.

The 2024 CSB Rebate Program is largely consistent with the 2023 CSB Rebate Program in terms of program design; however, the EPA made two noteworthy adjustments in the 2024 funding opportunity. First, applicants could only request up to $325,000 per bus, which is lower than the maximum amount of funding per bus in previous CSB funding opportunities. Narrowing the cost difference between clean school buses and diesel school buses remains an integral goal of the EPA CSB Program. The Agency adjusted electric school bus funding levels in the 2024 CSB Rebate Program to help stretch funding further and drive down long-term electric school bus market costs. The EPA recognizes that the Inflation Reduction Act (IRA) tax incentives for the purchase of clean commercial vehicles and refueling infrastructure can offer added value to selected applicants. Second, the EPA adjusted the maximum number of buses per application to 50 buses, whereas applicants could previously only request up to 25 buses per application. The increase in the total buses per project was in response to stakeholder feedback advocating for larger projects to help achieve fleet turnover.

As discussed throughout this report, the EPA learned from previous funding opportunities and stakeholder feedback that proactive and ongoing communication with key stakeholders, including school boards and local utilities, is critical to successful bus and infrastructure deployment. As such, all 2024 CSB Rebate Program applicants were required to submit a "School Board Awareness Certification" form to demonstrate that the school board had been made aware of the application. Applicants requesting funding for electric buses were also required to submit an "Electric Utility Partnership Template" form confirming they had initiated the infrastructure planning process with their local utility. Finally, third-party applicants were required to submit a "School District Approval Letter for Third-Party Applicants" form to confirm school district awareness and support for the proposed Clean School Bus deployment project. Additional details on required application materials are available in the *2024 Clean School Bus Program Guide* and on the Clean School Bus Rebate Program webpage. The EPA expects to include more information on the 2024 CSB Rebate Program, including a selectee summary, in the FY 2025 CSB Report to Congress.

Potential Benefits of Replacing Older School Buses on Academic Performance

The CSB Program requires school districts selected for funding to scrap their oldest buses (MY 2010 or older) before scrapping, selling, or donating relatively newer buses (MY 2011 or newer), which aligns with data researchers have seen when replacing the oldest school buses.[39] For example, a study found that school districts that used DERA funding[q] to replace pre-1990 MY buses had a greater impact on math and reading test scores when compared to school districts that did not receive EPA funds.[40] Test scores for school districts replacing their oldest school buses increased by 10 percent and 4 percent for reading/language arts and math, respectively. However, there is not confirmed causation that this increase in test scores is necessarily correlated with bus replacement.[41] Additional research would be beneficial to understanding the potential impacts that new school buses may have on children's academic achievement.[r]

Schools downwind of major highways have been found to have academic differences compared to those upwind from a major highway. Peak air pollution days have been associated with lower math proficiency in advantaged schools and overall chronic $PM_{2.5}$ exposure is associated with children's cognitive development.[42,s] Downwind schools have associations with lower test scores, more behavioral issues, and increased numbers of absences.[43] Though the CSB Program is not able to control the location of schools nor the proximity to major roadways, the CSB Program does support the idea of improving educational and cognitive development. By prioritizing the scrappage of older school buses, emissions should decrease over time and benefit those that live and learn in the community, especially students who ride the bus to and from school each day.

Credit: EPA; DeKalb County, GA, January 2024.

q This study looked at DERA funding allocation between the years 2012 and 2016.

r On average, a 0.06 SD higher reading/language arts and 0.03 higher math average test scores in the year after EPA funding lottery as compared to districts not selected for funding. There were no measurable impacts on math or reading test scores in school districts replacing relatively newer school buses.

s In the most recent Integrated Science Assessment for Particulate Matter, completed in December 2019, the EPA determined there was "likely to be a causal relationship for long-term exposure to $PM_{2.5}$ and nervous system effects". For additional information, please see EPA's Integrated Science Assessment for Particulate Matter (https://www.epa.gov/isa/integrated-science-assessment-isa-particulate-matter).

Section VIII. CSB Program Summary

To date, the EPA's CSB Program had awarded nearly $3 billion over three funding opportunities to support the replacement of more than 8,500 older diesel buses with new, cleaner school buses. As shown in Figures 3 and 4, these buses are distributed across over 1,200 school districts located within every state, Washington D.C., American Samoa, Puerto Rico, the U.S. Virgin Islands, and Guam.

