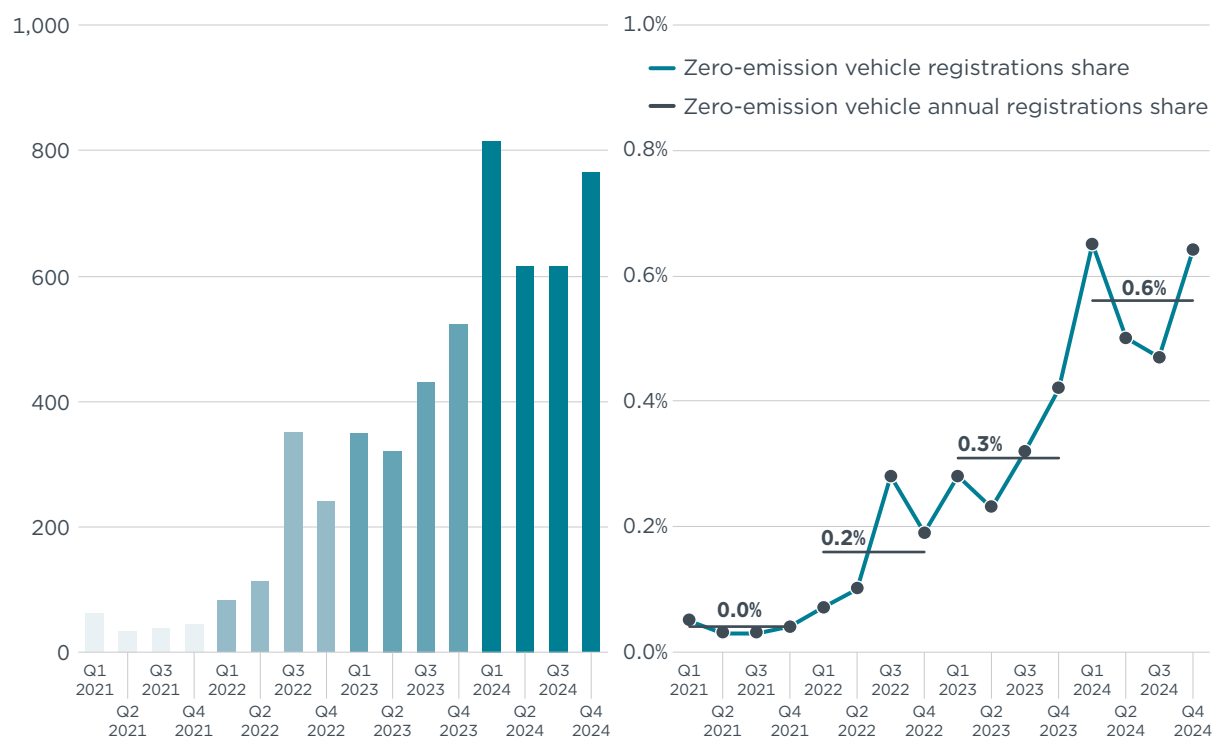


ZERO-EMISSION BUS AND TRUCK MARKET IN THE UNITED STATES (JANUARY-DECEMBER 2024)

ILMA FADHIL AND YIHAO XIE

FIGURE

Number and share of new zero-emission medium- and heavy-duty vehicle registrations, 2021-2024



