



ZEROING IN ON ZEBs

2020 EDITION

**THE ADVANCED TECHNOLOGY TRANSIT BUS INDEX:
A NORTH AMERICAN ZEB INVENTORY REPORT**

December 2020

A CALSTART Report
By John Jackson, Bryan Lee, and Fred Silver

www.calstart.org



Copyright © 2020 by CALSTART.

All rights reserved.

This report was funded by funding from the Federal Transit Administration (FTA), and the California Air Resources Board (CARB) Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP). No part of this document may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission by CALSTART. Requests for permission or further information should be addressed to CALSTART, 48 S. Chester Ave, Pasadena, CA 91106.

This document is based on information gathered in December 2020. This is the 2020 edition of this document.

List of Acronyms

APTA	American Public Transit Association
BEB	Battery Electric Bus
CAA	Clean Air Act
CARB	California Air Resources Board
FCEB	Fuel Cell Electric Bus
FAA	Federal Aviation Administration
FTA	Federal Transit Administration
GVWR	Gross Vehicle Weight Rating
HVIP	Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project
ICT	Innovative Clean Transit
kW	kilowatt
LoNo	Federal Transit Administration Low or No Emissions Program
MOU	Memorandum of Understanding
MW	Megawatt
TIRCP	Transit and Intercity Rail Capital Program
TIUOO	Total In-Use or On-Order
U.S.	United States of America
ZEB	Zero-Emission Bus

Table of Contents

List of Acronyms	ii
Executive Summary	6
Results and Analysis of Survey	8
Important Notes About This Report	11
Section 1: United States Zero Emission Transit Bus Count	12
Section 2: US Transit Properties Logo Map, By FTA Regions	16
Section 3: Canadian Zero Emission Transit Bus Count	28
Section 4: US Small Zero Emission Buses	30
Section 5: Zero-Emission Airport Buses	33
Section 6: Utility and Grid Impacts	35
References	37
Appendix A: Transit Properties with Battery Electric or Fuel Cell Transit Buses	38
Appendix B: State-by-State Active U.S. Zero-Emissions Transit Buses	45
Appendix C: Transit Properties with Active Battery Electric or Fuel Cell Transit Buses	47

List of Figures

Figure 1: Zero Emission Pathways	7
Figure 2: Distribution of ZEB Fleet Size in the United States	9
Figure 3: Distribution of ZEB Fleet Size in California	9
Figure 4: Transit Agencies with Extended Routes	10
Figure 5: United States Zero-Emission Bus Map	12
Figure 6: FTA Region 1	17
Figure 7: FTA Region 2	18
Figure 8: FTA Region 3	19
Figure 9: FTA Region 4	20
Figure 10: FTA Region 5	21
Figure 11: FTA Region 6	22
Figure 12: FTA Region 7	23
Figure 13: FTA Region 8	24
Figure 14: FTA Region 9 (Without California)	25
Figure 15: FTA Region 9 (California)	26
Figure 16: FTA Region 10	27
Figure 17: Zero-Emission Small Bus Distribution by State	31
Figure 18: Peak Fleet Power Demand	36

List of Tables

Table 1: State-By-State Zero-Emission Bus Distribution.....	13
Table 2: FTA Region 1 State-By-State Zero-Emission Bus Distribution.....	15
Table 3: FTA Region 2 State-By-State Zero-Emission Bus Distribution.....	15
Table 4: FTA Region 3 State-By-State Zero-Emission Bus Distribution.....	15
Table 5: FTA Region 4 State-By-State Zero-Emission Bus Distribution.....	16
Table 6: Canadian Transit Properties Bus with Battery Electric or Fuel Cell Transit Buses..	28
Table 7: Zero-Emissions Transit Buses by Canadian Province	28
Table 8: U.S. State-By-State Zero-Emission Small Bus Distribution	31
Table 9: Zero-Emission Airport Buses State-By-State Distribution	33
Table 10: Airports with Battery Electric or Fuel Cell Buses	34
Table 11: BEB Fleet Power Demand	35
Table 12: FCEB Fleet Power Demand.....	36

Executive Summary

Since the creation of the Clean Air Act (CAA), the federal government has been working with public and private organizations to reduce the amount of pollution released into the atmosphere. Transit buses have historically and predominantly operated on diesel fuel. Although buses produce less smog per capita than cars, they still release toxic fumes like nitrous oxide directly into urban communities.

Between 2013 and 2020, the Federal Transit Administration (FTA) has distributed over \$485 million for hybrids, battery electric, and hydrogen fuel cell buses via the Low or No-emission Bus Program. State-level grant programs, such as California's Transit and Intercity Rail Capital Program (TIRCP), have also supported the adoption of zero-emission buses (ZEBs). Additionally, money from the 2016 Volkswagen settlement has been made available to states to purchase zero-emission vehicles. Over the last decade, the rise in ZEBs has increased across the country. The number of ZEBs purchased by transit agencies, universities, and private entities has continued to grow as these organizations are continuously taking advantage of the evolving electric and fuel cell vehicle technology.

However, quantifying this increase has been difficult. Funding bodies like the FTA and TIRCP have tracked the number of buses they have supported, but do not assess how many ZEBs exist overall. Some state agencies, like the California Air Resources Board (CARB), have produced high quality maps of where ZEBs are, but only within their jurisdiction or accounting for a particular technology rather than an across the board index of all types of ZEBs. Tracking this data nationally is an important exercise because it helps offers important context into the United States' progress toward adopting this critical technology. ZEBs are a foundational commercial vehicle market segment where zero-emission and near-zero technology is most likely to succeed first and can also contribute to the development of vehicles in other segments.

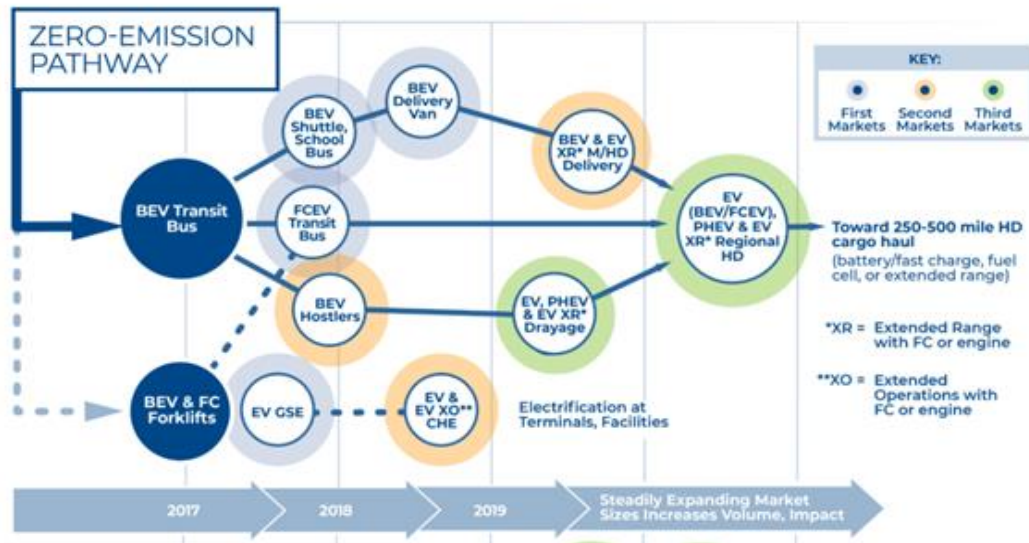


Figure 1: Zero Emission Pathways

As shown in the graphic above, developed by CALSTART for its Global Commercial Drive to Zero program, the technologies/components found in battery electric transit buses can be used in electric shuttle and school buses, electric delivery vans, electric hostlers and other vehicles¹

This report seeks to remedy this problem. Zero-emissions buses are still relatively new in the transit world. As this form of transportation technology expands, it is important to keep track of the transition from buses that run on fossil fuels and near-zero-emission fuels, to ones that are entirely zero-emissions. Through extensive research and outreach, this report aims to do exactly that. Enclosed is a breakdown of all zero-emission buses, categorized by battery electric buses and hydrogen fuel cell buses, for every state in the in the country. A list of transit agencies who are actively operating, ordering, or have received funding for ZEBs is shown next. Lastly, a map of the country, as well as a close-up view of every state, is displayed with all the aforementioned transit agency's logos.

This report also projects the number of active buses, small buses, and airport transit buses in the U.S. This report also highlights ZEB deployments in Canada. This is the first year that this report has tracked this data for Canada. Active buses are defined as buses that are on the road today. Highlighting these puts in perspective the likelihood of the average person seeing a ZEB on the road today. While the primary numbers in this report reflect the number of zero-emissions buses on order and actively on the road, it is important that the active buses are also singled out for perspective.

¹ CALSTART Beachhead Zero Emissions Pathways, CALSTART 2018

Results and Analysis of Survey

As of December 2020, there are:

Total U.S. Zero-Emission Transit Buses (ZEBs)	2,790
U.S. Transit Battery Electric Buses (BEBs)	2,703
U.S. Transit Hydrogen Fuel Cell Buses (FCEBs)	87
U.S. Zero-Emissions Small Buses	617
Active U.S. Zero-Emissions Transit Buses	1015
Canadian Zero-Emissions Transit Buses	249

Zero-emission transit buses nationally have grown to almost 2,800 buses on the road or on order, an increase of 24 percent over the last calendar year. The region of the country with the most buses was the West Coast (Washington, Oregon, and California), with over half in that region alone. California, a state where all transit buses must be zero-emission by 2040 according to the Innovative Clean Transit (ICT) regulation, had the highest number of ZEBs with over 1100. The median number of ZEBs per transit property nationwide was six, while the median number in California was nine. The smallest ZEB fleet in the United States has one bus. The largest ZEB fleet has 129 buses. The largest battery electric buses (BEB) fleet has 129 buses and the largest fuel cell electric bus (FCEB), fleets has 24 buses.

Most fleets in the United States have five or fewer ZEBs and the vast majority have ten or less (see Figure 2). This demonstrates that most of the fleets are small and more effort and resources will need to be devoted to helping these fleets to overcome the barriers to scaling. However, some fleets have begun to achieve deployments at scale. Currently there are 33 transit properties across the U.S. that have at least 20 ZEBs in operation or on order. Of these 33 properties, 17 are in California and have a mean of 43 buses per property. The other 16 are located in Washington, Utah, Nevada, Delaware, Rhode Island, Illinois, Indiana, Georgia, Pennsylvania, New Mexico, Florida, and Colorado.

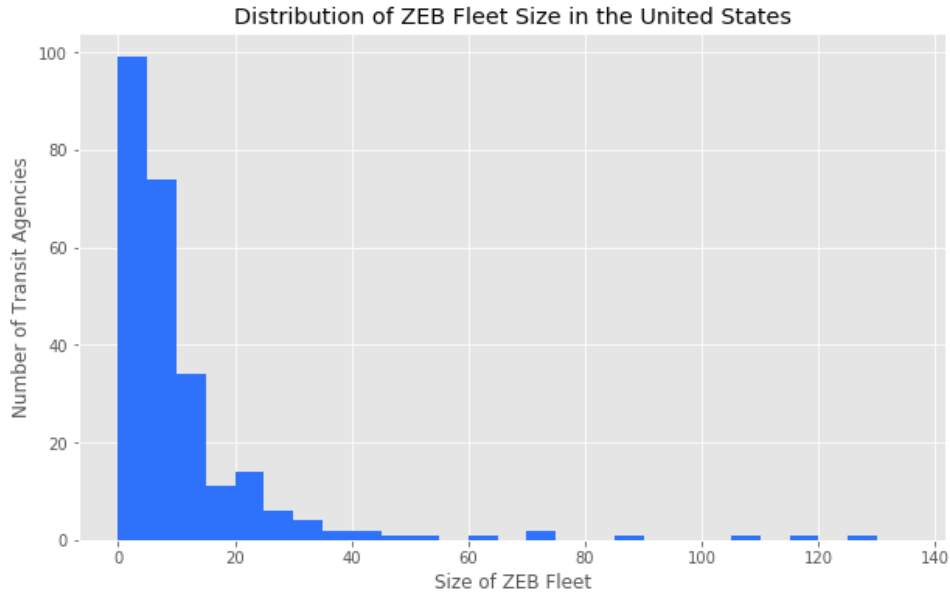


Figure 2: Distribution of ZEB Fleet Size in the United States

California is the state with the most ZEB deployments. California also has the majority of the larger ZEB deployments. However, despite this, the majority of California’s transit agencies have a ZEB fleet that is smaller than 10 buses (see Figure 3), indicating that California will also need to provide resources to help scale up its smaller fleets.