Selectee Maps

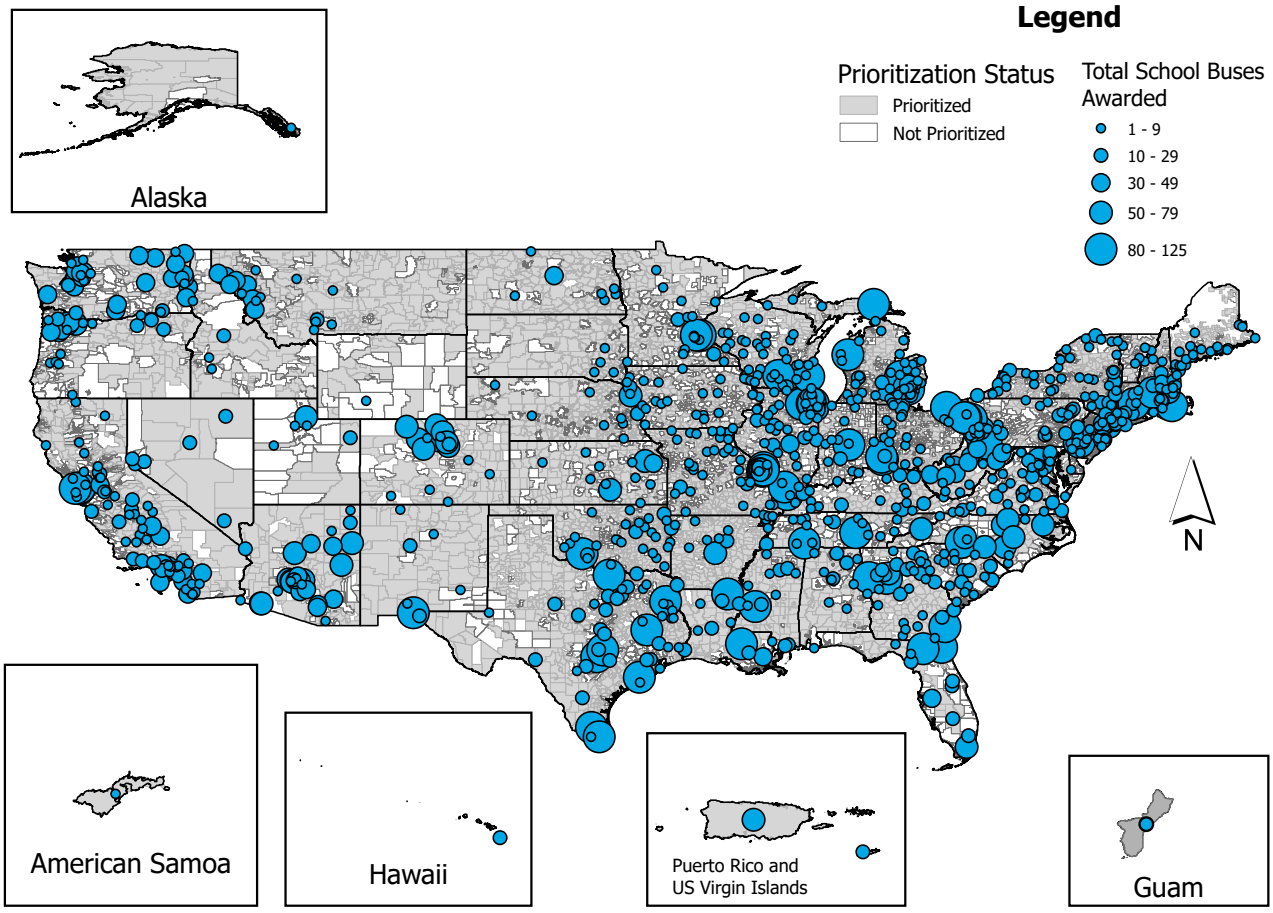
As illustrated below in Figure 3, all states have received at least one new clean school bus under the CSB Program. The relative number of buses awarded by school district are shown below, with larger circles indicating more buses were awarded in that county. School districts in Arizona, California, Illinois, North Carolina, and Texas were collectively awarded more than 1,000 new buses per state. School districts in the New York State have received the greatest number of buses under EPA's CSB funding programs with more than 1,700 buses to date. To date, the total number of buses funded in each state is largely due to the number of applications received from each state in the rebate programs, as well as the strength of applications received in the competitive 2023 CSB Grant Program (refer to Section III for more information on the EPA's grant and rebate programs). New York State has received the most buses of any state, largely due to the high number of applicants coming from New York City school districts, which have received funding in all three of the previous CSB Program funding opportunities. Furthermore, a greater number of buses were awarded in metropolitan areas such as New York City and Chicago, with smaller numbers of buses being awarded in more rural counties, which generally reflects the number of buses requested in applications received from rural areas to date.

The EPA Announces 2023 Rebate Recipients at a School in Jackson, MS

Credit: EPA; Jackson, MS, May 2024.

On May 29, 2024, EPA Administrator Michael Regan announced that approximately 530 school districts spanning nearly every state, Washington D.C., and several Tribes and U.S. territories are set to receive $900 million in rebates to replace older, diesel-fueled school buses that have been linked to asthma and other conditions that harm the health of students and surrounding communities.[44] The 2023 CSB Rebate Program, the third round of funding under the CSB Program, will help school districts purchase over 3,400 clean school buses–92 percent of which will be electric–to accelerate the transition to zero emission vehicles and produce cleaner air in and around schools. Administrator Regan was joined by NAACP President and Chief Executive Officer Derrick Johnson, Representative Bennie Thompson (MS), school children, district leaders and community members in Jackson, Mississippi, for the announcement.

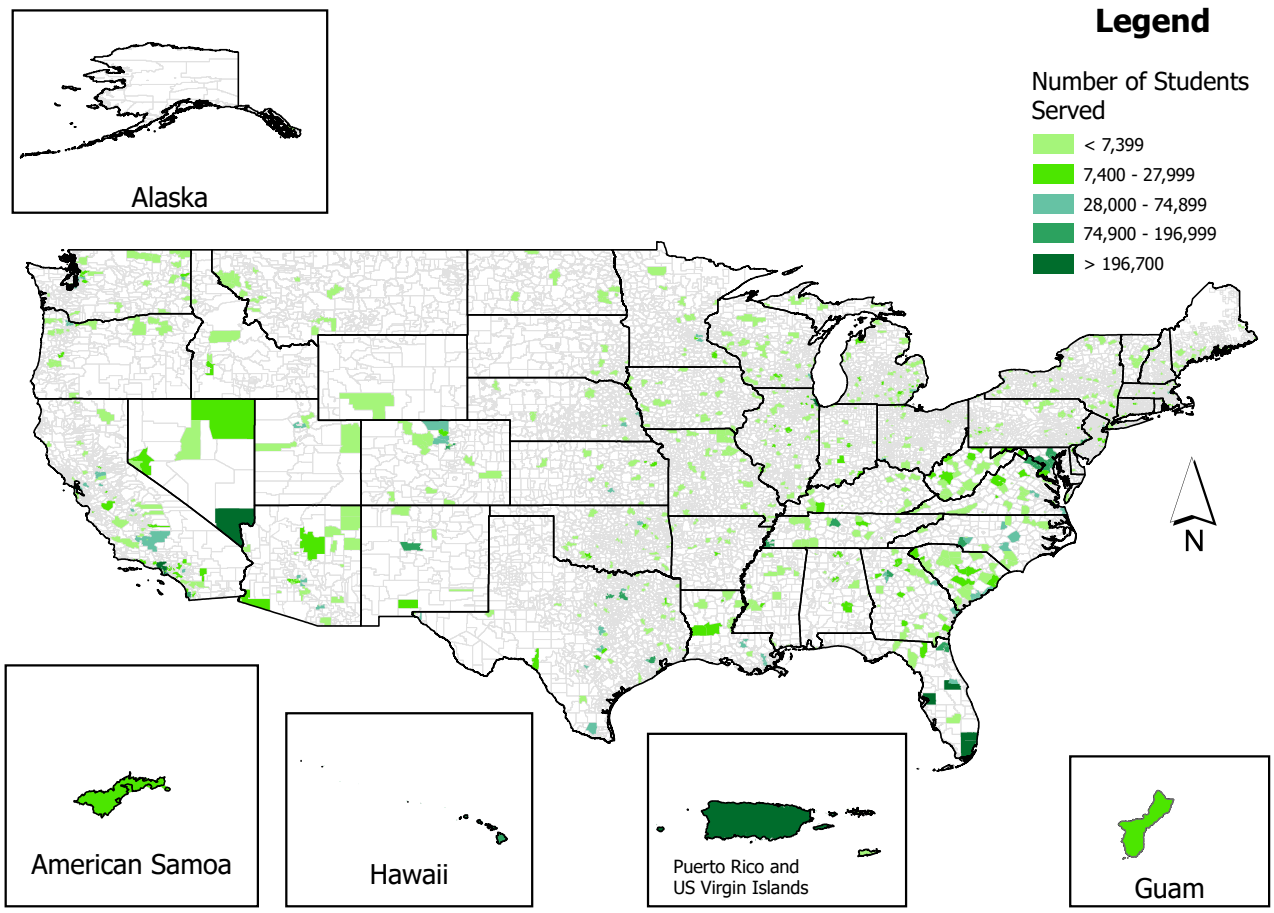
Figure 3. Total Number of Buses Awarded per School District Under FY 2022–2023 CSB Programs[t]



