

ZEV Transition Progress Update for ZEVTC

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Metrics of progress

Policy developments

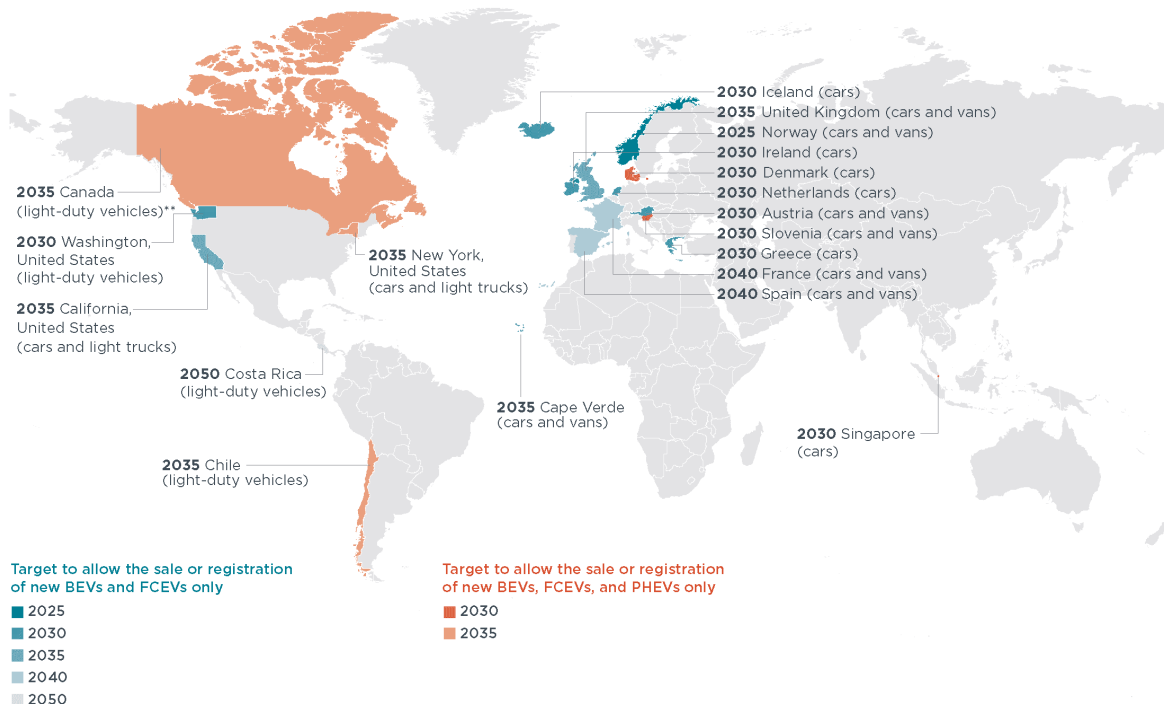
- **ICE phaseout targets** for cars, trucks, and buses
- **Zero-emission zones**
- **Supply-side ZEV regulations** for light-duty and heavy-duty vehicles
- **Demand-side ZEV regulations** for light-duty and heavy-duty vehicles
- **Efficiency and GHG standards** for light-duty and heavy-duty vehicles
- **EV charging infrastructure policies**

Market developments

- **ZEV sales and share of total sales** for light-duty and heavy-duty vehicles
- **Retail price comparison** between ZEV and ICE LDVs
- **Total cost of ownership parity projections** between ZEV and ICE HDVs
- **EV charging infrastructure statistics**