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OVERVIEW

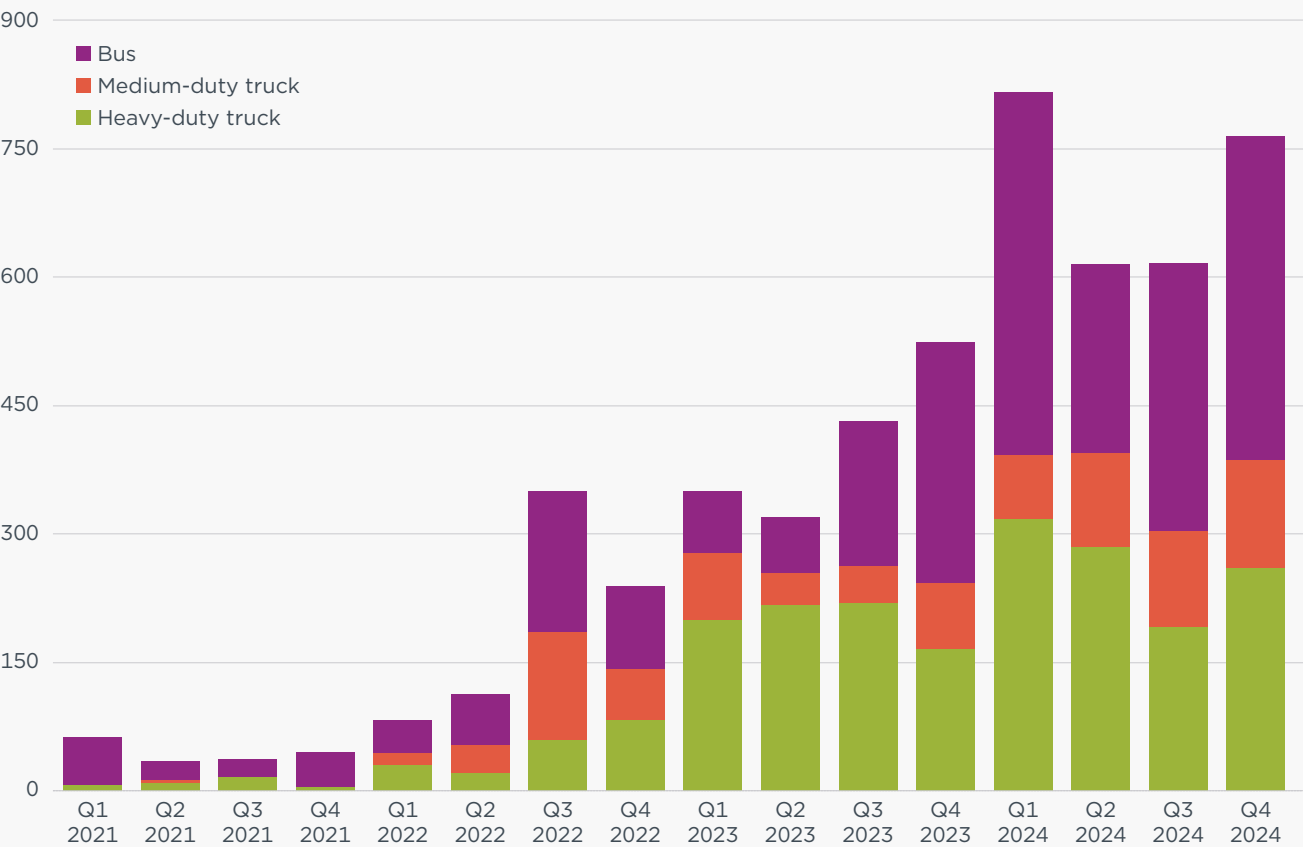
Approximately 2,810 zero-emission medium- and heavy-duty (MHD) trucks and buses were registered in the United States in 2024. Both the total registrations and the share of zero-emission MHD vehicles in 2024 surpassed the zero-emission market performance in 2023 (1,600 registrations and 0.31% zero-emission share). The registration share of zero-emission MHD vehicles continued to climb year-over-year, from approximately 0.04% in 2021, to 0.16% in 2022, to 0.31% in 2023, and to 0.56% in 2024.

ZERO-EMISSION MARKET BY VEHICLE TYPE

In all of 2024, zero-emission vehicles accounted for 7.0% of bus registrations, 0.18% of medium-duty truck registrations, and 0.40% of heavy-duty truck registrations. In the last quarter of 2024, zero-emission vehicles accounted for 8.30% of new bus registrations, 0.24% of new medium-duty truck registrations, and 0.40% of new heavy-duty truck registrations. Across all three vehicle types, Q4 2024 had higher shares of zero-emission registrations than Q4 2023, and higher zero-emission registration shares than Q3 2024.

In 2024, trucks represented 53% of zero-emission MHD vehicle registrations, and buses made up 47%. Zero-emission buses and heavy-duty trucks have comprised most zero-emission MHD vehicle registrations from 2021 to 2024, with zero-emission buses accounting for about half of the market in most quarters.

FIGURE 1.1
Number of new zero-emission medium- and heavy-duty vehicle registrations, 2021-2024



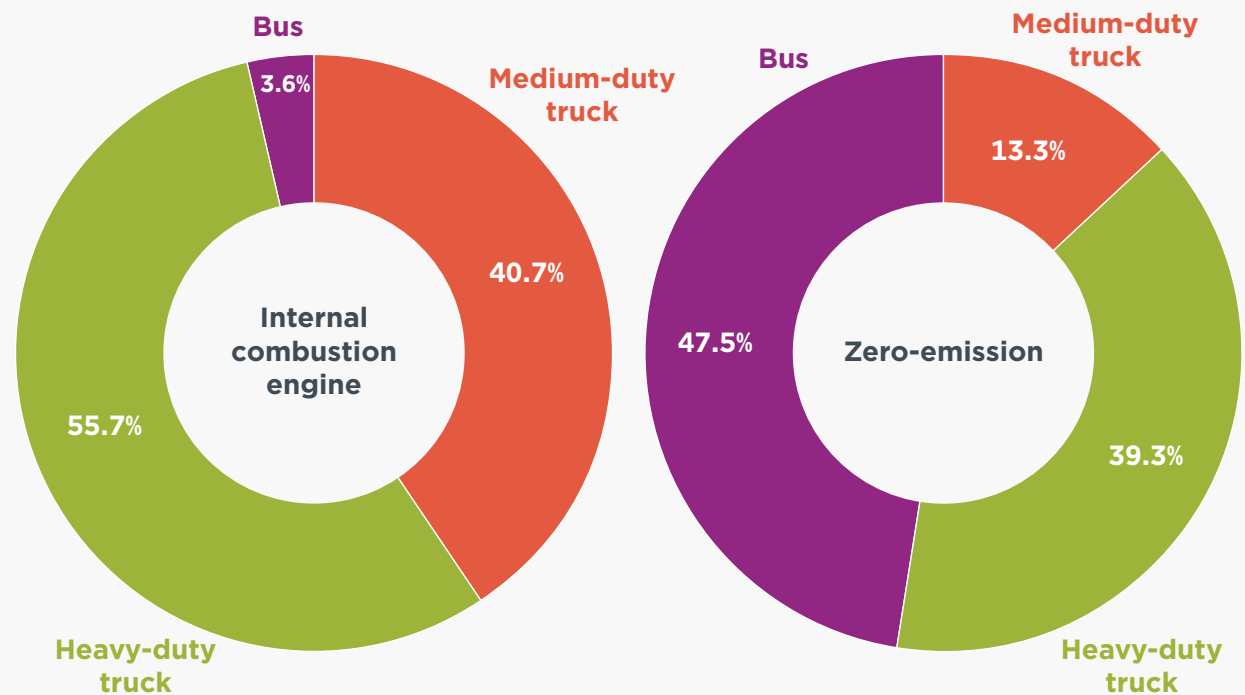
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TABLE 1.1
Share of new zero-emission heavy-duty vehicles registrations over time