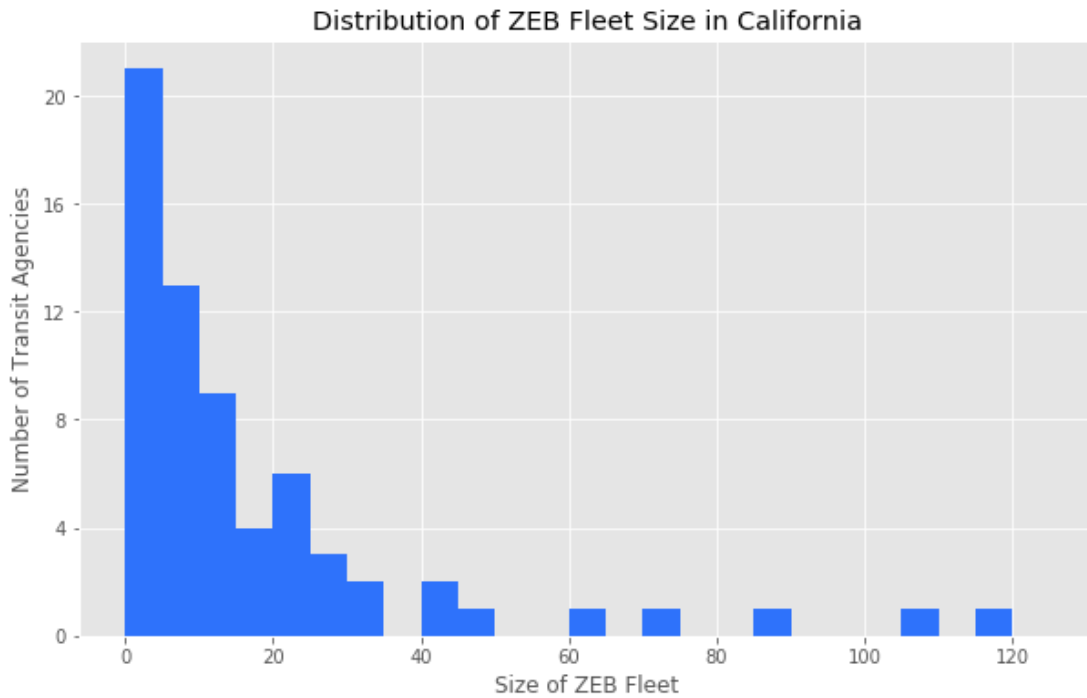


Figure 3: Distribution of ZEB Fleet Size in California

At this point in time, BEBs are the most common form of ZEBs on the road compared to FCEB. This can be attributed to a variety of factors including cost, infrastructure, and agency preference. However, since many transit agencies have extended routes (see Figure 4), many transit agencies are considering deploying FCEBs. As a result, it is likely that there will be an increase in FCEB deployments in the future.

Daily Mileage for Standard 40 ft. Percent of standard buses driven <150 miles/day

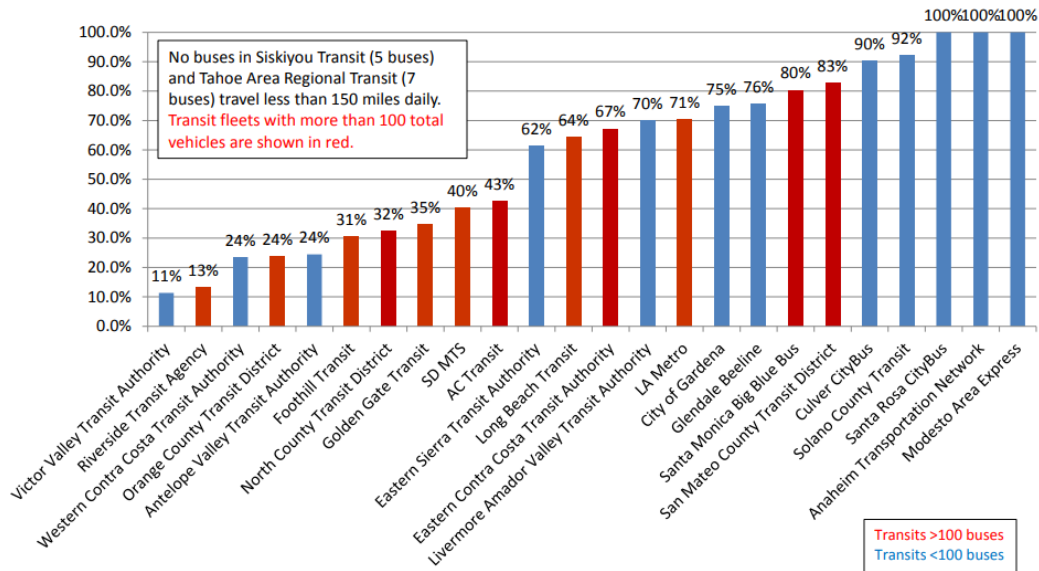


Figure 4: Transit Agencies with Extended Routes³

In total, there were 229 agencies that had ZEBs or had them on order in the United States (an increase of 53 from 2019), and eight in Canada. Of those 229 agencies, 57 of them are in California. Forty-four states, Washington D.C., and Guam have zero emission buses. Arkansas, Maine, New Hampshire, North Dakota, South Dakota, and West Virginia are the only states that do not yet have ZEBs. No new states added zero-emission buses this year compared to four in last year’s count.

³ California Air Resources Board. (2016). “Transit Agency Survey Preliminary Results.” ACT Workgroup Meeting. Available at: https://ww3.arb.ca.gov/msprog/bus/transit_survey_summary.pdf

Important Notes About This Report

- 1) The data for this report has been gathered primarily through award documents, press releases, phone interviews, and other methods of validation. As there is no centralized accounting of zero-emission buses, and transit agency plans for adoption can shift and/or be delayed, it is important to note that figures contained should not be considered static. Data collection is ongoing, and this index will be updated annually. If you have information about a zero-emission bus deployment that is not featured in this report, please reach out to John Jackson (jjackson@calstart.org), Bryan Lee (blee@calstart.org), or Fred Silver (fsilver@calstart.org).
- 2) Despite becoming much more popular among transit agencies, ZEBs are still advanced technology, and they can take months, if not years, for bus manufacturers to build and deliver the vehicles. Determining what buses are operating today and what buses are on order is a function of time, and any attempt to do so would become immediately outdated. This report tracks all ZEBs known to be operating today, on order, or at least have been awarded funding for the transit agency to purchase. This report occasionally uses the acronym "TIUOO" to refer to the "Total In-Use or On-Order" number of ZEBs, referring to the number of buses that are active on the roads and currently on-order to be delivered in the future.
- 3) The figures for the "Active U.S. Transit Zero-Emissions Buses" come from the American Public Transit Association (APTA) 2020 Fact Book, CALSTART's bus census (FY17 and 18), and bus sales information from bus manufacturers BYD, Proterra, and Nova, and data from redeemed CARB's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) transit bus vouchers.
- 4) This report counts the ZEBs known as of December 2020 as described in the previous note. All future versions of this report will similarly be a specific snapshot of a single day, date marked in the title of the report.
- 5) Zero-emission transit buses that are privately owned and not being used for transit revenue service are also counted in this report.

Section 1: United States Zero Emission Transit Bus Count

Battery and Fuel Cell Electric Transit Buses Currently Deployed, On Order, or Soon To Be On Order Within the United States of America

Last Updated: November 11, 2020

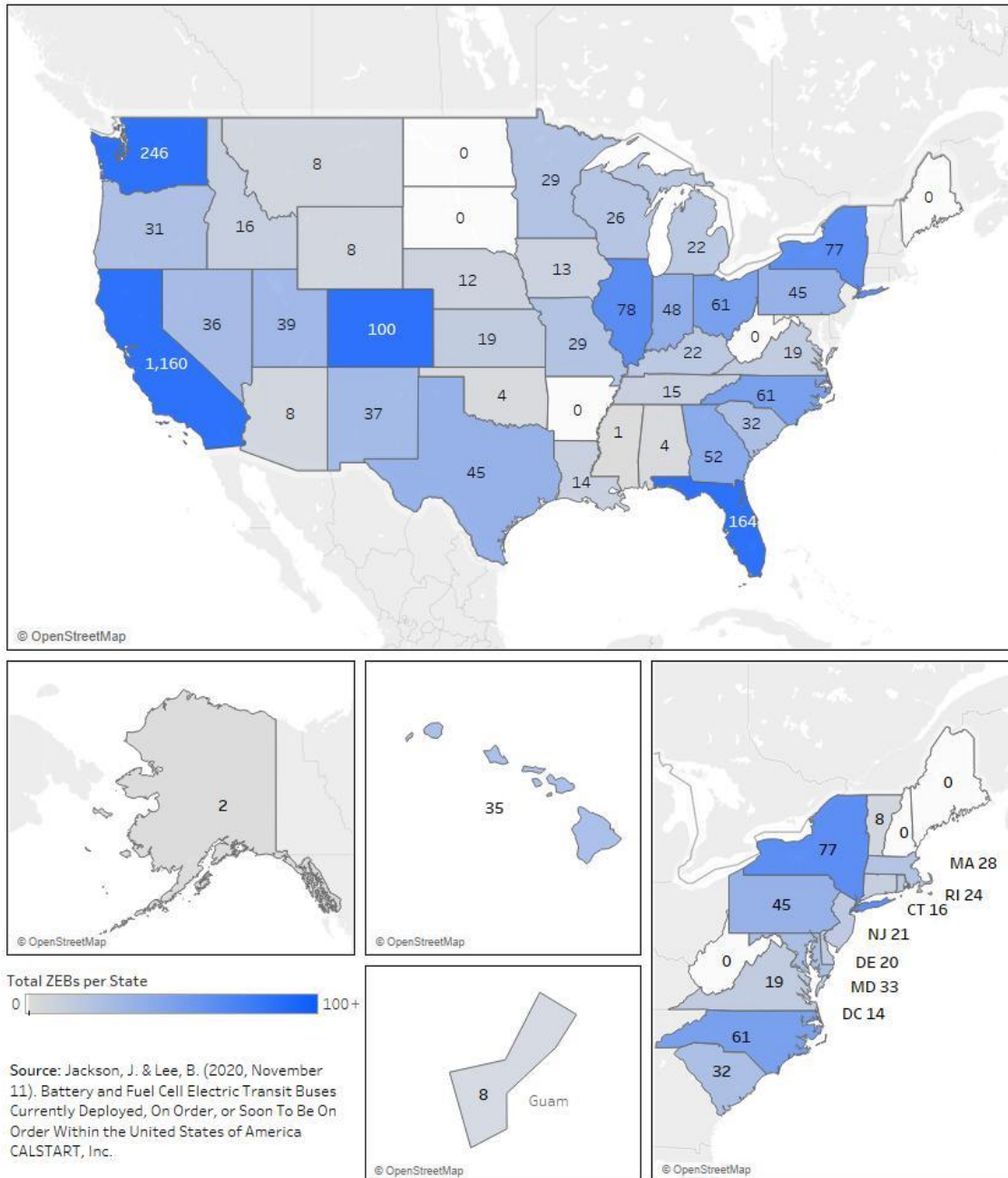


Figure 5: United States Zero-Emission Bus Map

The United States has 2,790 zero emission transit buses on order or deployed. Figure 7 provides a breakdown of the number of ZEBs deployed by state across the United States. Table 1 further disaggregates this data and provides a state-by-state breakdown of the number of BEBs and FCEBs deployed. These buses are deployed across 255 transit agencies. The transit agencies with ZEBs have been mapped out in Section 2. A list of these transit agencies can also be found in Appendix A.

Table 1: State-By-State Zero-Emission Bus Distribution

Total Buses = 2,790

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
Alabama	AL	3	1	4
Alaska	AK	2	0	2
Arizona	AZ	8	0	8
Arkansas	AR	0	0	0
California	CA	1108	52	1160
Colorado	CO	100	0	100
Connecticut	CT	16	0	16
Delaware	DE	20	0	20
District of Columbia	DC	14	0	14
Florida	FL	164	0	164
Georgia	GA	52	0	52
Hawaii	HI	34	1	35
Idaho	ID	16	0	16
Illinois	IL	74	4	78
Indiana	IN	48	0	48
Iowa	IA	13	0	13
Kansas	KS	19	0	19
Kentucky	KY	22	0	22
Louisiana	LA	14	0	14
Maine	ME	0	0	0
Maryland	MD	33	0	33
Massachusetts	MA	27	1	28
Michigan	MI	20	2	22
Minnesota	MN	29	0	29
Mississippi	MS	1	0	1
Missouri	MO	29	0	29
Montana	MT	8	0	8

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
Nebraska	NE	12	0	12
Nevada	NV	34	2	36
New Hampshire	NH	0	0	0
New Jersey	NJ	21	0	21
New Mexico	NM	37	0	37
New York	NY	77	0	77
North Carolina	NC	61	0	61
North Dakota	ND	0	0	0
Ohio	OH	37	24	61
Oklahoma	OK	4	0	4
Oregon	OR	31	0	31
Pennsylvania	PA	45	0	45
Rhode Island	RI	24	0	24
South Carolina	SC	32	0	32
South Dakota	SD	0	0	0
Tennessee	TN	15	0	15
Texas	TX	45	0	45
Utah	UT	39	0	39
Vermont	VT	8	0	8
Virginia	VA	19	0	19
Washington	WA	246	0	246
West Virginia	WV	0	0	0
Wisconsin	WI	26	0	26
Wyoming	WY	8	0	8
Guam	GU	8	0	8
Total		2703	87	2790

Tables 2-10 provide a regional breakdown of ZEB distribution. These tables provide a state-by-state breakdown of ZEB distribution by FTA Region and provide growth statistics for ZEB deployments as compared to 2019. ZEB growth occurred in every FTA region in the past year. The region with the highest growth rate was in the Midwest in FTA Region 7 with a growth rate of 128% compared to last year's ZEB Count. This region more than doubled the amount of ZEBs in each state, with the highest amount of growth coming from the state of Missouri, which added 18 ZEBs all which are battery electric. The region with the lowest growth rate was Region 9 in the Southwest U.S., which includes California. This can be attributed to the already large number of ZEBs in that region, particularly in California.