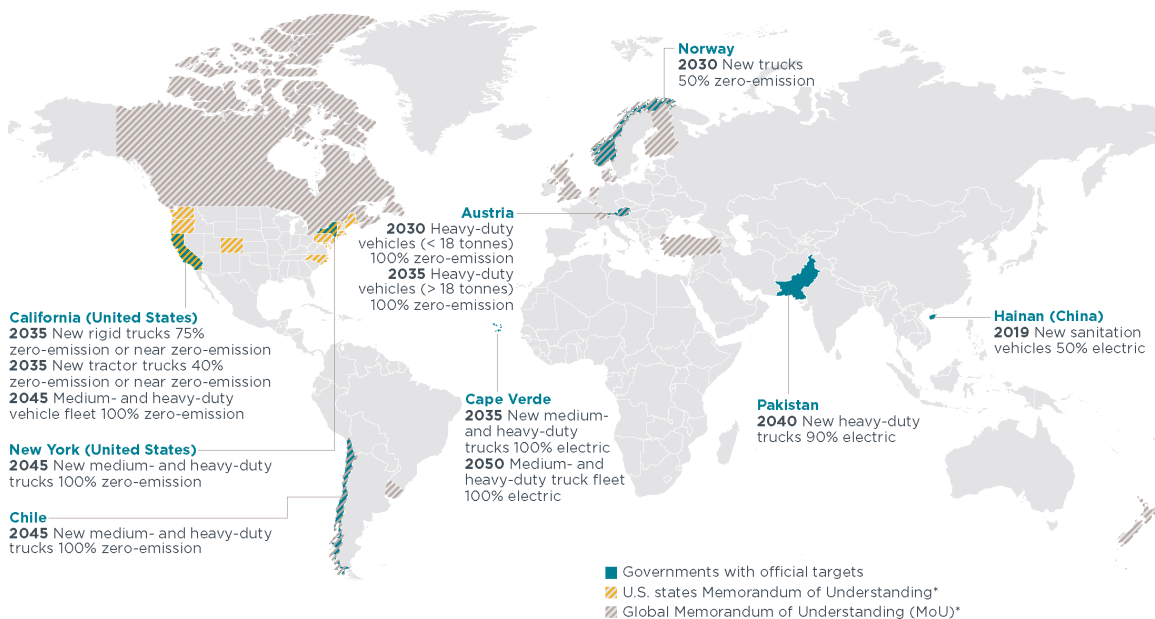
ICE phaseout targets for LDVs

Governments with official targets to 100% phase out sales or registrations of new internal combustion engine light-duty vehicles (passenger cars and vans/light trucks) by a certain date* (Status: Through March 2022)



ICE phaseout targets for trucks

Governments with targets toward phasing out sales of internal combustion engine trucks by a certain date
(Status: Through March 2022)



U.S. states Memorandum of Understanding (MoU)

California, Colorado, Connecticut, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont and Washington and the District of Columbia

2030 New medium- and heavy-duty vehicles 30% zero-emission

2050 New medium- and heavy-duty vehicles 100% zero-emission

Global Memorandum of Understanding (MoU)

Austria, Canada, Chile, Denmark, Finland, Luxembourg, Netherlands, New Zealand, Norway, Scotland, Switzerland, Turkey, United Kingdom, Uruguay, Wales

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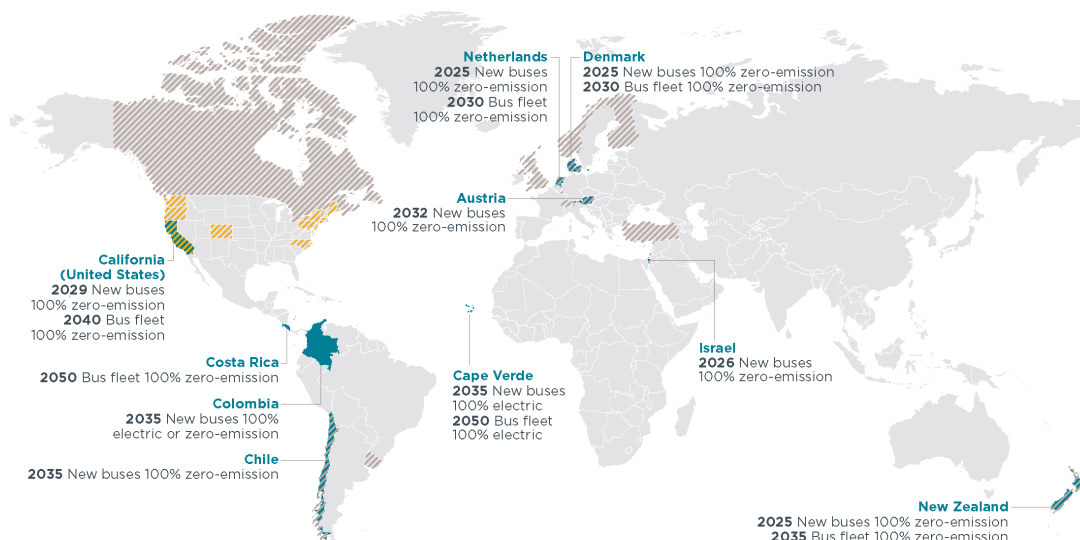
2040 New medium- and heavy-duty vehicles 100% zero-emission

Note: Governments with an at least 40% new truck sales target.