Vehicle type	Zero-emission share in Q4 2024	Zero-emission share in 2024	Change in registrations from Q3 2024	Change in registrations from Q4 2023	Change in registrations from 2023
Bus	8.3%	7.0%	+ 21.2%	+ 34.5%	+ 127.7%
Medium-duty trucks	0.2%	0.2%	+ 26.0%	+ 63.5%	+ 72.7%
Heavy-duty trucks	0.4%	0.4%	+ 27.4%	+ 57.7%	+ 34.4%
All HDVs	0.6%	0.6%	+ 34.2%	+ 52.1%	+ 81.0%

FIGURE 1.2

Share of new medium- and heavy-duty zero-emission vehicle registrations by type and powertrain in 2024



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BUSES

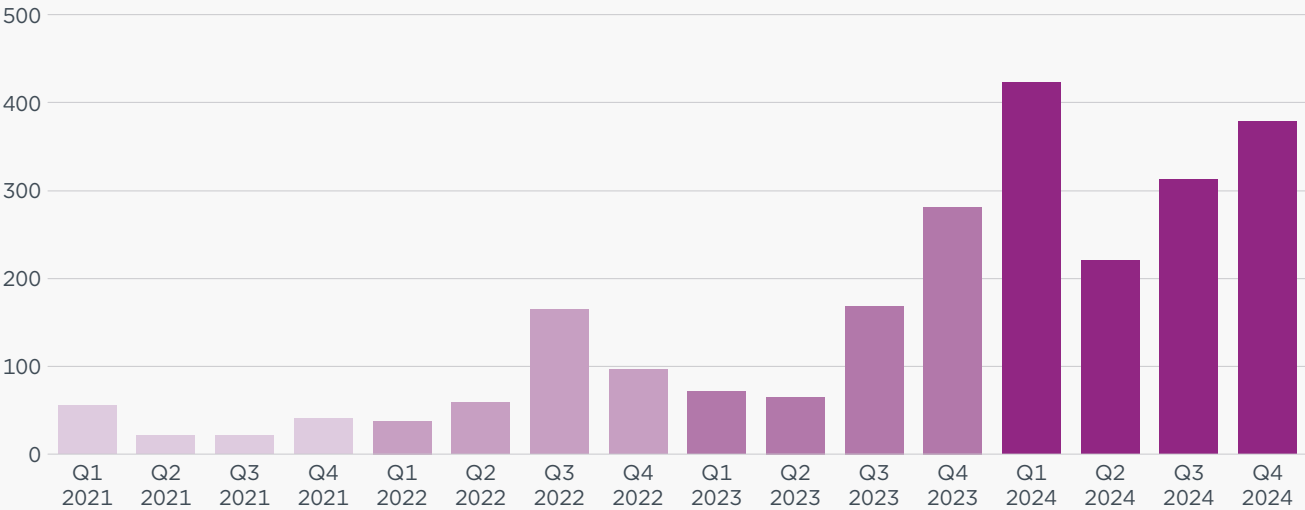
WITH A GROSS VEHICLE WEIGHT RATING ABOVE 14,001 LB

In 2024, 1,334 zero-emission buses were registered, representing approximately 7% of new bus registrations. In the first quarter of 2024, zero-emission buses made up over 10% of total bus registrations. The number of zero-emission buses registrations dropped slightly in the second and third quarters before reaching nearly 380 zero-emission buses in Q4, or 8% of new bus registrations.

Class 7 buses, which have a gross vehicle weight rating (GVWR) between 26,001 and 33,000 lb, made up 85% of zero-emission bus registrations in 2024. No Class 6 zero-emission buses (GVWR less than 26,000 lb) were registered in 2024. All zero-emission buses registered in the United States in 2024 were multi-purpose buses and city buses.

