



# Zeroing in on Zero-Emission Buses

The U.S. Advanced Technology Transit Bus Index



March 2025

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## OVERVIEW

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This report quantifies U.S. zero-emission transit bus (ZEB) adoptions as of July 2024. The number of full-size ZEBs in the country has grown to 7,028—an increase of 14% from 2023 and a consistent rate of growth despite serious industry headwinds, such as lingering supply chain issues and a smaller transit vehicle manufacturer pool. If this pace of adoption continues, the United States will surpass 15,000 full-size ZEBs by the year 2030. Battery-electric buses (BEBs) remain the dominant bus type, yet fuel cell electric buses (FCEBs) continue to see growth, with an overall increase of 55% from 2023.

California remains the top U.S. state with full-size ZEBs at 2,285, followed by New York (779), Florida (516), Washington (356), and Massachusetts (292). The number of small ZEBs added to public transit fleets grew by 25% compared to 2023. Small ZEBs in private fleets also increased by 13%, and small ZEBs in university fleets increased by 121%. Airports have adopted the least amount of small ZEBs, with overall growth at 3% since 2023.

In 2024, the Federal Transit Administration (FTA) **awarded nearly \$1.5 billion** through the Low and No Emission (Low No) Program and the Grants for Bus and Bus Facilities Program to transit agencies in 47 states and territories. Nearly 600 ZEBs were funded, representing 48% of all buses awarded, and more than \$180 million in funds were awarded to transit agencies for infrastructure projects between the Low No and Bus and Bus Facilities Programs.



# 1 U.S. FULL-SIZE ZEB COUNT

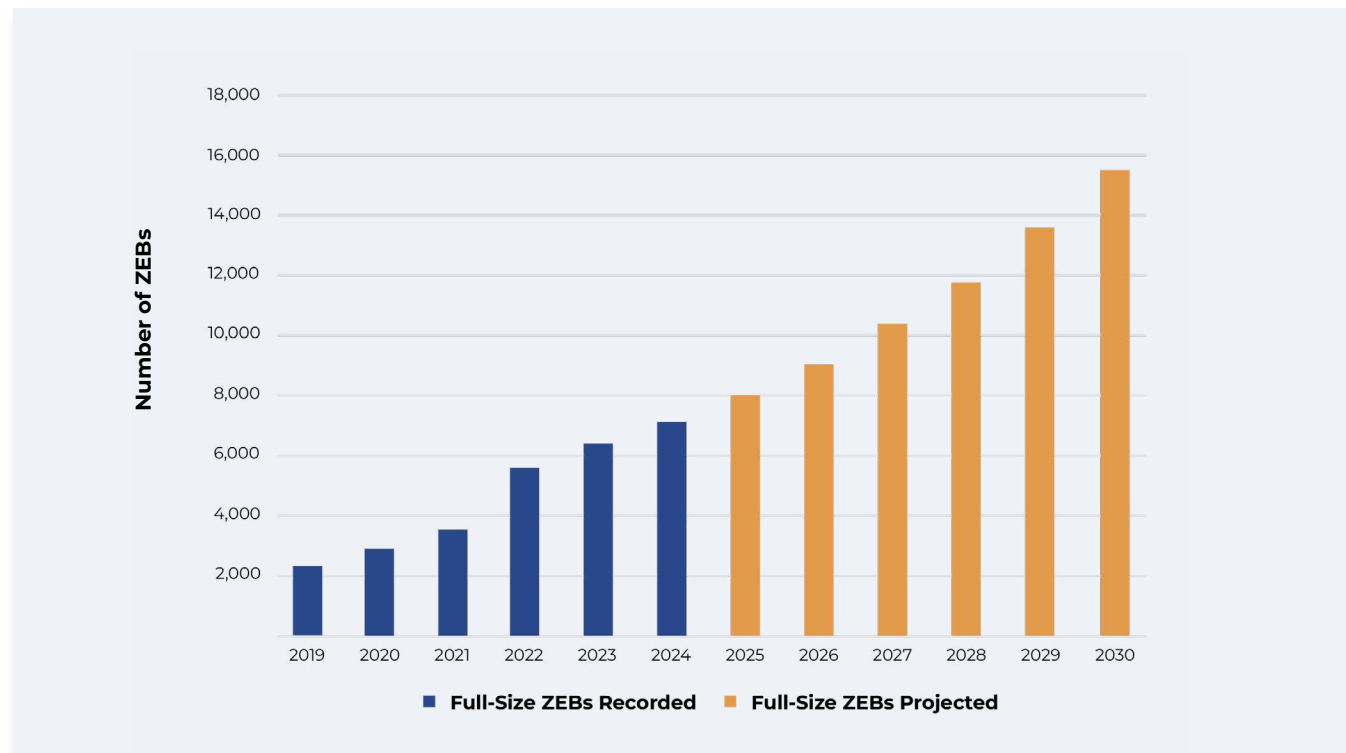
Full-size ZEBs—defined as Class 7 or 8 transit buses that are 30 or more feet in length—have grown to a total of 7,028 funded, ordered, delivered, or deployed across the United States as of July 2024,<sup>1</sup> an increase of 14% since the 2023 count (Table 1). While this pace of adoption is consistent with the previous year, it is encouraging that U.S. transit agencies continue to signify their commitment to reduce their environmental impact as they face serious industry headwinds, including lingering supply chain issues and a transit vehicle manufacturer pool that currently numbers just two U.S. companies. If this adoption rate persists, the United States will surpass 15,000 full-size ZEBs by the year 2030 (Figure 1).

<sup>1</sup>See Appendix A for definitions, assumptions, and data sources for this report.

**Table 1:** U.S. Full-Size Transit ZEBs Year-Over-Year Growth

| Bus Type          | 2023  | 2024  | Increase (2023 to 2024) | Growth % |
|-------------------|-------|-------|-------------------------|----------|
| <b>BEB</b>        | 5,775 | 6,453 | 678                     | 12%      |
| <b>FCEB</b>       | 327   | 575   | 186                     | 55%      |
| <b>Total ZEBs</b> | 6,147 | 7,028 | 881                     | 14%      |

**Figure 1:** U.S. Full-Size Transit ZEBs Projected Growth Based on Current 14% Adoption Rate



## BEB VS. FCEB HIGHLIGHTS

As noted in Table 1, BEB adoption increased by 12% from the previous year. Multiple transit agencies received federal funding to support zero-emission projects, including purchasing BEBs, in 2024. Some of the largest awards went to Los Angeles County Metro (50 BEBs), the Massachusetts Bay Transportation Authority (40 BEBs), and the Connecticut Department of Transportation (33 BEBs). More than **36 different agencies from 20 states** received funding to support the purchase of BEBs, showcasing that BEB adoption is occurring across the country and is not limited to certain geographic areas or agency profiles.<sup>2</sup>

BEBs remain the dominant ZEB type, but FCEB adoption increased by 55% overall in 2024. However, this growth is represented by only five out of the 13 states (California, Ohio, Oregon, Nevada, and South Carolina) that have reported FCEBs in their transit fleets in previous years. California continues to lead the country in the number of FCEBs

adopted, with 435 in total and more to come thanks to California transit agencies' **reported plans to adopt more than 2,000 FCEBs**. In 2024, New Flyer of America, Inc. (NFI) announced its largest FCEB purchase contract in the company's history to San Mateo County Transit (SamTrans). NFI will deliver **108 FCEBs to SamTrans** as the agency transitions to a 100% zero-emission fleet. Outside of California, TriMet in Portland, Oregon, was awarded almost **\$70 million to support 14 FCEBs** that will serve the future 82nd Avenue Transit project.

