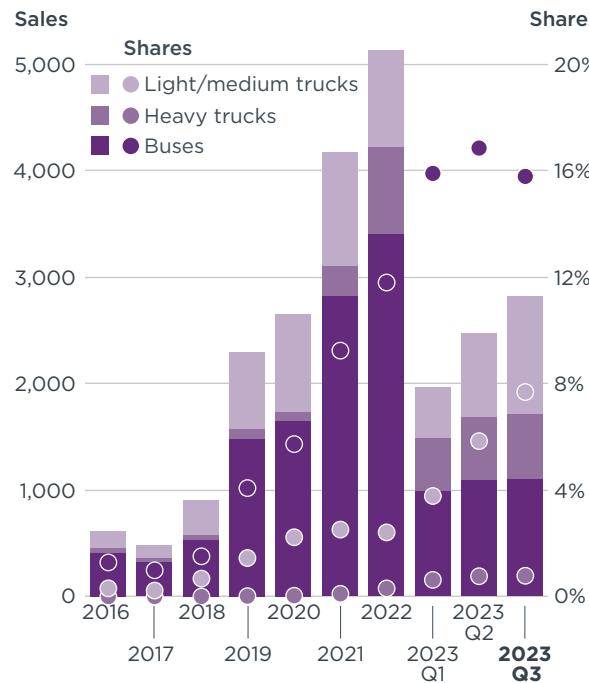


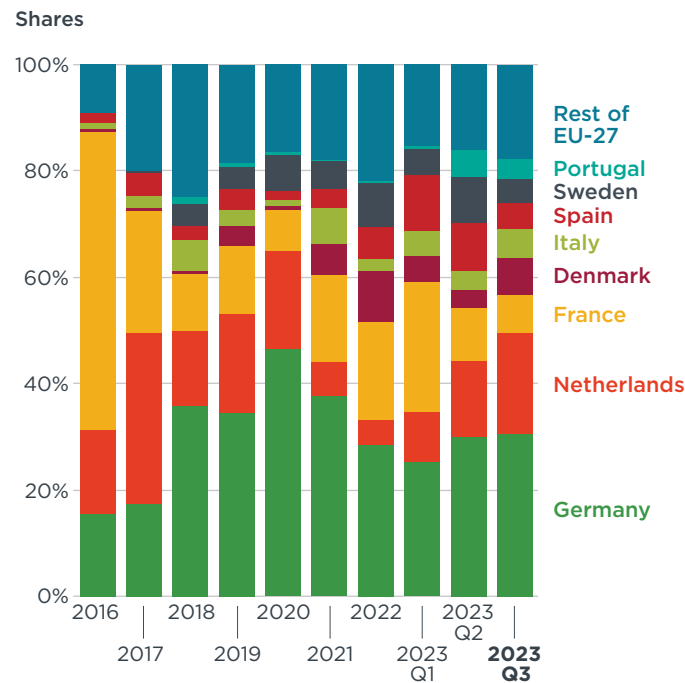
EUROPEAN HEAVY-DUTY VEHICLE MARKET DEVELOPMENT QUARTERLY (JANUARY - SEPTEMBER 2023)

EAMONN MULHOLLAND, SATHVIKA ANANDA

Sales of zero-emission heavy-duty vehicles by segment



Sale shares of zero-emission heavy-duty vehicles by Member State



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SUMMARY

In the third quarter of 2023, just over 2,800 new zero-emission heavy-duty vehicles were sold in the EU-27—a 14% increase over the second quarter of 2023—including 1,100 buses and coaches, 1,100 light and medium trucks, and 610 heavy trucks. The sales share of heavy trucks stagnated slightly in third quarter at 0.8%, the same as in the second quarter of 2023. Sales shares of zero-emission light and medium trucks increased from 6% to 8% over the same period, while zero-emission bus and coaches dipped from 17% to 16%.

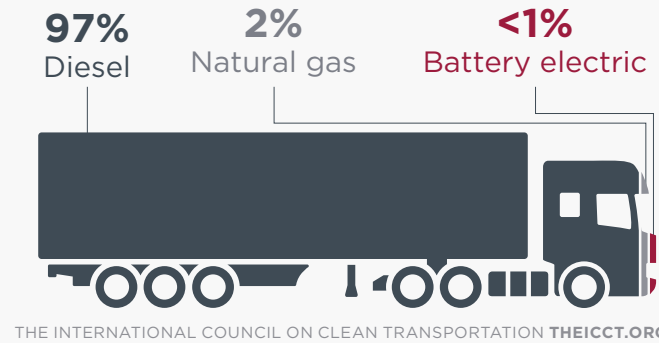
Of all zero-emission heavy-duty vehicles sales, 30% occurred in Germany, which is roughly equivalent to their 29% sales share of all heavy-duty vehicles. Almost 3% of all heavy trucks sold in the Netherlands were zero-emission in the third quarter of 2023, above the 0.8% EU-27 average, and a remarkable 60% of all light and medium trucks in the Netherlands were zero-emission in the same period, significantly higher than the 8% EU-27 average.