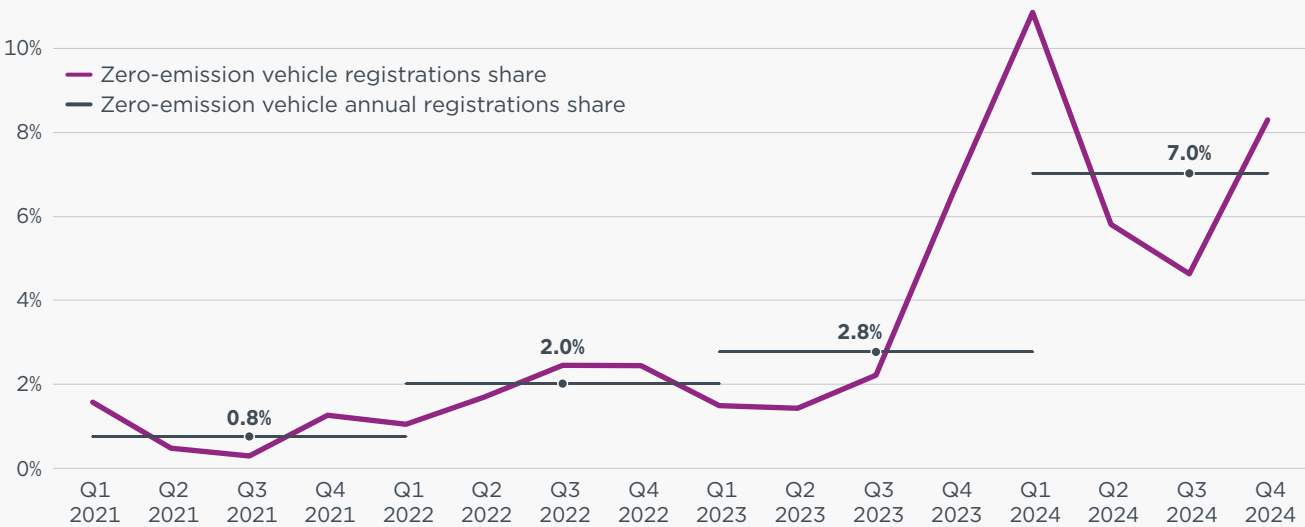
In 2024, Daimler and Traton were the largest manufacturer groups, and made up approximately 52% and 45% of new internal combustion engine (ICE) bus registrations, respectively, and accounted for 45% and 43% of the zero-emission market in 2024. Zero-emission buses made up approximately 9% of Daimler’s total bus registrations and nearly 6% of Traton’s bus registrations in the United States. Lion Electric, an all-electric manufacturer, recorded the remaining zero-emission buses registered.

FIGURE 2.1
Number of new zero-emission bus vehicle registrations in the United States, 2021–2024



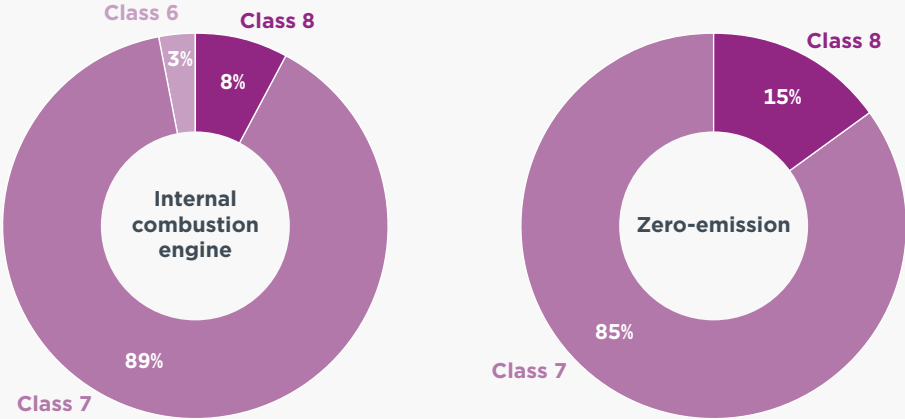
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FIGURE 2.2
Share of new zero-emission bus vehicle registrations by type and powertrain in 2024



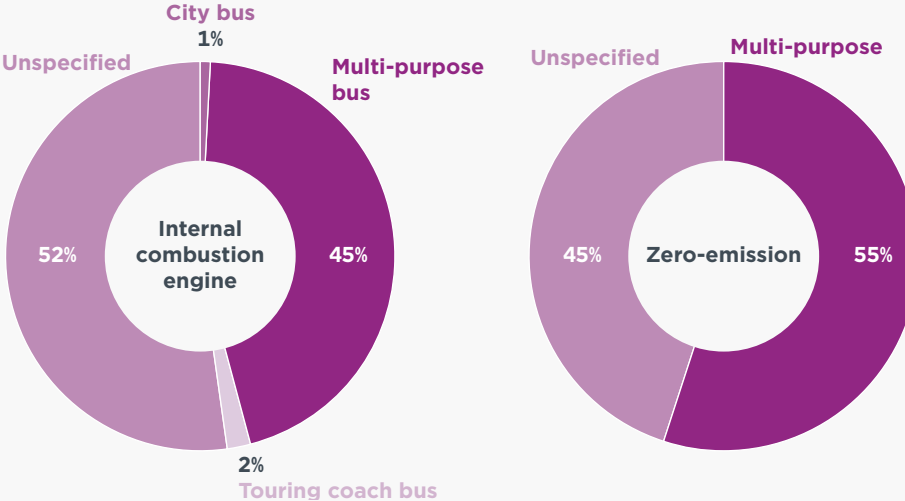
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FIGURE 2.3
New bus registrations in the United States by weight class in 2024



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FIGURE 2.4
New bus registrations in the United States by vehicle type and powertrain in 2024



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TABLE 2.1
Market share by manufacturer group for new internal combustion engine and zero-emission bus registrations in the United States in 2024

Manufacturer group	Zero-emission market share	Internal combustion engine market share
Daimler	45.1%	52.1%
Traton	43.2%	45.0%
Lion Electric	11.7%	0.0%

TABLE 2.2
Share of zero-emission bus registrations in the United States by manufacturer group in 2023 and 2024

