



## **2022 State of Electric School Buses in Colorado**

*Colorado is a leader in the nationwide transition to cleaner and healthier electric-powered school buses*



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Design cover: Alex Simon

Cover Image: Electric bus from Aurora Public School District. *Credit:* Staff.

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## Colorado: A leader in public funding for electric school buses

The yellow school bus is an icon of American culture, shepherding thousands of children in Colorado to and from school, field trips, and sports competitions.

Unfortunately, for decades fossil fuel school buses have exposed kids to toxic emissions both inside when they ride and outside as they wait to board.

Following the passage and signing of [SB22-193](#) in June 2022, Colorado became the [leading state in awarded funds per capita](#) to transition these buses from the current fossil fuel buses to cleaner, electric school buses.<sup>1</sup> While California has since approved a massive \$1.5 billion in electric school bus funding as part of the FY23 budget, Colorado remains second nationally in both overall awarded funds and per capita funding.

### Funding for electric school bus per capita by state (May 9, 2022):<sup>2</sup>

Rank	State	Public Funding (Awarded and Budgeted)	Population (US Census)	Per capita
1	California*	\$1,811,192,603	39,538,223	\$45.81
2	<b>Colorado</b>	<b>\$74,873,322</b>	<b>5,773,714</b>	<b>\$12.97</b>
3	New Jersey*	\$58,870,914	9,288,944	\$6.34
4	Connecticut*	\$20,122,689	3,605,944	\$5.58
5	Vermont	\$2,230,851	643,077	\$3.47
6	Florida	\$57,000,000	21,538,187	\$2.65
7	Washington	\$12,330,115	7,705,281	\$1.60
8	Virginia	\$10,145,110	8,631,393	\$1.18
9	New Hampshire	\$1,250,000	1,377,529	\$0.91
10	New York	\$12,100,000	20,201,249	\$0.60

\*Following the release of this data in May 2022 the following states passed additional funding for electric school bus adoption which have been included in this chart: CA FY23 budget = \$1.5B; NJ Bill A1282 Aca (1R) = \$45M; CT HB5506 = \$20M.

According to data provided by the [Atlas EV Hub](#) on electric school bus spending as of May 2022,<sup>3</sup> Colorado has allocated a total of nearly \$75 million to the electric bus transition, including about [\\$10 million](#) the state had received in previous years from the [Volkswagen scandal settlement](#).<sup>4</sup> The state is second nationally in total electric school bus funding, behind California but ahead of large states like Florida, New York and New Jersey.

**Top 10 states for total awarded electric school bus funding (May 9, 2022):<sup>5</sup>**

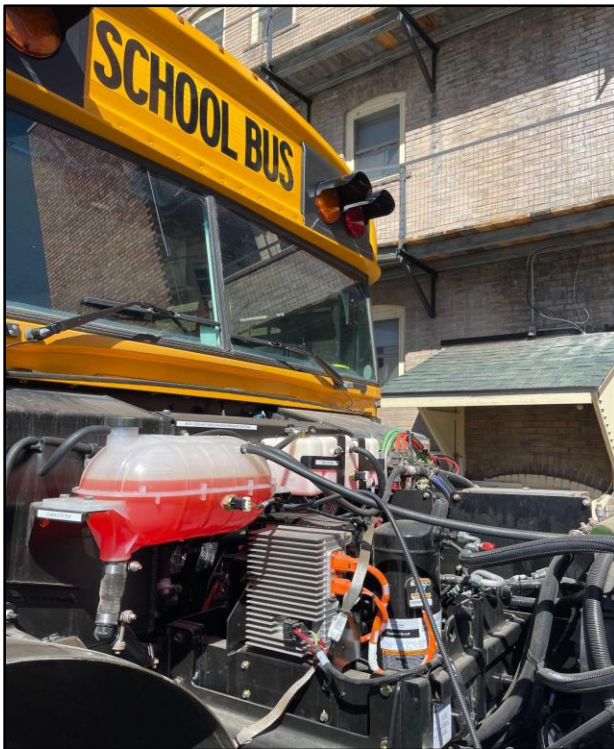
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5	Connecticut*	\$20,122,689
6	Washington	\$12,330,115
7	New York	\$12,100,000
8	Virginia	\$10,145,110
9	Vermont	\$2,230,851
10	New Hampshire	\$1,250,000
*Following the release of this data in May 2022 the following states passed additional funding for electric school bus adoption which are included in this chart: CA FY23 budget = \$1.5B; NJ Bill A1282 Aca (1R) = \$45M; CT HB5506 = \$20M.		