There are prioritized school districts in every state across the country, as shown in gray in Figure 3. At least 75 percent of the new, cleaner school buses are projected to serve prioritized school districts. The EPA also focuses education and outreach efforts on low-income, disadvantaged, and other high-need communities in rural, urban, and Tribal areas, including partnering with stakeholders to reach communities that may have never applied for a federal grant or rebate. For more on CSB stakeholder engagement, refer to Section IX of this report.

t Background shading in gray indicates prioritization status of a school district (gray = prioritized, white = non-prioritized). A larger dot indicates a greater number of buses awarded in that county.

Figure 4. Total Number of Students Served per School District Under FY 2022–2023 CSB Programs[u]



The school districts that received funding from the CSB Program and the total number of students served per school district where funds were awarded are shown above in Figure 4. The greatest number of students served are in school districts with darker colors, including districts in California, Florida, Georgia, Kentucky, Michigan, Nevada, North Carolina, and New York. Several school districts in other states also had relatively large numbers of students served by CSB Program funding, including Arizona, Georgia, Maryland, New Mexico, Tennessee, and Texas, among others. For more information on EPA-funded bus projects, including interactive maps and data tables, please visit the CSB Awards webpage.

u Figure includes the total number of school-aged children (age 5-17) enrolled in each school district receiving funding from the CSB Program (FY 2022 rebates, FY 2023 grants, and FY 2023 rebates).

Selectee Spotlights

Steelton-Highspire Project (Pennsylvania)

First Student Electrifies Steelton-Highspire's School Bus Fleet, the First in the US to Be Fully Supported by Solar

Steelton-Highspire School District, an underfunded urban district in Pennsylvania, serves approximately 1,350 students, with 95 percent identified as economically disadvantaged. Faced with a budget deficit of $11.7 million, the district sought innovative solutions to cut costs and improve the community's quality of life. By installing a solar array to power the schools, the district saw an opportunity to save further by transitioning to electric school buses, reducing fuel costs, and promoting environmental sustainability.

Steelton-Highspire leveraged the EPA CSB Program to purchase new electric school buses. The district collaborated with First Student's electrification team to navigate the funding application process. As a result, the district secured $2.1 million under the 2022 CSB Rebate Program, covering most of the cost for six new electric buses.

The EPA CSB Program has enabled Steelton-Highspire to become a pioneer in school transportation, utilizing both electric buses as well as solar energy to power said buses. The initiative is projected to save the district approximately $15,000 annually in fuel costs and provide significant environmental and health benefits.

"We are a small, urban, underfunded school district. All cost savings are extremely important to us, and almost eliminating approximately $15,000 in fuel costs every year is a huge win for us. There's also environmental and health savings that our students will realize moving forward."–J.J. Carnes, Business Manager, Steelton-Highspire School District

Credit: Photos courtesy of Steelton-Highspire School District

Eastern Band of Cherokee Indians Project (North Carolina)

Eastern Band of Cherokee Indians Electric School Bus Initiative

The Eastern Band of Cherokee Indians (EBCI) was selected to receive more than $5.9 million for 15 electric school bus replacements through the EPA's 2023 CSB Grant Program to serve Cherokee Central Schools, a Tribally-operated school system with approximately 1,300 students in grades K-12.

The EBCI applied, and was selected, to replace diesel buses from 1991, 1992, and 1998 with clean, electric school buses. Prior to the CSB Program, the EBCI had previously used other federal, state, and local funding to replace six older diesel school buses with electric school buses.

By adding 15 new electric buses, the district will increase its total number of electric school buses to 21, giving it a 100 percent electric school bus fleet.

Before putting their first electric school bus into rotation, the EBCI conducted a mountain test in the Smoky Mountains. The battery was at 78 percent when the bus reached the top, and 84 percent after going down the mountain. The bus performed well in the mountainous terrain and benefitted from the regenerative braking through which the bus battery can gain range when driving downhill. According to the EBCI, the average school bus was using around $800 a month in diesel fuel, compared to the new electric buses—which use around $400 a month in electric costs.

Credit: Photo courtesy of Eastern Band of Cherokee Indians School District

Chicago Public Schools Project (Illinois)

Chicago Public Schools: Leading the Way, Not Only in Bus Services, But in Clean Bus Services

The CSB Program is funding Chicago Public Schools (CPS) to begin implementing a transformational new clean bus fleet project. With approximately $20 million in EPA funding from the 2023 CSB Grant Program, CPS will purchase 50 new electric buses and 25 direct current fast chargers to help the school district:

1. Start building its own fleet of buses, rather than relying solely on vendors for transportation services;
2. Decrease students' exposure to pollution caused by fuel-burning vehicles; and
3. Care for the health and safety of the larger communities in which its students and families live.

Chicago Public Schools has historically worked with vendors who provide bus and yellow bus transportation services for their students. CPS CEO, Pedro Martinez, expressed enthusiasm for the new EPA funding which will allow CPS to begin developing its own, in-house fleet, which may provide cost savings and improve bus service for students and families.