1. HEAVY TRUCKS

TRUCKS WITH A GROSS VEHICLE WEIGHT ABOVE 12 TONNES

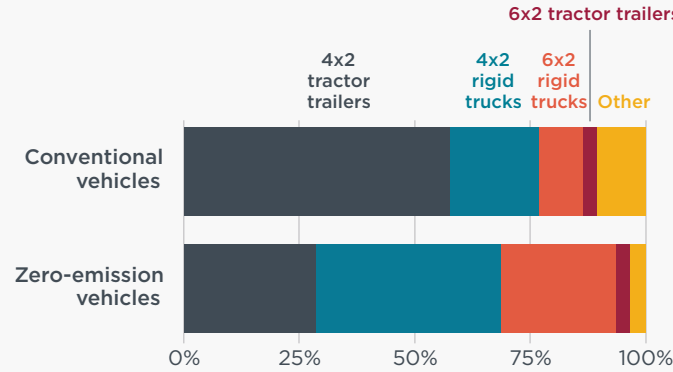
Heavy trucks represented 78% of sales of all heavy-duty vehicles. Of the 76,000 heavy trucks sold in the third quarter of 2023, 610 were zero-emission vehicles—almost double the entirety of zero-emission heavy truck sales in 2021. The majority of these were rigid body trucks, and the share of zero-emission tractor trailers, the most popular heavy-duty vehicle segment in Europe, fell from 36% in the second quarter of 2023 to 32% in the third quarter. Volvo Group, which consists of Volvo Trucks and Renault Trucks, produced two thirds of all zero-emission heavy trucks—a similar share to the second quarter—despite accounting for roughly 25% of conventional vehicle sales. IVECO did not sell any zero-emission trucks in the third quarter of 2023, and MAN sold just two. These manufacturers combined also sold roughly 25% of Europe’s conventional heavy trucks in the same period.

FIGURE 1.1
Sales of heavy trucks by powertrain



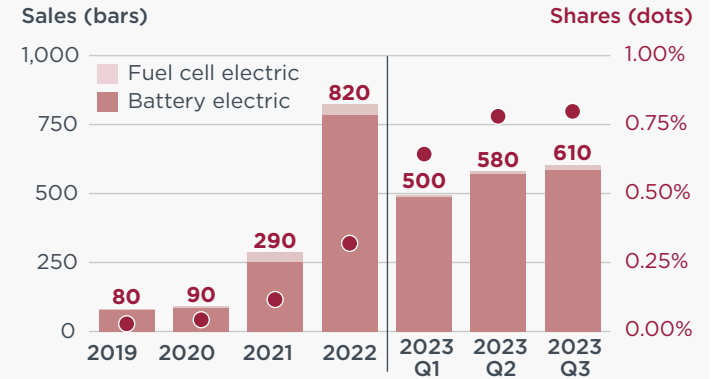
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FIGURE 1.3
Sales of zero-emission heavy trucks by configuration and powertrain



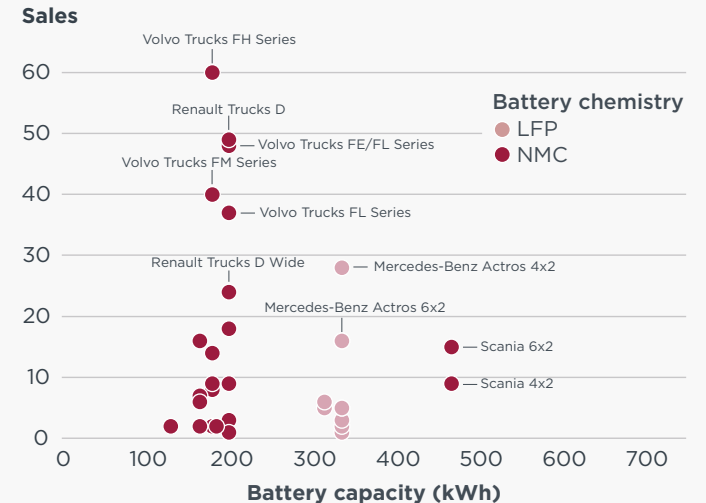
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FIGURE 1.2
Sales of zero-emission heavy trucks



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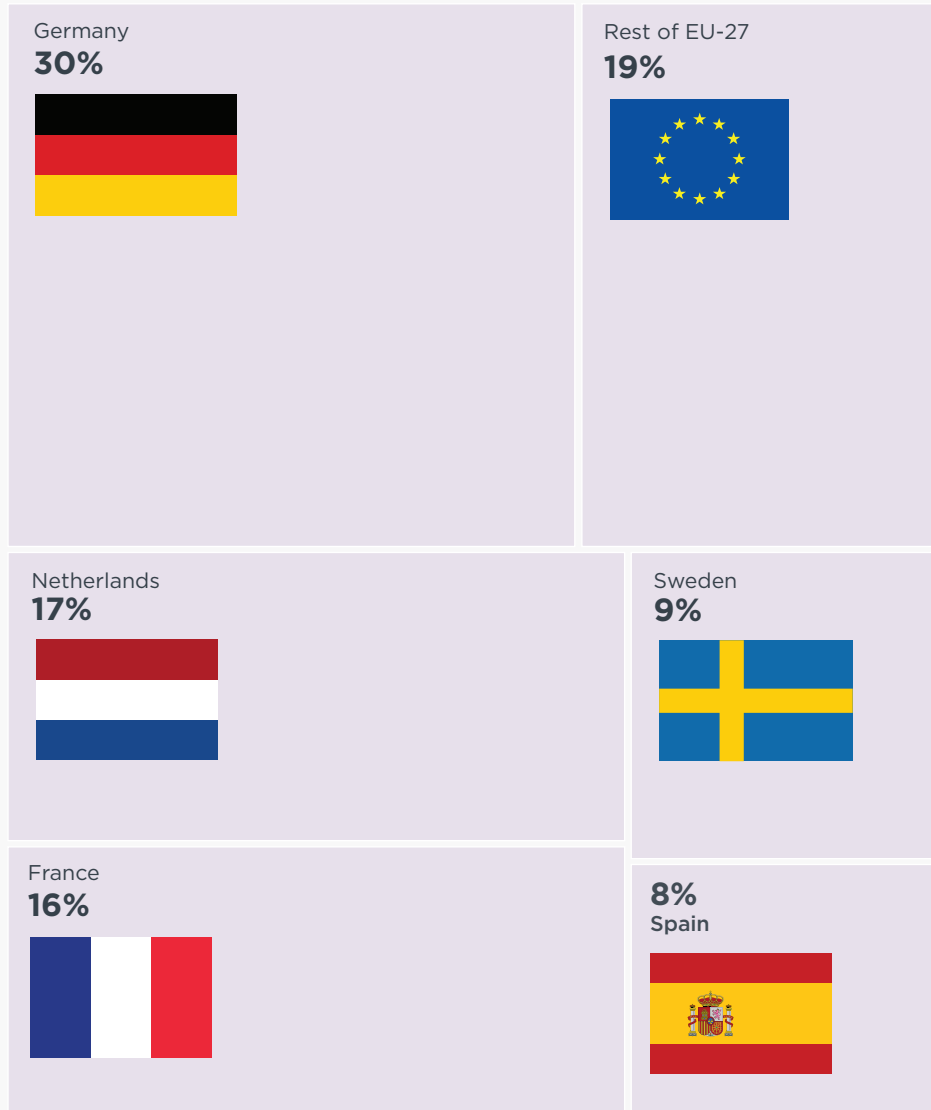
FIGURE 1.4
Sales of zero-emission heavy trucks by model and battery capacity



