Zero Emission Trucks & Buses Real Now, More Coming: First Success Markets, Timing, Pathways

Available Now

- BEV Shuttle, School Bus
- FCEV Transit Bus
- BEV Delivery
- BEV, PHEV & EV XR*
- ZEV Hostlers
- CHE
- EV, PHEV & EV XR*
- BEV/PHEV/FCEV Harbor Craft
- EV, PHEV & EV XR* Drayage

Available Soon

- BEV/PHEV/FCEV M/HD Delivery
- ZEV (BEV/FCEV), PHEV & EV XR* Regional HD
- Toward 250-500 mile HD cargo haul (battery/fast charge, fuel cell or extended range)

Coming 2022?

- Demo Now; Coming 2020?
- Demo Now; 2019 Europe; 2021 NA?

2018 2019 2020 2021 2022
Gigafactory Capacity Expanding

Source: Bloomberg New Energy Finance, 2017

ZE TECH IS RAPIDLY IMPROVING, DRIVEN BY INVESTMENTS, REDUCTIONS IN BATTERY COST AND BUSINESS CASE
ELECTRIC TECHNOLOGY IS HIGHLY TRANSFERABLE, SPEEDING PRODUCTION OF MULTIPLE VEHICLE TYPES

BYD energy storage modules transferable across range of bus, truck and grid backup applications. Inverters, controllers and voltage distribution units have a high degree of transferability between bus and truck platforms.

- Volvo electric truck based off core bus electric powertrain
- Same power train in autonomous electric dump truck, marine system

... inverters, controllers and voltage distribution units have a high degree of transferability between bus and truck platforms...
FIRST MOVER REGIONS WITH POTENTIAL FOR CONCURRENT MHDEV LAUNCHES

DRIVING GLOBAL VOLUMES FOR COMMON SUPPLY CHAIN, PRODUCTS

The Strategy: Target the right vehicles for first-market success, in the right order for sustainable industry growth, in the right regions embracing and supporting change. Collaboration and concurrent action is key to success and needed volumes. The result can be viable products by 2025 in all segments.
## Pledge Partners (to Date)

### Government
- Government of Canada
- Province of British Columbia
- California Air Resources Board
- California Energy Commission
- South Coast Air Quality Management District
- Bay Area Air Quality Management District
- Los Angeles Department of Transportation
- Foothill Transit
- Chile Sustainable Energy Agency

### Cities
- Los Angeles - Mayor Eric Garcetti
- New York - GCAS
- Oslo - Governing Mayor Raymond Johansen
- Sacramento - Mayor Darrell Steinberg
- Stockton - Mayor Michael D. Tubbs
- Helmond, The Netherlands
- Vancouver, B.C.

### Industry (Manufacturers, Fleets, Organizations)
- Auto Research Institute
- AxleTech
- BAE Systems
- Ballard Power Systems
- BYD
- Chanje Energy
- Effenco
- Lightning Systems
- Mayor USA
- Mitsubishi Fuso Truck
- Motiv Power Systems
- New Flyer Industries
- Orange EV
- Prospect Silicon Valley
- Proterra
- Ryder
- Siemens
- The Lion Electric Co.
- Southern California Edison
- TransPower
- Unique Electrical Solutions LLC
- US Hybrid
- Viatec
- West Valley Construction Company
- Workhorse
- XL
- Coast to Coast Smart e-Mobility
- Zenith Motors

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**The Pledge:** Cities, governments, manufacturers, fleets and fuel suppliers agree to work together to accelerate the early first-success markets for zero- and near-zero emission trucks, buses and equipment.
Create Regional “Ecosystems” Supporting Success

- Clear Policy Signals and Investments to Spur Demand
- Reduce High Initial Cost of Vehicles
- Build Out Infrastructure for Scale and Capacity
- Maintain Pipeline of Tech Innovations
- Support Fleet Transition—Decisions Tools, Case Studies
POLICIES AND ACTIONS TO PROMOTE THE UPTAKE OF ZECEVS

Government intervention to foster and develop a ZECEV market can take many forms. Exclusion zones with exceptions for ZECEVs create market signals for vehicle manufacturers to meet vehicles that meet zero-emission goals, regulations to improve vehicle and fuel performance can incentivize manufacturers to create zero-emission vehicles and fuels, and electric utilities may be permitted or obligated to advance commercial vehicle infrastructure availability. These policies, regulations, and actions and others are currently being implemented or are under development.

Exclusion Zones: Ports

Given the sheer volume of goods and people in transit every day, ports (including shipping and airports) can be hotbeds for air pollution and greenhouse gas emissions. The need to reduce emissions from the commercial vehicles that service ships and planes and transport goods and passengers to and from ports is recognised for the improved air quality around ports and for contributing to climate goals.

CURRENT EXAMPLES IN DEVELOPMENT

- The Port Authority of New York and New Jersey manages airports and shipping for the greater New York City area. The agency is committed to switching its transit fleet entirely to zero emissions (source link).
- The port of Rotterdam, the Netherlands, will incentives that would reduce emissions from port vehicles until the port would be entirely zero-emission by 2050 (source link).

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<th>Congestion Pricing - Gift Cards</th>
<th>Favorable Electric Rates</th>
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Primary Impact

- AQ / GHG
- ZEV Adoption
- AQ / GHG
- ZEV Adoption

Vehicle Models

- Truck: Transit Bus, School Bus, Shuttle, Off-Road
- AV: Transit Bus, School Bus, Shuttle, Off-Road

Examples - Current

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<th>NTUVP</th>
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Examples - In Development

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https://globaldrivetozero.org/resources/toolkit/
Zero-Emission Model Availability Guide

- Beta module live now
  - U.S. & Canada
- Full version Fall 2019
  - Asia
  - Europe
  - India
  - Latin America
DRIVE TO ZERO 
FOCUSES ON 
THE “HOW”

Target first-success markets where electrification works now.

Return to base, known routes, urban applications. This directly aligns with industry roadmaps.

Build supporting “ecosystems” of success in key first-mover regions made up of aligned policies, actions, incentives, infrastructure.

Work concurrently and collaboratively between regions and industry worldwide to encourage global supply chain of critical components and manufacturers.

Expand to succeeding success markets as supply chain grows and business case expands.

https://globaldrivetozero.org/
bvanamburg@calstart.org