In 2020, the City of Chicago's Air Quality and Health Report found that areas on the south and west sides of the city were experiencing higher levels of pollution and environmental vulnerability than other areas of the city. By purchasing electric school buses to build its fleet and concentrating the new fleet's services and charging infrastructure in these specific communities, CPS can ensure that students will breathe cleaner air, as will their broader communities.

"The transition to electric school buses represents a major step towards sustainability. Not only will these buses reduce our carbon footprint, but they also provide a cleaner and safer environment for our students." –CPS Chief Executive Officer, Pedro Martinez.

Credit: Stock photo

Red Lake School District (Minnesota)

Red Lake School District: Reflecting Anishinaabe Values in Sustainable Energy

Red Lake School District applied for the 2022 CSB Rebate Program because it wanted to be a community leader in sustainable energy. Red Lake School District was selected in the rebate lottery and awarded $790,000 in funding for two electric school buses. The EPA's Rebate Program helps smaller fleets, including high-need, rural, and/or Tribal applicants, transition to clean school buses by offering lower replacement vehicle minimums.

The school district hopes to transition from gas and diesel buses not only because of issues related to exhaust in their community, but also because they are prohibitively expensive to operate. Red Lake anticipates significantly lower maintenance costs on electric buses because they operate using fewer moving parts than traditional buses which, coupled with lower and less volatile electric rates, resulting in more funds going directly into classrooms and educational programs for students.

Red Lake's mission is to provide learning opportunities for students and community members aligned with Anishinaabe cultural values. They strive to achieve this goal not only through traditional curricula, but by utilizing best practices in energy utilization with the goal of exposing students to career opportunities in sustainable energy technology and STEM initiatives thanks to their new electric buses.

Credit: Photos courtesy of Red Lake School District

Beaverton School District Project (Oregon)

Beaverton School District to Get 50 New Electric School Buses After Already Procuring Oregon's Very First Electric School Bus in 2021

At Beaverton School District (BSD) in Beaverton, 65 percent of the district's 37,575 students ride a bus to school each day. The district currently has 315 school buses in its fleet, which is comprised of renewable diesel and renewable propane buses.[v] Beaverton was selected to receive $20 million in 2023 CSB Grant Program funding to purchase 50 new electric school buses and associated Level 2/3 chargers. BSD already has 15 electric school buses after procuring the state's very first electric school bus in 2021.

According to Craig Beaver, Administrator for Transportation BSD, the electric school buses are extremely quiet, which has a significant effect on student behavior. More than 80 percent of the electric school buses are deployed on special needs routes. Many of these students are sensitive to loud noises. The electric school buses (ESBs) have worked well to remove loud inputs and maintain a more pleasant ride for students. Additionally, BSD data indicates that ESBs' operational cost per month is 57 percent less than a diesel bus. This represents a $113,957 savings in FY 2023/2024. Upon full implementation of 80 buses, the district expects annual maintenance and fuel savings in excess of $500,000 per year.

"I drive kindergarten up through 12th grade on my electric bus. There is absolutely zero emission from an electric school bus. The biggest advantage is not having to smell the diesel fumes, it's smell-free basically. It's just fantastic for the environment."—Vu Tran, school bus driver, BSD

"We want to continue our progression to make a cleaner environment for our students and emission-free, electric school buses are critical in this effort. From a cost and maintenance standpoint, there's a tremendous advantage. Essentially, we'll only have to change tires and brakes on electric buses. Eliminating fuel, oil, coolant, and belts will greatly reduce our costs."—Craig Beaver, Administrator for Transportation BSD.

Credit: Photos courtesy of Beaverton School District

v Renewable diesel and renewable propane are fuels that are chemically identical to conventionally produced diesel and propane fuels but are derived from non-petroleum feedstocks. Renewable diesel and renewable propane have lower carbon intensity for the total lifecycle of the fuel, but because they are chemically identical replacements have the same tailpipe emissions rates as conventional diesel and propane.

Section IX. Stakeholder Engagement and Resources

During FY 2024, the CSB Program continued to utilize a variety of tools to engage with stakeholders, receive feedback, and evolve the program in response to stakeholder input. These efforts involved coordination between staff and management in EPA headquarters and regional offices.

Stakeholder Coordination

Credit: EPA, Orangeburg, SC, February 2024.

To achieve the CSB Program outreach goals described in the *Third Report to Congress*, the EPA continued to utilize several communication channels (e.g., listserv/newsletter, social media, website) to inform and educate the clean school bus community. The EPA's communication channels included CSB stakeholder networks that helped amplify program messaging, including webinar dates, application open and close dates, and other program announcements. These key stakeholders included other federal agencies, organizations working with priority applicants, associations related to schools and school buses, and other EPA offices.

In addition, the EPA continued to host a series of public webinars and listening sessions that provided overviews of program funding opportunities, as well as opportunities for stakeholders to provide feedback and suggestions to aid in the development of program guidance. Attendees represented a wide array of stakeholder groups, including community groups as well as school bus and electric vehicle supply equipment (EVSE) manufacturers. The EPA continues to collect feedback from a diverse group of stakeholders to inform future funding program design and ensure each funding opportunity is accessible to schools across the country that are interested in transitioning their school bus fleets to cleaner technologies.

EPA headquarters and regional offices worked collaboratively to support selectees/grantees under each CSB funding opportunity, especially those in low-income and disadvantaged communities. EPA headquarters and regional offices also continued to meet and share tools and resources to support outreach efforts throughout the country, including problem-solving applicants' questions and hosting community outreach events. In addition, the EPA provided numerous responses to questions received through webinars and an email helpline where questions ranged in topic from program requirements to technical questions on bus and infrastructure deployment. Where appropriate, the CSB Program pointed applicants to its partners at JOET for additional, free support with deploying new, clean school buses and any infrastructure.

The EPA also continued to convene with key program stakeholders to inform future incentive program design and implementation, as well as ensure awareness of existing CSB funding opportunities. This included participating in CALSTART's Electric School Bus Government Agency Forum, which consists of state government agencies that administer electric school bus incentive programs. The Forum was established in April 2024 and meets bimonthly to discuss program administration best practices, industry trends, and opportunities to coordinate amongst incentive programs.