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FIGURE 1.5

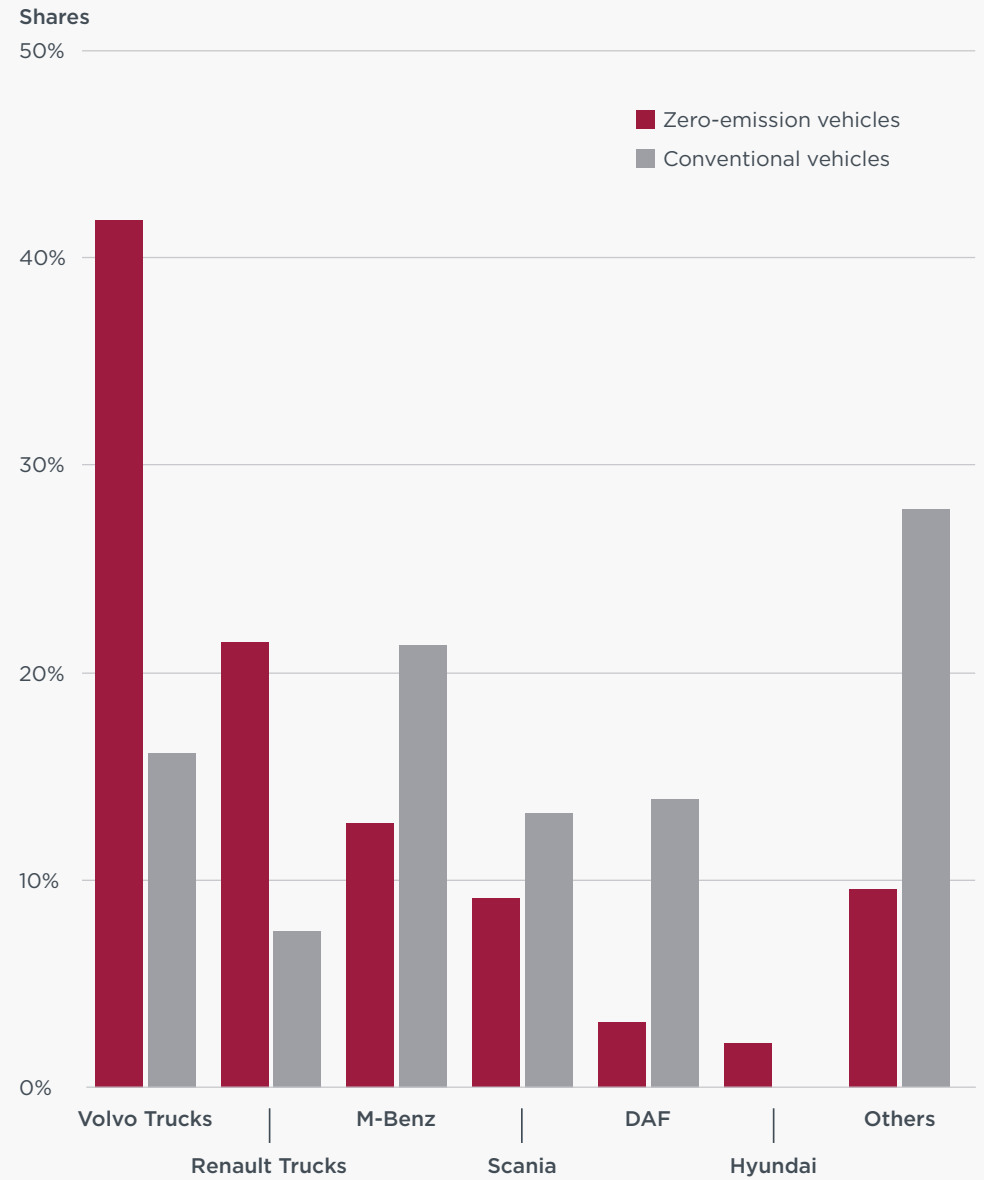
Sales of zero-emission heavy trucks by Member State



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FIGURE 1.6

Shares of heavy trucks by powertrain and manufacturer



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2. LIGHT AND MEDIUM TRUCKS

TRUCKS WITH A GROSS VEHICLE WEIGHT BETWEEN 3.5 TONNES AND 12 TONNES

Light and medium trucks represented 15% of sales of all heavy-duty vehicles. Of the 14,000 vehicles sold in the third quarter of 2023, 1,100 were zero-emission vehicles, representing an increase in the sales share from 6% in second quarter to 8% in the third quarter. Nearly 60% of zero-emission vehicle sales were vans, with the remainder being trucks, while vans only represented 35% of conventional vehicle sales. Ford was by far the greatest supplier of zero-emission light and medium trucks; their electric Ford Transit model had 770 purchases in the third quarter of 2023, representing 28% of all zero-emission heavy-duty sales.