Table 2: FTA Region 1 State-By-State Zero-Emission Bus Distribution**Total Buses = 76 (111% Growth from 2019)**

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
Connecticut	CT	16	0	16
Maine	ME	0	0	0
Massachusetts	MA	27	1	28
New Hampshire	NH	0	0	0
Rhode Island	RI	24	0	24
Vermont	VT	8	0	8
Total		75	1	76

Table 3: FTA Region 2 State-By-State Zero-Emission Bus Distribution**Total Buses = 98 (78% Growth from 2019)**

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
New Jersey	NJ	21	0	21
New York	NY	77	0	77
Total		98	0	98

Table 4: FTA Region 3 State-By-State Zero-Emission Bus Distribution**Total Buses = 131 (13% Growth from 2019)**

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
Delaware	DE	20	0	20
District of Columbia	DC	14	0	14
Maryland	MD	34	0	34
Pennsylvania	PA	45	0	45
Virginia	VA	19	0	19
West Virginia	WV	0	0	0
Total		131	0	131

Table 5: FTA Region 4 State-By-State Zero-Emission Bus Distribution**Total Buses = 290 (6.5% Growth from 2019)**

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
Alabama	AL	3	1	4
Florida	FL	164	0	164
Georgia	GA	52	0	52
Kentucky	KY	22	0	22
Mississippi	MS	1	0	1
South Carolina	SC	32	0	32
North Carolina	NC	61	0	61
Tennessee	TN	15	0	15
Total		289	1	289

Section 2: US Transit Properties Logo Map, By FTA Regions

Figures 6 – 16 map out the transit agencies that have ordered or deployed ZEBs. These maps are broken out by FTA Region. A list of transit agencies with ZEBs on order or deployed can be found in Appendix A.