2024 also saw significant public and private financial investment to support hydrogen project development. The U.S. Department of Energy announced a \$12.6 billion agreement to advance hydrogen projects in California. That agreement includes plans to **deploy more than 1,000 FCEBs** in the state. Another \$2.2 billion was awarded to **hydrogen hubs in the Gulf Coast and Midwest regions**. The continued investment in hydrogen is vital not only for clean transportation as a whole but

also to support transit agencies that have chosen hydrogen as a fuel source.

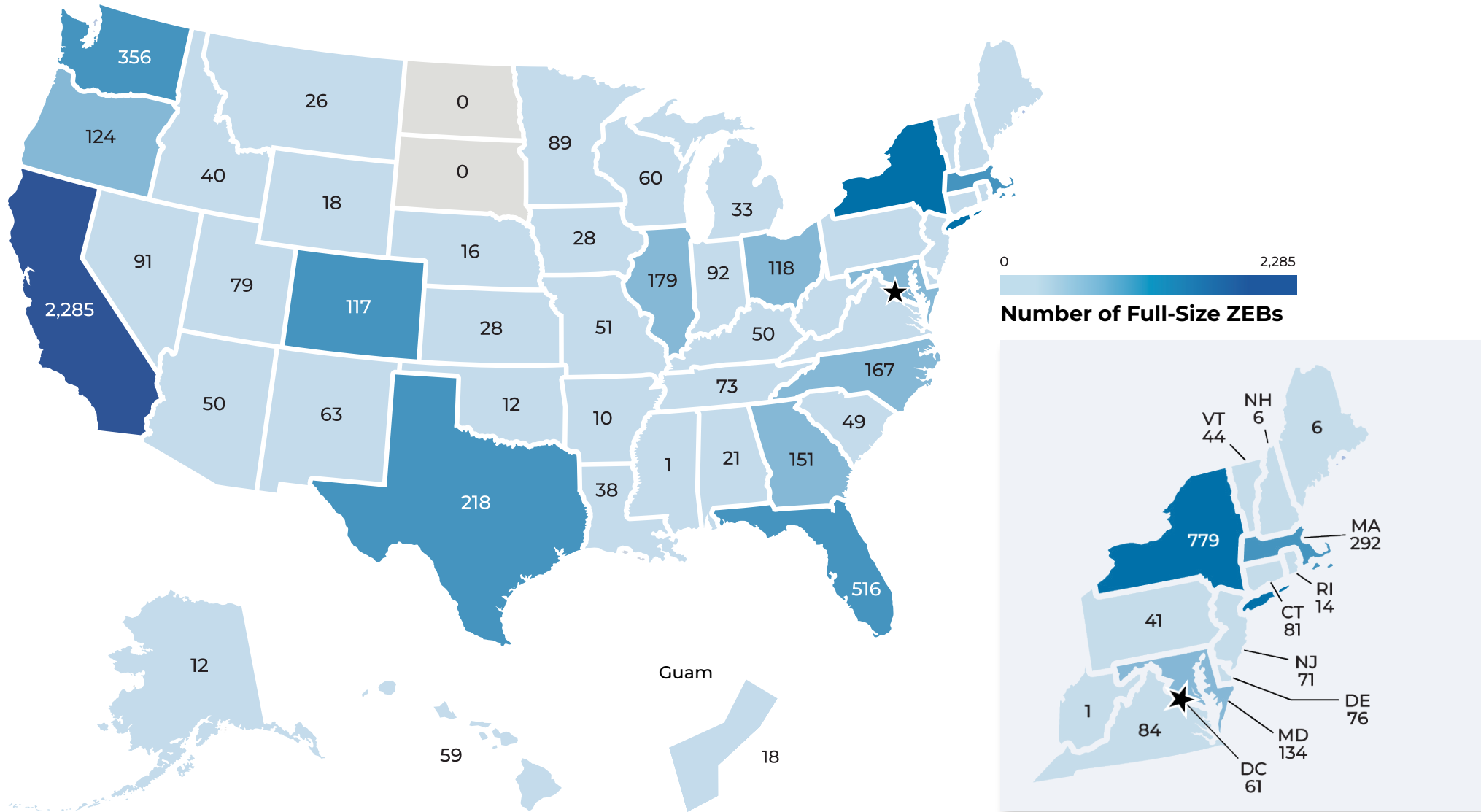
## ADOPTIONS BY STATE

California maintains its lead as the state with the most ZEBs in the nation, accounting for 32% of all ZEBs nationwide. New York, Florida, Washington, and Massachusetts now round out the top five states with the most full-size ZEBs. Figure 2 shows the number of full-size ZEBs adopted per state, and Table 3 further disaggregates this data with a state-by-state breakdown of the number of BEBs and FCEBs adopted.

<sup>2</sup>Transit agency profiles normally consist of general agency information, financial and modal data, and performance and trend indicators.



**Figure 2:** Full-Size Transit ZEBs Funded, Ordered, Delivered, or Deployed Within the United States (As of July 2024)





**Table 3:** State-By-State Full-Size Transit ZEB Distribution (As of July 2024)

| State                       | FTA Region | BEBs | FCEBs | Total ZEBs |       |
|-----------------------------|------------|------|-------|------------|-------|
| <b>Alabama</b>              | AL         | 4    | 20    | 1          | 21    |
| <b>Alaska</b>               | AK         | 10   | 12    | 0          | 12    |
| <b>Arizona</b>              | AZ         | 9    | 38    | 12         | 50    |
| <b>Arkansas</b>             | AR         | 6    | 10    | 0          | 10    |
| <b>California</b>           | CA         | 9    | 1,850 | 435        | 2,285 |
| <b>Colorado</b>             | CO         | 8    | 117   | 0          | 117   |
| <b>Connecticut</b>          | CT         | 1    | 81    | 0          | 81    |
| <b>Delaware</b>             | DE         | 3    | 60    | 16         | 76    |
| <b>District of Columbia</b> | DC         | 3    | 61    | 0          | 61    |
| <b>Florida</b>              | FL         | 4    | 516   | 0          | 516   |
| <b>Georgia</b>              | GA         | 4    | 151   | 0          | 151   |
| <b>Hawaii</b>               | HI         | 9    | 52    | 7          | 59    |
| <b>Idaho</b>                | ID         | 10   | 40    | 0          | 40    |
| <b>Illinois</b>             | IL         | 5    | 167   | 12         | 179   |
| <b>Indiana</b>              | IN         | 5    | 92    | 0          | 92    |
| <b>Iowa</b>                 | IA         | 7    | 28    | 0          | 28    |
| <b>Kansas</b>               | KS         | 7    | 28    | 0          | 28    |
| <b>Kentucky</b>             | KY         | 4    | 50    | 0          | 50    |
| <b>Louisiana</b>            | LA         | 6    | 38    | 0          | 38    |