FIGURE 2.1
Sales of light and medium trucks by powertrain

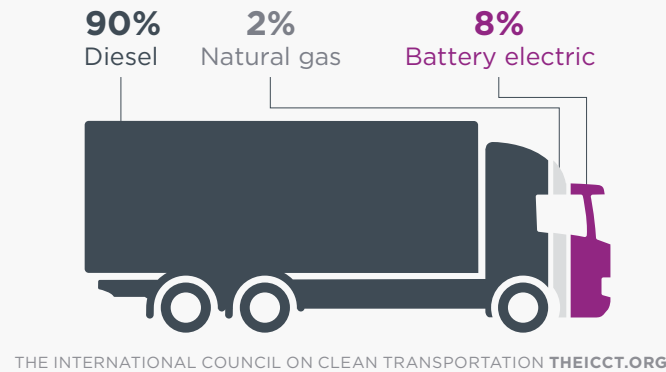


FIGURE 2.2
Historic sales of zero-emission light and medium trucks

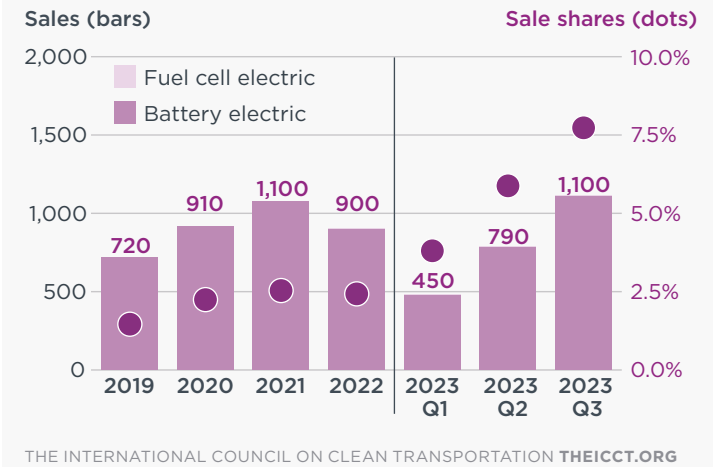


FIGURE 2.3
Sales of zero-emission light and medium trucks by configuration and powertrain

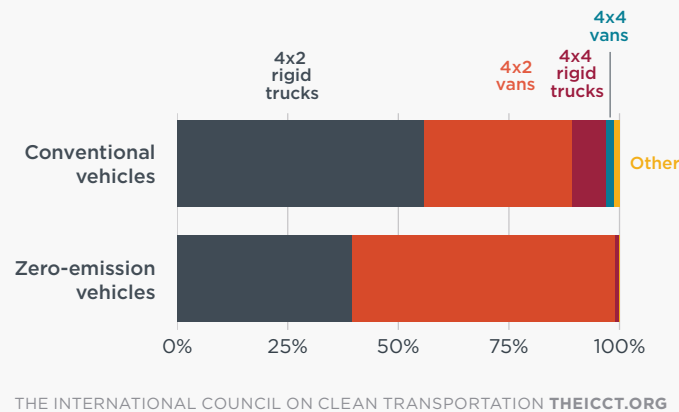


FIGURE 2.4
Sales of zero-emission light and medium trucks by model and battery capacity