Technical Assistance Coordination

In addition to continuing to work with stakeholders to reach selectees and potential applicants, as well as improve program design, the EPA continued to work with several stakeholders to provide clean school bus technical assistance. JOET's helpline, cleanschoolbusTA@nrel.gov, is available for applicants and selectees to submit their technical questions. JOET is able to provide technical assistance at any stage in the development journey of a school bus electrification project, from project planning, to deployment, and maintenance of the fleet.

Credit: EPA; DeKalb County, GA, January 2024.

From June 2022 to September 2024, JOET received nearly 800 email requests for clean school bus technical assistance. School districts submitted 26 percent of the helpline inquiries, 41 percent of which came from prioritized school districts. Other entities seeking assistance through the helpline included academic sources, Clean Cities and Communities, consultants, consumers, the federal government, local governments, industry groups, media, infrastructure providers, state agencies, private industry, fleets, utilities, and vehicle providers.

Most technical assistance inquiries received by JOET included questions about infrastructure (61 percent) or questions about individual alternative fuel vehicles (39 percent). Most vehicle inquiries submitted specifically referenced electric buses (70 percent), while about 29 percent contained general questions about alternative fuel vehicles and less than 1 percent directly inquired about propane vehicles. No technical assistance inquiries were received about natural gas (or CNG) vehicles.[w]

Joint Office of Energy and Transportation Support

As noted above, the EPA continued its partnership with JOET to offer clean school bus technical assistance to school districts, including information and tools to successfully plan for and deploy their awarded clean school buses and infrastructure. JOET works with the National Renewable Energy Laboratory (NREL) to lead the CSB Program's technical assistance efforts by developing resources and providing prompt customer service to stakeholders.

JOET's technical assistance helpline (cleanschoolbusTA@nrel.gov) responds to any technical clean school bus deployment or maintenance question CSB Program applicants and selectees may have within 48 hours. As needed, JOET will connect school districts with NREL experts to answer more specific technical questions. Below is a list of some of the services JOET can provide to school districts, free of charge:

- Coordinating with electric utilities
- Identifying available funding and incentives
- Analyzing charging infrastructure needs
- Conducting route analysis and planning
- Conducting training and workforce development
- Opportunities for resiliency (V2X)
- Analyzing energy needs and grid impact
- Identifying solar and battery storage opportunities

w All technical assistance inquiries exclude spam and administrative requests.

JOET also frequently joins EPA staff in meetings with selectees who have submitted requests to extend their Payment Request Form deadline for longer periods of time, and/or are considering withdrawing from the Program. During these conversations, JOET staff, EPA staff, and the selectee can discuss options. As needed, JOET can provide additional support to enable the selectee to continue with the CSB Program and successfully deploy their awarded buses and infrastructure.

The EPA and JOET co-hosted several public webinars on clean school bus training and maintenance considerations, fleet planning and route analysis, utility planning, and other technical assistance topics during FY 2024. In addition, the EPA and JOET developed a series of resources for CSB Program funding recipients preparing for electric school buses. The resources include:

- The National Electric Vehicle Infrastructure Utility Finder (NEVI U-Finder) helps school districts identify active local utility partners supporting the installation of EV chargers and potential additional funding incentives.
- The Route Analysis Tool helps school districts understand their fleet's charging infrastructure needs.
- The Electric School Bus Charging Station Planning Form is a tool for fleets to gather their charging-related data and prepare to meet with their electric utility.
- A Cold Weather Impacts on Electric School Buses Technical Assistance Help Sheet for schools located in cold climates seeking to understand their electric school bus options.
- A *Transition to Electric School Buses: Considerations and Resources Guide* to facilitate the successful purchase and timely deployment of electric school buses and charging infrastructure.

All CSB Program technical assistance resources can be found on the EPA CSB Program and JOET Technical Assistance websites.

The EPA Announces 2023 Grant Program Selected Applicants in Washington D.C

Credit: EPA; Alexandria, VA, May 2022

On January 8, 2024, EPA Administrator Michael Regan announced 67 applicants selected to receive nearly $1 billion in funding through EPA's first competitive CSB Grant.[45] The awards, made possible through President Biden's Investing in America agenda, will help selectees purchase over 2,700 clean school buses in 280 districts serving over 7 million students across 37 states. According to Vice President Kamala Harris, who was in attendance at the Washington D.C. event, "As part of our work to tackle the climate crisis, the historic funding we are announcing today is an investment in our children, their health, and their education. It also strengthens our economy by investing in American manufacturing and America's workforce." According to Senator Chuck Schumer (NY), who proudly led the passage of the Bipartisan Infrastructure Law, "This major investment set the wheels in motion to put new electric school buses on the road, curbing carbon emissions decreasing pollution, and improving air quality for students and communities across America." Other regional EPA offices held similar events announcing CSB grant recipients and encouraging other schools to apply for future program funding.

EPA Electric Sector Pledge

One of the primary barriers CSB Program selectees face with electric school bus deployment is uncertainty around charging infrastructure and how to engage with electric companies. To be responsive to stakeholder needs and questions surrounding utility engagement and collaboration, the EPA entered into an Electric Sector Pledge with two national electric sector organizations in February 2023: Edison Electric Institute (EEI), the association that represents all U.S. investor-owned electric companies, and the Beneficial Electrification League (BEL), a non-profit organization that works closely with rural electric cooperatives and public power utility providers on electrification initiatives. EEI members and BEL partners have pledged to proactively work with school districts to:

Credit: Stock image

- Facilitate communication between electric providers and school districts;
- Provide technical support and assistance; and
- Work together to increase funding and deployment for electric school buses.

Successful adoption of electric school buses requires initiating contact early on with electric utilities. One of the primary outcomes of the Electric Sector Pledge has been EEI and BEL identifying specific points of contact for applicants to speak with regarding their potential school bus electrification projects. To receive this information, applicants may contact cleanschoolbusTA@nrel.gov.

In February 2024, the EPA published *Clean School Bus Program: Coordinating with Electric Utility Partners*, a reference document that outlines the types of critical conversations school districts and utility partners should be having prior to embarking on a new electric school bus project. EPA also worked with utilities to refine the Utility Partnership Template. The updated template will be used for the 2024 CSB Rebate Program and future funding opportunities.