**Table 3:** State-By-State Full-Size Transit ZEB Distribution (As of July 2024)

| State          | FTA Region | BEBs | FCEBs | Total ZEBs |     |
|----------------|------------|------|-------|------------|-----|
| Maine          | ME         | 1    | 6     | 0          | 6   |
| Maryland       | MD         | 3    | 121   | 13         | 134 |
| Massachusetts  | MA         | 1    | 291   | 1          | 292 |
| Michigan       | MI         | 5    | 29    | 4          | 33  |
| Minnesota      | MN         | 5    | 89    | 0          | 89  |
| Mississippi    | MS         | 4    | 1     | 0          | 1   |
| Missouri       | MO         | 7    | 51    | 0          | 51  |
| Montana        | MT         | 8    | 26    | 0          | 26  |
| Nebraska       | NE         | 7    | 16    | 0          | 16  |
| Nevada         | NV         | 9    | 64    | 27         | 91  |
| New Hampshire  | NH         | 1    | 6     | 0          | 6   |
| New Jersey     | NJ         | 2    | 71    | 0          | 71  |
| New Mexico     | NM         | 6    | 63    | 0          | 63  |
| New York       | NY         | 2    | 774   | 5          | 779 |
| North Carolina | NC         | 4    | 167   | 0          | 167 |
| North Dakota   | ND         | 8    | 0     | 0          | 0   |
| Ohio           | OH         | 5    | 94    | 24         | 118 |
| Oklahoma       | OK         | 6    | 12    | 0          | 12  |
| Oregon         | OR         | 10   | 110   | 14         | 124 |



**Table 3:** State-By-State Full-Size Transit ZEB Distribution (As of July 2024)

| State                 | FTA Region | BEBs | FCEBs | Total ZEBs |       |
|-----------------------|------------|------|-------|------------|-------|
| <b>Pennsylvania</b>   | PA         | 3    | 41    | 0          | 41    |
| <b>Rhode Island</b>   | RI         | 1    | 14    | 0          | 14    |
| <b>South Carolina</b> | SC         | 4    | 47    | 2          | 49    |
| <b>South Dakota</b>   | SD         | 8    | 0     | 0          | 0     |
| <b>Tennessee</b>      | TN         | 4    | 73    | 0          | 73    |
| <b>Texas</b>          | TX         | 6    | 218   | 0          | 218   |
| <b>Utah</b>           | UT         | 8    | 79    | 0          | 79    |
| <b>Vermont</b>        | VT         | 1    | 44    | 0          | 44    |
| <b>Virginia</b>       | VA         | 3    | 84    | 0          | 84    |
| <b>Washington</b>     | WA         | 10   | 354   | 2          | 356   |
| <b>West Virginia</b>  | WV         | 3    | 1     | 0          | 1     |
| <b>Wisconsin</b>      | WI         | 5    | 60    | 0          | 60    |
| <b>Wyoming</b>        | WY         | 8    | 18    | 0          | 18    |
| <b>Guam</b>           | GU         | 9    | 18    | 0          | 18    |
| <b>Total</b>          | -          | -    | 6,453 | 575        | 7,028 |





Growth occurred in every FTA region, with the highest rate occurring in Region 10 at 40% followed by Region 1 at 30%. Region 7 had the lowest growth rate at 1%. For detailed information on growth per FTA region, refer to Appendix B. Figure 3 highlights the

10 states with the largest numerical increases in full-size ZEB adoption since the previous count.

### AVERAGE ZEB FLEET SIZE

The median number of full-size ZEBs per transit agency nationwide stayed at eight in 2024. New York's Metropolitan

Transportation Authority remains the largest full-size ZEB fleet, with 545 buses as of July 2024. The Los Angeles Department of Transportation, Santa Monica's Big Blue Bus, Massachusetts Bay Transportation Authority, and King County Metro comprise the top five largest fleets in the nation with ZEBs.

Approximately 60% of transit fleets in the United States have 10 or fewer ZEBs. That percentage has remained relatively unchanged since 2022 (Figure 4).