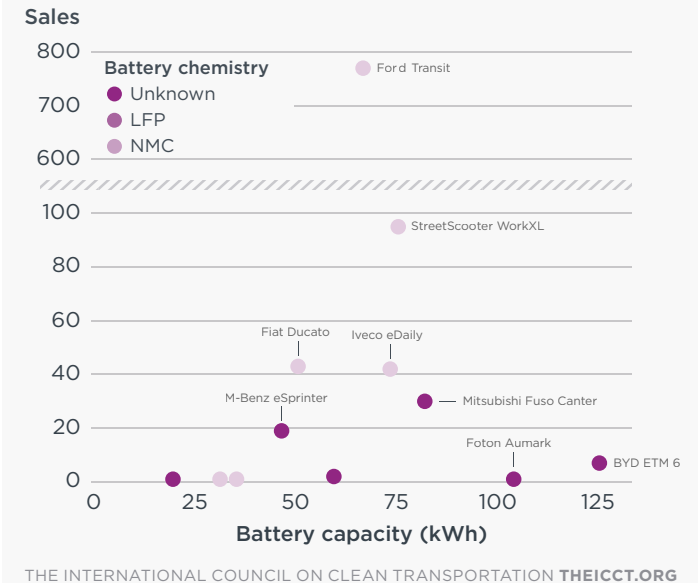
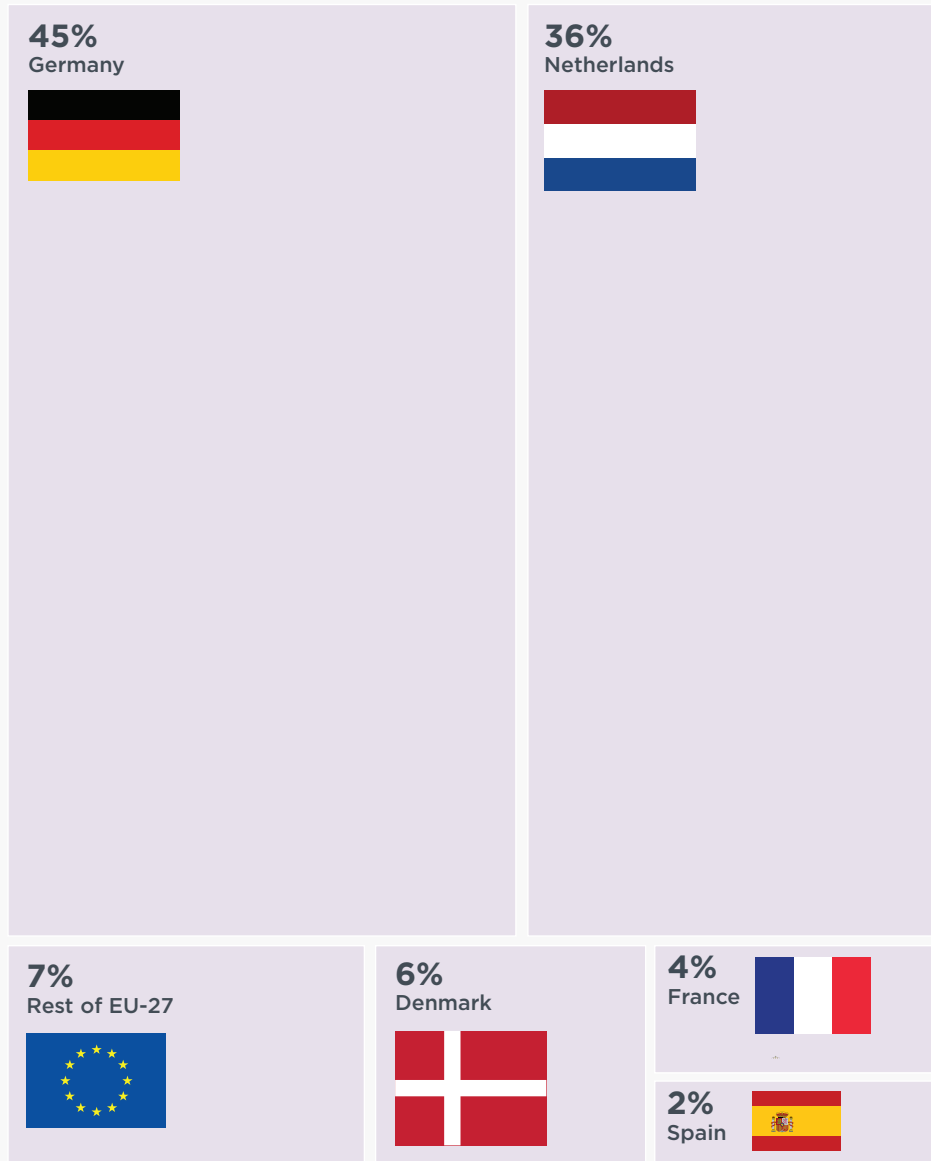


FIGURE 2.5

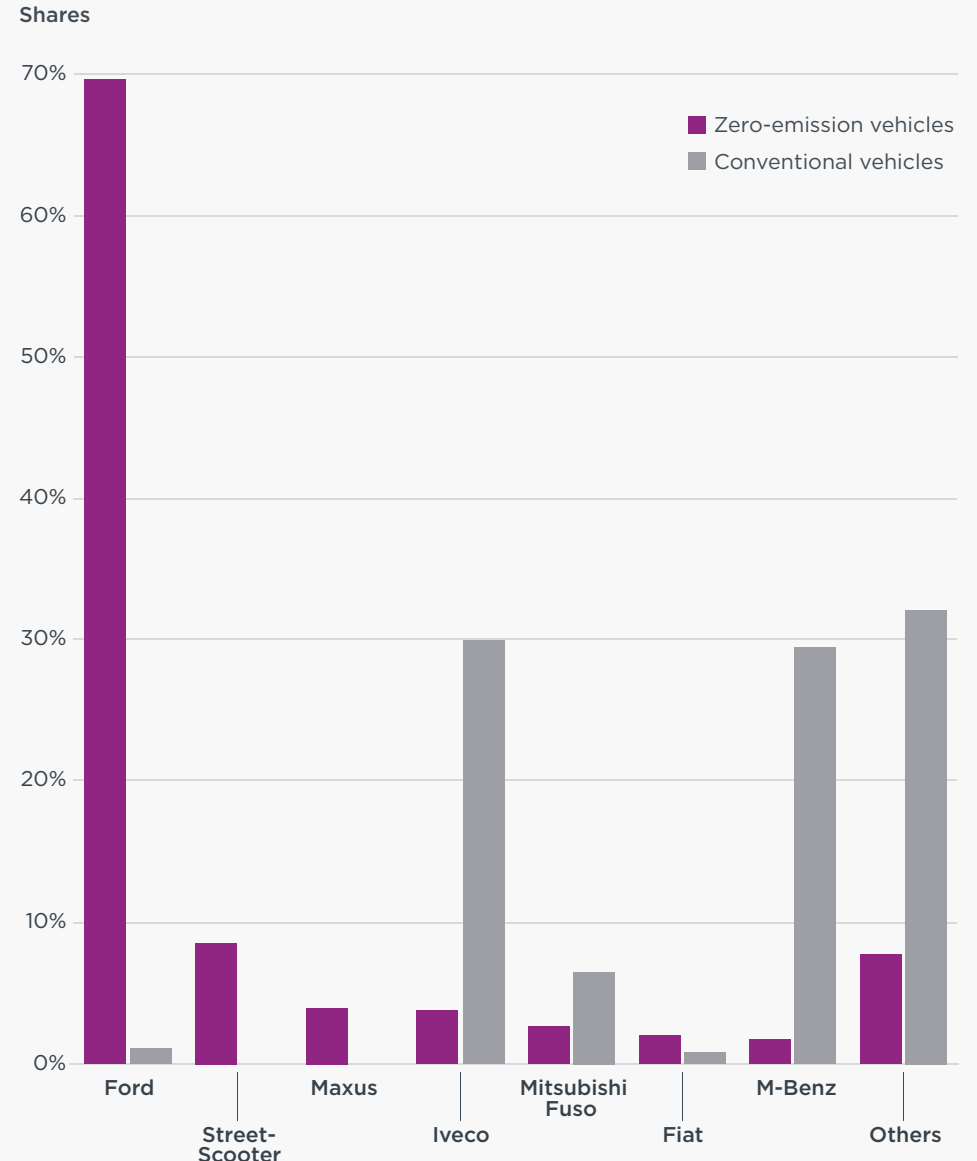
Sales of zero-emission light and medium trucks by Member State