## Electric school buses reduce pollution and save money

Electric school buses protect kids' health by avoiding exposure to toxic diesel emissions. Diesel exhaust is classified as a [likely carcinogen](#) by the EPA<sup>6</sup> and contains a mixture of very fine particles of carbon and toxic gasses including Benzene, which is classified as a [known carcinogen](#).<sup>7</sup>

Inhalation of diesel exhaust has been [linked to numerous health problems](#), including lung cancer, asthma, bronchitis and other respiratory illnesses.<sup>8</sup> According to [a study](#) from Yale University, "there is no known safe level of exposure to diesel exhaust for children, especially those with respiratory illness."<sup>9</sup>

Studies show that levels of diesel emissions inside school buses can be up to [4 times higher](#) than outside the bus, translating into a significant increase of risk to the children inside.<sup>10</sup>



*In an electric bus, there is no longer an engine or fuel tank.*

*Instead, the electric motor functions as both the engine and transmission, while the bus battery replaces the fuel tank.*

*Electric school bus engine, Denver Public Schools fleet.*

*Photo Credit: Staff.*

In addition, the transportation sector is the [leading source](#) of greenhouse gas emissions in Colorado.<sup>11</sup>

By eliminating internal combustion engines and tailpipes, electric school buses do not emit harmful air pollution and produce much less carbon emissions - even if the electricity used to power it is generated in part from fossil fuels. Based on [Colorado's current energy grid mixture](#) an electric vehicle produces about 50% less carbon pollution than a traditional gas-powered alternative.<sup>12</sup>

Replacing all of America's school buses with electric buses could avoid an average of [5.3 million tons](#) of greenhouse gas emissions each year.<sup>13</sup> Given Colorado's school bus fleet of 6,838 total school buses<sup>14</sup> (of which less than 1% are currently electric),<sup>15</sup> that equates to approximately 72,483 tons of ghg emissions annually.<sup>16</sup>

Electric school buses can also save districts money over the long term through lower maintenance and fueling costs. An analysis of the fuel costs for the electric school bus in Kremmling, CO found it was [three times cheaper](#) to fuel than the diesel version.<sup>17</sup>

The cost savings for school districts are set to grow. Large battery size and long idle periods make electric school buses ideal candidates for vehicle-to-grid ("VTG") technology, where buses can use their batteries to store low cost energy and sell it back to the grid during periods of high demand.<sup>18</sup> Electric school buses can also be used for vehicle-to-building ("V2B") applications, which allows the buses to provide backup power to buildings and critical facilities like hospitals and shelters during emergencies.<sup>19</sup>

This type of energy storage can make the grid and our communities more resilient by enabling the grid to better absorb shocks and thereby prevent or manage disruptions - which in turn can mitigate the scale, length and impact of power outages on communities. This is especially important in our rural and mountainous regions that see more extreme weather.

Boulder Valley School District (BVSD) has six committed electric school buses. Landon Hilliard, the Safe Rides Coordinator for BVSD, oversees the purchase and implementation of school buses for the district. When asked why they were an early adopter of an electric school bus he said:

*“There’s a real call to action for us to electrify our fleets and try to reduce the footprint of the transportation sector that’s harming people, harming the globe, and if you think about tailpipe emissions at a local level about the students riding the bus, there are fumes and toxins that aren’t the best for human health.”*



*Arrival of the first electric school bus in Boulder County, photo via Landon Hilliard, Boulder Valley School District.*

Local communities are enjoying the benefits of new electric school buses in both expected and unexpected ways. “It’s a great conversation starter,” said West Grand School District Director of Transportation Bethany Aurin, noting that she receives calls from other curious districts in Colorado and across the country. It’s being incorporated into the high school curriculum and has also “been a great source of pride for our students and our community.”