Another outcome of the Electric Sector Pledge has been monthly meetings with utility trade associations. These meetings allow the EPA an opportunity to discuss ideas and concerns and gives the Agency better understanding of how utilities operate. As of August 2024, participants in these meetings included representatives from the National Rural Electric Cooperative Association (NRECA), America Public Power Association (APPA), EEI, BEL, the Smart Electric Power Alliance (SEPA), the EPA and JOET.

Clean Cities Coalition Network

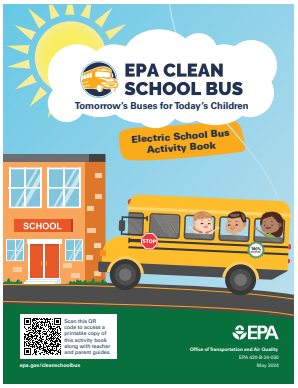
The EPA continues to work with the Department of Energy's Clean Cities Coalition Network ("Clean Cities"), which consists of more than 75 coalitions located across the country that work to advance affordable domestic transportation fuels, energy-efficient mobility systems, and other fuel-saving technologies and practices. EPA's regional offices utilized their existing relationships with their local Clean Cities Coalitions to direct applicants' locally-specific technical questions to the appropriate point of contact. Additionally, Clean Cities hosted a series of public webinars on a wide variety of topics, including Introduction to Electric School Buses, Infrastructure Planning and Solutions, and Driver and Technician Training.

CSB Program Outreach

The EPA continued to support selectees and promote funding opportunities through a robust webinar schedule, presentations at conferences and external webinars, and question and answer documents. During FY 2024, the EPA hosted and co-hosted 20 webinars and panel discussions on various CSB topics including utility planning, fleet planning and route analysis, charging best practices, fraud prevention, awareness and education by the OIG, and Internal Revenue Service tax credits. All webinars were presented in English and Spanish, and webinar slideshows and recordings were posted to the CSB Webinars webpage. In addition to responding to questions at the end of each webinar, the EPA held dedicated Q&A office hours and continued to respond to stakeholder questions posed through the CSB helpline by maintaining Questions and Answers documents for the 2022 CSB Rebate, 2023 CSB Grant, 2023 CSB Rebate, and 2024 CSB Rebate Programs. At the time of this report, the EPA had posted over 1,400 questions and answers and responded to over 6,000 email inquiries.

In addition, the EPA participated in webinars held by external partners including JOET, the World Resources Institute, the Beneficial Electrification League and other CSB supporters and stakeholders during FY 2024 and posted them on the CSB webinars webpage. The EPA also participated at conferences hosted by transportation and environmental organizations, Tribal and environmental justice organizations, education and school groups, and other external stakeholders. The EPA received several speaking requests to discuss the CSB Program and accepted as many offers as staffing capacity allowed.

Educational Resources



The EPA continued to develop and distribute educational resources to enhance the CSB Program's outreach. The *Electric School Bus Activity Book* for elementary school students (kindergarten through 5th grade), allows children to explore clean transportation, electric school buses, public health, and climate change through coloring, games, riddles, and storytelling. The resource has been very popular among program stakeholders. EPA staff have distributed the book at in-person events and conferences and encouraged stakeholders to download and print it from the CSB website. A Spanish version of the Electric School Bus Activity Book has been developed and is also distributed at in-person events.

To help spread the word about the CSB Program directly from selectees, the EPA continued to promote its *How to Write a Success Story* guide. The guide breaks down how to write an article that effectively communicates the positive impact of clean school buses with the intention that selectees will publish their clean school bus "success stories" to a school district website, local news outlet, etc. The guidance is shared with selectees once they install their awarded infrastructure and begin using their new buses.

In addition to the mentioned resources, the EPA continues to develop one-page flyers to promote and summarize each funding opportunity. The flyers are posted to the CSB Program website and shared with program stakeholders. The most recent flyer, a summary of the 2024 CSB Rebate Program, was published in September 2024.

Workforce Development

The EPA's Workforce Development and Training Resources webpage features a list of resources about ZE buses, EVSE installation, vehicle operation training, and maintenance and repair. Included on this webpage is a *Workforce Planning Recommendations and Resources* guide created by the EPA. Several stakeholders have also hosted webinars specific to electric school bus training, including this driver and technician training from the Alternative Fuels Data Center and an overview for electric school bus operators from JOET. These webpages and resources are consistently updated to support school districts with the most up-to-date information from the industry.

Through the 2023 CSB Grant competition, the EPA encouraged school districts to prepare their workers for buses purchased through the program by including a detailed description about workforce development in their project narrative. Applicants' description of their plan for workforce development was a scored criterion in the application evaluation process. This component of the grant competition asked applicants to assess the impact the buses would have on their workforce and to propose solutions for training and worker readiness to encourage a smooth, safe transition to clean school buses. To support school districts in these efforts, driver and mechanic training related to the maintenance and operation of new technologies and training to certify licensed electricians to install EVSE were included as eligible project costs.

In 2023, clean school bus OEMs were invited to respond to an EPA survey, developed in collaboration with the Department of Labor, regarding each OEM's job quality and workforce development practices. OEMs answered questions about their employee benefits, union neutrality, training and apprenticeship programs, community partnerships, and other important topics tied to job quality. All OEMs shared that their permanent full-time employees are offered a retirement plan, many OEMs discussed their goals to expand diversity in the manufacturing sector, and several OEMs shared examples of robust training programs to create career pathways into advanced manufacturing while promoting upward mobility for current employees. To provide stakeholders with transparent information about school bus manufacturer job quality, the survey responses were published on EPA's CSB Workforce Development webpage.

Credit: EPA; DeKalb County, GA, January 2024.

Section X. Build America, Buy America

The Build America, Buy America Act (BABA), enacted as part of the IIJA, requires the application of domestic preference requirements to infrastructure projects funded by federal financial assistance issued on or after May 14, 2022.[x] For all funding rounds under the CSB Program, school buses are not required to meet BABA requirements. The 2022 CSB Rebate program was granted a waiver from BABA requirements on July 29, 2022, to allow funding recipients and the EPA to transition to new rules and processes that addressed vehicle charging equipment and associated infrastructure.[46] The EV charger waiver was in place for all EV chargers manufactured on or before June 30, 2024 and begin installation by October 1, 2024, which covered actions under these three programs up until then. All infrastructure (e.g., EV chargers) manufactured on or after July 1, 2024, must now be fully BABA compliant.