**Figure 3:** Top 10 States with Largest Numerical Increases in Full-Size Transit ZEB Adoption (Compared to 2023)

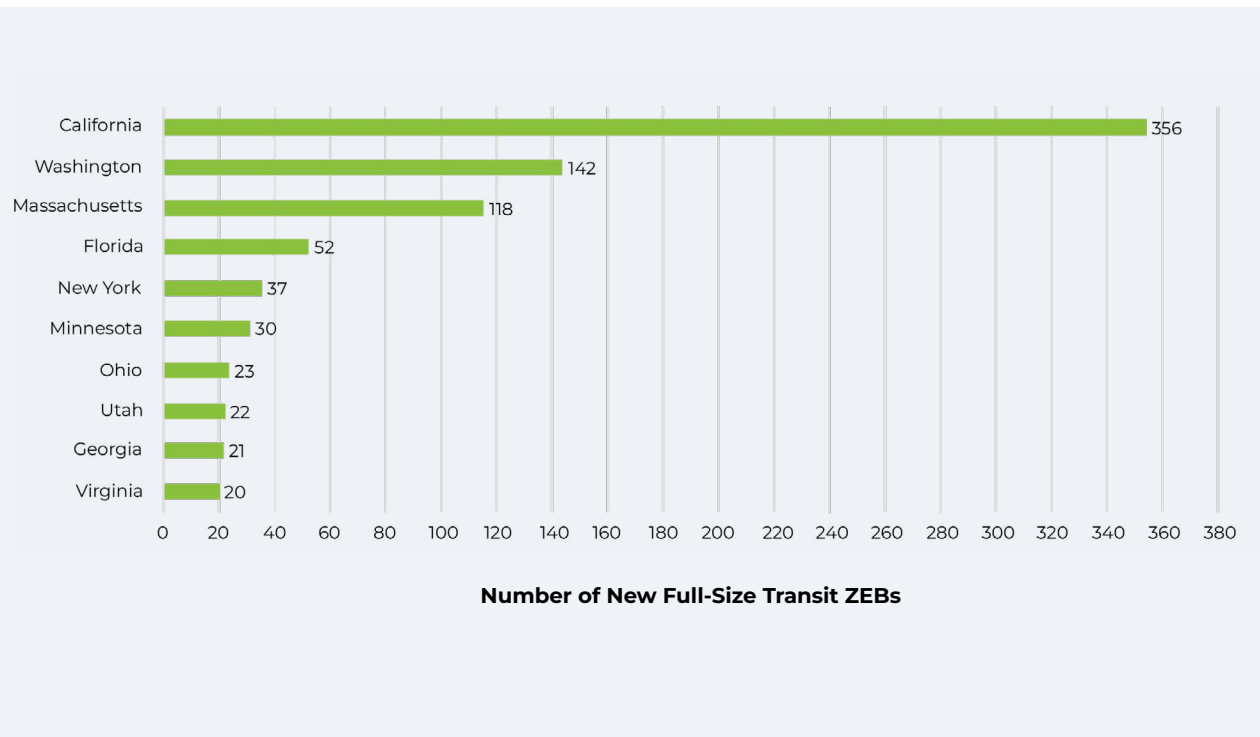
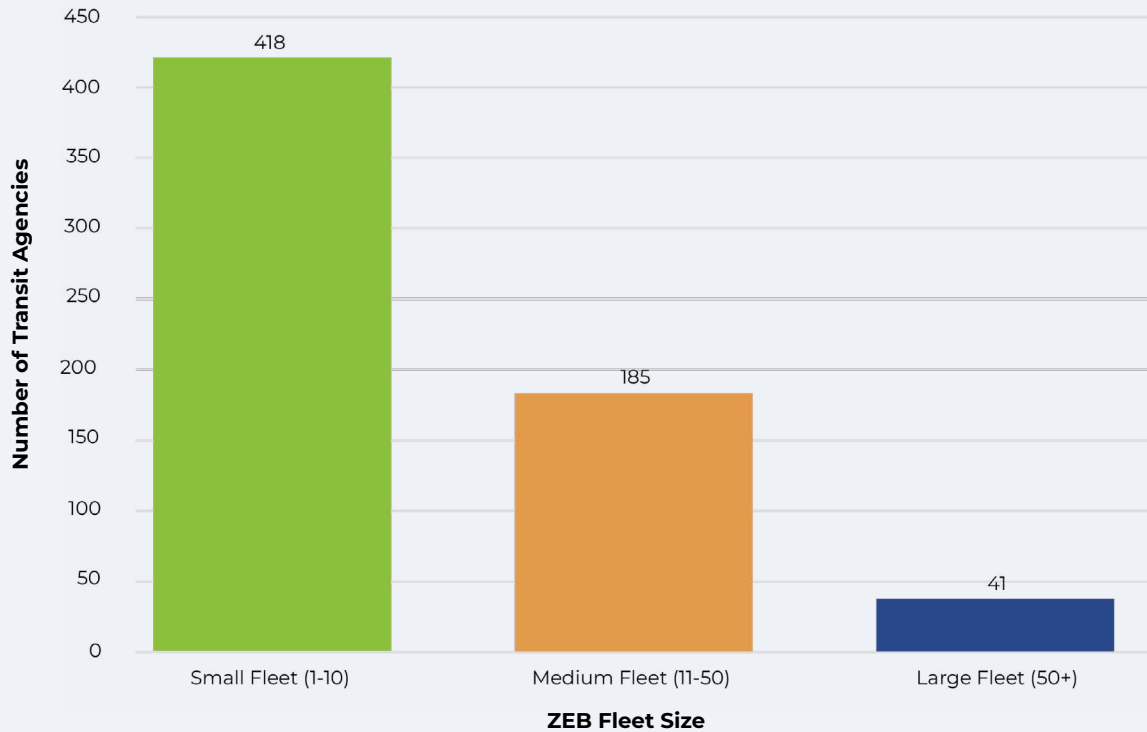




Figure 4: Distribution of Full-Size Transit ZEB Fleet Size in the United States



## 2 U.S. SMALL ZEB COUNT

As of July 2024, 1,165 small ZEBs—defined as transit buses that are Class 3–6 and shorter than 30 feet—have been adopted in the United States. This number, which includes small ZEBs adopted by public transit agencies, private fleets, universities, and airports, grew by 155 from 2023, representing a consistent overall increase of 15% year-over-year (Table 4).<sup>3</sup> Based on the data collected, no new small FCEBs have been purchased since 2022.

Transit agencies in Arkansas and Connecticut were awarded their first small ZEBs in 2024 (Table 5). Of the 11 states that saw growth in small ZEBs, California had the largest year-over-year increase at 72 buses.

<sup>3</sup>The 2023 airport small-ZEB counts were updated in Table 4 to reflect reclassification of some vehicles from airport to private fleets based on changing business structures. Additionally, some vehicles previously counted as public have been reclassified as belonging to airport fleets.



**Table 4:** Small Transit ZEBs Year-Over-Year Growth

| Fuel Type    | Fleet Type | 2023  | 2024  | Difference (2023-2024) | Growth % |
|--------------|------------|-------|-------|------------------------|----------|
| <b>BEB</b>   | Public     | 527   | 659   | 132                    | 25%      |
|              | Private    | 347   | 353   | 6                      | 2%       |
|              | Airport    | 113   | 113   | 0                      | 0%       |
|              | University | 14    | 31    | 17                     | 121%     |
| <b>FCEB</b>  | Public     | 9     | 9     | 0                      | 0%       |
|              | Private    | 0     | 0     | 0                      | 0%       |
|              | Airport    | 0     | 0     | 0                      | 0%       |
|              | University | 0     | 0     | 0                      | 0%       |
| <b>Total</b> | -          | 1,010 | 1,165 | 155                    | 15%      |

**Table 5:** State-By-State Small Transit ZEB Distribution (As of July 2024)

| State              | FTA Region | BEBs | FCEBs | Total ZEBs |     |
|--------------------|------------|------|-------|------------|-----|
| <b>Alabama</b>     | AL         | 4    | 1     | 0          | 1   |
| <b>Arizona</b>     | AZ         | 9    | 20    | 0          | 20  |
| <b>Arkansas</b>    | AR         | 6    | 2     | 0          | 2   |
| <b>California</b>  | CA         | 9    | 670   | 4          | 674 |
| <b>Colorado</b>    | CO         | 8    | 11    | 0          | 11  |
| <b>Connecticut</b> | CT         | 1    | 1     | 0          | 1   |
| <b>Florida</b>     | FL         | 4    | 10    | 0          | 10  |
| <b>Georgia</b>     | GA         | 4    | 10    | 0          | 10  |
| <b>Hawaii</b>      | HI         | 9    | 5     | 0          | 5   |