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FIGURE 2.6

Shares of light and medium trucks by powertrain and manufacturer



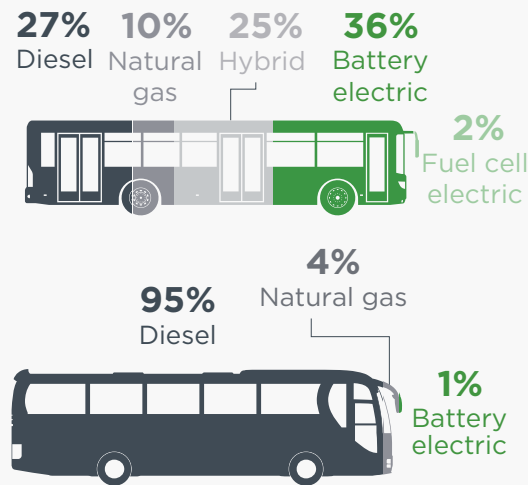
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3. BUSES AND COACHES

WITH A GROSS VEHICLE WEIGHT ABOVE 3.5 TONNES

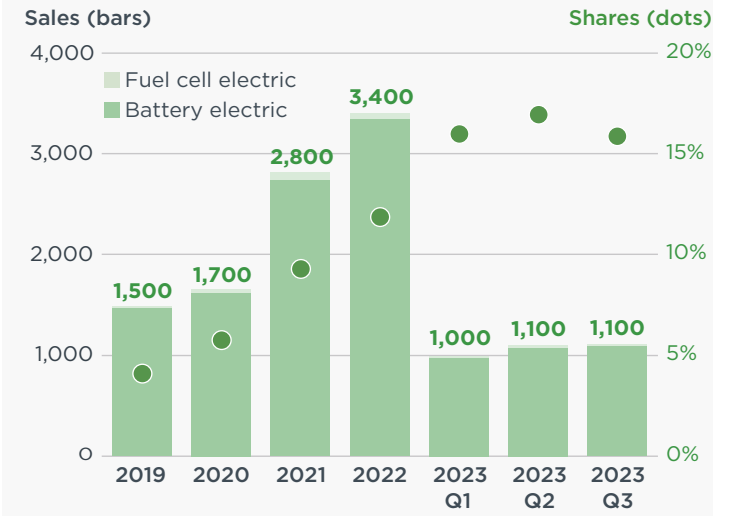
Buses and coaches represented 7% of sales of all heavy-duty vehicles. Of the 7,000 vehicles sold in the third quarter of 2023, 1,100 were zero-emission vehicles, representing a 16% share—a drop from 17% in the second quarter. Battery electric city bus shares remained the same as in the second quarter of 2023 at 36%, but the shares of natural gas city buses fell due to a rise in the sales shares of hybrid vehicles. Only zero-emission city buses were sold in four countries (the Netherlands, Denmark, Ireland, and Finland) in the third quarter of 2023, and sales were above 50% in five additional countries (Portugal, Greece, Romania, Belgium, and Poland). In the third quarter, MAN delivered the largest number of zero-emission buses of any manufacturer, representing 12% of all zero-emission bus sales, followed by Yutong with an 11% share. The third largest supplier of zero-emission buses was a new entrant to the market, China-based manufacturer Guangtong, which produced 120 (or 11%) of all zero-emission buses sold. The manufacturer sold just 9 buses in the EU prior to the third quarter. Unlike the other China-headquartered manufacturers which have a strong market presence in Europe—namely BYD and Yutong—Guangtong was not amongst the top ten manufacturers of zero-emission vehicles sold in China in 2022.

FIGURE 3.1
Sales of city buses (top) and interurban/coaches (bottom) by powertrain



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FIGURE 3.2
Historic sales of all zero-emission buses