The EPA and the CSB Program have remained committed to implementing BABA and advancing domestic sourcing. All CSB Program funding awards included BABA terms and conditions for infrastructure. In addition, CSB Rebate Program selectees and grantees will now include BABA compliance data as part of performance reporting. Both the CSB Grant and Rebate Programs collect data, as required, to not only track and distribute funds, but also track waiver applications and usage. The EPA also encourages bus procurements from domestic sources.

The EPA established an email inbox, BABA-OTAQ@epa.gov, where any CSB Program BABA-related questions can be routed. The same email inbox may also be used by grant/rebate recipients to submit project-specific waiver requests for the EPA to review. The CSB Program sent reminders to program participants ahead of the expiration of the EV chargers waiver and has been providing responses to questions from CSB Program participants following the waiver's expiration.

Credit: Stock image

Credit: EPA; DeKalb County, GA, January 2024.

x On October 23, 2023, BABA implementing regulations became effective under Part 184 to Title 2 of the Code of Regulations (CFR). The Office of Management and Budget issued subsequent guidance on October 25, 2023, in memorandum M-24-04, Implementation Guidance on Application of Buy American Preference in Federal Financial Assistance Programs for Infrastructure. Memorandum M-24-02 summarizes certain aspects of 2 CFR 184 and provides supplemental guidance for infrastructure projects subject to BABA, including how agencies should process waivers for a Buy America preference.

The EPA and JOET Visit School Districts to Provide Technical Assistance and Support

Representatives from the EPA's CSB Program and JOET visited two school districts that received funding in the 2022 Rebates Program: Wabaunsee USD 329 in Alma, Kansas and Cassville R-IV School District in Cassville, Missouri. During these visits, EPA and JOET staff met with school district administrators as well as fleet transportation leads and bus drivers to discuss successes and challenges that the districts had experienced with their electric school buses. At Wabaunsee, JOET staff assisted with troubleshooting technical issues with the electric school buses, and fleet transportation leads provided helpful insight into the challenges electric school buses face when navigating rural terrain on their routes. At Cassville, fleet transportation leads explained how they navigated issues with selecting the proper charging equipment for their buses as well as how they are working to address problems with maintaining a comfortable temperature on their electric buses in the winter months. Through these site visits, EPA and JOET gained valuable insight into challenges that CSB Program selectees may experience, which can be used to inform future program design and provide targeted technical assistance resources to program applicants and selectees.

EPA and JOET staff discuss utility upgrades and charging equipment with Cassville R-IV School District's fleet manager, bus mechanic, and school district administrators. Cassville received funding to purchase five electric school buses, five level 2 chargers, and one DC fast charger in the FY 2022 Rebates program.

Credit: EPA; Cassville, MO, September 2024

EPA and JOET staff met with the school district superintendent and a bus driver at Wabaunsee USD-329 to troubleshoot problems experienced with their electric school buses. Wabaunsee received funding to purchase two electric school buses and two level 2 chargers in the FY 2022 Rebates program.

Credit: EPA; Wabaunsee, SD, September 2024

Section XI. Looking Ahead

Credit: EPA; Jackson, MS, May 2024.

To date, the EPA has issued nearly $3 billion in clean school bus funding under its 2022 CSB Rebate, 2023 CSB Grant and 2023 CSB Rebate programs. The EPA also recently announced up to $965 million in funding for a 2024 CSB Rebate program and anticipates administering the remaining CSB funds by the end of fiscal year 2026.

To achieve the CSB Program's goal of providing school districts with multiple funding opportunities, the EPA encourages applicants not selected for funding, as well as those previously awarded EPA funding, to re-apply under future programs. The EPA will continue to post CSB Program updates on the CSB Program website.

The EPA remains committed to frequently engaging with stakeholders to promote the CSB Program and collect feedback that informs future program development. The EPA continues to provide stakeholders with multiple channels for proving feedback through regular meetings, public webinars and the CSB Helpline (cleanschoolbus@epa.gov). Based on lessons learned, the EPA will continue to improve and strengthen the Clean School Bus Program. The EPA will continue to publish information on future CSB funding opportunities and other program guidance on our website, in questions and answers documents, and electronic newsletters shared with CSB selectees and listserv subscribers. This strategy ensures that all potential U.S., Tribal and Territory applicants are aware of clean school bus resources, funding opportunities, and applicable deadlines. As more selectees begin to use their new clean school buses, the EPA will continue to share program successes and challenges in EPA newsletters, webinars, and future Reports to Congress.

Clean School Bus selectees and stakeholders continue to indicate that the planning, financing, and installation of EV infrastructure remains one of the larges hurdles to completing their CSB Program-funded projects and deploying electric school buses. The EPA continues to work with JOET, inter-agency partners, and stakeholder to share the best possible technical assistance, resources, and guidance through the Clean School Bus Technical Assistance website and the CSB Technical Assistance Helpline (cleanschoolbusTA@nrel.gov).

Additionally, the EPA continues to promote cost parity between diesel and clean school buses to ensure that ZE and clean school buses are affordable for school districts in low-income and disadvantaged communities and on track to becoming the new American standard. The EPA will continue to work with stakeholders to design future funding opportunities that incentivize lower clean school bus costs and the adoption of affordable clean school bus technologies to maximize the number of clean school buses on the road.

The replacement of older school buses with new zero- and low-emission school buses not only substantially reduces harmful emissions that increase the risk of asthma and other respiratory illnesses, but also reduces GHG emission reductions in the transportation sector, and is linked to improvements in student attendance and academic achievement.[47] The EPA's Clean School Bus Program is a critical step towards improving the health of students, bus drivers, school staff and surrounding communities while addressing climate change and environmental justice.

Appendix A. Emission Calculation Methodology

Overview

For the projected emissions reductions estimates included in this Report to Congress, the CSB Program calculated emissions reductions from the operation of school buses replaced and purchased through the 2022 CSB Rebate Program, which was the CSB funding program with the most robust data available at the time of calculating emissions estimates. Emissions sources for both criteria air pollutants and GHGs included tailpipe, evaporative systems, and brake and tire wear emissions. The emissions calculation was performed using the EPA's MOtor Vehicle Emissions Simulator (MOVES) 4.0.1 and the Argonne National Lab's Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET 2023) tools. The calculation methodology below details the assumptions, calculation terms, and equations the CSB Program used for the emissions reduction values included in the Report to Congress.