* Not necessarily yet reflected in an official national/state policy document such as a climate or transport strategy/plan, in a law, or in a similar framework.

ICE phaseout targets for buses

Governments with official targets to 100% phase out sales of internal combustion engine buses by a certain date
(Status: Through March 2022)



- Governments with official targets
- U.S. states Memorandum of Understanding (MoU)*
- Global Memorandum of Understanding (MoU)*

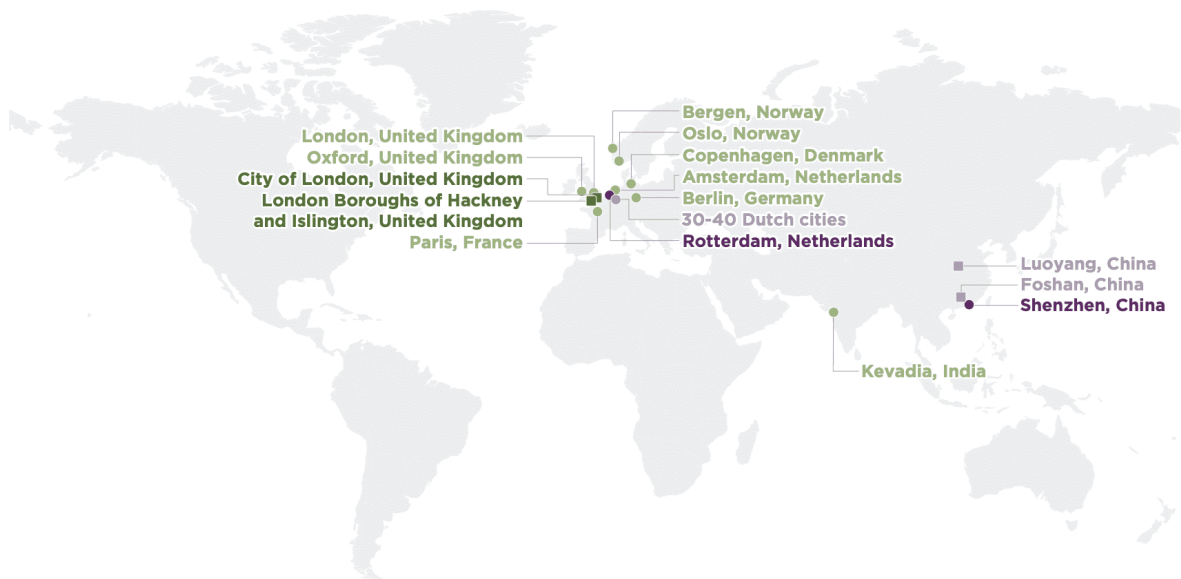
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Zero-emission zones

Cities with implemented and planned zero-emission zones and variants globally* (Status: July 2021)



	Zero-emission zone	Near-zero-emission zone		Zero-emission zone for freight	Near-zero-emission zone for freight
Implemented	—	■	Implemented	●	—
Planned	●	—	Planned	●	■

*Zero-emission zones grant unrestricted access to battery electric vehicles (BEVs) and fuel cell electric vehicles (FCEVs) only. In addition to BEVs and FCEVs, near-zero-emission zones grant unrestricted access to plug-in hybrid electric vehicles (PHEVs). Zones for freight are defined in different ways, with affected vehicles ranging from urban delivery vehicles to medium- and heavy-duty trucks. Affected areas of zones range from a few streets to an entire city.