Manufacturer group	Zero-emission share in Q4 2024	Zero-emission share in 2024	Change in registrations from Q3 2024	Change in registrations from Q4 2023	Change in registrations from 2023
Daimler	9.0%	6.1%	+16.7%	+60.3%	+100.7%
Traton	5.7%	6.8%	+13.5%	+1.7%	+189.4%
Lion Electric	100.0%	100.0%	+78.6%	+47.1%	+194.3%

MEDIUM-DUTY TRUCKS

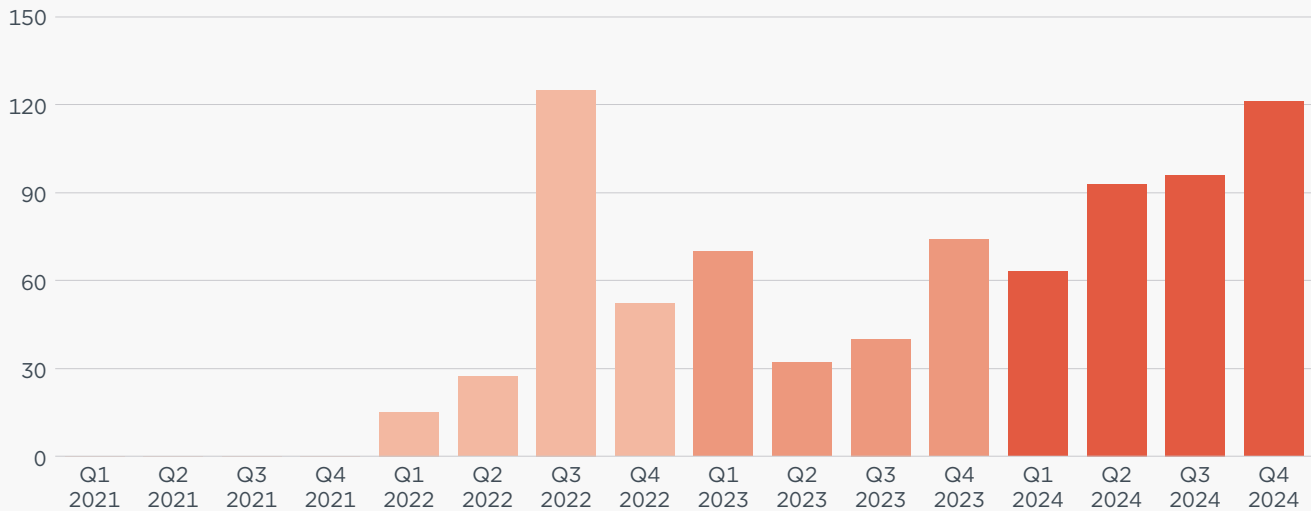
TRUCKS WITH A GROSS VEHICLE WEIGHT RATING BETWEEN 14,001 AND 26,000 LB (CLASS 4-6)

In 2024, there were 373 zero-emission medium-duty trucks registered in the United States, a 73% increase from 2023. In the last quarter of 2024, zero-emission medium-duty trucks were approximately 0.24% of the total registrations, higher than the 0.18% share in all of 2024. This percentage nearly matched the peak share of 0.27% observed in the third quarter of 2022.

Class 5 and 6 made up almost all zero-emission medium-duty truck registrations in 2024. Rigid trucks accounted for about 30% of zero-emission registrations. Light commercial trucks (56%) recorded the highest share of vehicle type in the zero-emission medium-duty truck market.

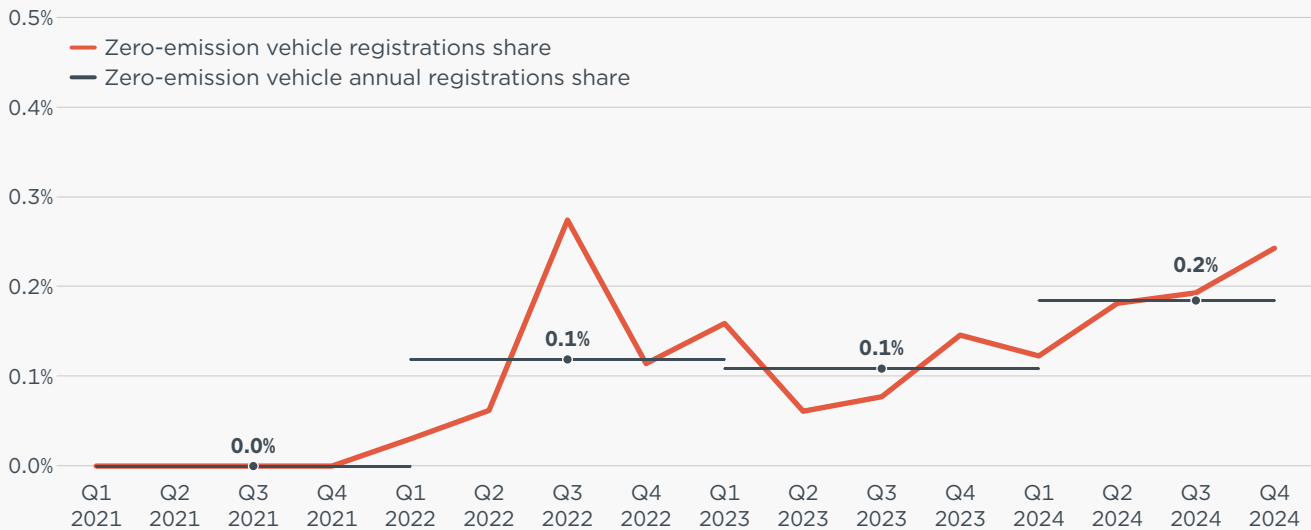
Daimler accounted for 77% of the zero-emission medium-duty trucks registered in 2024, followed by Traton (3%). Other manufactures, such as Paccar and Volvo Truck, collectively made up 20%. Most major manufacturers sold few zero-emission vehicles in this segment. The low registration volumes of medium-duty trucks are reflected by large fluctuations of percentage change from quarter to quarter.