Methodology

The projected emissions reduction estimates were calculated with the following assumptions:

- Based on user-reported data from nearly 7,000 school buses,[y] it is assumed:
  - School buses are driven an average of 10,000 miles per year.
  - School buses idle for 163 hours per year.
- Every new clean school bus replaced the purchase of a new diesel school bus.
- Every school bus has a useful operating life of 15 years.[z]
- Every existing MY2010 or older bus replaced through the 2022 CSB Rebate Program is scrapped, as required in the 2022 Program Guide.
- Every existing MY2011 or newer bus replaced through the 2022 CSB Rebate Program is assumed to remain in use.
  - Many selectees may opt to scrap their MY2011 or newer buses and the CSB Program intends to update these emissions values accordingly when vehicle replacement processes are fully captured in the project close out data of the 2022 CSB Rebate Program.

y CSB Program applicants and selectees provided the EPA with data on average annual idling hours and average miles driven for each bus to be replaced through the 2022 and 2023 CSB Rebate Programs. The values of 10,000 miles and 163 hours per year were selected as representative values at a national level based on this robust dataset.

z The 2022 CSB Rebate Program required fleets to scrap any diesel buses from MY 2010 or older first. This element of program design was aimed at removing the buses with the highest emission rates from the road first.

For each year of emissions during the useful operating life of buses replaced or purchased through the 2022 CSB Rebate Program, the following calculation occurs in Equation 1:

$$Emissions_{Category} = \sum_{Year\ 1}^{Year\ n} \left(EF_{running} \times VMT\right) + \left(EF_{idle} \times Idle\ Hours\right)$$

Equation 1 Calculation Terms:

- $Emissions_{Category}$: The Emissions term represents the values for NO_x, CO, CO_2, VOC, PM_{10}, and $PM_{2.5}$ emissions[aa] that are calculated for each bus. The category for each bus determines whether the emissions are avoided or added because of CSB Program policies. Total emissions are summed over the different categories, including emissions from a baseline replacement bus, emissions from vehicles scrapped through the program, emissions from vehicles that are not required to be scrapped, and emissions from the new vehicles the CSB Program funded. See the Equation 2 calculation terms for more details.
- Year 1 to Year n: The summation captures each year of useful operating life for buses purchased or replaced through the 2022 CSB Rebate Program. All buses are assumed to have a useful operating life of 15 years and emissions are calculated only for the operation of vehicles during the 2022 CSB Rebate Program period (e.g., a new bus purchased through the program will have emissions calculated for all 15 years, whereas an existing bus that is sold instead of scrapped after 12 years in operation is assumed to continue operating, but will only have emissions calculations included for the last three years of its assumed 15-year useful operating life).
- $EF_{running}$: This term represents emission factors of each criteria air pollutant and GHG that occur from driving the vehicle. These emission factors have a unit of mass per distance and are calculated for each year using the MOVES model based on the school bus regulatory class,[ab] fuel type, MY, and emissions year.
- VMT: Vehicle miles traveled, i.e., the distance a vehicle is driven and is assumed to be 10,000 miles per year for each bus.
- EF_{idle}: This term represents emission factors of each criteria air pollutant and GHG that occur while the vehicle is idling separate from its operation during normal driving routes. These emission factors have a unit of mass per time and are calculated using the MOVES model based on the school bus regulatory class, fuel type, MY, and emissions year.
- Idle Hours: This term represents the number of hours a vehicle is running idle and is assumed to be 163 hours per year for each bus.

aa MOVES calculates PM_{10} and $PM_{2.5}$ emissions from three sources: primary exhaust, brake wear, and tire wear. The PM values presented in the report represent the sum of these three sources.

ab The emission rates in MOVES vary by vehicle regulatory class to account for average vehicle weight. For school buses, MOVES Regulatory Class IDs 41, 42, 46, and 47 respectively correspond with vehicle class sizes Class 3, Class 4 and 5, Class 6 and 7, and Class 8a and 8b.

Equation 2 is used to calculate the total emissions reductions:

$$Emissions_{Total} = Emissions_{Baseline} + Emissions_{Scrapped} - Emissions_{CSB} - Emissions_{Existing}$$

Equation 2 Calculation Terms:

- $Emissions_{Total}$: This term represents the total net emission reduction for each criteria air pollutant and GHG from all the buses replaced and purchased through the 2022 CSB Rebate Program.
- $Emissions_{Baseline}$: This category represents avoided emissions from new diesel buses.[ac] It is assumed new diesel buses would have been purchased to serve school districts in the 2022 CSB Rebate Program had the rebate program participants not received funding for a CSB. These new diesel buses are all assumed to be MY2024 and are the same Regulatory Class as the corresponding CSB purchased through the program.
- $Emissions_{Scrapped}$: This category represents avoided emissions from existing school buses that were replaced through the program and scrapped before the end of their useful life.
- $Emissions_{CSB}$: This category represents added emissions due to the operation of the new CSB funded through the program.
- $Emissions_{Existing}$: This category represents added emissions due to the continued operation of existing MY2011 or newer buses that are replaced through the program but are sold or donated instead of scrapped.

Data Sources

Emissions Calculations:

MOVES was the primary data source for the emissions calculations, with AFLEET providing values for propane vehicles.[ad]

MOVES 4.0.1:

- EPA's MOVES is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, GHG, and air toxics.

AFLEET 2023:

- Argonne National Lab's AFLEET tool helps stakeholders estimate petroleum use, GHG emissions, air pollutant emissions, and cost of ownership of light-duty and heavy-duty vehicles.

ac For projects that have emissions reductions due to buses that are scrapped before the end of their useful operating life, no avoided emissions were included for the Baseline category during emissions years with emissions reduction values for the Scrapped category. This removes any potential double-counting of avoided emissions from both scrapped buses and new diesel replacement buses in the same emissions year.

ad The running and idle emissions rates for propane school buses were generated from MOVES 4.0.1 based on school bus regulatory class, MY, and emissions year for gasoline school buses and then adjusted using the pollutant multipliers for propane school buses from AFLEET 2023.

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