**Table 5:** State-By-State Small Transit ZEB Distribution (As of July 2024)

| State         | FTA Region | BEBs | FCEBs | Total ZEBs |       |
|---------------|------------|------|-------|------------|-------|
| Illinois      | IL         | 5    | 63    | 0          | 63    |
| Indiana       | IN         | 5    | 2     | 0          | 2     |
| Iowa          | IA         | 7    | 33    | 0          | 33    |
| Kansas        | KS         | 7    | 18    | 0          | 18    |
| Maryland      | MD         | 3    | 5     | 0          | 5     |
| Massachusetts | MA         | 1    | 29    | 0          | 29    |
| Michigan      | MI         | 5    | 40    | 0          | 40    |
| Minnesota     | MN         | 7    | 26    | 0          | 26    |
| Missouri      | MO         | 7    | 19    | 0          | 19    |
| New Jersey    | NJ         | 2    | 23    | 0          | 23    |
| New Mexico    | NM         | 6    | 23    | 0          | 23    |
| New York      | NY         | 2    | 4     | 0          | 4     |
| Ohio          | OH         | 5    | 16    | 5          | 21    |
| Oregon        | OR         | 10   | 14    | 0          | 14    |
| Pennsylvania  | PA         | 3    | 1     | 0          | 1     |
| Tennessee     | TN         | 4    | 2     | 0          | 2     |
| Texas         | TX         | 6    | 66    | 0          | 66    |
| Vermont       | VT         | 1    | 19    | 0          | 19    |
| Washington    | WA         | 10   | 10    | 0          | 10    |
| Wisconsin     | WI         | 5    | 13    | 0          | 13    |
| <b>Total</b>  | -          | -    | 1,156 | 9          | 1,165 |



Despite challenges including supply chain constraints and a lack of vehicle options, agencies are developing innovative ways to deploy small ZEBs, including service models such as zero-emission microtransit projects that continued to take shape in 2024.

**The City of Santa Maria, California, introduced a new microtransit service**

to provide residents with a flexible, zero-emission transit option. ABQ RIDE Connect, located in Albuquerque, New Mexico, launched its own zero-emission microtransit service. Since the service’s launch on March 18, 2024, it has **reported more than 1,800 rides.**

Transit agencies and municipalities also successfully leveraged state and local dollars to support zero-emission projects for microtransit and beyond. For example, the City of Costa Mesa, California, was awarded more than **\$1 million to launch a new zero-emission, on-demand rideshare service** for residents. The continued demand for small buses across the country, coupled with new service models, will provide opportunities for transit agencies to not only offer cost-

effective options to help boost ridership but also to transition their small bus fleets to ZEBs.

As of July 2024, the number of full-size airport ZEBs in the United States has grown to 214, all of which are battery-electric. Based on changing business structures causing reclassification of some vehicles from airport to private fleets, the number of small ZEBs at airports has not changed since

3

**U.S. AIRPORT ZEB COUNT**

**Table 6:** Airport ZEBs State-By-State Distribution (As of July 2024)

| State                 |    | Full-Size | Small ZEBs | Total |
|-----------------------|----|-----------|------------|-------|
| <b>California</b>     | CA | 103       | 82         | 185   |
| <b>Florida</b>        | FL | 4         | 0          | 4     |
| <b>Georgia</b>        | GA | 2         | 0          | 2     |
| <b>Hawaii</b>         | HI | 0         | 4          | 4     |
| <b>Indiana</b>        | IN | 9         | 2          | 11    |
| <b>Michigan</b>       | MI | 2         | 4          | 6     |
| <b>Missouri</b>       | MO | 7         | 19         | 26    |
| <b>Nevada</b>         | NV | 23        | 0          | 23    |
| <b>New Jersey</b>     | NJ | 12        | 0          | 12    |
| <b>New Mexico</b>     | NM | 0         | 2          | 2     |
| <b>New York</b>       | NY | 24        | 0          | 24    |
| <b>North Carolina</b> | NC | 28        | 0          | 28    |
| <b>Texas</b>          | TX | 4         | 0          | 4     |
| <b>Total</b>          | -  | 214       | 113        | 327   |



2023 (Table 6).<sup>4</sup> Accounting for updated fleet type designations, 10 new ZEBs were adopted by airport fleets in California and North Carolina, representing overall growth of 3% from 2023.

At airports, ZEBs are commonly utilized as “people movers,” shuttling airline passengers and employees between parking lots and airport terminals. Many offsite parking operators have also embraced ZEBs to transport passengers to and from the airport. Airport funding continues to support ZEB projects. The Airport Zero Emission Vehicle and Infrastructure Pilot Program, open to public-bus airport sponsors who are part of the National Plan of Integrated Airport Systems, has provided **\$15 million to U.S. airports for ZEBs and support** since 2023. Since the program’s inception, more than **\$90 million has been awarded** to support the transition of airport-owned buses to ZEBs. ZEB adoption at airports remains most prevalent in California, largely due to the Zero-Emission Airport Shuttle Regulation

requiring operators at 13 major airports to transition entirely to **zero-emission shuttles by 2035**.

## 4 U.S. POLICY AND FUNDING SOURCES

The transportation sector remains the largest emitter of greenhouse gases in the United States, accounting for **28% of total greenhouse gas emissions**. To combat climate change and improve air quality, transit agencies across the country aim to transition to ZEBs. Policies and funding sources at both the federal and state level are vital to support transit agencies’ adoption of this technology.

### FEDERAL

**FTA’s Low and No Emission (Low No) Program** is a competitive grant program that helps state and local government entities purchase or lease zero-emission and low-emission transit buses and pay for necessary supporting facilities and infrastructure and workforce training for maintenance

staff and bus drivers. The Infrastructure Investment and Jobs Act (IIJA), passed in 2022 with bipartisan support, provides **\$5.25 billion in funding over five years to FTA’s Low No Program**. Coupled with Low No is FTA’s Grants for **Buses and Bus Facilities Competitive Program**. The Bus and Bus Facilities grant program makes funding available to states, designated recipients, and local governments that operate fixed-route bus services to replace, rehabilitate, and purchase buses and related equipment and to construct needed facilities.

At the time of writing, it remains unclear how IIJA funds will be dispersed for the two programs under the Trump administration and whether funding will continue after the final year of allocation. Yet the financial support provided through Low No and the Bus and Bus Facilities grant program is critical for the continued adoption of ZEBs. In 2024, FTA awarded nearly \$1.5 billion to transit agencies in 47 states and territories, including **funding for approximately 1,200 transit buses**.