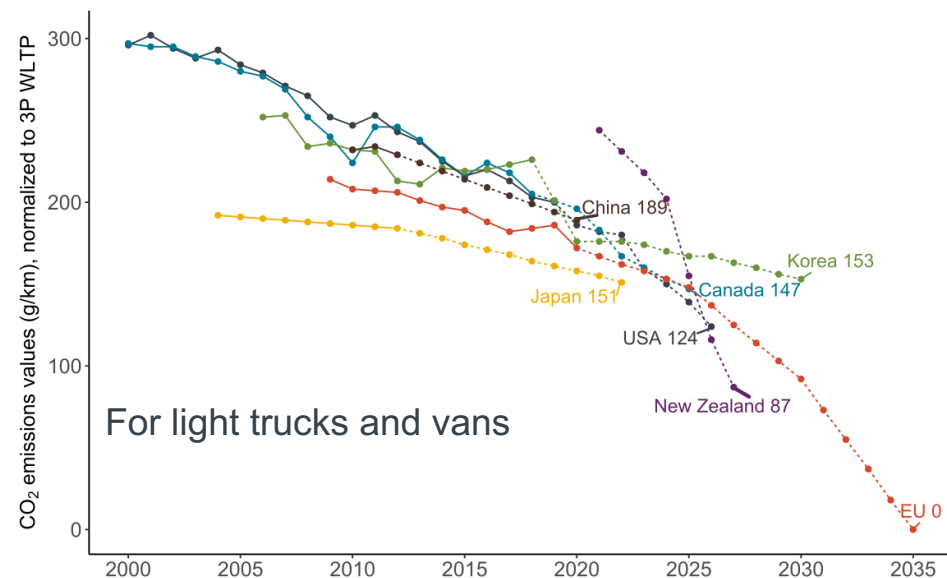
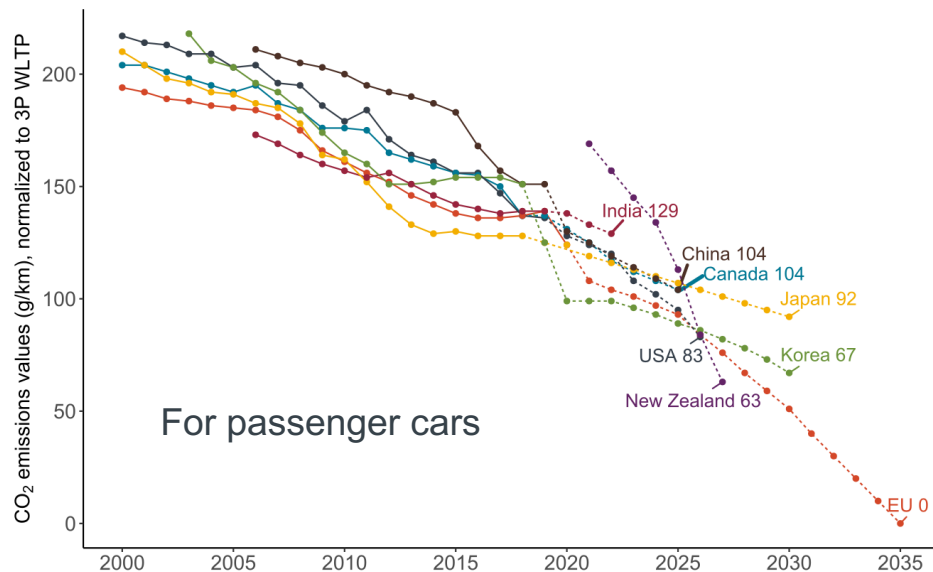
Supply-side ZEV regulations for LDVs and HDVs

Regulation	Policy summary	LDV or HDV	Final target year	Publication year	Policy status
<u>California Advanced Clean Cars I*</u>	8% EV Share of Sales	LDV	2024	2012	In Force
<u>California Advanced Clean Cars II</u>	100% EV Share of Sales; at most 20% PHEV	LDV	2035	2022	Proposed
<u>British Columbia Zero Emission Vehicles Act</u>	100% EV share of sales (10% by 2025; 30% by 2030)	LDV	2040	2019	In Force
<u>California Advanced Clean Trucks**</u>	55% ZEV share of Class 2b-3 sales; 40% ZEV share of Class 7-8 tractor sales; and 75% ZEV share of Class 4-6 and 7-8 (except tractors) sales	HDV	2035	2021	Adopted