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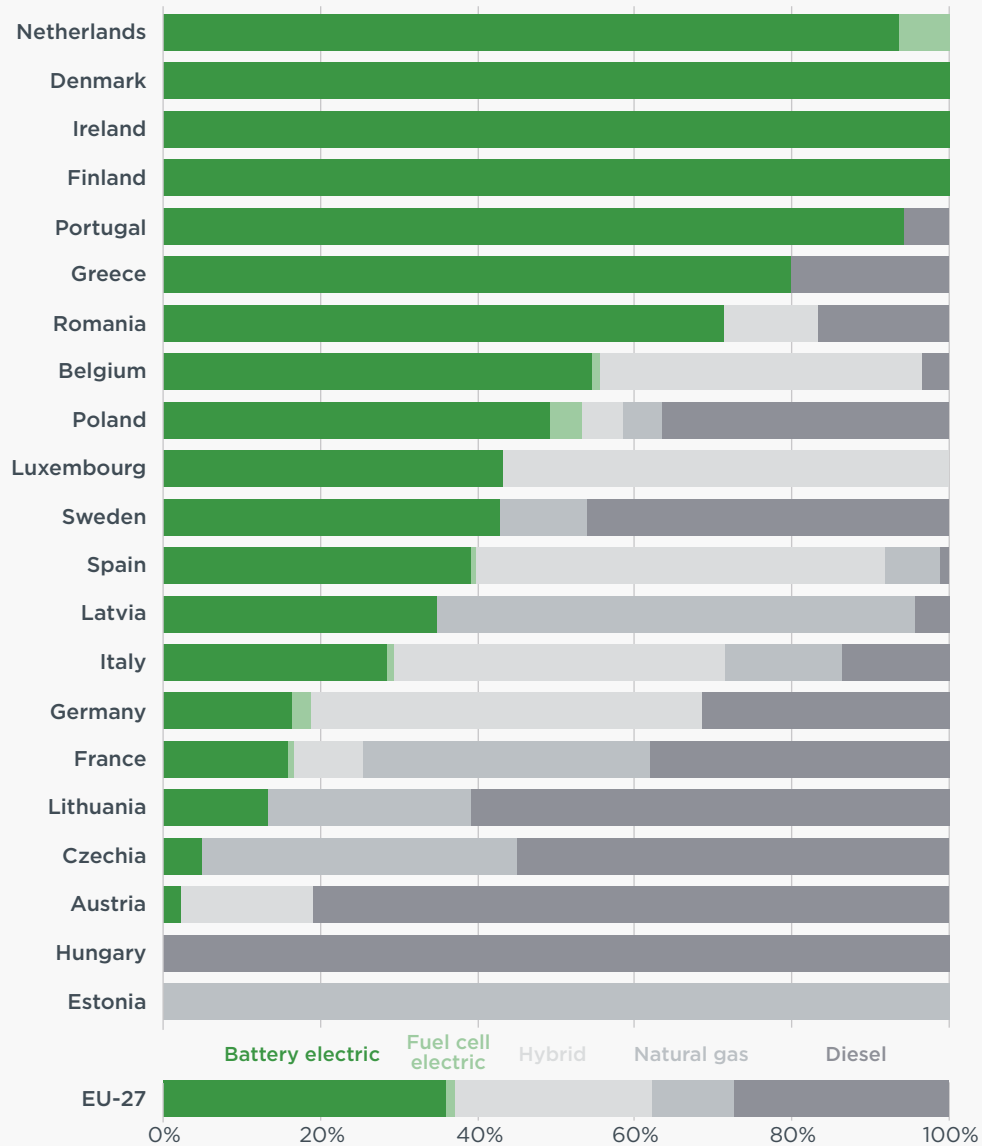
FIGURE 3.3
Sales of city buses by Member State and powertrain



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FIGURE 3.4

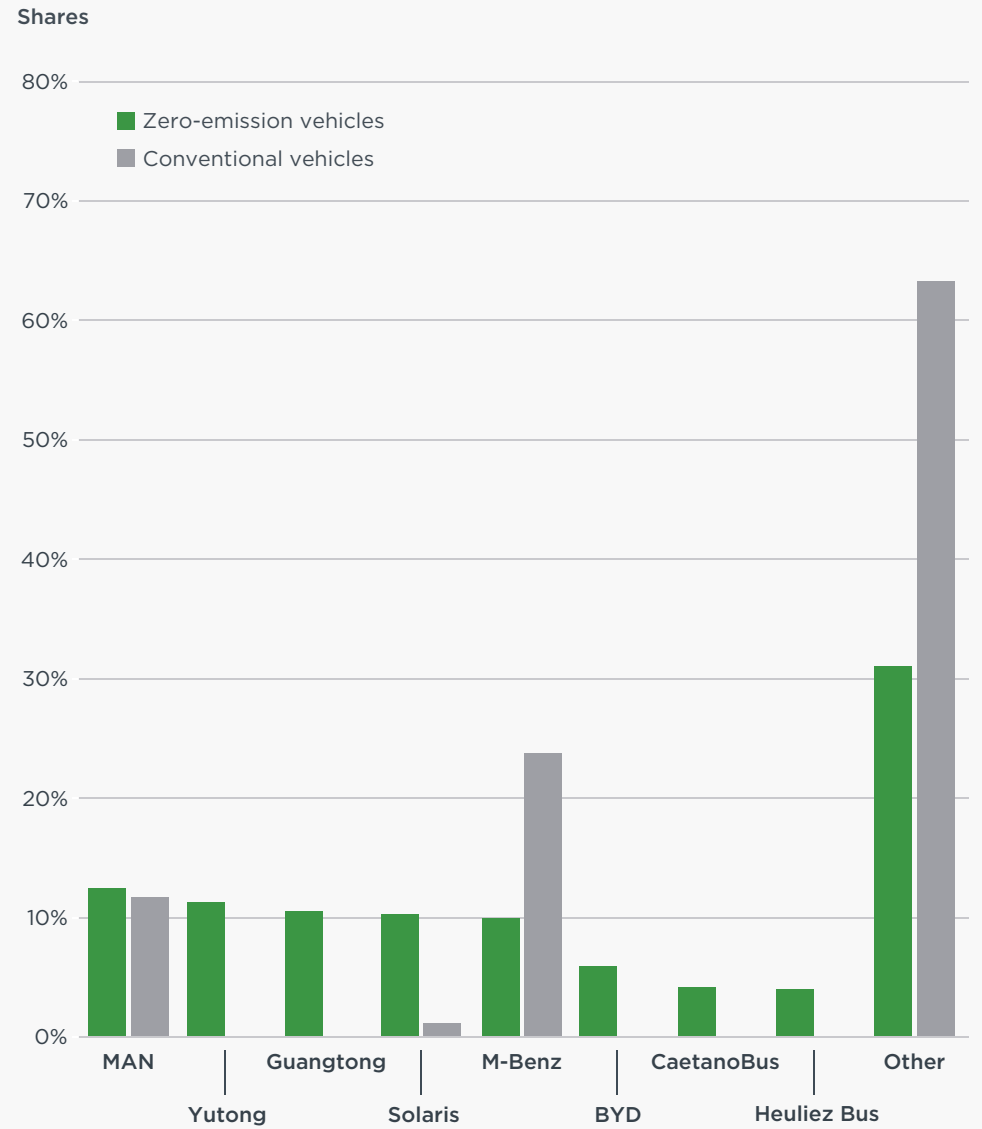
Sales of zero-emission city buses by powertrain and Member State