Figure 6: FTA Region 1

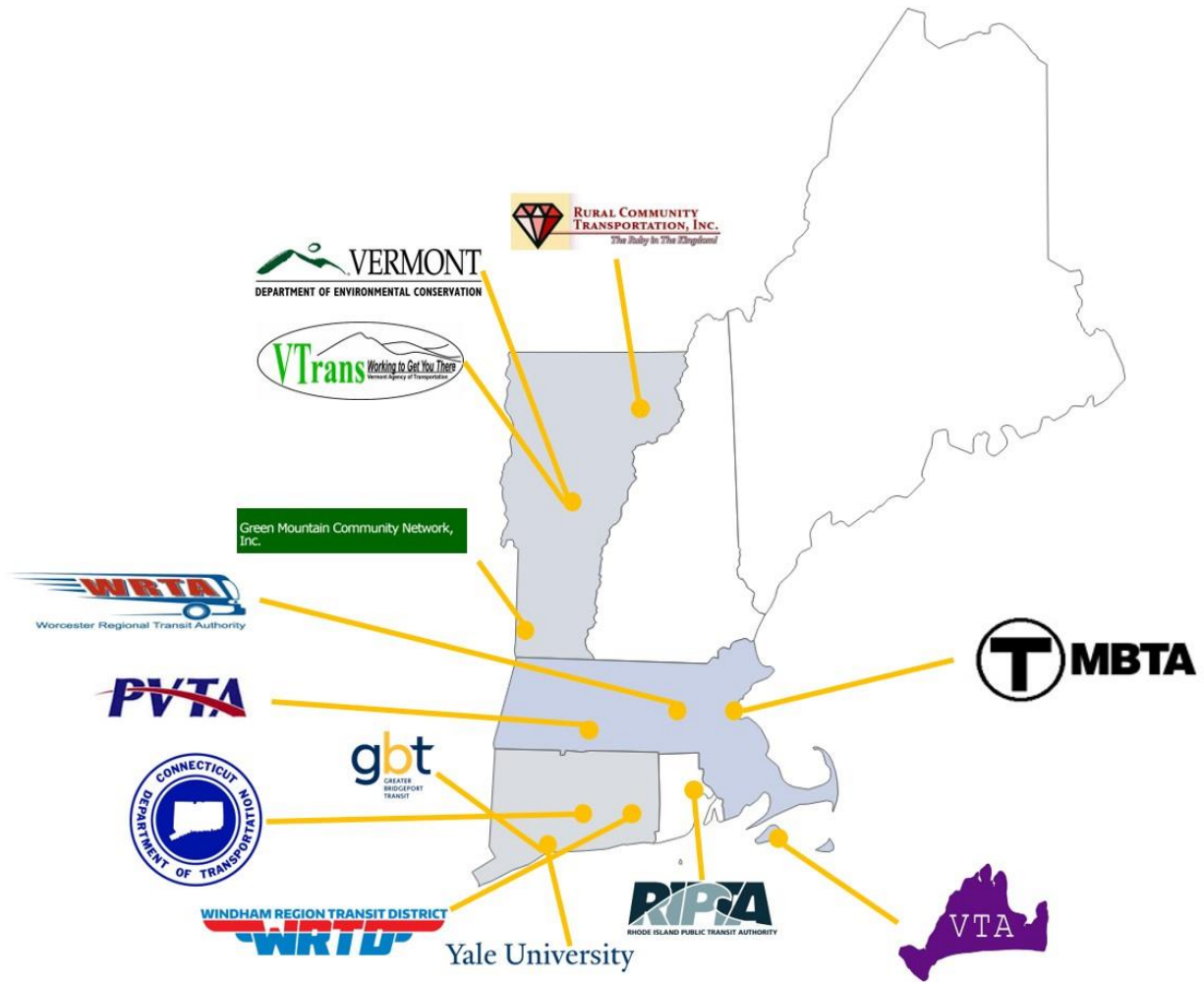


Figure 7: FTA Region 2

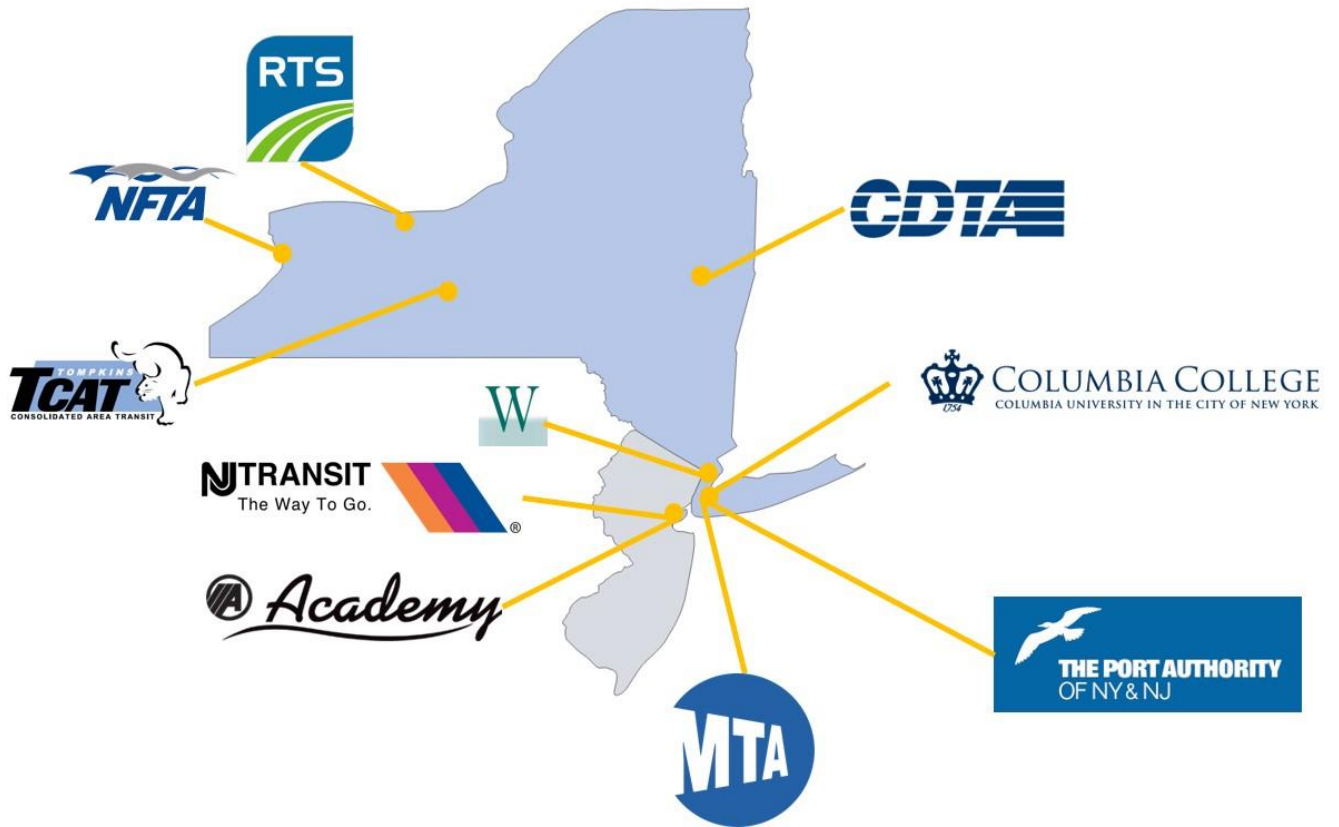


Figure 8: FTA Region 3

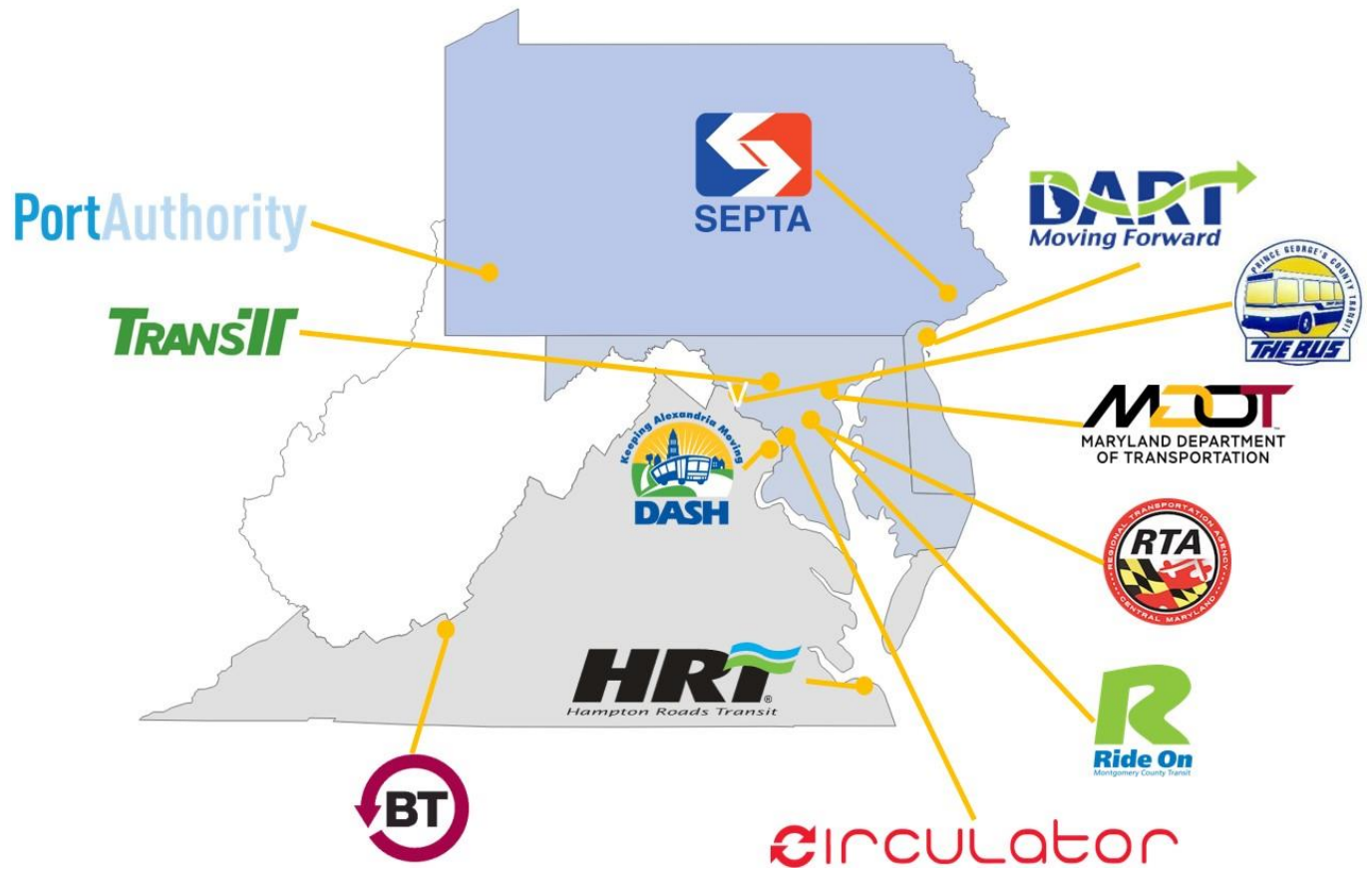


Figure 9: FTA Region 4

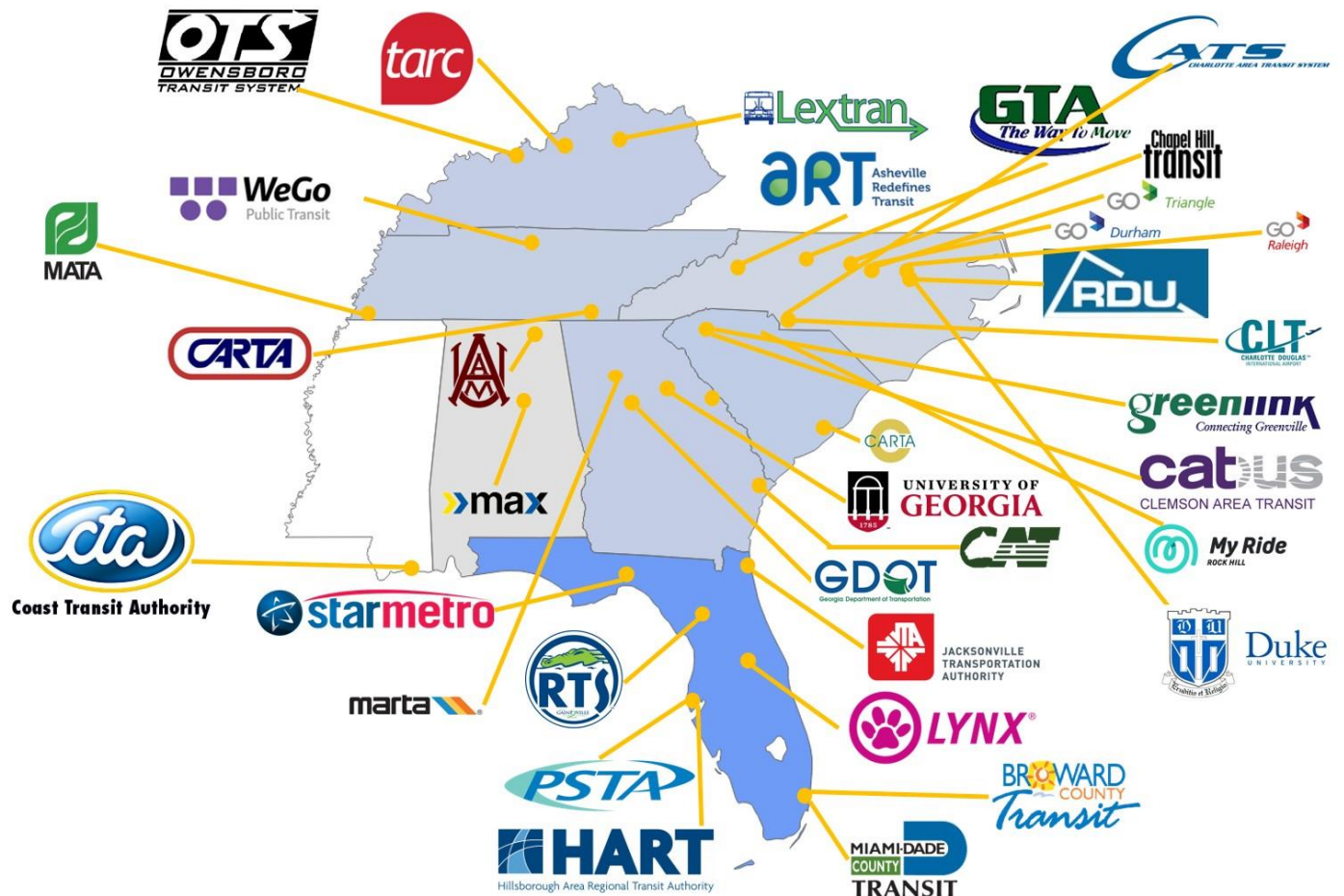


Figure 10: FTA Region 5



Figure 11: FTA Region 6

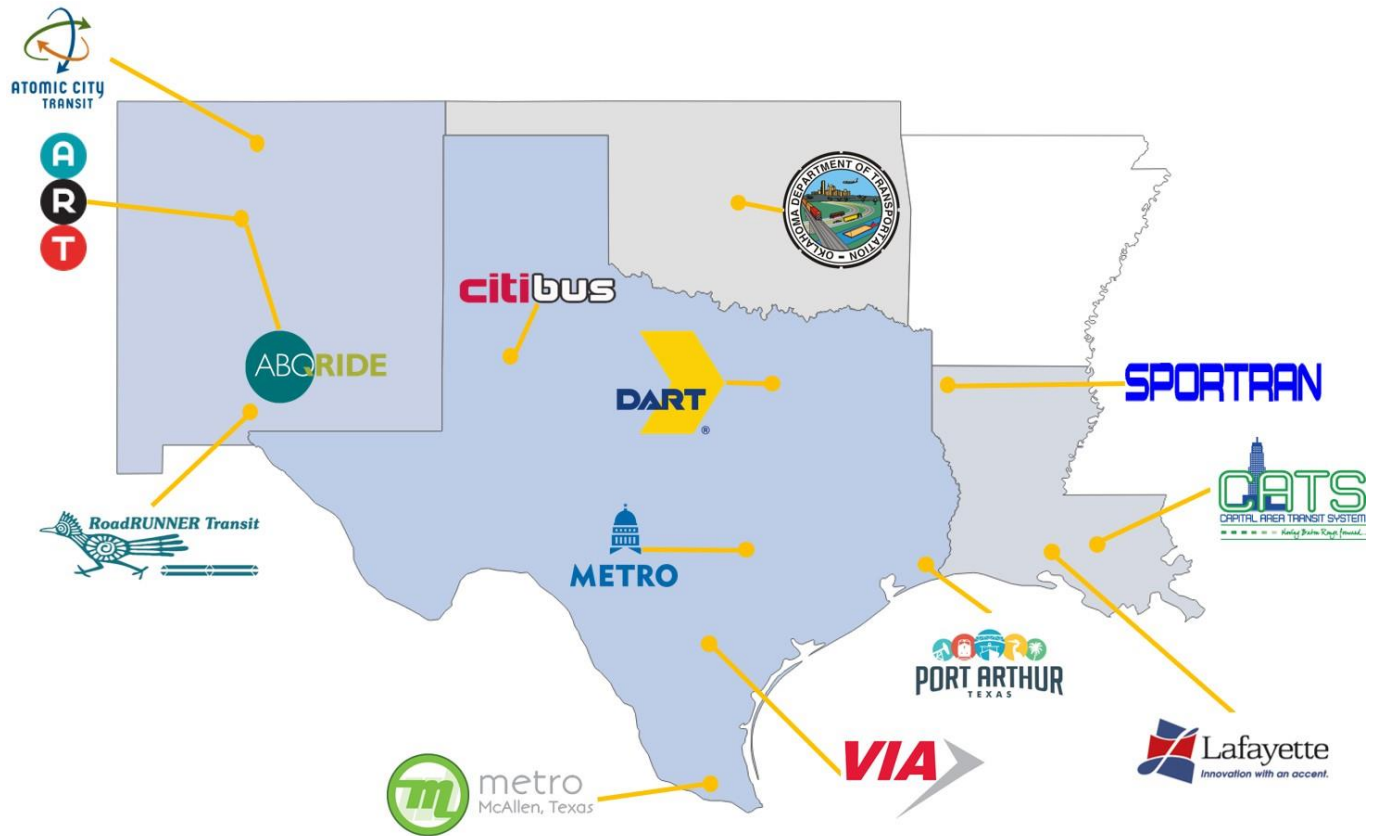


Figure 12: FTA Region 7

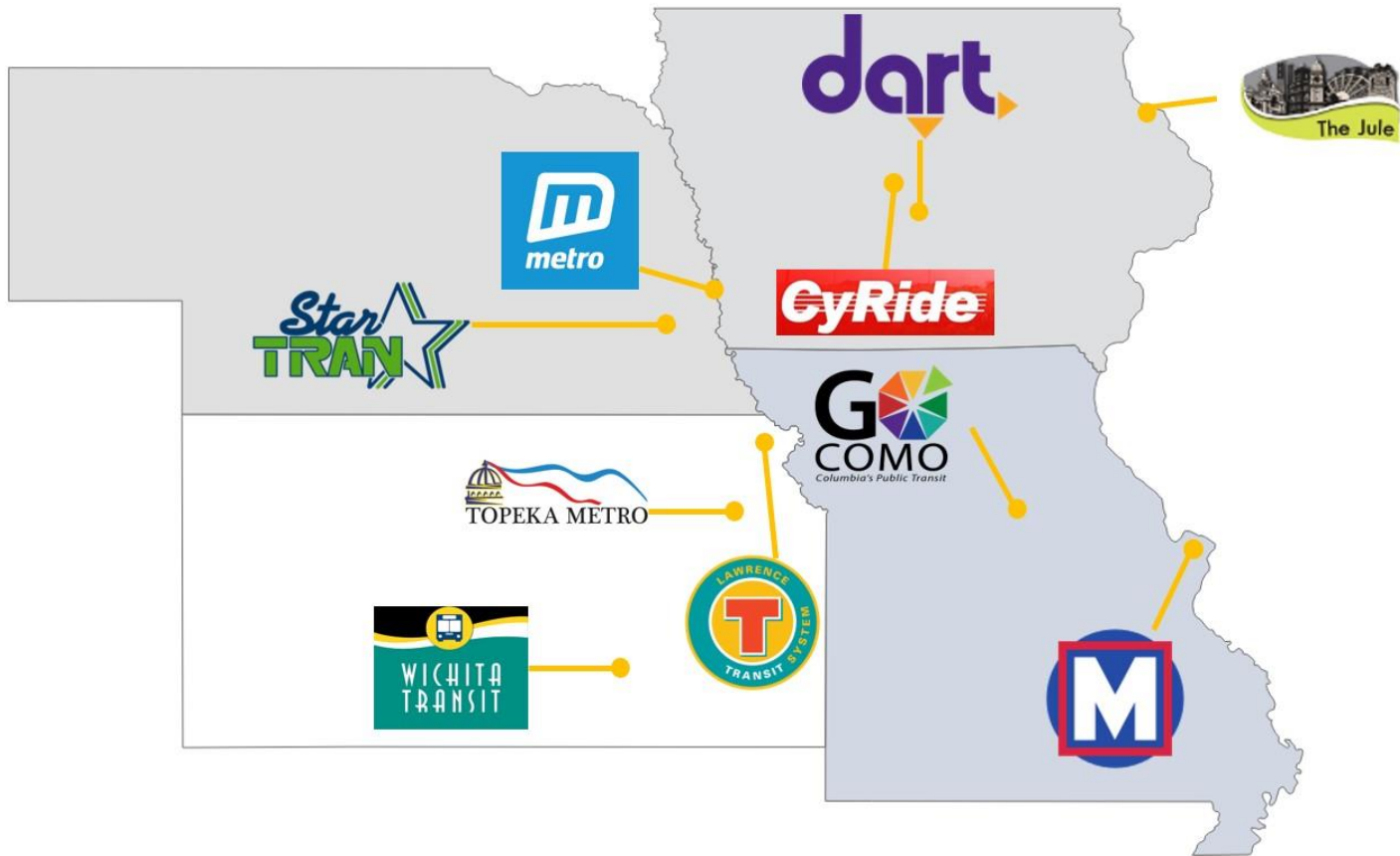


Figure 13: FTA Region 8

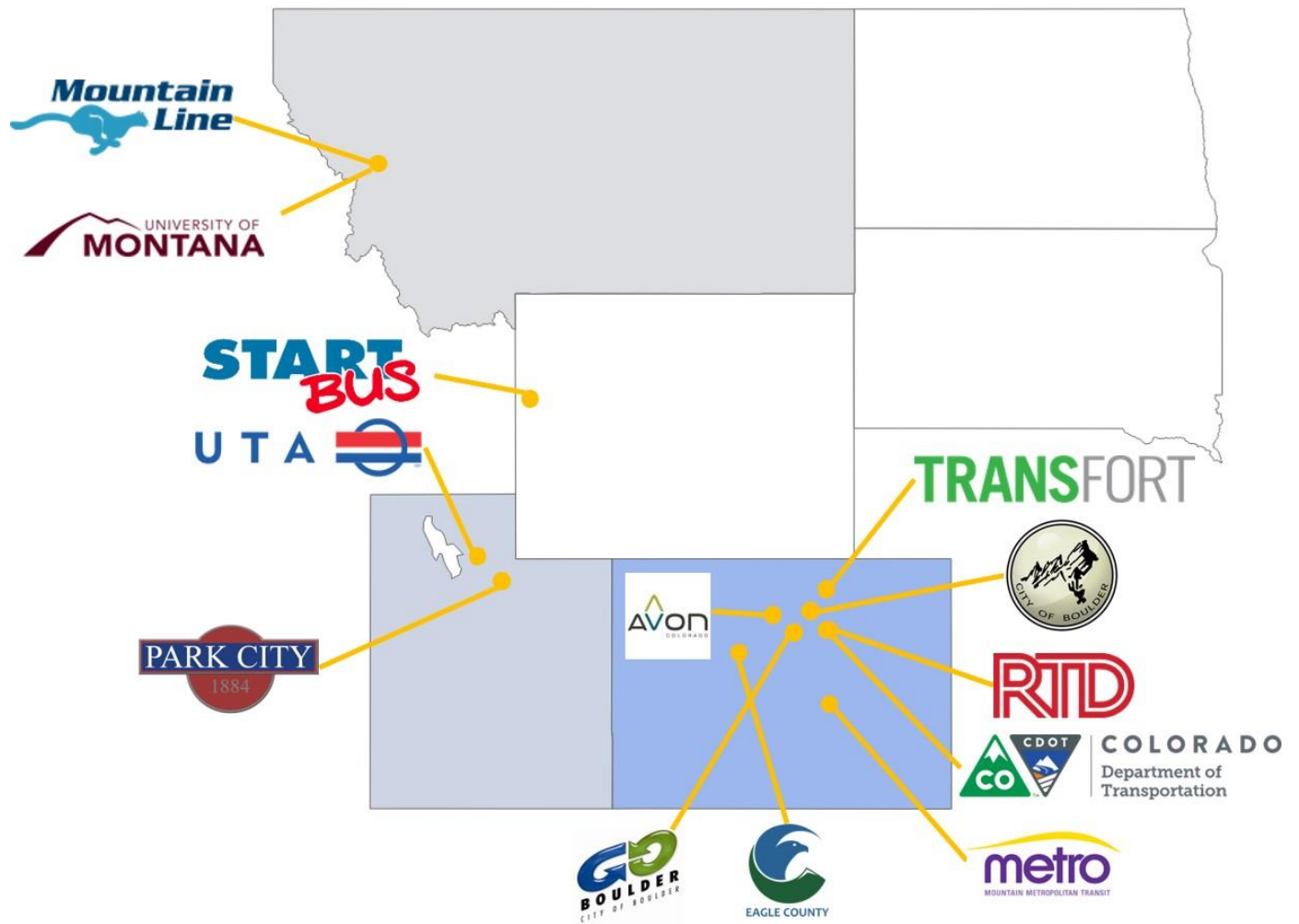


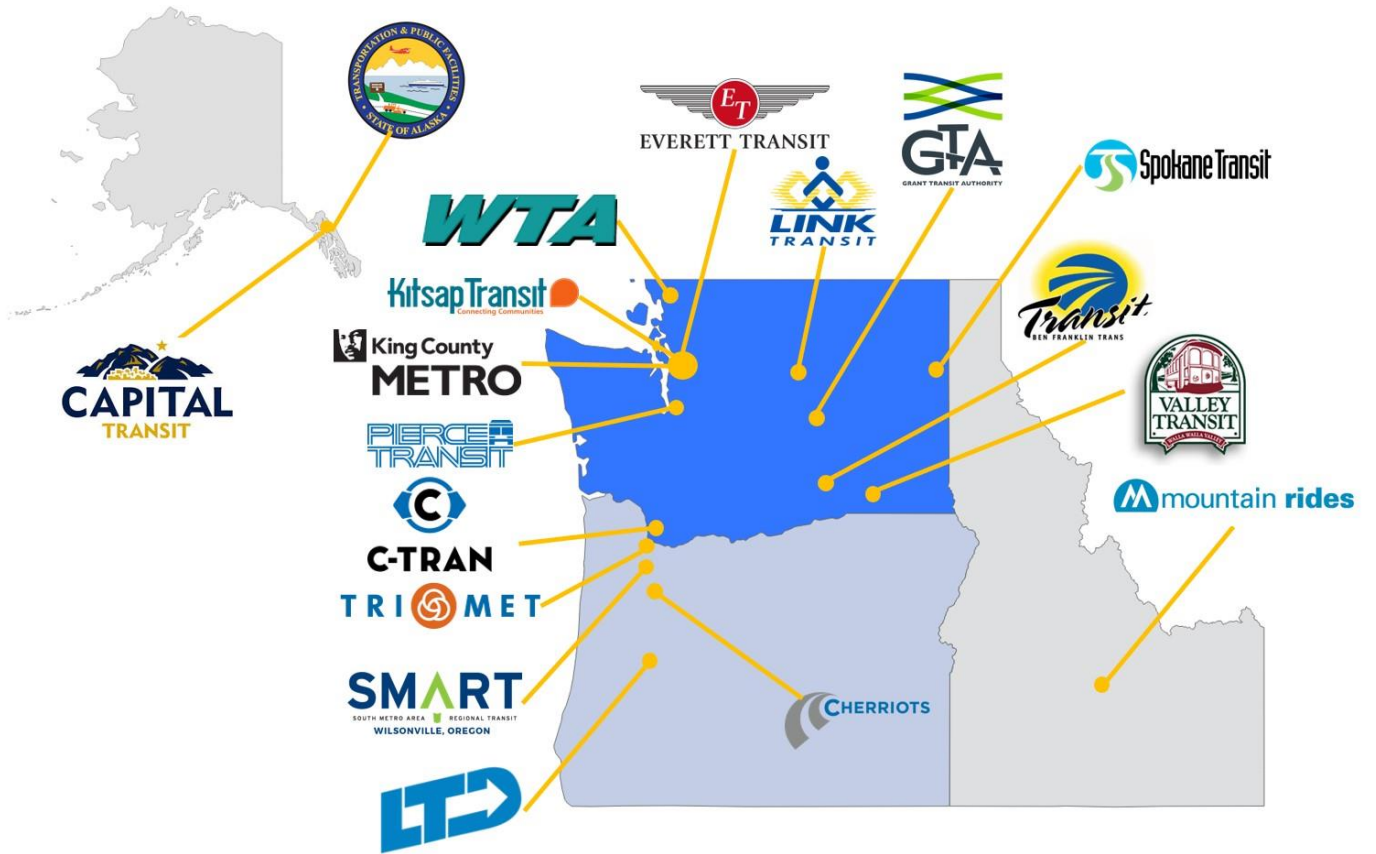
Figure 14: FTA Region 9 (Without California)



Figure 15: FTA Region 9 (California)



Figure 16: FTA Region 10



Section 3: Canadian Zero Emission Transit Bus Count

One of the new elements of this year’s inventory report is the inclusion of Canadian ZEBs. This data was gathered by a combination of original research as well as reaching out to various bus manufacturers regarding bus sales in the country to date. Canada shares a common supply chain for both Transit Buses and its associated infrastructure. As we envision that the costs for ZEBs to decrease over the next five years the additional volumes associated with Canada will prove to be valuable in this effort. In addition, the Canadian government has pledged to put 5,000 zero-emissions buses, both transit and school buses, on the roads by 2025. This commitment also pledges to build 5,000 electrical charging stations along the Trans-Canada Highway, as well as other roads across the country.⁵