Fleet purchase rules for LDVs and HDVs

Regulation	Fleet type	Policy target (Interim target)	Target date	Policy status
California Advanced Clean Fleets	Public Fleets	100% ZEV HDV sales (50% by 2024)	2027	Proposed
	Drayage Trucks	100% ZEV share of stock	2035	
	Priority Fleets*	100% ZEV share of stock	2035-2042	
California Innovative Clean Transit	Transit Buses	100% ZEV sales	2029	In Force
		100% ZEV share of stock	2040	
China Green Mobility Action Plan	Transit Buses	80% ZEV sales	2020	Proposed
		50% ZEV share of stock	2022	
Colombia Electric Vehicle Promotion Bill	Transit Buses	100% ZEV sales	2035	In Force
European Union Clean Vehicles Directive	Buses	33-65% ZEV Sales**	2030	In Force
	Trucks	7-15% ZEV Sales**		
Israel Public Bus Purchase Scheme	Transit Buses	100% ZEV sales	2026	Adopted
New Zealand Public Transport Decarbonization	Transit Buses	100% ZEV sales	2025	Proposed
	Transit Buses	100% ZEV share of stock	2035	

Efficiency/GHG standards for LDVs



Efficiency/GHG standards for HDVs

Market	Category	Base year	Target improvement	Target year
United States*	Class 2b-3	2018	16%	2027
	Vocational vehicles		24%	
	Tractors		30%	
European Union	Heavy trucks	2020	30%	2030
India	Buses	2018	16%	2021
	Medium-duty rigid trucks		8%	
	Heavy-duty rigid trucks		11%	
	Tractors		7%	
China	City buses	2015	16%	2020
	Coach buses		12%	
	Straight trucks		14%	
	Tractors		15%	
Japan	Transit buses	2015	13%	2025
	Medium/Heavy trucks		14%	

EV charging infrastructure policies

Market	Policy	Summary
California	Resolution E-51	Assigned responsibility to electric utilities to develop behind-the-meter infrastructure for EV charging installations
United States	Infrastructure Investment and Jobs Act	\$7.5 billion funding committed for EV charging infrastructure to install 500,000 chargers
Canada	2030 Emissions Reduction Plan	Combined commitment of C\$991 million from various governmental entities to install 50,000 new chargers
European Union	Alternative Fuels Infrastructure Regulation	Install 7 GW of public chargers by 2030, around 4 MW capacity every 60 km
France	ADVENIR Update	€320 million budget assigned to finance 100,000 chargers by 2025, further €500 million assigned for expansion
Germany	Fast Charging Infrastructure Initiative	Tenders for 1,100 locations launched as part of a €2 billion plan to install chargers with minimum output of 150 kW
United Kingdom	Electric Vehicle Infrastructure Strategy	Committed £1.6 billion to install 300,000 public chargers including 6,000 superfast chargers by 2035
India	Charging Infrastructure for Electric Vehicles	Provides a comprehensive set of charging standards for all vehicles

EV sales share for LDVs

Passenger cars

Market	2020		2021		Percentage-point change 2020–2021	
	BEV	PHEV	BEV	PHEV	BEV	PHEV
Canada	2.3%	0.8%	2.9%	1.1%	0.6%	0.3%
China	5.0%	1.2%	11.7%	2.8%	6.7%	1.6%
Denmark	7.2%	9.2%	13.3%	21.7%	6.1%	12.5%
European Union	5.2%	4.9%	9.1%	9.0%	3.9%	4.1%
France	6.7%	4.5%	9.8%	8.5%	3.1%	4.0%
Germany	6.7%	6.9%	13.6%	12.4%	6.9%	5.5%
India	0.2%	0.0%	0.5%	0.0%	0.3%	0.0%
Italy	2.3%	2.0%	4.6%	4.8%	2.3%	2.8%
Japan	1.1%	1.0%	0.5%	0.6%	-0.6%	-0.4%
Mexico	0.4%	0.1%	0.3%	0.1%	-0.1%	0.0%
Netherlands	20.5%	4.3%	19.8%	9.7%	-0.7%	5.4%
Norway	54.3%	20.4%	64.5%	21.7%	10.2%	1.3%
South Korea	2.1%	0.5%	4.8%	1.3%	2.7%	0.8%
Spain	2.0%	2.6%	2.7%	4.9%	0.7%	2.3%
Sweden	9.5%	22.5%	19.0%	25.7%	9.5%	3.2%
United Kingdom	6.6%	4.1%	11.6%	7.0%	5.0%	2.9%
United States	1.7%	0.5%	3.3%	1.2%	1.6%	0.7%