<sup>4</sup>Both full-size and small airport ZEBs reported in this section were also included in the overall full-size and small ZEB counts.

In total, nearly 600 ZEBs were funded in 2024, representing 48% of all buses awarded. As noted in 2023, portions of this funding did support low-emission and conventional fuel buses, however, multiple awards included funding for mixed-fleets (i.e., fleets with conventional vehicles as well as ZEBs), signifying that fleets are continuing to seek ways to integrate ZEBs into their operations. While the number of ZEBs funded remained lower than in previous years, millions of dollars were awarded to transit agencies to support needed infrastructure for zero-emission projects. Over \$180 million was [awarded to infrastructure projects](#) between the Low No and Bus and Bus Facilities Programs.

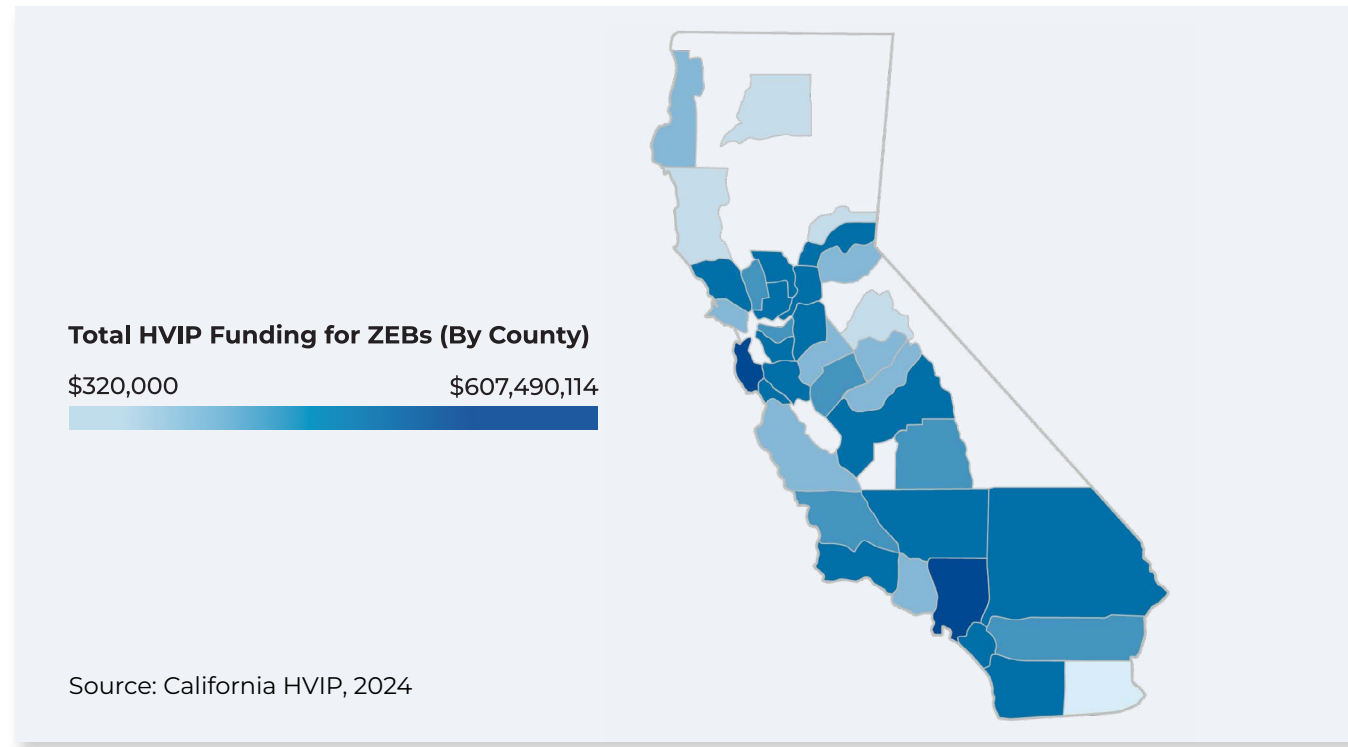
Other federal programs like the [Congestion Mitigation and Air Quality Improvement \(CMAQ\) Program](#) have also been used to fund ZEB purchases. IJJA provides [\\$13.2 billion in funding for CMAQ](#) over five years, which will open additional funding sources for ZEB investments. Likewise, the [Commercial Clean Vehicle Credit](#) provides tax credits of \$40,000 for

vehicles, which includes transit buses, with a gross vehicle weight rating over 14,000 pounds. The tax credit is designed to help offset the incremental upfront cost that a transit agency may incur when purchasing ZEBs. However, as mentioned previously, at the time of writing it is uncertain whether these programs and tax credits will continue.

## STATE

States have also played a key role in supporting the adoption of ZEBs and may start to provide even more support given the potential scale back of policy and funding programs at the federal level. California launched the [Clean Truck and Bus Voucher Incentive Project \(HVIP\)](#) in 2009, and more than

**Figure 5:** California HVIP Voucher Map





2,300 vouchers for heavy- and medium-duty buses have been redeemed or requested. The vouchers underwrite point-of-purchase price reductions to fleets for clean commercial vehicles like ZEBs. These 2,300+ vouchers account for over \$268 million in funding for ZEBs within California (Figure 5).

California continues to make progress in implementing [the Innovative Clean Transit \(ICT\) regulation](#), adopted in December 2018. This regulation mandates that all public transit agencies transition to ZEB fleets by 2040, and applies to all transit agencies that own, operate, or lease buses with a gross vehicle weight rating greater than 14,000 pounds, encompassing standard, articulated, over-the-road, double-decker, and cutaway buses. The regulation requires a percentage of [new bus purchases to be zero-emission](#) beginning in 2023; by 2029, 100% of all new bus purchases in California must be zero-emission.

As of September 12, 2024, numerous transit agencies have [submitted their rollout plans](#). Large agencies such as the Los Angeles County Metropolitan

Transportation Authority, San Francisco Municipal Transportation Agency, and Long Beach Transit have detailed plans in place. Among small transit agencies, entities like Butte Regional Transit, Central Contra Costa Transit Authority, and the City of Burbank have also submitted their rollout plans. Several transit agencies have transitioned to zero-emission fleets ahead of the 2040 target. The Antelope Valley Transit Authority, the City of Artesia, and the City of South Pasadena have fully transitioned their fleets to ZEBs. Additionally, five California transit agencies are on track to reach zero-emission goals 10 years ahead of schedule: Los Angeles Department of Transportation, Los Angeles County Metropolitan Transportation Authority, Foothill Transit, Long Beach Transit, and Santa Monica's Big Blue Bus.