Canada in the last decade has procured over 200 zero-emissions buses in all of its largest cities, including ones in its smallest. There are buses located in six of its 10 provinces stretching from British Columbia to Quebec. Growth in the Canadian market with ZEB technology continues to expand as more transit agencies across the world continue to transition their bus fleets to electric. Transit agencies in Montreal and British Columbia have committed themselves to having completely zero-emissions fleets by 2040.

Table 6: Canadian Transit Properties Bus with Battery Electric or Fuel Cell Transit Buses

#	Province	City	Transit Agency
1.	Ontario	Brampton	Brampton Transit
2.	Alberta	Edmonton	Edmonton Transit Service (ETS)
3.	Quebec	Montreal	Montreal Metro (STM)
4.	Ontario	Oakville	Oakville Transit
5.	Saskatchewan	Saskatoon	Saskatoon Transit
6.	Ontario	Toronto	Toronto Transit Commission (TTC)
7.	British Columbia	Vancouver	TransLink
8.	Manitoba	Winnipeg	Winnipeg Transit

⁵ Zero-Emission Vehicles: Our Platform - Canada. (2020). Retrieved December 08, 2020, from <https://liberal.ca/our-platform/zero-emission-vehicles/>

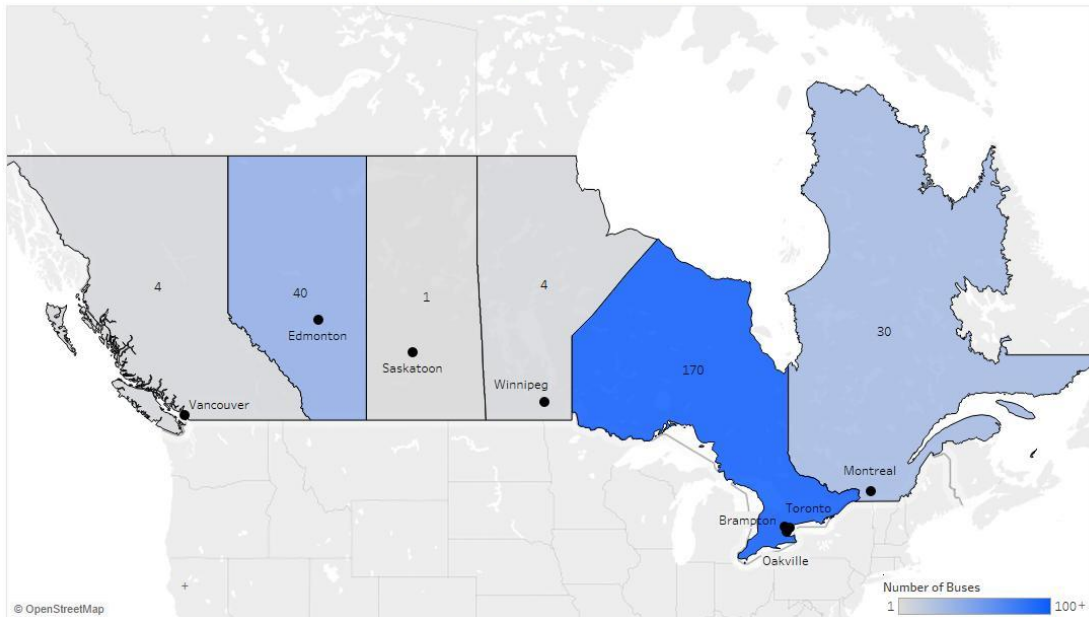
Table 7: Zero-Emissions Transit Buses by Canadian Province

Total # = 249

Province		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
Alberta	AB	40	0	40
British Columbia	BC	4	0	4
Manitoba	MB	4	0	4
New Brunswick	NB	0	0	0
Newfoundland and Labrador	NL	0	0	0
Nova Scotia	VS	0	0	0
Ontario	ON	170	0	170
Prince Edward Island	PE	0	0	0
Quebec	QC	30	0	30
Saskatchewan	SK	1	0	1
Total		249	0	249

Battery and Fuel Cell Electric Transit Buses Currently Deployed, On Order, or Soon To Be On Order Within Canada

Last Updated: December 4, 2020



Source: Jackson, J. & Lee, B. (2020, December 4). Battery and Fuel Cell Electric Transit Buses Currently Deployed, On Order, or Soon To Be On Order Within Canada CALSTART, Inc.