## Money from the EPA's Clean School Bus Program and Colorado's state legislation provide unprecedented resources for school districts

In May of 2022, the EPA launched a [Clean School Bus Program](#), funded by the Bipartisan Infrastructure Law, that provides \$5 billion in funding over five years (2022-2026) to replace existing school buses with zero or low-emission models.<sup>20</sup> The program will provide rebates to school districts, nonprofit school transportation associations and tribal organizations to replace older, diesel buses with newer electric or low-emission models.<sup>21</sup>

The application process for the first round of funding closed on August 19, 2022. Applicants will be selected and posted by the EPA in October 2022, which [will prioritize](#) high-need or disproportionately impacted school districts, rural districts, and Tribal school districts.<sup>22</sup> Four additional rounds of funding will be allocated annually through 2026, and school districts can continue to find the latest information about the award process including links to apply on the [EPA Clean School Bus Program website](#): <https://www.epa.gov/cleanschoolbus/school-bus-rebates-clean-school-bus-program>.<sup>23</sup>

In addition, the federal government passed the [Inflation Reduction Act](#) in August, which includes \$1 billion for electric heavy duty vehicles including electric school buses.<sup>24</sup>

On top of federal funds, Colorado's General Assembly and Governor Jared Polis worked together to [invest \\$65 million to incentivize school districts to purchase new electric school buses](#) rather than traditional diesel models. The program will offer rebates to cover the cost differential between diesel and electric models alongside associated charging infrastructure and administrative costs.<sup>25</sup>

The program is designed to work as a complement to the federal funding and will also prioritize disproportionately impacted communities, rural areas, and Tribal districts. Additional program details are expected to be released by [Colorado's Department of Public Health and Education](#) this fall.<sup>26</sup>



## Colorado ranks 11th nationally with 36 committed electric school buses<sup>27</sup>

An electric school bus is considered committed once a school district or fleet operator has been awarded funding or has a formal agreement to purchase it from a dealer or manufacturer. As of June 2022, Colorado ranks eleventh nationwide with 36 committed electric school buses.<sup>28</sup> The state is well positioned to capitalize on both federal and state funds to increase that number in the coming years.

### Committed electric school buses per state (June 2022):<sup>29</sup>

Rank	State	Committed		Rank	State	Committed
		ESBs	ESBs			ESBs
1	California	1376	14	14	Indiana	16
2	Maryland	336	15	15	Oregon	14
3	Florida	218	16	16	North Carolina	10
4	New York	118	17	17	MN, MO, MT	9
5	Virginia	110	20	20	South Carolina, Utah	8
6	Illinois	89	22	22	Rhode Island	9
7	New Jersey	78	23	23	Vermont	7
8	Connecticut	45	24	24	Mississippi	6
9	Washington, Massachusetts	41	25	25	Nevada	4
<b>11</b>	<b>Colorado</b>	<b>36</b>	26	26	Tennessee, Texas	3
12	Pennsylvania	21	28	28	AL, IA, ME, OK	2
13	Michigan	18	32	32	AK, DE, GA, HI, NM, ND	1

Within Colorado, school districts in Aurora and Steamboat Springs leading the state with 7 buses each, followed closely by Boulder and Aspen both with 6.

**Committed electric school buses in Colorado (June 2022):<sup>30</sup>**

<b>Entity Name</b>	<b>City</b>	<b>Committed ESBs</b>	<b>Students in district</b>	<b>Schools in the district</b>
Aspen Country Day School	Aspen	1	NA	NA
Aspen School District No. 1 in the county of Pitkin and Sta	Aspen	5	1,594	5
Aurora Joint District No. 28 of the counties of Adams and A	Aurora	7	37,907	64
Boulder Valley School District No. Re2	Boulder	6	29,240	56
Buena Vista School District No. R-31	Buena Vista	1	962	5
Durango School District No. 9-R	Durango	1	6,931	15
Hayden School District No. Re 1	Hayden	1	384	3
Roaring Fork School District No. Re-1	Glenwood Springs	1	5,292	13
School District No. 1 in the county of Denver and State of C	Denver	3	89,081	205
State Charter School Institute	Denver	2	20,749	43
Steamboat Springs School District No. Re 2	Steamboat Springs	7	2,567	7
West Grand School District No. 1	Kremmling	1	399	2
<b>Total Committed Electric School Buses in CO</b>		<b>36</b>		



*A new electric school bus, one of 7 that are part of Aurora School District's fleet. The district hopes to use federal and state funds to purchase more electric school buses in coming years.*

*Photo credit: Staff.*

## 2022 Electric School Bus Funding Timeline

- ★ **May** - EPA announces \$500 million Clean School Bus Program, funded through the Bipartisan Infrastructure Law
- ★ **June** - Colorado funds \$65 million in rebates for new electric school buses, the largest per capita investment nationwide
- ★ **August**
  - August 12: Congress passes the Inflation Reduction Act with up to \$1 billion in funding for heavy duty electric vehicles
  - August 19: First round of applications for EPA program closed
- ★ **October** - First round of EPA program awardees announced
- ★ **2023-2026**: Four more cycles of federal financing released

## RECOMMENDATIONS

As thousands of kids head back to school this fall, Colorado has only a small number of electric school buses in operation relative to the overall fleet. However, the combination of both federal and state funding has Colorado well positioned to dramatically increase the number of electric school buses in operation in the next few years.