In New York, the [New York Voucher Incentive Program \(NYTVIP\)](#), administered by the New York State Energy Research and Development Authority (NYSERDA), continues to provide vouchers to support transit agencies' adoption of ZEBs. There are

currently five transit agencies that are eligible for NYTVIP funding: Capital District Transportation Authority, Niagara Frontier Transportation Authority, Rochester-Genesee Regional Transit Authority, Suffolk County Transit, and Westchester County Vee-Line Bus System.

Beyond California and New York, states including Indiana, Massachusetts, Montana, Virginia, and Washington offer [incentives, rebates, and grants](#) to support the adoption of ZEBs and associated infrastructure.

The [Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding \(Multi-State MOU\)](#) was signed in July 2020 by Washington, D.C. and 18 states (California, Colorado, Connecticut, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, Nevada, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington). In 2022, the signatories developed an action plan in coordination with the Northeast States for Coordinated Air Use Management that included more than





65 recommendations to support the transition to clean transportation while doing so at scale and in an equitable fashion. In particular, the task force highlighted the benefits of regulation coupled with inventive programs like HVIP and NYTVIP to hasten the adoption of clean transportation vehicles like ZEBs.

With policy and funding efforts at the federal and state levels supporting transit agencies' adoption of ZEBs, tools such as statewide procurement contracts should continue to be utilized wherever practical. As CALSTART has previously reported, statewide contracts provide a means for transit agencies to **reduce the cost and effort of procuring ZEBs** while ensuring compliance with federal and state regulations. Using statewide contracts can quicken the process of purchasing ZEBs, which can get more of these vehicles in service faster. Outside of state-led procurement efforts, transit agencies are also successfully pooling their resources to develop joint procurement efforts to reduce costs and utilize public dollars. States like

Washington and California continue to offer ZEBs on state contracts available to transit agencies in and outside their state. Washington's contract, which meets FTA procurement standards, has worked with **nearly 200 agencies in 35 states** on bus procurements.

5

**CONCLUSION:  
PROGRESS DESPITE  
HEADWINDS**

Challenges persisted for transit agencies seeking to adopt both full-size and small ZEBs in 2024. As previously noted, the United States effectively has two transit bus manufacturers building full-size buses for U.S. transit agencies—an unrealistic number to fully meet the diverse needs of transit agencies seeking to transition to ZEBs.

Yet the pace of adoption remained consistent compared to 2023. Multiple efforts continued in 2024 to support transit manufacturers and agencies in strengthening the transit vehicle market. In February 2024, the Biden administration hosted a clean bus manufacturing roundtable to bring

together manufacturers, transit agencies, and other key stakeholders to discuss the progress in the transition to low- and zero-emission transit buses. The American Public Transit Association (APTA), which also attended the roundtable, released their **recommendations from the Bus Manufacturing Task Force** to address ZEB cost concerns, support manufacturing, and ensure that transit agencies can continue to take advantage of historic levels of funding available for ZEBs.

It is clear that transit agencies across the country want to deploy ZEBs. ZEBs improve the environment for the drivers, riders, and communities in which they operate. Furthermore, the deployment of this technology has resulted in savings in the total cost of ownership for the vehicles and a smoother, quieter ride for the passengers and the driver. With continued funding support at the federal level uncertain at this time, collective efforts to support ZEB manufacturing and adoption will be vital for the sustained growth of this technology in the United States.

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## APPENDIX A: DEFINITIONS, ASSUMPTIONS, AND DATA SOURCES

This report defines zero-emission buses (ZEBs) as Class 3 and above battery-electric or fuel cell electric transit buses. Full-size ZEBs are defined as Class 7 or 8 transit buses that are 30 or more feet in length, and small ZEBs are defined as Class 3–6 transit buses that are shorter than 30 feet in length. The adoption of transit ZEBs is defined as those that have been funded, ordered, delivered, or deployed within the United States, according to data collected through July 2024:

- **Funded:** Funding to support the procurement of the ZEB has been officially awarded.
- **Ordered:** The transit provider has submitted an order for the ZEB.
- **Delivered:** The ZEB has been received by the transit provider and is being prepared to be placed into operational service.
- **Deployed:** The ZEB has been placed in active operation by the transit provider.

Previous iterations of this report also included ZEB counts for Canada. For an in-depth look at the Canadian ZEB landscape, refer to the [Canadian Urban Transit Research & Innovation Consortium's \(CUTRIC\) ZEB Database™](#). CUTRIC's most recent update to their ZEB database was released on May 6, 2024, and includes analysis of ZEBs in the pronouncement stage as well as the feasibility stage; these two categories are not included in this report's data collection methodology.

Unless otherwise noted, all figures are copyright CALSTART based on data as of July 2024. This data was gathered primarily through local, state, and federal award documents; press releases; and author correspondence with nine state Departments of Transportation and 78 transit agencies via email and phone interviews. Some adoption numbers may differ slightly from previous reports due to corrections in data provided by fleets.

## APPENDIX B: BREAKDOWN OF ZEB DISTRIBUTION BY FTA REGION

The following tables list the count of full-size transit ZEBs for each FTA region by state as of July 2024.

**Table A-1:** FTA Region 1 State-By-State Full-Size Transit ZEB Distribution

30% Growth from 2023

| State                |    | BEBs | FCEBs | Total ZEBs |
|----------------------|----|------|-------|------------|
| <b>Connecticut</b>   | CT | 81   | 0     | 81         |
| <b>Maine</b>         | ME | 6    | 0     | 6          |
| <b>Massachusetts</b> | MA | 291  | 1     | 292        |
| <b>New Hampshire</b> | NH | 6    | 0     | 6          |
| <b>Rhode Island</b>  | RI | 14   | 0     | 14         |
| <b>Vermont</b>       | VT | 44   | 0     | 44         |
| <b>Total</b>         | -  | 442  | 1     | 443        |

**Table A-2:** FTA Region 2 State-By-State Full-Size Transit ZEB Distribution

5% Growth from 2023

| State             |    | BEBs | FCEBs | Total ZEBs |
|-------------------|----|------|-------|------------|
| <b>New Jersey</b> | NJ | 71   | 0     | 71         |
| <b>New York</b>   | NY | 774  | 5     | 779        |
| <b>Total</b>      | -  | 845  | 5     | 850        |

## APPENDIX B: BREAKDOWN OF ZEB DISTRIBUTION BY FTA REGION

**Table A-3:** FTA Region 3 State-By-State Full-Size Transit ZEB Distribution

10% Growth from 2023

| State                       |    | BEBs | FCEBs | Total ZEBs |
|-----------------------------|----|------|-------|------------|
| <b>Delaware</b>             | DE | 60   | 16    | 76         |
| <b>District of Columbia</b> | DC | 61   | 0     | 61         |
| <b>Maryland</b>             | MD | 121  | 13    | 134        |
| <b>Pennsylvania</b>         | PA | 41   | 0     | 41         |
| <b>Virginia</b>             | VA | 84   | 0     | 84         |
| <b>West Virginia</b>        | WV | 1    | 0     | 1          |
| <b>Total</b>                | -  | 368  | 29    | 397        |