Figure 17: Zero-Emission Bus Distribution by Canadian Province

Section 4: US Small Zero Emission Buses

Zero-emission small buses, defined as battery electric or hydrogen fuel cell cutaway buses with a length of less than 30 feet, a Gross Vehicle Weight Rating (GVWR) of greater than 14,000 pounds, and are classified in the FTA's 5 year/150,000 mile or 7 year/200,000 mile service-life category, have also become an established technology in fleets. While most efforts to electrify fleets has focused on Class 7-8 transit buses, small buses comprise a significant proportion of transit fleets. According to the FTA's 2018 Annual Revenue Vehicle Inventory, transit fleets in the United States employed 183,760 cutaway buses⁶. As a result, small buses are responsible for a large quantity of GHG emissions. Transit agencies typically use small buses to provide demand response service for senior and disabled citizens. However, many transit agencies aim to boost ridership by providing additional services, like on demand response and first/last mile service, to the general public. As a result, the deployment of zero-emission small buses will support the transition to this emerging transit business model. As of December 2020, there are 617 zero-emission small buses purchased, on order, or deployed in the United States. Eighty-three of these small buses have been deployed by transit agencies. However, zero-emission small buses have been deployed by non-transit entities. Private transportation companies, businesses & corporations, and government agencies have also adopted zero-emission buses. Private entities have deployed or purchased 534 zero-emission small buses, all of which are battery electric. One hundred fifty-seven of these private shuttle buses are owned by airport parking companies (see Zero-Emission Airport Buses section). This edition of Zeroing in on ZEBs is the first time that CALSTART has tracked the proliferation of this technology. To gather this data, CALSTART analyzed press releases, data from voucher incentive programs, and cross referenced this data with manufacturers.

To date, battery electric has been the dominant shuttle bus technology, with 608 of the buses being battery electric. There have also been nine fuel cell electric shuttle buses. The majority of zero-emission shuttle bus deployments have occurred in California. However, zero-emission small buses have also been deployed in Nevada, Texas, Iowa, Michigan, Wisconsin, Ohio, and Vermont. Similar to zero-emission transit buses, deployments of zero-emission small buses are primarily concentrated in California, the Midwest, and the Northeast. However, over time, small bus deployments will likely occur in more regions of the United States.

⁶ Federal Transit Administration. *2018 Annual Database Revenue Vehicle Inventory*. Available at: <https://www.transit.dot.gov/ntd/data-product/2018-annual-database-revenue-vehicle-inventory>

Table 8: U.S. State-By-State Zero-Emission Small Bus Distribution

Total = 617

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
California	CA	577	4	581
Iowa	IA	2	0	2
Michigan	MI	12	0	12
Nevada	NV	1	0	1
Ohio	OH	0	5	5
Texas	TX	6	0	6
Vermont	VT	4	0	4
Wisconsin	WI	6	0	6
Total		608	9	617

Battery and Fuel Cell Electric Small Buses Currently Deployed, On order, or Soon to Be On Order Within the United States of America

Last updated: December 13, 2020

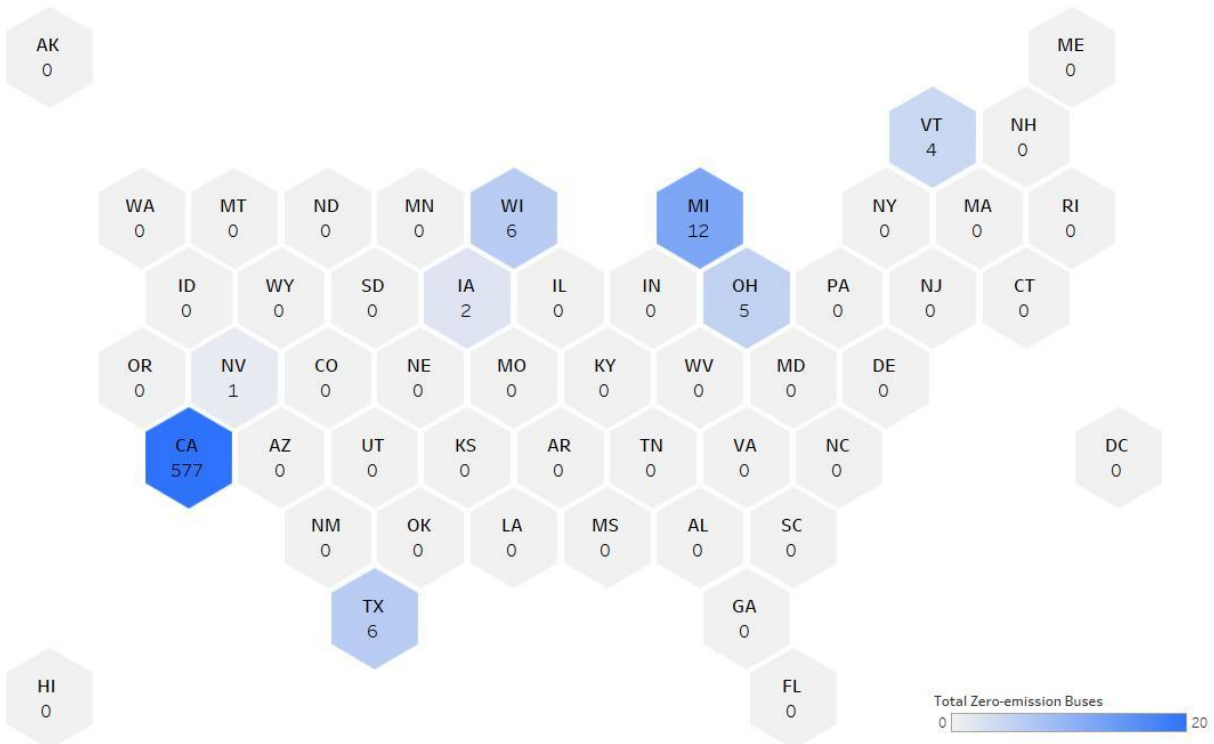


Figure 17: Zero-Emission Small Bus Distribution by State

It is important to note that there have been significantly fewer small bus deployments than transit buses. This has occurred because small buses are not as technologically mature as transit buses. While there have been numerous zero-emission transit buses that have completed Altoona testing, the market for small buses that have completed Altoona testing is much smaller. This puts constraints on transit agencies as it means that FTA funding cannot be used to purchase these vehicles. As small buses reach technological maturity and more bus models complete Altoona testing, it is expected that demand for small buses will increase.

Small bus deployments have been supported by various governmental policies. In California, the Innovative Clean Transit Regulation requires that transit agencies begin adopting zero-emission buses in 2023. The percentage of annual bus purchases that must be zero-emission increases over time until 2029, when all bus purchases must be zero-emission. This regulation applies to all buses that have a GVWR of greater than 14,000 pounds. As a result, small buses are subject to the Innovative Clean Transit Regulation, which has incentivized transit agencies to adopt zero-emission buses. As a result, regulatory pressures have driven aggressive deployment of zero-emission small buses in California.

Financial incentive programs have also supported the adoption of zero-emission small buses. California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) is a voucher incentive program that provides funding to purchase zero-emission buses. Numerous small bus purchases have been supported by this program. The Federal Transit Administration's Low-No Emissions Bus Grant Program (LoNo) has also funded zero-emission small bus deployments.

The pace of zero-emission small bus deployments is expected to accelerate. One development that will accelerate deployments is the signing of statewide procurement contracts to small bus manufacturers. These statewide procurement contracts allow transit agencies to purchase buses from manufacturers at a fixed price without having to issue a RFP or initiate the procurement process. These procurement contracts will speed up the purchasing of small buses and will accelerate the growth of this market. At the time of writing, California is able to purchase small buses through the purchasing contract led by the California Association for Coordinated Transportation and the Morongo Basin Transit Authority. Other states may follow suit in the near future, which would help to accelerate deployments.

Section 5: Zero-Emission Airport Buses

Zero-emission buses have also become a common sight at airports. Numerous airports across the United States have adopted zero-emission transit and small buses. These buses are typically used to as “people movers” to transport flyers from parking lots to their airport terminal. Many companies that operate off-site parking lots have also adopted zero-emission buses to transport flyers to the airport.

To date, airports have deployed or ordered 97 zero-emission transit-style buses. All of these zero-emission airport buses have been battery electric. The majority of airport zero-emission bus deployments have been in California. This growth in airport buses has been driven by California’s Zero-emission Airport Shuttle Regulation. This regulation mandates that bus operators in 13 of the state’s largest airports must fully transition to zero-emission shuttle buses by 2035⁷. This has led to increased adoption of both zero-emission small and transit buses at airports. This regulation applies to both the airport themselves and private buses that go to the airport. As a result, this regulation has also resulted in private airport parking companies purchasing zero-emission buses. Private airport parking companies have purchased or deployed 157 zero-emission small buses. Due to this regulation, airports and private airport parking companies in California are expected to deploy additional zero-emission buses in the future.

Table 9: Zero-Emission Airport Buses State-By-State Distribution

Total = 97

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
California	CA	51	0	51
Georgia	GA	2	0	2
Indiana	IN	9	0	9
Michigan	MI	2	0	2
Missouri	MO	4	0	4
New Jersey	NJ	6	0	6
New Mexico	NM	2	0	2

⁷ California Air Resources Board. (2019, June 19). Retrieved December 08, 2020, from <https://ww2.arb.ca.gov/news/california-air-resources-board-approves-comprehensive-effort-clean-airport-shuttles>

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
New York	NY	12	0	12
North Carolina	NC	9	0	9
Total		97	0	97

Table 10: Airports with Battery Electric or Fuel Cell Buses

#	State	Airport
1.	CA	John Wayne Airport (SNA)
2.	CA	Los Angeles International Airport (LAX)
3.	CA	Sacramento International Airport (SMF)
4.	CA	San Diego International Airport (SAN)
5.	CA	San Francisco Airport Commission – San Francisco International Airport (SFO)
6.	CA	San Jose Norman Mineta International Airport (SJC)
7.	GA	Hartsfield-Jackson Atlanta International Airport (ATL)
8.	IN	Indianapolis International Airport (IND)
9.	MI	Detroit Metropolitan Airport (DTW)
10.	MO	Kansas City International Airport (MCI)
11.	NC	Charlotte Douglas International Airport (CLT)
12.	NC	Raleigh-Durham International Airport (RDU)
13.	NJ	Newark Liberty International Airport (EWR)
14.	NM	Albuquerque Sunport International Airport (ABQ)
15.	NY	John F. Kennedy International Airport (JFK)
16.	NY	New York LaGuardia International Airport (LGA)

Section 6: Utility and Grid Impacts

The deployment of zero-emission buses will have implications for the electrical grid. Zero-emission buses, regardless of the fuel type, are energy intensive and require electricity to operate. Battery electric buses consume electricity directly as fuel. Fuel cell electric buses on the other hand, consume hydrogen. However, electricity is used to produce, compress, and dispense hydrogen to the buses. As a result, the deployment of zero-emission buses will increase the amount of electricity that transit agencies consume. The nation-wide power demand from the 2,790 zero-emission transit buses in this report is expected to be 143.46 MW. If California’s ICT Regulation is fully implemented, California, by itself, would have 12,000 ZEBs deployed by 2030.⁸ These deployments are expected to draw 617.14 MW. If all of America’s 65,000 transit buses are electrified, this would draw 3,342.85 MW. In 2019, average power draw for the United States was 471,105.25 MW.⁹ The United States has 1.1 million MW of utility-scale electrical generation capacity.¹⁰ As a result, the United States has enough generation to power these buses. However, the main challenge will be to ensure that localities and each transit agency has access to this power capacity.

The amount of power that a fleet draws from the grid depends on the size of the fleet. The average battery electric bus is expected to have a power demand of approximately 51 kW, assuming a 7-hour charging time. Table 11 below outlines the expected power demand for various fleet sizes of battery electric buses:

Table 11: BEB Fleet Power Demand

Electric					
Fleet Size	kWh/bus	utilized capacity	Time to charge (hours)	Peak in MW	
50	450		80%	7	2.57
100	450		80%	7	5.14
250	450		80%	7	12.86

⁸ American Public Transportation Association. (2019). “Public Transit Leading in Transition to Clean Technology.” Available at: https://www.apta.com/wp-content/uploads/Public_Transit_Leading_In_Transition_To_Clean_Technology.pdf

⁹ US Energy Information Administration. “Total Electric Power Industry Summary Statistics, 2019 and 2018.” Available at: https://www.eia.gov/electricity/annual/html/epa_01_01.html

¹⁰ US Energy Information Administration. “Electricity explained: Electricity generation, capacity, and sales in the United States.” Available at: <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php#:~:text=At%20the%20end%20of%202019,solar%20photovoltaic%20electricity%20generating%20capacity.>

The power demand for a fuel cell electric bus fleet mainly comes from the compression and dispensing of hydrogen to the buses. Table 12: FCEB Fleet Power Demand outlines the expected power demand for various sizes of fuel cell electric bus fleets:

Table 12: FCEB Fleet Power Demand

Hydrogen				
Number of buses	kg/day	kWh/kg for Compression*	time available to compress and fill	Peak MW
50	30	3.1	7	0.66
100	30	3.1	7	1.33
250	30	3.1	7	3.32

Figure 19 compares the power demand between BEB and FCEB fleets for various fleet sizes. BEB fleets draw much more power than FCEB fleets and as a result, have more impact on the grid.