Vans

Market	2020		2021		Percentage-point change 2020–2021	
	BEV	PHEV	BEV	PHEV	BEV	PHEV
China	2.3%	0.0%	5.1%	0.0%	2.8%	0.0%
Denmark	1.5%	0.5%	4.6%	1.0%	3.1%	0.5%
European Union	2.0%	0.1%	2.9%	0.2%	0.9%	0.1%
France	2.2%	0.1%	2.8%	0.2%	0.6%	0.1%
Germany	3.2%	0.1%	4.7%	0.1%	1.5%	0.0%
Italy	1.2%	0.0%	2.1%	0.2%	0.9%	0.2%
Netherlands	2.8%	0.0%	4.6%	0.1%	1.8%	0.1%
Norway	8.0%	0.1%	16.2%	0.8%	8.2%	0.7%
Spain	1.5%	0.0%	1.9%	0.1%	0.4%	0.1%
Sweden	6.1%	0.3%	7.3%	0.2%	1.2%	-0.1%
United Kingdom	1.8%	0.5%	3.4%	0.7%	1.6%	0.2%
United States	1.2%	0.0%	1.6%	0.0%	0.4%	0.0%

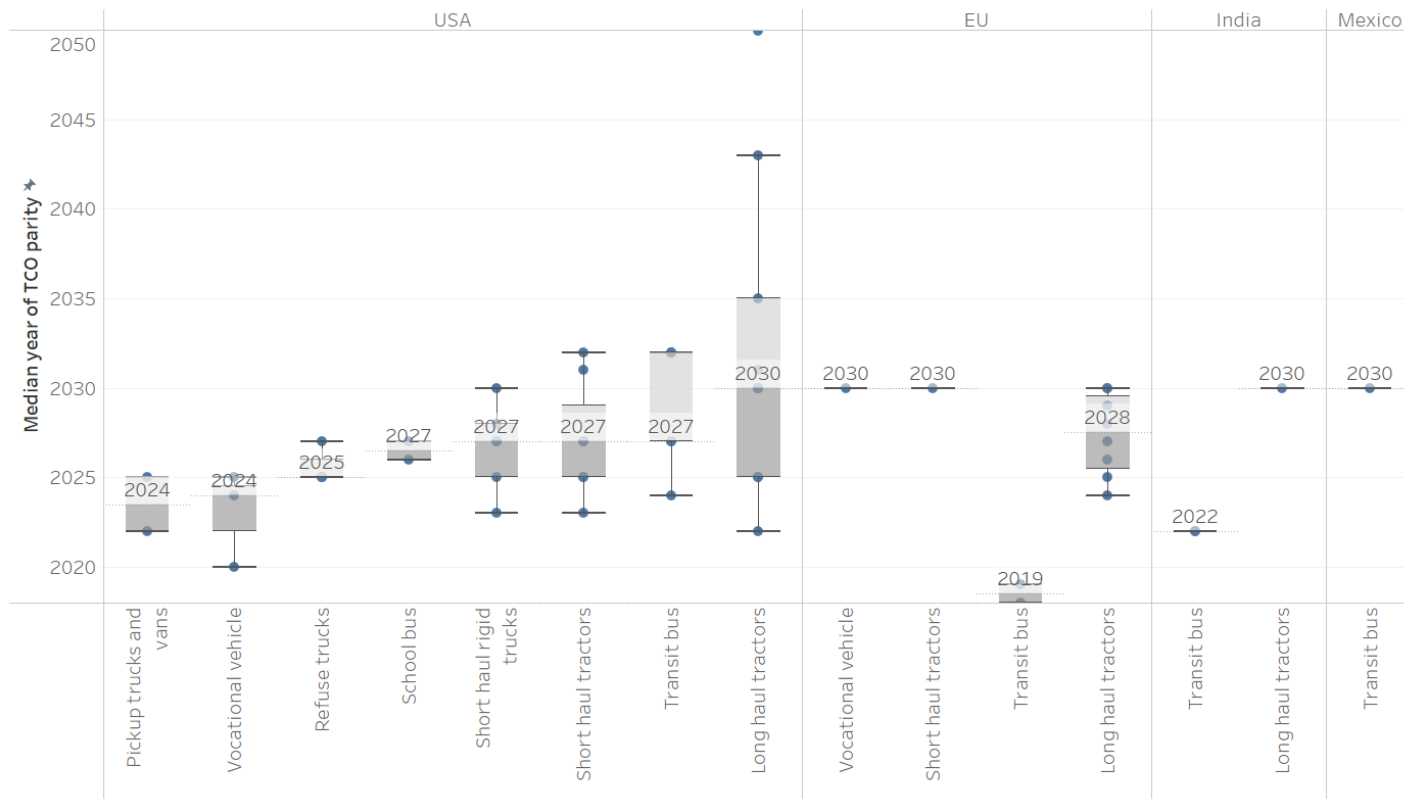
EV sales share for HDVs

Market	Medium trucks			2020 Heavy trucks			Buses		
	BEV	PHEV	EV	BEV	PHEV	EV	BEV	PHEV	EV
Canada	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%	1.7%
China	0.2%	0.0%	0.2%	1.2%	0.1%	1.3%	21.7%	1.6%	23.3%
Denmark	0.0%	0.0%	0.0%	0.4%	0.0%	0.4%	2.3%	0.0%	2.3%
European Union	3.5%	0.0%	3.5%	0.1%	0.0%	0.1%	6.1%	0.0%	6.1%
France	1.9%	0.0%	1.9%	0.0%	0.0%	0.0%	2.6%	0.0%	2.6%
Germany	6.5%	0.0%	6.5%	0.1%	0.0%	0.1%	5.9%	0.0%	5.9%
India	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.4%
Italy	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.7%	0.0%	0.7%
Japan	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Mexico	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Netherlands	3.4%	0.0%	3.4%	0.2%	0.0%	0.2%	69.4%	0.0%	69.4%
Norway	0.1%	0.0%	0.1%	0.4%	0.0%	0.4%	16.5%	0.0%	16.5%
Republic of Korea	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spain	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	1.8%	0.0%	1.8%