**Colorado school districts should:**

- Create an account on [www.SAM.gov](http://www.SAM.gov), which is a precursor to applying for federal funds. It is free to set up an account and four additional rounds of funding will be available through 2026.
- Connect with a [ReCharge coach](#) who can provide detailed information about funding and incentives.
- Leverage all financing programs available, including both federal and state grant programs.
  - Federal: [EPA Clean School Bus Program](#), [National Electric Vehicle Infrastructure Formula Program](#) and [EV Charging and Fueling Infrastructure Grant Program](#).
  - State: [Charge Ahead Colorado](#) offers grant funding for EV charging projects and [Colorado Recharge Coaches](#) provide coaching services for EV infrastructure and development in every county in the state. The [Colorado Department of Public Health and Education](#) will release more program details in Fall of 2022. The state funding is designed to complement and leverage federal funds for school districts.
- Start a conversation with your utility company as early as possible to see what resources they can provide. Many utilities offer consulting services to assess wiring and charging needs, rebates to reduce the costs of the wiring upgrades and chargers, tariffs to save money on charging, and some even have rebates for the vehicles themselves. In addition, work with your utility to ensure a competitive charging price system is in place.
- Pass a resolution to end the purchase of new fossil fuel buses, and transition to a 100% zero-emission fleet. This can send an important market signal and help bring the school community together behind a single goal.

**Lawmakers and regulators should:**

- Find additional funds to ensure all school districts have the resources to transition to a 100% electric fleet.
- Remove barriers and incentivize utility companies to develop effective and consistent rates for electric school bus charging.
- Financially support research and development in electric school bus technology, including vehicle-to-grid and vehicle-to-building technology.

## Utility companies should:

- Continue to reduce emissions and increase renewable energy capacity, making electric buses even cleaner.
- Develop turnkey programs to assist school districts in assessing their charging needs and providing incentives for charging infrastructure.
- Establish bulk purchase savings programs to lower costs for school districts.
- Create pricing structures that incentivize school districts to use vehicle-to-building and/or vehicle-to-grid opportunities from school buses.
- Support development of vehicle-to-grid pilot programs with school districts.

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<sup>1</sup> Katz, Danny, “Colorado makes country’s largest per capita investment in electric school buses,” <https://copirg.org/news/cop/colorado-makes-country%E2%80%99s-largest-capita-state-investment-electric-school-buses>, last accessed 9 August 2022.

<sup>2</sup> Altas EV Hub, <https://www.atlasevhub.com/>, State Public Funding of Electric School Buses, data as of 9 May 2022, [see full list here](#).

<sup>3</sup> Proprietary data provided by Atlas EV HUB <https://www.atlasevhub.com/>: Dataset of state public funding of electric school buses as of 9 May 2022, [see full list here](#).

<sup>4</sup> Clean Air Fleets AFC Award Page. <https://cleanairfleets.org/afc-award-page>, last accessed 29 August 2022.

<sup>5</sup> Altas EV Hub, <https://www.atlasevhub.com/>, State Public Funding of Electric School Buses, data as of 9 May 2022, [see full list here](#).

<sup>6</sup> United States Environmental Protection Agency, Integrated Risk Information System, [Diesel engine exhaust CASRN NA | DTXSID1024043 | IRIS | US EPA, ORD](#), last accessed 29 August 2022.

<sup>7</sup> United States Environmental Protection Agency, Integrated Risk Information System, [Benzene CASRN 71-43-2 | IRIS | US EPA, ORD](#), last accessed 29 August 2022.

<sup>8</sup> Miller, Alana et al. “Electric Buses: Clean Transportation Options for Healthier Neighborhoods and Cleaner Air.” U.S.PIRG Education Fund, Frontier Group, and Environment America, May 2018, p.8. <https://pirg.org/wp-content/uploads/2018/05/Electric-Buses-National-May-2018-web-1.pdf>, last accessed 29 August 2022.

<sup>9</sup> Wargo, John et al. “Children’s Exposure to Diesel Exhaust on School Buses.” Environment and Human Health, Inc., February 2002.