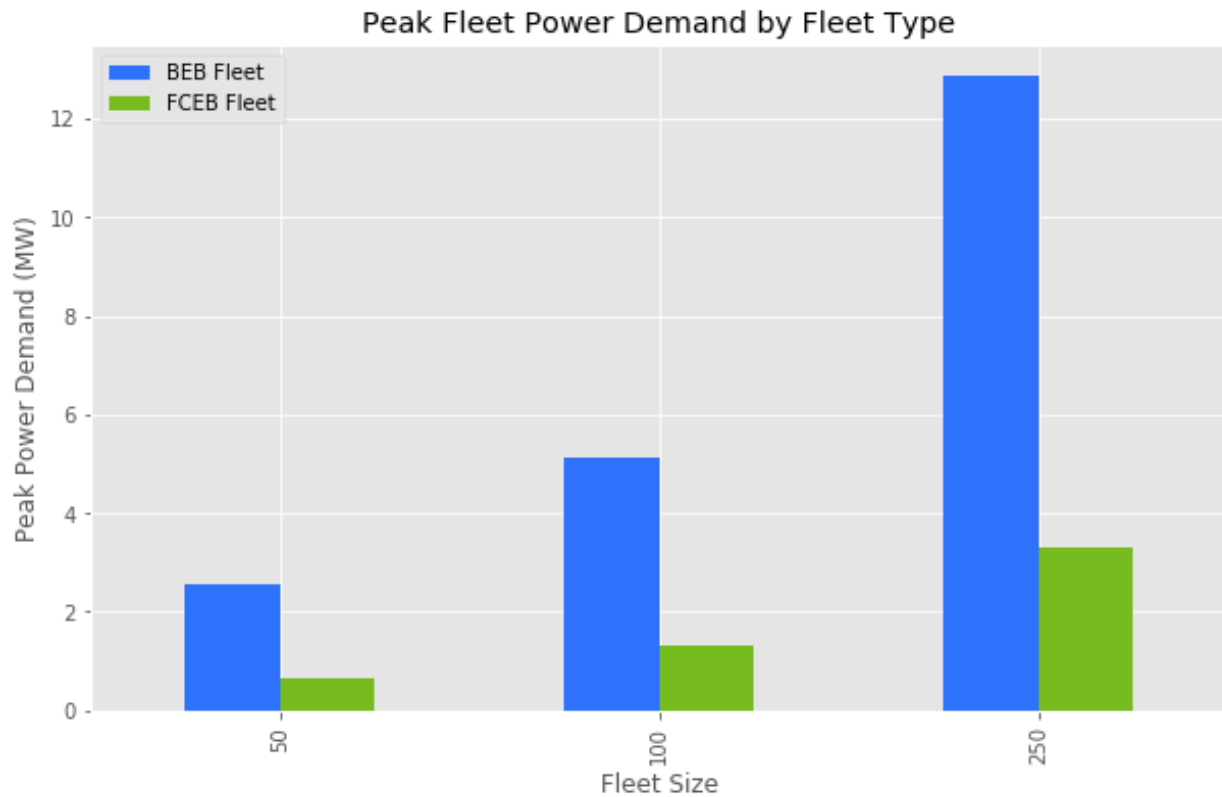


Figure 18: Peak Fleet Power Demand

References

1. American Public Transportation Association (APTA). (2019). "Public Transit Leading in Transition to Clean Technology." Retrieved December 12, 2020, from https://www.apta.com/wp-content/uploads/Public_Transit_Leading_In_Transition_To_Clean_Technology.pdf
2. California Air Resources Board. (2016). Retrieved December 4, 2020. "Transit Agency Survey Preliminary Results." ACT Workgroup Meeting. Available at: https://ww3.arb.ca.gov/msprog/bus/transit_survey_summary.pdf
3. California Air Resources Board. (2020, July 15). Retrieved December 1, 2020, Available at: <https://ww2.arb.ca.gov/news/15-states-and-district-columbia-join-forces-accelerate-bus-and-truck-electrification>
4. California Air Resources Board. (2019, June 19). Retrieved December 8, 2020, from <https://ww2.arb.ca.gov/news/california-air-resources-board-approves-comprehensive-effort-clean-airport-shuttles>
5. Federal Transit Administration. 2018 Annual Database Revenue Vehicle Inventory. Available at: <https://www.transit.dot.gov/ntd/data-product/2018-annual-database-revenue-vehicle-inventory>
6. US Energy Information Administration. "Electricity explained: Electricity generation, capacity, and sales in the United States." Available at: <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php#:~:text=At%20the%20end%20of%202019,solar%20photovoltaic%20electricity%20generating%20capacity>
7. US Energy Information Administration. "Total Electric Power Industry Summary Statistics, 2019 and 2018." Available at: https://www.eia.gov/electricity/annual/html/epa_01_01.html
8. Zero-Emission Vehicles: Our Platform - Canada. (2020). Retrieved December 8, 2020, from <https://liberal.ca/our-platform/zero-emission-vehicles/>

Appendix A: Transit Properties with Battery Electric or Fuel Cell Transit Buses

Total # of Transit Agencies = 229

The following chart lists all of the transit agencies in the United States have deployed or purchased ZEBs. Transit agencies that have ordered ZEBs but are not yet in physical possession of them are included in this chart.

#	State	Transit Agency
1.	AL	Alabama A&M University
2.	AL	Birmingham-Jefferson County Transit Authority (BJCTA MAX)
3.	AK	Alaska Department of Transportation & Public Facilities
4.	AK	City and Borough of Juneau (Capital Transit)
5.	AZ	City of Tucson (SunTran)
6.	CA	Airline Coach Services
7.	CA	Alameda-Contra Costa Transit District (AC Transit)
8.	CA	Anaheim Resort Transportation
9.	CA	Anteater Express (University of California, Irvine)
10.	CA	Arvin Transit
11.	CA	Antelope Valley Transit Authority (AVTA)
12.	CA	Big Blue Bus
13.	CA	Bruin Bus (University of California, Los Angeles)
14.	CA	Butte Regional Transit (BCAG)
15.	CA	California State University Fresno
16.	CA	Central Contra Costa Transit Authority (CCTA / County Connection)
17.	CA	City of San Jose
18.	CA	Culver City Bus
19.	CA	Fairfield and Suisun Transit (FAST)
20.	CA	Foothill Transit
21.	CA	Fresno Area Express (FAX)
22.	CA	Fresno County Rural Transit
23.	CA	Golden Empire Transit District (GETbus)
24.	CA	Gardena Transit (GTrans)
25.	CA	Humboldt Transit Authority
26.	CA	Lake Transit Authority
27.	CA	Los Angeles County Metropolitan Transportation Authority (LA Metro)
28.	CA	Los Angeles Department of Transportation (LADOT)
29.	CA	Long Beach Transit
30.	CA	Marguerite (Stanford University)

#	State	Transit Agency
31.	CA	Marin Transit
32.	CA	Merced County (TJPAMC)
33.	CA	Modesto Transit
34.	CA	Montebello Transit
35.	CA	Monterey-Salinas Transit
36.	CA	Napa Valley Transportation Authority
37.	CA	North County Transit District
38.	CA	Norwalk Transit System
39.	CA	Orange County Transportation Authority (OCTA)
40.	CA	Porterville Transit
41.	CA	Redding Area Bus Authority
42.	CA	Roseville Transit
43.	CA	Sacramento Regional Transit District (SacRTD and Yolo County Transit – Yolo Bus)
44.	CA	San Diego Metropolitan Transit System (San Diego MTS)
45.	CA	San Francisco Municipal Transportation Agency (SF Muni)
46.	CA	San Joaquin Regional Transit District (SJRTD)
47.	CA	San Mateo County Transit District (SamTrans)
48.	CA	Santa Barbara Metropolitan Transit District (SBMTD)
49.	CA	Santa Clara Valley Transportation Authority (Santa Clara VTA)
50.	CA	Santa Cruz Metropolitan Transit Districts
51.	CA	Santa Monica Big Blue Bus (BBB)
52.	CA	Santa Rosa City Bus
53.	CA	Solano County Transit
54.	CA	Sonoma County Transit
55.	CA	SunLine Transit
56.	CA	Tri Delta Transit (Antioch Transit/Eastern Contra Costa Transit Authority)
57.	CA	Unitrans (UC Davis)
58.	CA	University of California, Irvine (UCI)
59.	CA	University of California, San Francisco (UCSF)
60.	CA	Victor Valley Transit Authority
61.	CA	Yosemite National Park
62.	CA	Visalia Transit
63.	CO	Avon Transit
64.	CO	City of Boulder (GoBoulder)
65.	CO	City of Colorado Springs (Mountain Metro Transit)
66.	CO	Eagle County Transit (ECO Transit)
67.	CO	Estes Park Transit
68.	CO	City of Fort Collins (Transfort)

#	State	Transit Agency
69.	CO	Denver Regional Transportation District (RTD)
70.	CO	Roaring Fork Transportation Authority (RFTA)
71.	CO	State of Colorado Department of Transportation
72.	CO	Summit Stage (Summit County)
73.	CO	Town of Breckenridge
74.	CO	Town of Vail
75.	CO	Via Transit
76.	CT	Connecticut Department of Transportation
77.	CT	Windham Regional Transit District
78.	CT	Greater Bridgeport Transit (GBT)
79.	CT	Yale University
80.	DC	Washington Metropolitan Area Transportation Authority and District Transportation Authority (WMATA and DCDOT)
81.	DE	Delaware Transit Corporation
82.	FL	Broward County
83.	FL	Star Metro - City of Tallahassee
84.	FL	Gainesville RTS
85.	FL	Hillsborough Area Regional Transit Authority (HART)
86.	FL	Jacksonville Transportation Authority
87.	FL	Central Florida Regional Transportation Authority (LYNX)
88.	FL	Miami-Dade County Transit
89.	FL	Pinellas Suncoast Transit Authority
90.	GA	Chatham Area Transit Authority
91.	GA	Macon – Bibb County Transit Authority - Georgia Department of Transportation
92.	GA	Metropolitan Atlanta Rapid Transit Authority (MARTA)
93.	GA	University of Georgia (UGA)
94.	HI	County of Hawaii (Hele-On)
95.	HI	City and County of Honolulu
96.	HI	State of Hawaii Department of Transportation
97.	IA	Iowa State University (CyRide)
98.	IA	Des Moines Area Regional Transit Authority (DART)
99.	IA	Iowa City Transit
100.	ID	Mountain Rides Transit Authority
101.	ID	Valley Regional Transit
102.	IL	Bloomington-Normal Public Transit System
103.	IL	Champaign-Urbana Mass Transit
104.	IL	Chicago Transit Authority (CTA)
105.	IL	Greater Peoria Mass Transit District
106.	IL	JLL

#	State	Transit Agency
107.	IL	Quad Cities Metrolink
108.	IN	Fort Wayne Public Transit
109.	IN	Gary Public Transit Corporation
110.	IN	Bloomington Public Transportation Corporation
111.	IN	Indianapolis Public Transportation Authority - IndyGo
112.	KS	City of Wichita (Wichita Transit)
113.	KS	Lawrence Transit
114.	KY	City of Owensboro (Owensboro Transit)
115.	KY	Lextrans
116.	KY	Transit Authority of River City (TARC)
117.	MA	Martha's Vineyard Transit Authority
118.	MA	Massachusetts Bay Transportation Authority (MBTA)
119.	MA	MetroWest Regional Transit Authority (MWRTA)
120.	MA	Pioneer Valley Transit Authority
121.	MA	Worcester Regional Transit Authority
122.	MD	Maryland Department of Transportation
123.	MD	Montgomery County, Maryland
124.	MD	Prince George's County
125.	MD	Regional Transportation Agency
126.	MD	TransIT (Frederick County)
127.	MI	Blue Water Area Transportation Commission
128.	MI	Capital Area Transit Authority
129.	MI	Flint Mass Transportation Authority
130.	MI	Detroit Department of Transportation/SMART
131.	MI	Huron Transit
132.	MI	Michigan Department of Transportation (Benzie Transit)
133.	MN	City of Rochester
134.	MN	Duluth Transit Authority
135.	MN	Metro Transit
136.	MO	City of Columbia
137.	MO	St Louis Metro Transit
138.	MS	Coast Transit Authority
139.	MT	Missoula Urban Transportation District
140.	MT	University of Montana
141.	NC	Chapel Hill Transit
142.	NC	Charlotte Area Transit System
143.	NC	City of Asheville
144.	NC	City of Durham
145.	NC	Duke University
146.	NC	Greensboro Transit Authority