FIGURE 3.1
Number of new zero-emission medium-duty trucks registrations in the United States



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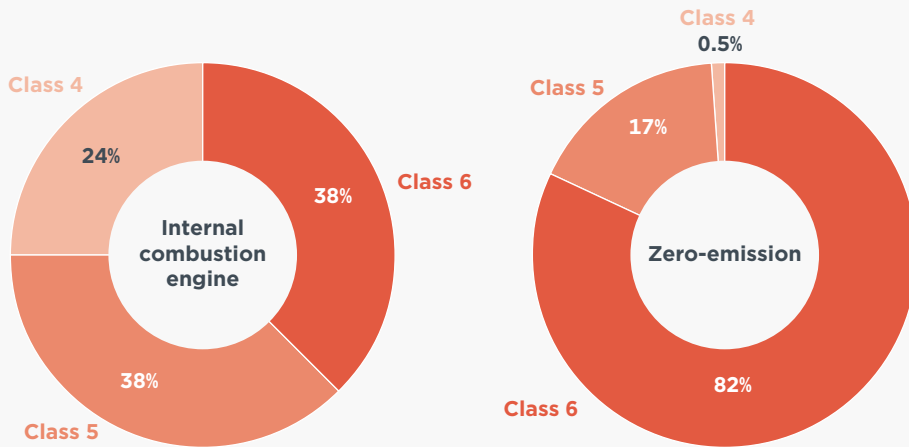
FIGURE 3.2
Share of new zero-emission medium-duty trucks registrations in the United States



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FIGURE 3.3

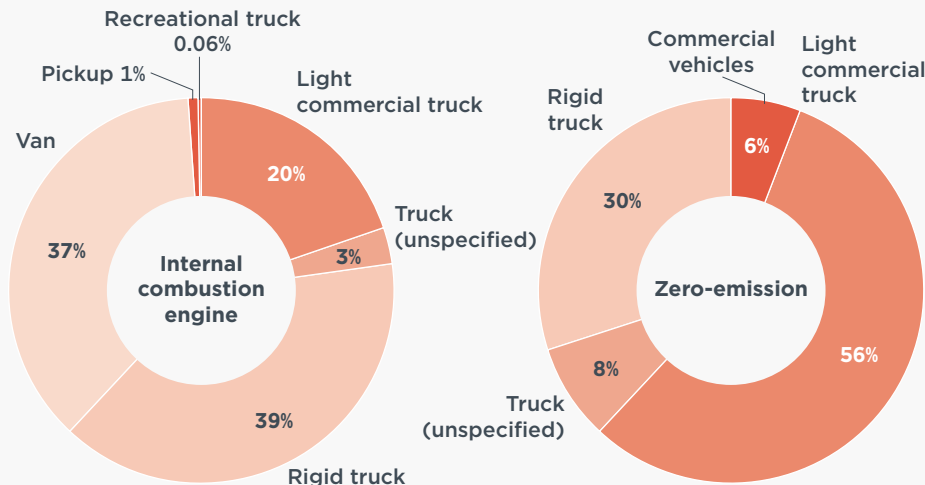
New medium-duty truck registrations in the United States by weight class in 2024



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FIGURE 3.4

New medium-duty truck registrations in the United States by vehicle type and powertrain in 2024



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TABLE 3.1

Market share by manufacturer group for new internal combustion engine and zero-emission medium-duty truck registrations in the United States in 2024

Manufacturer group	Zero-emission market share	Internal combustion engine market share
Ford	0.0%	44.9%
Daimler	77.5%	11.0%
Isuzu	0.0%	10.7%
General Motors	0.0%	9.4%
Traton	2.9%	8.4%
Stellantis	0.0%	7.9%
Toyota	0.0%	2.9%
Others	19.6%	4.6%

TABLE 3.2

Share of zero-emission medium-truck registrations in the United States by manufacturer group in 2023 and 2024

Manufacturer group	Zero-emission share in Q4 2024	Zero-emission share in 2024	Change in registrations from Q3 2024	Change in registrations from Q4 2023	Change in registrations from 2023
Daimler	2.0%	1.3%	+23.6%	+685.7%	+896.6%
Traton	0.0%	0.1%	0.0%	-100.0%	-38.9%
Others	0.3%	0.8%	+57.1%	-45.5%	-56.8%