Sweden	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%	9.9%	0.0%	9.9%
United Kingdom	2.8%	0.0%	2.8%	0.1%	0.0%	0.1%	6.2%	0.0%	6.2%
United States	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%

Retail price comparison between top-selling ICE and equivalent BEV model for LDVs

Market	Year	Top-selling ICE passenger car model	ICE price	Equivalent BEV passenger car model	BEV price before incentives	BEV price with incentives	BEV/ICE price ratio before incentives	BEV/ICE price ratio with incentives
Germany	2021	VW Golf	\$33,708	VW ID.3	\$43,714	\$32,395	1.30	0.96
United Kingdom	2021	Vauxhall Corsa	\$27,838	Vauxhall Corsa-e	\$38,243	\$36,180	1.37	1.29
France	2021	Renault Clio	\$23,832	Renault Zoe Life	\$39,090	\$31,993	1.64	1.34
United States	2021	Toyota Camry	\$25,845	Chevrolet Bolt	\$31,500	\$31,500	1.22	1.22
Canada	2021	Honda Civic	\$22,661	Chevrolet Bolt	\$34,120	\$30,132	1.51	1.33
Japan	2021	Toyota Corolla	\$17,638	Nissan Leaf	\$30,306	\$26,479	1.72	1.50
India	2021	Tata Nexon petrol	\$10,200	Tata Nexon BEV	\$20,009	\$16,007	1.96	1.57

TCO parity projections between ZEV and ICE HDVs



EV public charging infrastructure statistics

- 2020 data were not available for California and India.
- Data labels show percent changes for values greater than 100%.
- ICCT research has found that a sustained 30% or higher annual growth rate in the number of public chargers is needed over the next decade to support ZEV uptake in line with climate goals.

Countries with 30%
growth rate for only
AC chargers

Countries with 30%
growth rate for none