#	State	Transit Agency
147.	NC	GoRaleigh
148.	NC	Research Triangle Regional Public Transportation Authority (GoTriangle)
149.	NE	City of Lincoln (StarTran)
150.	NE	Omaha Metro
151.	NJ	Academy Express LLC
152.	NJ	New Jersey Transit
153.	NM	Atomic City Transit
154.	NM	Albuquerque Rapid Transit
155.	NM	ABQ Ride
156.	NM	City of Las Cruces
157.	NM	North Central Regional Transit District
158.	NV	Regional Transportation of Washoe County
159.	NV	Tahoe Transportation District
160.	NV	Washoe Regional Transportation District
161.	NY	Capital District Transportation Authority
162.	NY	Columbia University
163.	NY	Niagara Frontier Transportation Authority
164.	NY	New York City Metropolitan Transit Authority (MTA)
165.	NY	Port Authority of NY and NJ
166.	NY	Rochester Genesee Regional Transportation Authority
167.	NY	Suffolk County Transit
168.	NY	Tompkins Consolidated Area Transit
169.	NY	Westchester County Department of Transportation
170.	OH	Central Ohio Transit Authority (COTA)
171.	OH	Metro RTA
172.	OH	Laketran
173.	OH	Stark Area Regional Transit Authority (SARTA)
174.	OH	Toledo Area Rapid Transit (TARTA)
175.	OK	Central Oklahoma Transportation and Parking Authority (Embark)
176.	OK	Cherokee Nation
177.	OR	City of Wilsonville, Oregon
178.	OR	Lane Transit District (LTD)
179.	OR	Salem Mass Transit District
180.	OR	TriMet
181.	PA	Berks Area Regional Transit Authority (BARTA)
182.	PA	Port Authority of Allegheny County (PAAC)
183.	PA	Southeastern Pennsylvania Transportation Authority (SEPTA)
184.	RI	Rhode Island Public Transit Authority
185.	SC	Berkeley-Charleston Dorchester Council of Government

#	State	Transit Agency
186.	SC	Charleston Area Regional Transportation Authority
187.	SC	City of Rock Hill
188.	SC	City of Seneca and Oconee County
189.	SC	Clemson Area Transit
190.	SC	Greenville Transit Authority (GreenLink)
191.	TN	Chattanooga Area Regional Transportation Authority
192.	TN	Memphis Area Transit
193.	TN	Nashville Metropolitan Transit Authority (Nashville MTA)
194.	TX	Capital Metropolitan Transportation Authority
195.	TX	City of Lubbock/Citibus
196.	TX	City of McAllen
197.	TX	Dallas Area Rapid Transit Authority (DART)
198.	TX	Port Arthur Transit
199.	TX	VIA Metropolitan Transit
200.	UT	Park City Transit
201.	UT	Utah Transit Authority (UTA)
202.	VA	Alexandria (DASH)
203.	VA	Blacksburg Transit
204.	VA	Hampton Roads Transit
205.	VT	Green Mountain Transit
206.	VT	Marble Valley Regional Transit District (VEIC)
207.	VT	Vermont Agency of Transportation
208.	WA	Ben Franklin Transit (BFT)
209.	WA	Chelan Douglas Public Transportation Benefit Area
210.	WA	Clark County Public Transit Benefit Area Authority (C-Tran)
211.	WA	Everett Transit
212.	WA	Grant Transit Authority
213.	WA	King County Metro
214.	WA	Kitsap Transit
215.	WA	Link Transit
216.	WA	Metro Transit
217.	WA	Pierce Transit
218.	WA	Spokane Transit (STA)
219.	WA	Valley Transit
220.	WA	Whatcom Transportation Authority
221.	WI	City of Madison
222.	WI	City of La Crosse
223.	WI	City of Merrill
224.	WI	Dunn County Transit
225.	WI	Milwaukee County Department of Transportation

#	State	Transit Agency
226.	WI	Wisconsin Department of Transportation (WDOT)
227.	WI	City of Racine (Racine Transit)
228.	WY	Southern Teton Area Rapid Transit
229.	GU	Guam Regional Transit Authority

Appendix B: State-by-State Active U.S. Zero-Emissions Transit Buses

Total = 1016¹¹

The following chart provides a state-by-state breakdown of the number of active zero-emission transit buses. Active buses are those that have been delivered and are in the physical possession of the transit agency.

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
Alabama	AL	0	0	0
Alaska	AK	0	0	0
Arizona	AZ	0	0	0
Arkansas	AR	0	0	0
California	CA	452	72	524
Colorado	CO	44	0	44
Connecticut	CT	12	0	12
Delaware	DE	0	0	0
District of Columbia	DC	15	0	15
Florida	FL	31	0	31
Georgia	GA	2	0	2
Hawaii	HI	0	0	0
Idaho	ID	0	0	0
Illinois	IL	40	2	42
Indiana	IN	21	0	21
Iowa	IA	0	0	0
Kansas	KS	0	0	0
Kentucky	KY	21	0	21
Louisiana	LA	0	0	0
Maine	ME	0	0	0
Maryland	MD	4	0	4
Massachusetts	MA	0	0	0
Michigan	MI	0	2	2
Minnesota	MN	16	0	16
Mississippi	MS	0	0	0
Missouri	MO	18	0	18
Montana	MT	8	0	8

¹¹ This number is derived from a combination of data from the 2020 APTA Fact Book, CALSTART internal tracking of ZEBs since 2016, and total HVIP Vouchers redeemed

State		Battery Electric Buses	Fuel Cell Buses	Total Zero-emission Buses
Nebraska	NE	0	0	0
Nevada	NV	21	0	21
New Hampshire	NH	0	0	0
New Jersey	NJ	0	0	0
New Mexico	NM	18	0	18
New York	NY	29	0	29
North Carolina	NC	23	0	23
North Dakota	ND	0	0	0
Ohio	OH	0	7	7
Oklahoma	OK	1	0	1
Oregon	OR	5	0	5
Pennsylvania	PA	29	0	29
Rhode Island	RI	0	0	0
South Carolina	SC	14	0	14
South Dakota	SD	0	0	0
Tennessee	TN	32	0	32
Texas	TX	22	0	22
Utah	UT	3	0	3
Vermont	VT	0	0	0
Virginia	VA	5	0	5
Washington	WA	47	0	47
West Virginia	WV	0	0	0
Wisconsin	WI	0	0	0
Wyoming	WY	0	0	0
Total		933	83	1016

Appendix C: Transit Properties with Active Battery Electric or Fuel Cell Transit Buses

The following chart lists the transit agencies that have active ZEB deployments.

#	State	Transit Agency
1.	CA	Alameda-Contra Costa Transit District (AC Transit)
2.	CA	Anaheim Resort Transportation
3.	CA	Antelope Valley Transit Authority (AVTA)
4.	CA	Central Contra Costa Transit Authority (CCTA / County Connection)
5.	CA	Culver City Bus
6.	CA	Foothill Transit
7.	CA	Golden Empire Transit District (GETbus)
8.	CA	Gardena Transit (GTrans)
9.	CA	Los Angeles County Metropolitan Transportation Authority (LA Metro)
10.	CA	Long Beach Transit
11.	CA	Montebello Transit
12.	CA	Monterey-Salinas Transit
13.	CA	Orange County Transportation Authority (OCTA)
14.	CA	Sacramento Regional Transit District (SacRTD and Yolo County Transit – Yolo Bus)
15.	CA	San Diego Metropolitan Transit System (San Diego MTS)
16.	CA	San Francisco Municipal Transportation Agency (SF Muni)
17.	CA	San Joaquin Regional Transit District
18.	CA	Santa Barbara Metropolitan Transit District
19.	CA	Santa Clara Valley Transportation Authority (VTA)
20.	CA	Santa Cruz Metropolitan Transit Districts
21.	CA	Solano County Transit
22.	CA	SunLine Transit
23.	CA	Tri Delta Transit (Antioch Transit/Eastern Contra Costa Transit Authority)
24.	CA	Victor Valley Transit Authority
25.	CA	Yosemite National Park
26.	CA	Visalia Transit
27.	CA	We Drive U, Inc.
28.	CO	Denver RTD
29.	CO	Roaring Fork Transportation Authority (RFTA)

#	State	Transit Agency
30.	CT	CTtransit - Connecticut Department of Transportation
31.	DC	DC Circulator
32.	DE	Delaware Transit Corporation
33.	FL	Broward County
34.	FL	Star Metro - City of Tallahassee
35.	FL	Gainesville RTS
36.	FL	Hillsborough Area Regional Transit Authority (HART)
37.	FL	Jacksonville Transportation Authority
38.	FL	Central Florida Regional Transportation Authority (LYNX)
39.	FL	Miami-Dade County Transit
40.	FL	Pinellas Suncoast Transit Authority
41.	FL	StarMetro – City of Tallahassee
42.	GA	Chatham Area Transit Authority
43.	GA	Georgia Department of Transportation
44.	GA	Metropolitan Atlanta Rapid Transit Authority (MARTA)
45.	GA	University of Georgia
46.	HI	County of Hawaii (Hele-On)
47.	HI	City and County of Honolulu
48.	HI	Daniel K. Inouye International Airport
49.	HI	JTB Hawaii
50.	HI	State of Hawaii Department of Transportation
51.	IA	CyRide - Iowa State University
52.	IA	Des Moines Area Regional Transit Authority (DART)
53.	ID	Mountain Rides Transportation Authority
54.	ID	Valley Regional Transit
55.	IL	601 W Companies, LLC
56.	IL	Bloomington-Normal Public Transit System
57.	IL	Champaign-Urbana Mass Transit
58.	IL	Chicago Transit Authority
59.	IL	Greater Peoria Mass Transit District
60.	IL	JLL
61.	IL	Quad Cities Metrolink
62.	IL	SL PRU, LLC
63.	IN	Bloomington Public Transportation Corporation
64.	IN	Indianapolis Airport
65.	IN	IndyGo
66.	KS	City of Wichita (Wichita Transit)
67.	KS	Lawrence Transit
68.	KS	Topeka Metro

#	State	Transit Agency
69.	KY	City of Owensboro (Owensboro Transit)
70.	KY	Lextrans
71.	KY	Transit Authority of River City (TARC)
72.	LA	Capital Area Transit Systems (CATS)
73.	LA	City of Shreveport
74.	LA	Lafayette City-Parish Consolidated Government
75.	MA	Martha's Vineyard Transit Authority
76.	MA	Massachusetts Bay Transportation Authority (MBTA)
77.	MA	MetroWest Regional Transit Authority (MWRTA)
78.	MA	Pioneer Valley Transit Authority
79.	MA	Worcester Regional Transit Authority
80.	MD	Maryland Department of Transportation
81.	MD	Montgomery County, Maryland
82.	MD	Prince George's County
83.	MD	Regional Transportation Agency
84.	MD	TransIT (Frederick County)
85.	MI	Capital Area Transit Authority (CATS)
86.	MI	Blue Water Area Transportation Commission
87.	MI	Detroit Department of Transportation/SMART
88.	MI	Flint Mass Transportation Authority
89.	MN	City of Rochester
90.	MN	Duluth Transit Authority
91.	MN	Metro Transit
92.	MO	St Louis Metro Transit
93.	MT	Missoula Urban Transportation District
94.	MT	University of Montana
95.	NC	Greensboro Transit Authority
96.	NC	Raleigh-Durham International Airport
97.	NC	GoRaleigh
98.	NC	Research Triangle Regional Public Transportation Authority (GoTriangle)
99.	NJ	Academy Express LLC
100.	NJ	New Jersey Transit (NJ Transit)
101.	NM	ABQ Ride
102.	NV	Washoe Regional Transportation District
103.	NY	Capital District Transportation Authority
104.	NY	New York City Metropolitan Transit Authority (MTA)
105.	NY	Rochester Genesee Regional Transportation Authority
106.	OH	Stark Area Regional Transit Authority (SARTA)

#	State	Transit Agency
107.	OK	Central Oklahoma Transportation and Parking Authority (Embark)
108.	OR	TriMet
109.	PA	Port Authority of Allegheny County (PAAC)
110.	PA	Southeastern Pennsylvania Transportation Authority (SEPTA)
111.	SC	Clemson Area Transit
112.	SC	Greenville Transit Authority
113.	TN	Metropolitan Transit Authority
114.	TX	Capital Metropolitan Transportation Authority
115.	TX	Dallas Area Rapid Transit Authority (DART)
116.	TX	VIA Metropolitan Transit
117.	UT	Utah Transit Authority (UTA)
118.	VA	Blacksburg Transit
119.	WA	Chelan Douglas Public Transportation Benefit Area
120.	WA	King County Metro
121.	WA	Kitsap Transit
122.	WA	Pierce Transit