HEAVY-DUTY TRUCKS

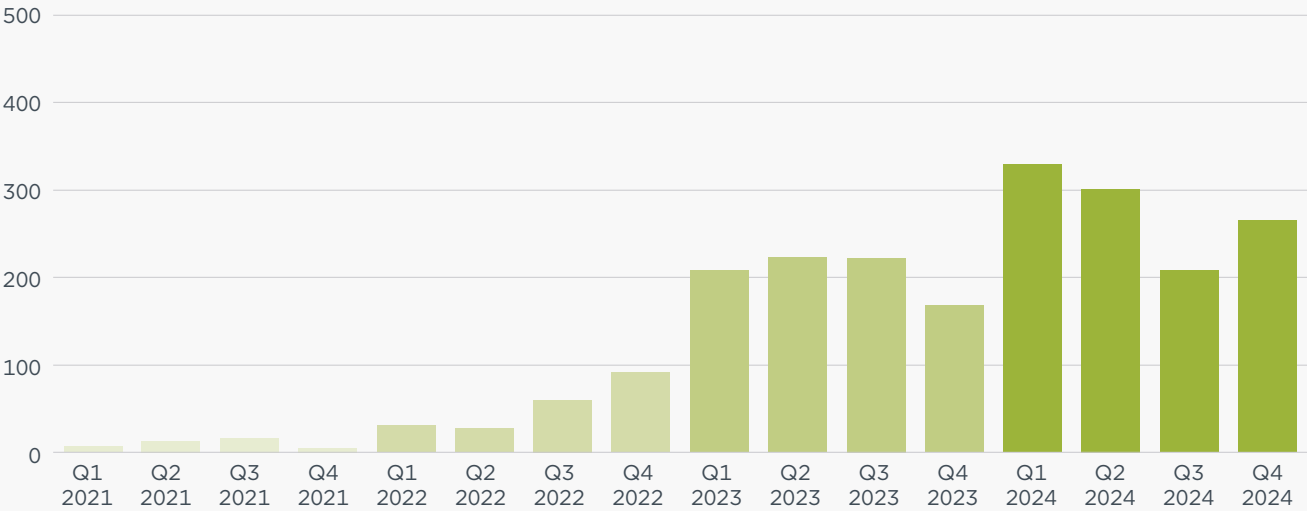
TRUCKS WITH A GROSS VEHICLE WEIGHT RATING ABOVE 26,001 LB (CLASS 7-8)

A total of 1,103 zero-emission heavy-duty trucks were registered in 2024, 34% more than in 2023 and nearly four times more than in 2022. Out of roughly 277,000 heavy-duty trucks registered, zero-emission heavy-duty trucks accounted for 0.40%. The first quarter of 2024 saw the highest share of zero-emission heavy-duty truck registrations to date, reaching around 0.47%.

Tractor trucks (89%) and rigid trucks (11%) were popular body types in the zero-emission market. Class 8 tractor trucks were the most popular weight class and accounted for 89% of all zero-emission trucks registered, reflecting manufacturers' deployment of battery electric drayage trucks. Class 7 and 8 rigid trucks together accounted for 11% of zero-emission truck registrations in 2024.

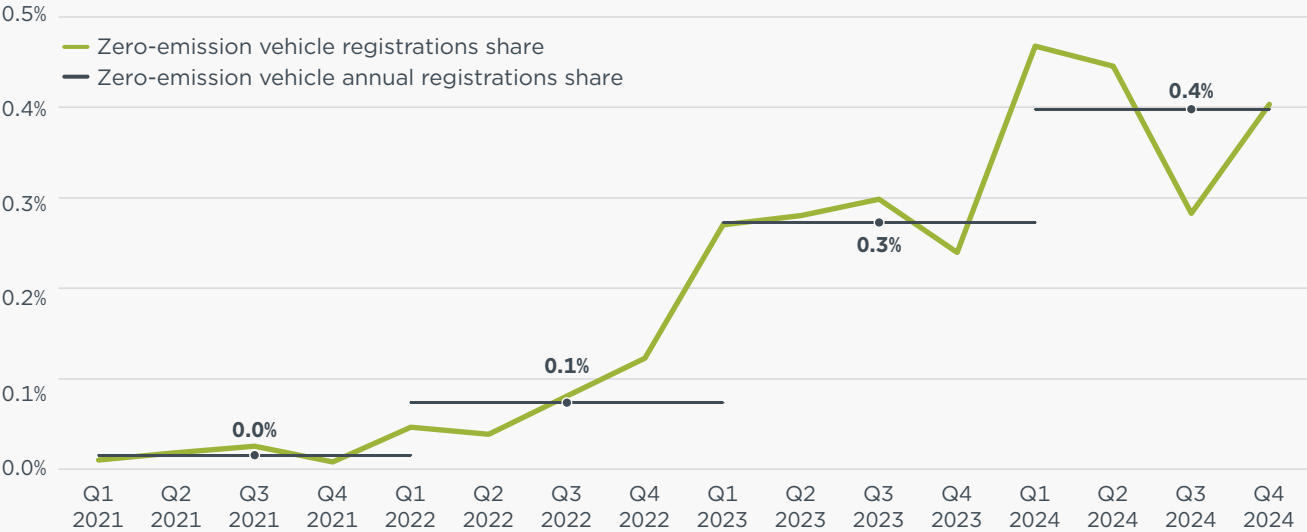
The four largest manufacturers of ICE heavy-duty trucks also dominated the zero-emission market, collectively representing approximately 63% of registrations in 2024. For Daimler, Paccar, Volvo Truck, and Traton—the top four heavy-duty truck manufacturer groups in the United States—zero-emission products account for less than 1% of total registrations. The substantial change in manufacturer zero-emission market share observed over different periods reflects the small volume of sales.