**Table A-4:** FTA Region 4 State-By-State Full-Size Transit ZEB Distribution

9% Growth from 2023

| State                 |    | BEBs  | FCEBs | Total ZEBs |
|-----------------------|----|-------|-------|------------|
| <b>Alabama</b>        | AL | 20    | 1     | 21         |
| <b>Florida</b>        | FL | 516   | 0     | 516        |
| <b>Georgia</b>        | GA | 151   | 0     | 151        |
| <b>Kentucky</b>       | KY | 50    | 0     | 50         |
| <b>Mississippi</b>    | MS | 1     | 0     | 1          |
| <b>North Carolina</b> | NC | 167   | 0     | 167        |
| <b>South Carolina</b> | SC | 47    | 2     | 49         |
| <b>Tennessee</b>      | TN | 73    | 0     | 73         |
| <b>Total</b>          | -  | 1,025 | 3     | 1,028      |

## APPENDIX B: BREAKDOWN OF ZEB DISTRIBUTION BY FTA REGION

**Table A-5:** FTA Region 5 State-By-State Full-Size Transit ZEB Distribution

8% Growth from 2023

| State            |    | BEBs | FCEBs | Total ZEBs |
|------------------|----|------|-------|------------|
| <b>Illinois</b>  | IL | 167  | 12    | 179        |
| <b>Indiana</b>   | IN | 92   | 0     | 92         |
| <b>Michigan</b>  | MI | 29   | 4     | 33         |
| <b>Minnesota</b> | MN | 89   | 0     | 89         |
| <b>Ohio</b>      | OH | 94   | 24    | 118        |
| <b>Wisconsin</b> | WI | 60   | 0     | 60         |
| <b>Total</b>     | -  | 531  | 40    | 571        |

**Table A-6:** FTA Region 6 State-By-State Full-Size Transit ZEB Distribution

5% Growth from 2023

| State             |    | BEBs | FCEBs | Total ZEBs |
|-------------------|----|------|-------|------------|
| <b>Arkansas</b>   | AR | 10   | 0     | 10         |
| <b>Louisiana</b>  | LA | 38   | 0     | 38         |
| <b>New Mexico</b> | NM | 63   | 0     | 63         |
| <b>Oklahoma</b>   | OK | 12   | 0     | 12         |
| <b>Texas</b>      | TX | 218  | 0     | 218        |
| <b>Total</b>      | -  | 341  | 0     | 341        |



**APPENDIX B: BREAKDOWN OF ZEB DISTRIBUTION BY FTA REGION**

**Table A-7:** FTA Region 7 State-By-State Full-Size Transit ZEB Distribution

**1% Growth from 2023**

| State           |    | BEBs | FCEBs | Total ZEBs |
|-----------------|----|------|-------|------------|
| <b>Iowa</b>     | IA | 28   | 0     | 28         |
| <b>Kansas</b>   | KS | 28   | 0     | 28         |
| <b>Missouri</b> | MO | 51   | 0     | 51         |
| <b>Nebraska</b> | NE | 16   | 0     | 16         |
| <b>Total</b>    | -  | 123  | 0     | 123        |

**Table A-8:** FTA Region 8 State-By-State Full-Size Transit ZEB Distribution

**18% Growth from 2023**

| State               |    | BEBs | FCEBs | Total ZEBs |
|---------------------|----|------|-------|------------|
| <b>Colorado</b>     | CO | 117  | 0     | 117        |
| <b>Montana</b>      | MT | 26   | 0     | 26         |
| <b>North Dakota</b> | ND | 0    | 0     | 0          |
| <b>South Dakota</b> | SD | 0    | 0     | 0          |
| <b>Utah</b>         | UT | 79   | 0     | 79         |
| <b>Wyoming</b>      | WY | 18   | 0     | 18         |
| <b>Total</b>        | -  | 240  | 0     | 240        |

## APPENDIX B: BREAKDOWN OF ZEB DISTRIBUTION BY FTA REGION

**Table A-9:** FTA Region 9 (Without California) State-By-State Full-Size Transit ZEB Distribution

12% Growth from 2023

| State          |    | BEBs | FCEBs | Total ZEBs |
|----------------|----|------|-------|------------|
| <b>Arizona</b> | AZ | 38   | 12    | 50         |
| <b>Hawaii</b>  | HI | 52   | 7     | 59         |
| <b>Nevada</b>  | NV | 64   | 27    | 91         |
| <b>Guam</b>    | GU | 18   | 0     | 18         |
| <b>Total</b>   | -  | 172  | 46    | 218        |

**Table A-10:** California (FTA Region 9) Full-Size Transit ZEB Distribution

17% Growth from 2023

| State             |    | BEBs  | FCEBs | Total ZEBs |
|-------------------|----|-------|-------|------------|
| <b>California</b> | CA | 1,850 | 435   | 2,285      |

**Table A-11:** FTA Region 10 State-By-State Full-Size Transit ZEB Distribution

40% Growth from 2023

| State             |    | BEBs | FCEBs | Total ZEBs |
|-------------------|----|------|-------|------------|
| <b>Alaska</b>     | AK | 12   | 0     | 12         |
| <b>Idaho</b>      | ID | 40   | 0     | 40         |
| <b>Oregon</b>     | OR | 110  | 14    | 124        |
| <b>Washington</b> | WA | 354  | 2     | 356        |
| <b>Total</b>      | -  | 516  | 16    | 532        |

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## ACKNOWLEDGMENTS

This report was funded by the Federal Transit Administration. The authors would like to thank key CALSTART staff for their critical review of and additions to this report:

- Robyn Coates
- Lily Paul
- Katrina Bayer
- Jared Schnader
- Ruth Fatolitis
- Taaj Stillitano
- Jennifer Kritzler
- Emily Varnell

The author would also like to thank Emily Castrichini for being our gifted graphic designer, and Heather Flanagan and Tristen Stone for overseeing graphic design and marketing. Any errors are the authors' own.

## ABOUT CALSTART

A mission-driven, industry organization focused on transportation decarbonization and clean air for all, CALSTART has offices in California, Colorado, Florida, Michigan, New York, and Europe. CALSTART is uniquely positioned to build the national clean transportation industry by working closely with its member companies and building on the lessons learned from the major programs it manages for the State of California. CALSTART has more than 280 member companies and manages more than \$1 billion in vehicle incentive and technical assistance programs in the United States.

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Cover photo: New Flyer's Xcelsior CHARGE FC fuel cell electric bus. Photo provided by New Flyer.

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