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FIGURE 3.5

Shares of all buses by powertrain and manufacturer



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4. TECHNOLOGY FOCUS: ELECTRIFIED ROAD SYSTEMS

LOOKING BEYOND QUARTERLY SALES

Electric road systems (ERS) are a means of providing power to electric vehicles while in motion. The technology is of particular interest to the truck sector, as widespread installation of the technology may enable long-haul vehicles to reduce battery sizes and charging times. There are three main forms of ERS: (i) overhead catenary lines, where a vehicle connects to overhead power lines through a pantograph; (ii) induction charging, where the vehicle is powered wirelessly through charging plates in the road; and (iii) conductive rail charging, where the collector

is fitted to the bottom of the vehicle and connects to an electric rail embedded in the road. Today approximately 30 km of ERS is currently in operation, almost entirely made up by overhead catenary lines which operate in Germany.

The eHighway project on the A5 in Frankfurt, Germany, is the most notable example of an overhead catenary ERS. Scania trucks fitted with pantographs traverse the lines on the 17 km route. The largest demonstration of induction charging, led by Electreon, concluded in 2023 in Visby, Sweden, where 1.6 km of road was fitted with charging plates and

was tested with a Scania and GINAF truck. Electreon has also won a tender to build wireless charging roads in Trondheim, Norway, and another 2km stretch south of Paris on the A10 highway. Both projects are set to commence in 2024. There are further plans in Germany to expand the existing A5 eHighway from Darmstadt to the border of Baden-Württemberg, which will result in approximately 60 km of overhead catenary lines if deployed in both directions. There are further plans to deploy new overhead catenary lines as part of the E-Highway in Bayern, but details of the plan are still unclear.



1. A1 Siemens eHighway

Provider: Siemens
Length: 10 km
Type: Overhead catenary line

4. A5 Siemens eHighway

Provider: Siemens
Length: 17 km
Type: Overhead catenary line

7. eWayBW

Provider: Siemens
Length: 3.4 km
Type: Overhead catenary line

10. Sweden eArlanda

Provider: Evias
Length: 2 km
Type: Conductive electric rail

13. APS for Road

Provider: Alstom
Length: 400 m
Type: Conductive rail charging

2. Gross Dölln

Provider: Siemens
Length: 2 km
Type: Multiple technologies

5. Lkw-Innovationscluster

Provider: Unknown
Length: Unknown
Type: Overhead catenary line

8. A10 ElectReon

Provider: ElectReon
Length: 2 km
Type: Induction charging

11. Sweden Smartroad Gotland

Provider: ElectReon
Length: 1.6 km
Type: Induction charging

14. Italy Arena del Futuro

Provider: Aleatica
Length: 1 km
Type: Induction charging

3. E-charge cologne

Provider: ElectReon
Length: 100 m
Type: Induction charging

6. E-Highway Bayern

Provider: Unknown
Length: Unknown
Type: Overhead catenary line

9. E16 Sweden

Provider: Siemens
Length: 2 km
Type: Overhead catenary line

12. EVolution Road Project Lund

Provider: Elonroad
Length: 1 km
Type: Conductive rail charging

15. Trondheim electric road project

Provider: Electreon
Length: Unknown
Type: Induction charging

DEFINITIONS, DATA SOURCES, METHODOLOGY, AND ASSUMPTIONS

A **zero-emission vehicle** is any vehicle whose propulsion system produces zero combustion emissions, such as a dedicated battery-electric, fuel cell-electric, or other motor that is not driven by combustion.

A **heavy-duty vehicle** is a commercial vehicle, intended for the transport of passengers or freight, with a gross vehicle weight above 3.5 tons.

A **heavy truck** is a truck with a gross vehicle weight above 12 tons.

A **light and medium truck** is a truck or van with a gross vehicle weight between 3.5 tons and 12 tons.

A **city bus** is a passenger vehicle with a gross vehicle weight above 3.5 tons that is used exclusively in urban environments.

An **interurban bus** is a passenger vehicle with a gross vehicle weight above 3.5 tons that is used in both urban and regional environments.

A **coach** is a passenger vehicle with a gross vehicle weight above 3.5 tons that is used exclusively in regional environments.

All data on the sheets for **heavy trucks** and **light and medium trucks** and any figures with the heading “all zero-emission buses” in the **buses and coaches** sheet are supplied by IHS Markit; Copyright © IHS

Markit, 2023. The exception is the battery size and chemistries in Figures 1.4 and 2.4, which were derived from manufacturer websites and press releases. Any figure with the heading “city buses” was sourced from Chatrou CME Solutions. All data from the **technology focus on electric road systems** was sourced from project reports and press releases. All countries from the EU-27 Member States, except Bulgaria, are covered here. Data related to city buses exclude Bulgaria, Slovakia, Croatia, Malta, and Cyprus.

The authors would like to thank Patrik Akerman (Siemens) and Jakob Rogstadius (RISE) for their very useful comments on ERS deployment in Europe.

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