FIGURE 4.1
Number of new zero-emission heavy-duty trucks registrations in the United States



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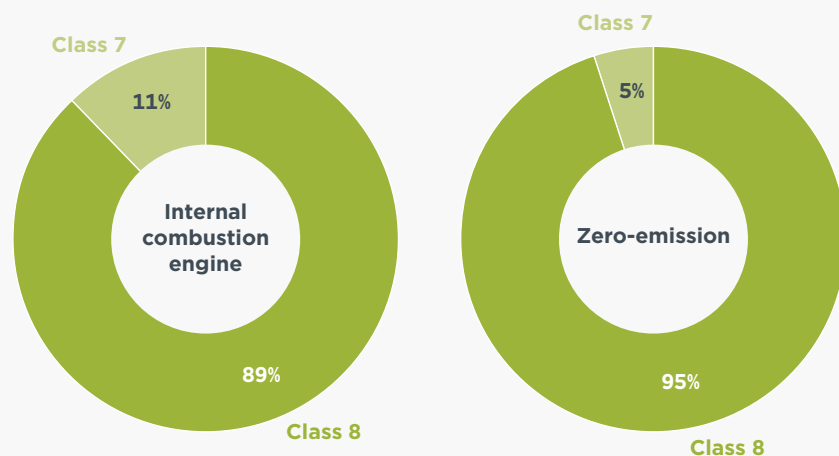
FIGURE 4.2
Share of new zero-emission heavy-duty trucks registrations in the United States



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FIGURE 4.3

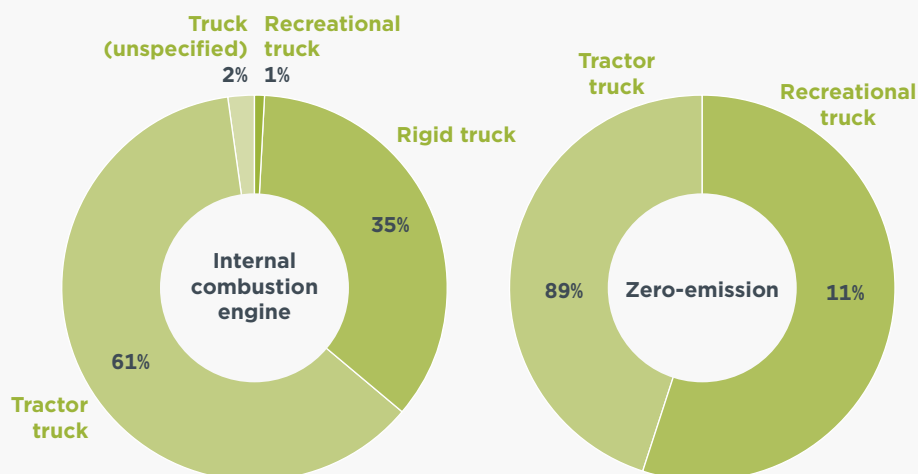
New heavy-duty truck registrations in the United States by weight class in 2024



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FIGURE 4.4

New heavy-duty truck registrations in the United States by vehicle type and powertrain in 2024



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TABLE 4.1

Market share by manufacturer group for new internal combustion engine and zero-emission heavy-duty truck registrations in the United States in 2024

Manufacturer group	Zero-emission market share	Internal combustion engine market share
Daimler	22.8%	38.7%
Paccar	6.8%	30.1%
Volvo Truck	31.5%	15.1%
Traton	1.9%	11.5%
Autocar	3.8%	0.8%
Others	33.2%	3.8%

TABLE 4.2

Share of zero-emission heavy-duty registrations in the United States by manufacturer group in 2023 and 2024

Manufacturer group	Zero-emission share in Q4 2024	Zero-emission share in 2024	Change in registrations from Q3 2024	Change in registrations from Q4 2023	Change in registrations from 2023
Daimler	0.1%	0.2%	-31.4%	-31.4%	-21.8%
Paccar	0.1%	0.1%	+12.5%	-47.1%	+59.6%
Volvo Truck	0.9%	0.8%	+135.7%	+23.8%	+135.1%
Traton	0.1%	0.1%	-50.0%	+66.7%	0.0%
Autocar	1.9%	1.8%	-35.3%	+1000.0%	+4100.0%
Others	4.4%	3.5%	+21.9%	+254.5%	+28.5%

DEFINITIONS AND DATA SOURCES

Zero-emission vehicles: Any vehicle whose propulsion system produces zero combustion emissions, such as a dedicated battery-electric, fuel cell-electric, or other motor that is not powered by combustion.

Heavy-duty vehicles: All vehicles with a gross vehicle weight rating above 14,001 lb, which correspond to Classes 4–8 in the National Highway Administration’s vehicle class definition.

Buses: All Class 4-8 buses and coaches.

Medium-duty trucks and vans: Class 4–6 trucks and vans with a gross vehicle weight rating of 14,001–26,000 lb.

Heavy-duty trucks: Class 7 and 8 trucks with a gross vehicle weight rating greater than 26,001 lb.

Truck class	Gross vehicle weight rating (lb)	Gross vehicle weight rating (kg)	Classification in this market spotlight
4	14,001-16,000	6,350-7,257	Medium-duty trucks
5	16,001-19,500	7,258-8,845	
6	19,501-26,000	8,846-11,793	
7	26,001-33,000	11,794-14,968	Heavy-duty trucks
8	33,001+	14,968+	

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