<sup>10</sup> Solomon, Gina M. et al. “[No Breathing In The Aisles: Diesel Exhaust Inside School Buses](#),” p.8. National Resources Defense Council and Coalition for Clean Air, January 2001.

<sup>11</sup> Colorado Energy Office, GHG Pollution Reduction Roadmap, p.3. <https://energyoffice.colorado.gov/climate-energy/ghg-pollution-reduction-roadmap>, last accessed 9 August 2022.

<sup>12</sup> According to the [DOE's Alternative Fuels Data Center](#), in Colorado average annual emissions for all electric vehicles is 5,254 lbs per year vs. Gasoline: 11,435 lbs per year = 45.9%

<sup>13</sup> Miller, Alana et al. “Electric Buses: Clean Transportation Options for Healthier Neighborhoods and Cleaner Air.” U.S.PIRG Education Fund, Frontier Group, and Environment America, May 2018, p.2. <https://pirg.org/wp-content/uploads/2018/05/Electric-Buses-National-May-2018-web-1.pdf>, last accessed 29 August 2022.

<sup>14</sup> World Resource Institute, Dataset of Electric School Bus Adoption In The United States. [https://datasets.wri.org/dataset/electric\\_school\\_bus\\_adoption](https://datasets.wri.org/dataset/electric_school_bus_adoption), Dataset-version 3, sheet 6, cell C8, data through June 2022, last accessed 29 August 2022.

<sup>15</sup> World Resource Institute, Dataset of Electric School Bus Adoption In The United States. [https://datasets.wri.org/dataset/electric\\_school\\_bus\\_adoption](https://datasets.wri.org/dataset/electric_school_bus_adoption), Dataset-version 3, sheet 6, cell E8, data through June 2022, last accessed 29 August 2022.

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<sup>16</sup> Total school buses in USA = 500,000 (source: [U.S. School Buses May Never Be The Same Thanks to Biden's Infrastructure Plan](#)) therefore  $5,300,000 / 500,000 = 10.6$  tons of ghg per year per diesel bus. 10.6 tons of ghg per year x 6,838 school buses = 72,438 tons of ghg annually.

<sup>17</sup> Roshni Vora and Miguel Yanez-Barnuevo, "[New Electric School Buses in Colorado Provide Safer, Cleaner, Cheaper Rides](#)," Environmental and Energy Study Institute (EESI), 26 January 2022.

<sup>18</sup> Horrox, James, Sarah Nick and Matt Casale, "Electric School Buses and The Grid: Unlocking the power of school transportation to build resilience and a clean energy future," 17 March 2022, p. 12. <https://environmentamerica.org/resources/electric-school-buses-and-the-grid/>, last accessed 29 August 2022.

<sup>19</sup> Horrox, James, Sarah Nick and Matt Casale, "Electric School Buses and The Grid: Unlocking the power of school transportation to build resilience and a clean energy future," 17 March 2022, p. 26. <https://environmentamerica.org/resources/electric-school-buses-and-the-grid/>, last accessed 29 August 2022.

<sup>20</sup> United States Environmental Protection Agency Clean School Bus Program, <https://www.epa.gov/cleanschoolbus/school-bus-rebates-clean-school-bus-program>, last accessed 30 August 2022.

<sup>21</sup> Ibid.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> U.S. Congress legislation, <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>, last accessed 30 August 2022.

<sup>25</sup> Colorado General Assembly, SB22-193, <https://leg.colorado.gov/bills/sb22-193>, last accessed 30 August 2022.

<sup>26</sup> Colorado Department of Health and Environment, Electric School Buses, <https://cdphe.colorado.gov/electric-school-buses>, last accessed 30 August 2022.

<sup>27</sup> World Resource Institute, Dataset of Electric School Bus Adoption In The United States. [https://datasets.wri.org/dataset/electric\\_school\\_bus\\_adoption](https://datasets.wri.org/dataset/electric_school_bus_adoption), Dataset-version 3, sheet 6, column D, data through June 2022, last accessed 30 August 2022.

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> World Resource Institute, Dataset of Electric School Bus Adoption In The United States. Data through June 2022, [https://datasets.wri.org/dataset/electric\\_school\\_bus\\_adoption](https://datasets.wri.org/dataset/electric_school_bus_adoption), Dataset-version 3, sheet 1, columns AG, BC, BD, data through June 2022, last accessed 30 August 2022.